Agency Review Draft
Remedial Investigation and Feasibility Study Work Plan

Paine Field Fire Training Pit PFAS Site
Snohomish County Paine Field Airport
Everett, Washington

for
Snohomish County Airport

March 11, 2026

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Ecology Agreed Order No. DE 23771
Paine Field Fire Training Pit PFAS Site
Snohomish County Paine Field Airport
Everett, Washington

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1.0 Introduction and Purpose

Snohomish County (County) entered into Agreed Order (AO) DE 23771 with the Washington State Department of Ecology (Ecology) on December 9, 2025 (Appendix A) to provide remedial actions at Paine Field Fire Training Pit PFAS Site (Site; Cleanup Site ID: 16912 and Facility/Site ID: 49626114) at Snohomish County Paine Field Airport (Paine Field; Airport) in Everett, Washington (Vicinity Map, Figure 1). The Site is impacted by releases of per- and polyfluoroalkyl substances (PFAS) in soil, groundwater and surface water from past Airport operations and emergency response training activities at an area known as the Snohomish County Airport Fire Training Pit (former FTP or FTP). The Site is generally located near the western boundary of the Airport on portions of four contiguous parcels owned by the County and consist of undeveloped areas including wetlands, stormwater detention ponds, and open space adjacent to Airport ramps, taxi lanes, taxiways and runways (Site Plan, Figure 2).

The boundaries of the Site have not been fully delineated and may extend beyond the areas previously described and as shown in the Location Diagram, Exhibit A of the AO. To evaluate the potential extent of PFAS impacts beyond the Airport boundary, this Remedial Investigation proposes investigation activities at select publicly owned parcels downgradient of the Site along Big Gulch Creek. These locations are referred to in this Work Plan as off-property investigation areas and are included solely for the purpose of delineating the lateral and downgradient extent of Site-related contamination. Inclusion of these areas in the RI does not imply that they are part of the MTCA Site or that they represent confirmed sources of contamination.

Under the AO DE 23771, the County is required to:

- Prepare a draft work plan for a RI, conduct an RI, and prepare an Agency Review Draft RI Report and Draft Feasibility Study (FS) for Ecology; all reports will be prepared in accordance with Washington Administrative Code (WAC) 173-340-840.
- Prepare Public Review Draft RI and FS Reports.
- Submit an Agency Review preliminary draft Cleanup Action Plan (DCAP) for the site in accordance with the schedule and terms of the Scope of Work and Schedule (Exhibit B of AO) and all other requirements of the AO.
- Submit quarterly Progress Reports that describe the actions taken during the previous quarter to implement the requirements of the AO, by the tenth (10th) day of the month in which they are due after the effective date of the AO.
- Notify Ecology in writing of a significant change in conditions at the Site, including but not limited to a statistically significant increase in contaminant concentrations in any media, and provide any reports or records relating to the change in conditions within 7 days of learning of the change in condition.
- Submit an Interim Action Work Plan, including a scope of work and schedule; under WAC 173-340-430, an interim action is a remedial action that is technically necessary to:
  - Reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance
  - Correct a problem that may be substantially worse or cost substantially more to address if the remedial action is delayed
  - Provide for completion of a site hazard assessment, remedial investigation/feasibility study or design of a cleanup plan

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The purpose of these requirements, to be completed by the County, are to provide sufficient data, analysis and evaluations to enable Ecology to select a cleanup alternative for the Site that meets requirements in WAC 173-340-360 and is consistent with expectations in WAC 173-340-370.

This remedial investigation and feasibility study work plan (Work Plan) presents the RI activities, including scope and schedule, required to address data gaps and characterize the Site in accordance with Model Toxics Control Act (MTCA); Chapter WAC 173-340), RCW 70A.305.050(1), as a requirement of the AO and in accordance with WAC 173-340-350 and WAC 173-204-560.

1.1 WORK PLAN OBJECTIVES

Objectives for the Work Plan include the following and are in accordance with the AO, Ecology's RI and FS checklists, and WAC 173-340-350 and WAC 173-340-351 for RI and FS to support cleanup action decision making under MTCA.

- Present the scope of work and schedule to complete RI activities
- Present the project management strategy for implementing and documenting RI activities
- Present project personnel involved in conducting the RI, including descriptions of responsibilities and authorities
- Present the Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP), attached as Appendix B
- Identify and submit specific data collection procedures in SAP/QAPP prepared in accordance with WAC 173-340-820 and WAC 173-204-600 for defining the nature and extent of contamination
  - The QAPP will be prepared in accordance with the Guidance for Preparation of Quality Assurance Project Plans, U.S. Environmental Protection Agency (EPA) Region 10, Quality Data Management Program, QA/R-5, requirements of the EPA Contract Laboratory Program, Ecology's Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies. Laboratories must meet the accreditation standards established in WAC 173-50.
- Submit a Health and Safety Plan (HASP), as Appendix C, for the project prepared in accordance with WAC 173-340-810
- Submit an Inadvertent Discovery Plan (IDP), as Appendix D, for the project prepared in accordance with WAC 173-340-815

1.2 WORK PLAN ORGANIZATION

The remaining sections of this Work Plan are organized as follows:

- **Section 2.0 – Site Background and Setting**. Describes the Site background and history, physical setting and features, environmental and geological features and setting, and current and future land use and water use.
- **Section 3.0 – Previous Investigations**. Describes the prior investigations conducted at the Site from pre-2000 to 2025, including results/references to summaries of results and associated cleanup actions.
- **Section 4.0 – Conceptual Site Model.** Describes and presents the preliminary conceptual site model (CSM) developed in accordance with WAC 173-340-200. The CSM describes potential contaminant

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sources and of concern, media of concern, exposure pathways and potential receptors, and contamination fate and transport.

- **Section 5.0 – Preliminary Cleanup Levels.** Presents the preliminary cleanup levels (PCULs) presented in Ecology's CLARC data tables and methods presented in Ecology's Guidance for PFAS Investigations and Remediation (Ecology 2023) as the screening levels to evaluate RI data.
- **Section 6.0 – Identification of Data Gaps.** Identifies and describes the data gaps remaining from prior investigations to be assessed in this RI to support cleanup actions under MTCA.
- **Section 7.0 – Remedial Investigation.** Describes the planned RI activities to assess identified data gaps and associated RI objectives in accordance with the AO, Ecology's RI checklist and WAC 173-340-350.
- **Section 8.0 – Terrestrial Ecological Evaluation.** Describes the planned terrestrial ecological evaluation activities to be conducted as a part of the RI in accordance with MTCA and WAC 173-340-7490.
- **Section 9.0 – Feasibility Study.** Describes the major steps to complete an FS for the Site, in accordance with Ecology's FS checklist and WAC 173-340-351, including but not limited to, identifying cleanup objectives and alternatives.
- **Section 10.0 – Data Evaluation and Reporting.** Describes how RI and FS data will be evaluated consistent with WAC 173-340-350 and 173-340-351; describes how reporting will be submitted in accordance with WAC 173-340-840.
- **Section 11.0 – Schedule of Work.** Presents the schedule for RI and FS activities.
- **Section 12.0 – Limitations.**
- **Section 13.0 – References.**

2.0 Site Background and Setting

The Site is located at Snohomish County Paine Field Airport in Everett, Washington at an elevation of approximately 600 feet above mean sea level (msl). The Site, as defined under the AO with Ecology, encompasses the former firefighting training pit (FTP) area and associated on-Airport properties under Snohomish County ownership and control. Surface topography in the vicinity of the Site is relatively flat, with localized depressions in wetland and drainage areas. The Site is primarily developed with Airport buildings, runways and taxiways, paved parking, roads and landscaped areas, as shown in Figure 2.

The Site was historically used as a firefighting training site for Paine Field and other local fire departments. Activities at the Site included ignition of flammable materials including petroleum hydrocarbons inside a pit in the ground which were extinguished using Aqueous Film Forming Foam (AFFF) containing PFAS. The approximate location of the former FTP is shown on Figures 2 and 3. Prior investigations completed at the Site between 1989 and 2006 identified total petroleum hydrocarbons (TPH) and lead in soil. Remedial actions were completed at the former FTP in 2006 to address TPH and lead in soil at concentrations greater than the applicable Ecology MTCA cleanup levels (CULs); the Snohomish County Airport Fire Pit Site (Cleanup Site ID: 3234; Facility/Site ID: 49626114) received a No Further Action (NFA) determination from Ecology in 2007.

Subsequent investigations completed at the Site by Shannon & Wilson in 2018, 2022 and 2023 identified PFAS in soil and groundwater within the Site and in areas hydraulically downgradient of the Site (Tables 1

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through 3). An in-situ pilot study was conducted by the Airport between 2023 and 2026 to evaluate the treatability of PFAS-impacted soil (Regenesis 2023). The pilot study included the application of in-situ remediation products and installation of lysimeters to sample porewater to evaluate the effectiveness of the treatment (see Figure 3). The treatment study is ongoing at the Site and included sampling events in 2024, 2025 and early 2026. Supplemental environmental investigations were completed at the Site in 2024 and 2025 by GeoEngineers to assess and document groundwater conditions and flow direction (Table 4), further evaluate the extent of PFAS in soil and groundwater (Tables 5 and 6), and evaluate surface water conditions in adjacent wetlands, the stormwater detention pond and groundwater seeps located in proximity to the former FTP (Tables 6 and 7).

The Site is listed by Ecology as the Paine Field Fire Training Pit PFAS (Cleanup Site ID: 16912; Facility/Site ID: 49626114) with the status listed as "awaiting cleanup." This RI is being conducted in accordance with the AO to characterize the nature and extent of contamination originating from the Site, including evaluation of potential PFAS migration off Airport property.

2.1 LOCATION AND PROPERTY DESCRIPTION

The Site is located in Everett, Washington, along the western boundary of Snohomish County Paine Field Airport, east of Mukilteo Speedway and north of Bernie Webber Drive (Figure 2). Explorations proposed in this Work Plan include locations on Airport property, as well as locations west of Mukilteo Speedway that are off Airport Property and within the city limits of Mukilteo. References to off-property investigation areas in this Work Plan are intended solely to support delineation of the extent of contamination originating from locations on Airport property and do not constitute a determination of Site boundaries, ownership or liability. The majority of the Site is situated on an elevated plateau constructed through placement of fill during historical airport runway development. Taxi Lane K-6 is located along the eastern portion of the Site, and private aircraft hangars are located along the southern boundary.

A steep slope along the western edge of the Site descends to a stormwater detention pond located adjacent to Mukilteo Speedway. This pond receives stormwater from portions of the Site and other areas of the Airport and discharges to Big Gulch Creek. Big Gulch Creek flows generally northwest of the Site and represents a potential downgradient migration pathway for Site-related contaminants.

The southern portion of the Site generally consists of a grass-covered field that gently slopes toward the west. The northern portion of the Site is heavily vegetated and includes several wetlands, seasonal ponds and drainage features that drain toward the northwest. An approximately 20-foot-tall triangular soil mound is located northeast of the former FTP, constructed using fill material generated during airport construction activities.

2.2 ENVIRONMENTAL AND GEOLOGIC SETTING

Soil conditions encountered at the Site generally consist of fill overlying native glacial till. The fill is comprised of a mixture of sand and silt, with varying amounts of gravel, emplaced during historical grading and construction associated with development of Paine Field and associated Airport infrastructure. The fill ranges in thickness from approximately 4 feet near the northern end of the Site at boring FP-MW13 to approximately 20 feet near the central portion of the Site near the former FTP. The fill at the Site overlies glacial till and outwash comprised of dense to very dense sand with interbedded silt and varying amounts of gravel. The upper portion of the till (generally 5 to 10 feet) is weathered and less dense than the underlying, unweathered till. This stratigraphy is consistent with regional geologic conditions mapped for

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the Paine Field area (Washington Division of Geology and Earth Resources, 2005). Soil boring logs from GeoEngineers 2024 and 2025 investigations are included in Appendix E.

Groundwater at the Site occurs within the fill and the upper portion of the weathered till. Groundwater was encountered in borings FP-MW7 through FP-MW13 and in borings FP-MW14 through FP-MW20 during investigations conducted in 2024 and 2025 (Table 4). Observed groundwater elevations indicate that shallow groundwater is laterally discontinuous and responsive to seasonal variations in recharge. The groundwater flow direction is inferred to be generally toward the southwest across the central portion of the Site, becoming westerly near the western end of the former FTP based on 2025 groundwater monitoring results. Shallow groundwater originating from the area near the former FTP is inferred to discharge along the western slope and enter the stormwater detention pond at the base of the slope, as observed during prior investigations.

A deeper, regional aquifer is interpreted to be present within advance outwash deposits beneath the Airport and vicinity at depths of greater than 130 feet below ground surface (bgs) with a regional groundwater flow direction toward the north (CDM 2000). This deeper groundwater system corresponds to the regional aquifer described herein and is inferred to be hydraulically separated from the shallow perched groundwater by intervening low-permeability glacial till. Based on the interpreted stratigraphy and perched nature of the shallow groundwater, the regional aquifer is not expected to be impacted by Site-related contamination; however, confirmation of hydraulic separation will be informed by the proposed deep monitoring well installation.

Surface water at the Site includes several wetlands located at the northern portion of the Site identified by the Airport as Wetlands 16, 17 and 19. Surface water in the wetlands generally flows to the north and west, moving through open channels and into Wetland 17 near the northwestern corner of the Site before discharging to the stormwater conveyance system beneath Mukilteo Speedway near the northwestern corner of the Site and into Big Gulch Creek (Figure 2). Surface water is present at the stormwater detention pond located at the western end of the Site, which receives stormwater from the western portion of the Airport, as discussed below. Surface water is present seasonally in a stormwater drainage ditch located south of the Former Historic Flight Building (see Figure 2).

2.3 STORMWATER INFRASTRUCTURE

Stormwater utility infrastructure at the Site includes enclosed pipes, catch basins and the stormwater detention pond located at the base of the slope west of the Former FTP (see Figure 2). The stormwater detention pond receives outfall from enclosed pipes and open channels on the western side of the Airport that collect stormwater from the undeveloped fields surrounding the former FTP and soil mound, Taxiway K-6, and additional infrastructure on the western side of the Airport. The stormwater detention pond discharges into Big Gulch Creek through a culvert located beneath Mukilteo Speedway. Stormwater originating from other wetlands located south of the Site is conveyed through an isolated utility pipe that flows directly to Big Gulch Creek and does not enter the stormwater detention pond. Big Gulch Creek receives stormwater and shallow groundwater discharge from the Site, flowing north and west through Mukilteo and discharging to Puget Sound approximately 2 miles downstream to the west from the stormwater detention pond.

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2.4 HISTORICAL, CURRENT AND FUTURE USES

The Airport was originally constructed in 1936, and from approximately 1941 to 1946, the Airport served as a location for the U.S. Army Air Corps. From approximately 1951 through the mid-1960s, the Airport operated as Paine Air Force Base supporting various U.S. Air Force units. In 1966, military operations largely ceased, and portions of the Airport were subsequently redeveloped, including the construction of a Boeing Company aircraft assembly plant north of the Airport, with some facilities extending onto Airport property.

The Site was historically used by the Airport and other local fire departments for firefighting training activities that included burning petroleum and other flammable materials in a pit (i.e., the former FTP) and extinguishing the flames with PFAS-containing AFFF (CDM 2007). The Paine Field Fire Department also conducted Federal Aviation Administration (FAA) mandated annual calibration and compliance testing by spraying AFFF on the ground near the soil mound (see Figure 2). These testing practices were modified in June 2019 after acquisition of a closed-loop testing system that does not discharge AFFF to the ground during training activities.

The Site is currently owned by Snohomish County and used by Paine Field Airport as a commercial and general aviation facility. Developments at the Site consist primarily of Airport buildings, runways and taxiways, paved parking areas, roadways, and landscaped or undeveloped fields. The Site is zoned for light industrial use. No residential land uses are present within the Site, and access to the Site is limited to authorized airport personnel.

Future land use of the Site is expected to remain consistent with current airport and light industrial uses. Areas located downgradient of the Site and off Airport property along Big Gulch Creek include a mix of public and privately owned parcels used for transportation infrastructure, open space, residential and wetlands. Current and reasonably anticipated future uses of off-property investigation areas include surface water conveyance, ecological habitat, and passive recreational or utility corridor functions. No changes to land use in these areas that would alter exposure assumptions have been identified at this time.

3.0 Previous Investigations

Environmental investigations have been conducted at the Site since the 1980s, beginning with the investigation and cleanup of petroleum hydrocarbon contamination at the former FTP. Recent investigations have focused on characterizing the nature and extent of PFAS impacts in soil, groundwater, surface water and stormwater conveyance features associated with the Site.

The following provides a brief overview of environmental investigations completed at the Site.

- **Early Environmental Investigations** (Pre-2000): Initial studies at the Site in the late 1980s and 1990s identified petroleum hydrocarbons and metals in soil and surface water at the former FTP. These investigations established the presence of historical petroleum hydrocarbon contamination associated with firefighting training activities at the Site and prompted subsequent remedial actions.
- **FTP Soil Remediation** (CDM 2007): In 2006, approximately 170 cubic yards (cy) of petroleum- and lead-impacted soil were excavated from the FTP and disposed off-property. The area was backfilled with clean soil and Ecology issued an NFA determination in 2007 (Ecology 2007). PFAS were not evaluated as part of this remedial action.

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- **PFAS Investigation** (CDM 2018): Subsequent investigations identified PFAS in soil and groundwater near the FTP. The most frequently detected compounds were PFOA, PFOS, PFNA and PFHxS. These findings identified PFAS as contaminants of concern and initiated focused PFAS investigation activities at the Site.
- **Supplemental PFAS Investigation** (SWI 2023): Additional investigations in 2022 to 2023 further characterized PFAS impacts to soil and groundwater at the Site. These investigations expanded the understanding of lateral and vertical PFAS distribution near source areas but did not fully delineate the extent of PFAS.
- **Summary Report for SourceStop® Treatment** (Regenesis 2023, 2024, 2025): A pilot study was conducted by the Airport to evaluate soil treatment technologies using powdered activated carbon to test PFAS sequestration in the FTP source area. Post-treatment sampling through early 2024 showed greater than 99 percent reductions of PFAS leaching in soil and measurable decreases in porewater and groundwater concentrations of total PFAS. Long-term performance monitoring is ongoing, and the effectiveness of this technology over extended timeframes remains under evaluation.
- **Data Gaps Investigation** (GeoEngineers 2024): GeoEngineers completed a Data Gaps Investigation in 2024 that included the collection and chemical analysis of soil, groundwater and surface water samples. The objectives of the investigation were to document the extent of PFAS detected in soil and groundwater during previous investigations at the Site, assess and document groundwater conditions and flow direction, and evaluate surface water conditions in adjacent wetlands, the stormwater detention pond and groundwater seeps located west of the former FTP. Sample locations for soil borings, monitoring wells and surface water samples are shown in Figure 4 and included the following:
  - Ten soil borings (FP-B1 through FP-B3, and FP-MW7 through FP-MW13) to assess lateral and vertical extent of PFAS.
  - Seven groundwater monitoring wells (FP-MW7 through FP-MW13) to assess groundwater conditions in areas that had not been previously evaluated.
  - Five surface water samples (FP-SW1 through FP-SW5) in the wetlands north of the former FTP to evaluate conditions of surface water in the wetland area.
  - One groundwater seep sample (FP-SEEP) collected where groundwater was observed discharging from the slope west of the stormwater detention pond to evaluate conditions in surface water.
- **Supplemental Data Gaps Investigation** (GeoEngineers 2025): GeoEngineers completed a Supplemental Data Gaps Investigation in June 2025 that included the collection and chemical analysis of soil, groundwater surface water, and stormwater conveyance system catch basin water and solids samples. The objectives of the investigation were to further document the extent of PFAS detected in soil and groundwater at concentrations greater than preliminary cleanup levels (PCULs; see Section 5.0), the extent of PFAS in surface water, including in adjacent wetlands and the stormwater detention pond located west of the former FTP, and assess and evaluate the presence of PFAS in solids and water within the stormwater conveyance system. PFAS was detected in soil, groundwater, surface water, and catch basin water and solids at concentrations greater than the PCULs. Sample locations for soil borings, monitoring wells, surface water, and catch basin water and solids are shown in Figure 4 and included the following:
  - Seven soil borings (FP-MW14 through FP-MW20) to assess and document lateral and vertical extent of PFAS in soil.

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- Seven groundwater monitoring wells were installed (FP-MW14 through FP-MW20) to assess groundwater conditions in areas that had not been previously evaluated.
- Four surface water samples (FP-SW2, FP-SW6, FP-SW7 and FP-SW8) collected from stormwater detention pond and within Wetland 19 area.
- Five stormwater catch basin water samples (FP-CB1 through FP-CB4 and FP-CB6) and two catch basin solids samples (FP-CB4 and FP-CB5) collected along the access road north of Wetland 19 and south of the stormwater detention pond.

Analytical results from these investigations identified PFAS in soil, groundwater, surface water and stormwater infrastructure at concentrations exceeding PCULs (summarized in Tables 1 through 7). While the investigations significantly advanced understanding of on-Site source areas and transport mechanisms, data gaps remain regarding the downgradient extent of PFAS impacts in surface water, shallow groundwater and associated sediments beyond the Site boundary. Addressing these data gaps is a primary objective of the RI.

4.0 Conceptual Site Model (CSM)

This section presents the preliminary Conceptual Site Model (CSM) for the Site, which integrates existing site information to describe contaminant sources, contaminants and media of concern, potential exposure pathways and receptors, and discussion of contaminant fate and transport. The preliminary CSM provides the framework for identifying key data gaps described in Section 6 and designing the Remedial Investigation described in Section 7.

4.1 POTENTIAL CONTAMINANT SOURCES

Potential sources of contamination associated with historical operations at the Site were identified during previous environmental investigations. PFAS-containing AFFF released to the soil at the former FTP during historical fire training exercises migrated through the unsaturated zone and into the water table, migrating toward the west with the prevailing groundwater flow direction. Releases of AFFF along the K-6 Taxiway during annual fire truck calibration and FAA compliance testing activities impacted the soil mound and surrounding grass field (see Figure 2), and surface runoff in areas adjacent to the former FTP resulted in PFAS-impacted soil in the vicinity of the soil mound and in soil and surface water in the north-adjacent wetland area. Additionally, surface runoff in areas adjacent to the former FTP may have resulted in residual AFFF-impacted solids in the stormwater conveyance system. Residual AFFF-impacted solids remaining in the stormwater conveyance system may be a secondary PFAS source. Releases of AFFF in this area stopped in June 2019 when truck system testing and FAA calibration methods were changed to a non-discharging system.

4.2 POTENTIAL CONTAMINANTS OF CONCERN

The proposed contaminants of concern (COCs) include potentially hazardous or toxic compounds which have a history of use at the former FTP, or which were detected in environmental media during previous environmental investigations. Based on the findings of prior investigations, the proposed COCs for the Site are PFAS compounds, and the media of concern is soil, groundwater and surface water. The RI will target the 40 PFAS compounds validated for analysis using EPA Method 1633A, which includes the

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10 PFAS compounds regulated by Ecology and 30 additional PFAS compounds. Chemical analytical results from prior PFAS investigations are presented in Tables 1 through 7.

4.3 MEDIA OF CONCERN

PFAS concentrations exceeding applicable PCULs have been documented in soil, surface water and groundwater at the Site. These media are identified as primary media of concern.

In addition, sedimentary materials may be present within the receiving environment at Big Gulch Creek and have been documented within the Site's stormwater conveyance infrastructure. Washington Sediment Management Standards (SMS) (WAC 173-204-200) define sediment as settled particulate matter located below the Ordinary High Water Mark (OHWM) within surface waters of the state. Materials located landward (above) the OHWM are not regulated as sediment under WAC 173-204 and are instead considered soil under MTCA (WAC 173-340), even if periodically inundated.

For purposes of this investigation, these materials are collectively categorized as Sediment and Accumulated Solids, with the following distinctions:

- Creek sediment represents depositional material located below the OHWM within Big Gulch Creek and within the receiving surface water body. These sediments may serve as a long-term reservoir for PFAS subject to ecological exposure, resuspension and downstream transport.
- Stormwater detention pond sediment represents accumulated material within engineered stormwater management facilities. Where these materials occur below a defined OHWM within a surface water of the state, they may meet the SMS definition of sediment; however, where located within constructed upland stormwater infrastructure without an OHWM, they are considered accumulated solids or soil for regulatory purposes. Stormwater detention pond contents consists of accumulated material within engineered stormwater management facilities designed to attenuate flow and promote settling of suspended solids. These solids may represent an intermediate storage zone for PFAS mobilized from upland source areas prior to discharge to downgradient surface water.
- Wetland sediment represents organic-rich depositional material located below the OHWM within jurisdictional wetland areas hydraulically connected to surface waters of the state and may therefore meet the SMS definition of sediment where applicable. Wetland sediments may function as both a sink and a potential secondary source depending on hydrologic conditions.
- Catch basin solids consist of accumulated particulate material within the stormwater conveyance system (e.g., manholes and catch basins) located above the OHWM and therefore do not meet the regulatory definition of sediment under WAC 173-204. These materials are regulated as solid waste or soil, as applicable. These materials are considered a potential source reservoir of residual PFAS-containing AFFF and may contribute to ongoing PFAS mobilization to surface water systems.

Although sediment-specific PFAS criteria have not been promulgated under MTCA or the Washington SMS, these sedimentary media will be evaluated to refine the CSM, assess potential ecological exposure pathways, and characterize source strength and transport mechanisms.

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4.4 EXPOSURE PATHWAYS AND POTENTIAL RECEPTORS

Based on current site conditions and the CSM, potential current and future exposure pathways include:

- Direct contact with soil, including incidental ingestion and dermal contact by workers or the public.
- Inhalation of particulates generated from disturbed soil during construction or maintenance activities.
- Ingestion of and dermal contact with groundwater or surface water, including exposure during construction dewatering, maintenance activities or recreational contact, if applicable.
- Migration of PFAS via stormwater runoff, resulting in transport to surface water, wetlands or sediment.
- Ecological uptake from sediment and surface water, including bioaccumulation within aquatic and terrestrial food webs.
- Potential leaching from soil or accumulated solids to groundwater, resulting in downgradient transport.

Current and future receptors that may potentially be exposed to chemicals originating from the Site include:

- Commercial, industrial and construction workers, including utility and stormwater system maintenance personnel.
- The general public, including nearby residents and site visitors, with consideration of potentially vulnerable or overburdened communities.
- Aquatic organisms, including benthic invertebrates and fish within the creek.
- Wetland-dependent species, including amphibians and invertebrates.
- Terrestrial plants and wildlife, including soil invertebrates and higher trophic-level receptors that may experience dietary exposure through bioaccumulation.

4.5 CONTAMINANT FATE AND TRANSPORT

The fate and transport of PFAS at the Site are influenced by historical AFFF release locations, subsurface geology and hydrogeology, surface water hydrology and the stormwater conveyance system. Based on investigations conducted to date, PFAS released at the Site migrated through soil to groundwater and were transported via groundwater flow and stormwater infrastructure to downgradient surface water features, including the stormwater detention pond, wetlands and potentially off-property receiving waters. Figure 5 is a cross section depicting known PFAS impacts in soil and groundwater at the Site, groundwater flow and groundwater discharge to surface water.

The subsections below summarize the current understanding of PFAS fate and transport associated with the primary historical release areas. The RI will further evaluate and refine these mechanisms.

In addition to evaluating the extent of PFAS impacts in environmental media, select targeted analytical techniques may be applied to a limited subset of samples to further assess plume stability, potential precursor contributions, and downgradient commingling of PFAS from multiple source areas. These analyses are intended to refine the CSM and support the evaluation of long-term transport mechanisms and potential remedial technologies.

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4.5.1.1 FORMER FIRE TRAINING PIT AREA

Historical AFFF releases to soil at the former FTP migrated vertically through the vadose zone to groundwater and were transported laterally via advective groundwater flow toward the west with the prevailing groundwater gradient. Where the water table intersects surface expressions, groundwater discharge may contribute PFAS to surface water and sediment. Surface water within the stormwater detention pond receives inputs from both groundwater discharge and stormwater conveyance lines. PFAS transported in groundwater and stormwater are inferred to migrate westward. Residual PFAS in soil within the former FTP source area may continue to leach to groundwater.

4.5.1.2 HISTORICAL FIRE TRUCK CALIBRATION AND FAA COMPLIANCE TESTING

Annual mobile fire suppression system calibration and compliance testing activities resulted in AFFF releases to the ground surface east of the former FTP. PFAS migrated vertically through soil to groundwater and were transported downgradient to the west. AFFF discharged during testing activities may have been transported by aerial dispersion and deposition to adjacent paved areas and wetlands. Subsequent precipitation events likely mobilized deposited PFAS into surface water and shallow subsurface media and near-by stormwater catch basins. Stormwater conveyance lines in this area are a potential pathway for PFAS to enter the stormwater detention pond and downgradient receiving waters. PFAS contributions from the former FTP and the historical calibration area overlap within downgradient groundwater, stormwater infrastructure and receiving surface water features.

5.0 Preliminary Cleanup Levels (PCULs)

The PCULs presented in this Work Plan are based on the currently available regulatory guidance with the understanding that regulations for an emerging contaminant group such as PFAS can create a challenge for evaluating data over the course of a project lifetime. Given the evolving regulatory framework for PFAS, the PCULs presented in this Work Plan are subject to refinement as additional guidance or regulations are issued by Ecology. The PCULs used for this RI were developed by Ecology using Ecology's Cleanup Levels and Risk Calculation (CLARC) spreadsheet updated February 2026 (CLARC 2026). Ecology has provided a PCUL spreadsheet for use during the RI that is included as Appendix F.

Soil and groundwater PCULs for 10 PFAS compounds (PFOA, PFOS, PFNA, PFHxS, PFBS, PFBA, PFHxA, HFPO-DA, PFDA and 6:2 FTS) are used to evaluate the impacts at the subject property in the RI. These 10 compounds have Ecology-established PCULs at the time of Work Plan preparation; other PFAS compounds will be evaluated qualitatively in the context of data trends, analytical uncertainty and emerging regulatory considerations. Soil and groundwater PCULs are based on MTCA Method B protection of potable groundwater values. The PCULs for surface water are based on the groundwater to surface water pathway for protection of freshwater receptors, consistent with the CLARC framework.

Stormwater utility media (solids and water) do not have specified cleanup standards. Stormwater utility solids samples are compared to the sediment PCUL for PFOS for fresh surface water, as directed by Ecology, which is based on the direct contact pathway.

In addition to individual compound comparisons, the established Hazard Index will be used to evaluate the potential for cumulative non-cancer health risk from multiple PFAS compounds. A Hazard Index value of

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one is commonly used as a threshold for potential concern. While individual PFAS compounds are compared to their respective PCULs, the Hazard Index provides an additional risk-based evaluation of additive risks from multiple chemicals of concern.

PCULs for soil are shown in Tables 1, 2 and 5; PCULs for groundwater and surface water are shown in Tables 1, 3 and 6, and the freshwater sediment PCUL used for stormwater utility solids is shown in Table 7. These tables summarize data from prior investigations conducted by GeoEngineers and incorporate PCULs applied in the 2025 Supplemental Data Gaps Investigation. The PCUL framework applied in this Work Plan is consistent with the updated CLARC methodology described above.

6.0 Identification of Data Gaps

This section identifies data gaps which are the basis for the RI field program described in Section 7.0.

1. **Extent of PFAS Greater than PCULs in Soil**. The lateral and vertical extent of PFAS in soil has not been delineated at the Site based on the results of investigations completed to date.
2. **Extent of PFAS Greater than PCULs in Groundwater**. The extent of PFAS in groundwater to the southwest of FP-MW14 and at locations off-Airport Property has not been evaluated. The presence of deeper groundwater within the glacial till and potential presence of PFAS in deeper groundwater has not been evaluated.
3. **Extent of PFAS Greater than PCULs in Surface Water**. The extent of PFAS in surface water at locations off-Airport Property has not been evaluated.
4. **Extent of PFAS Greater than PCULs in Stormwater Conveyance System**. The extent of PFAS in Airport stormwater conveyance system solids and water has not been determined.
5. **Source Differentiation and Plume Stability.** The potential for downgradient commingling of PFAS from the former FTP area with other upgradient or adjacent sources has not been evaluated, and uncertainties remain regarding plume stability and precursor contributions in groundwater.

7.0 Remedial Investigation

The RI will be conducted in accordance with the AO to determine the nature and extent of contamination at the Site exceeding PCULs and to address the data gaps identified in Section 6.0. The RI is designed to further refine the CSM, delineate the horizontal and vertical extent of PFAS impacts across identified media of concern, and generate data needed to support the feasibility study and selection of cleanup actions.

The RI will be implemented using the phased investigation approach described below to efficiently evaluate the first phase of data and provide for conditional “step-out” sampling, if needed, to define the extents of the Site. This phased approach provides a structured and predictable framework for delineation while maintaining flexibility to address site-specific conditions encountered during field implementation. Detailed field methods, analytical requirements, and quality assurance procedures are presented in the combined Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP) included as Appendix B.

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7.1 SITE RECONNAISANCE

A Site Reconnaissance was conducted on February 18, 2026 to confirm site conditions and confirm the feasibility of the proposed sampling and drilling locations. The reconnaissance included:

- Verification of access routes and staging areas for drilling and sampling activities;
- Confirmation of proposed sampling locations and identification of any necessary field adjustments;
- Inspection of stormwater conveyance infrastructure to identify suitable catch basins for solids and water sampling;
- Evaluation of access and safety conditions at proposed surface water and sediment sampling locations, including Big Gulch Creek and wetland areas;
- Identification of utility conflicts and coordination requirements with Airport operations and adjacent property owners.

Findings from the reconnaissance were used to develop the proposed sampling locations and support logistical planning prior to RI sampling.

7.2 PHASED INVESTIGATION APPROACH

The RI will be implemented using a phased approach to efficiently delineate the nature and extent of PFAS contamination at the Site and address the data gaps identified in Section 6.0. This approach is designed to confirm preliminary extent boundaries, refine the conceptual site model (CSM), and allow for adaptive "step-out" sampling where necessary to achieve RI objectives. The initial phase of sampling is identified herein as Tier 1, which will be followed by sampling at Tier 2 locations, as warranted and described below. Tier 1 and Tier 2 sampling locations are shown Figure 6. Tier 1 locations include both existing and new monitoring wells, surface water locations or catch basins that were sampled during prior investigations. Locations with a green "halo" are new monitoring wells or other sampling locations that have not been previously sampled. Tier 2 locations are proposed to be sampled, if needed, based on the results of Tier 1 sampling.

7.2.1 Tier 1 Investigation

Tier 1 sampling is designed to evaluate known and suspected source areas and primary migration pathways, and to assess whether PFAS concentrations exceed PCULs at the proposed exploration locations. Tier 1 locations were selected to address the data gaps presented in Section 6.0 and are based on the current understanding of the Site CSM. The Tier 1 sampling results will be evaluated to determine whether the extent of PFAS at concentrations greater than the PCULs has been delineated and whether additional sampling is required.

7.2.2 Tier 2 Investigation (Conditional Step-Out)

If Tier 1 analytical results indicate that PFAS concentrations exceed PCULs at the proposed exploration locations, sampling will be completed at the proposed Tier 2 locations to further delineate the extent of contamination. The proposed Tier 2 sampling locations are positioned hydraulically downgradient or at greater depths relative to Tier 1 exploration locations/depths.

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Tier 2 activities may include additional soil borings, monitoring well installations, sediment sampling locations, stormwater catch basins or surface water sampling points not shown in Figure 6, if needed, to further characterize the Site and complete the RI. The need for Tier 2 implementation will be evaluated based on Tier 1 results and conducted in consultation with Ecology to ensure that RI objectives are efficiently achieved.

7.3 QUARTERLY GROUNDWATER MONITORING

Groundwater samples will be collected on a quarterly basis from the newly installed monitoring wells and up to 16 existing monitoring wells (for a total of up to 24 groundwater samples). The first quarterly groundwater sampling event (Q1) will be completed in two phases.

- The first phase of Q1 groundwater monitoring will include sampling of up to 16 existing monitoring wells plus the monitoring wells installed during Tier 1 of RI drilling.
- The second phase of Q1 groundwater monitoring will only include sampling of monitoring wells installed during Tier 2 of RI drilling.

Following the initial two phases of the first quarterly groundwater sampling event, up to 24 select monitoring wells will be sampled during the second (Q2), third (Q3) and fourth (Q4) quarterly RI groundwater monitoring events. Each monitoring event will include survey of groundwater elevations in monitoring wells.

7.4 FIELD EXPLORATIONS AND SAMPLING

The RI field program will be conducted to delineate the nature and extent of PFAS contamination across identified media of concern and address the data gaps described in Section 6.0. Field activities will be implemented in accordance with the combined Sampling and Analysis Plan and Quality Assurance Project Plan (SAP/QAPP) provided in Appendix B. PFAS-specific sampling protocols will be followed during all field activities. Health and safety requirements are provided in Appendix C, and procedures for inadvertent discovery of cultural resources are provided in Appendix D.

Field investigations will be conducted across three primary areas: the former FTP Area, the wetlands located north of the former FTP, and the area west of Mukilteo Speedway. Activities across these areas will include installation of monitoring wells, groundwater monitoring, collection of soil, surface water, sediment and stormwater infrastructure samples, and elevation surveying to support groundwater flow interpretation. Area-specific objectives and sampling details are provided in the subsections below.

7.4.1 Former FTP Area

The Former FTP Area represents a primary historical source area of PFAS associated with legacy AFFF use. Investigation activities in this area are designed to address Data Gaps 1 through 4 and to further delineate the vertical and lateral extent of PFAS in soil, groundwater, surface water, and stormwater infrastructure media within and downgradient of the former FTP footprint.

The proposed investigation focuses on:

- Evaluating vertical PFAS distribution in soil and deeper groundwater within the former FTP footprint (Data Gaps 1 and 2);

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- Assessing lateral migration in groundwater through existing and newly installed monitoring wells (Data Gap 2);
- Characterizing PFAS in surface water within the stormwater detention pond (Data Gap 3); and
- Evaluating migration pathways through the stormwater conveyance system, including catch basin solids and associated surface water features (Data Gap 4).

Specific sampling locations, media, depth intervals and extent objectives are summarized below. These locations are intended to evaluate whether PFAS concentrations exceed PCULs at interpreted vertical and lateral boundary conditions and along identified migration pathways. All samples included in the former FTP are part of the Tier 1 investigation and are not considered contingent.

FORMER FTP AREA PROPOSED EXPLORATIONS

PROPOSED EXPLORATIONS	LOCATION	SAMPLE MEDIA	DEPTH/INTERVAL	EXTENT OBJECTIVE	DATA GAP(S)
FP-MW4, FP-MW8, FP-MW10, FP-MW13 through FP-MW20	FTP footprint at existing and select wells in source area	Groundwater	Various well screen depths	Lateral delineation and migration pathway evaluation	2
FP-MW21	FTP footprint	Groundwater	Screened in saturated zone within glacial till or outwash (~100 to 120 ft bgs)	Vertical delineation and migration pathway evaluation	1 2
		Soil	At water table and base of boring		
FP-SW2	Stormwater detention pond	Surface Water	Grab sample	Source characterization and migration pathway evaluation	3
FP-CB10	FTP footprint	Catch Basin Solids	Catch basin outfall to surface wetland	Migration pathway evaluation	4
FP-SEEP	Slope leading to stormwater detention pond	Surface water	Grab sample	Source characterization and migration pathway evaluation	3

7.4.2 Wetlands Area North of Former FTP

The wetlands located north of the former FTP represent a potential downgradient receptor area and secondary migration pathway for PFAS transported via surface water, shallow groundwater discharge, and stormwater infrastructure. Investigation activities in this area are designed to address Data Gaps 1, 3 and 4 and to evaluate the presence and extent of PFAS in wetland surface water, shallow soil, and stormwater conveyance media.

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The proposed investigation focuses on:

- Assessing PFAS concentrations in wetland surface water and shallow soil to evaluate potential migration from the former FTP footprint (Data Gaps 1 and 3);
- Characterizing PFAS within stormwater conveyance infrastructure that may discharge to the wetland (Data Gap 4); and
- Evaluating potential source-to-receptor transport pathways between the former FTP area and adjacent wetland features.

Specific sampling locations, media, depth intervals and extent objectives are summarized below.

WETLANDS AREA NORTH OF FTP PROPOSED EXPLORATIONS

PROPOSED EXPLORATIONS	LOCATION	SAMPLE MEDIA	DEPTH/INTERVAL	EXTENT OBJECTIVE	DATA GAP(S)
FP-CB4 and FP-CB11	Airport access road north of the wetlands	Catch basin surveyance water	Grab sample	Source characterization and migration pathway evaluation	4
		Catch basin solids	Grab sample		
FP-SW9	On property wetlands northwest of well FP-MW19	Surface water	Grab sample	Migration pathway evaluation	1 3
		Soil	Hand auger 0-0.5 ft, 1-2 ft bgs		
FP-SW10	On property wetlands north of well FP-MW19	Surface water	Grab sample	Migration pathway evaluation	1 3
		Soil	Hand auger 0-0.5 ft, 1-2 ft bgs		

7.4.3 Area West of Mukilteo Speedway

PFAS impacts originating from the Site may have been transported off Airport property to the west via groundwater flow, surface water discharge, and stormwater conveyance. Investigation activities in this area are designed to address Data Gaps 1 through 4 and to delineate the horizontal and vertical extent of PFAS impacts in soil, groundwater, surface water and stormwater media beyond the Airport property boundary.

The proposed investigation focuses on:

- Evaluating the vertical and lateral extent of PFAS in groundwater and soil west of the former FTP;
- Assessing PFAS concentrations in Big Gulch Creek surface water and adjacent shallow soils; and
- Characterizing PFAS within stormwater conveyance infrastructure along the western property boundary to evaluate potential migration pathways to downgradient receptors.

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Sampling locations, media, depth intervals and extent objectives for the Tier 1 investigation are summarized below. These locations are intended to evaluate whether PFAS concentrations exceed PCULs at interpreted lateral and vertical extent boundaries and along identified downgradient migration pathways.

TIER 1 PROPOSED EXPLORATIONS WEST OF MUKILTEO SPEEDWAY

PROPOSED EXPLORATIONS	LOCATION	SAMPLE MEDIA	DEPTH/INTERVAL	EXTENT OBJECTIVE	DATA GAP(S)
FP-MW22 through FP-MW25	West of Wetland 19 (FP-MW22), west of FTP plume (FP-MW23), southwest of FTP (FP-MW24), and south of FTP (FP-MW25).	Groundwater	Various depths (~20 to 50 ft bgs)	Lateral and vertical delineation	1 2
		Soil	Above water table, within water table, and base of boring.		
FP-SW11 and FP-SW12	Along south branch of Big Gulch Creek	Surface water	Grab sample	Lateral delineation and migration pathway evaluation	3
FP-GEI-5 and FP-GEI-6	Co-located with FP-SW11 and FP-SW12	Soil	Hand auger 0-0.5 ft and 1-2 ft bgs	Lateral and vertical delineation	1

If Tier 1 analytical results indicate that PFAS concentrations exceed PCULs at proposed extent locations, additional delineation will be conducted through Tier 2 step-out sampling as summarized below.

TIER 2 PROPOSED EXPLORATIONS WEST OF MUKILTEO SPEEDWAY

PROPOSED EXPLORATIONS	LOCATION	SAMPLE MEDIA	DEPTH/INTERVAL	EXTENT OBJECTIVE	DATA GAP(S)
FP-MW26 through FP-MW28	Downgradient of FP-MW-22 FP-MW23, and FP-MW24, respectively.	Groundwater	Various depths (~15 to 40 ft bgs)	Lateral and vertical delineation	1 2
		Soil	Above water table, within water table, and base of boring.		
FP-SW13	Along north branch of Big Gulch Creek	Surface water	Grab sample	Lateral delineation and migration pathway evaluation	3
FP-GEI-7	Collocated with FP-SW13	Soil	Hand auger 0-0.5 ft and 1-2 ft bgs	Lateral and vertical delineation	1
FP-CB7 through FP-CB9	Additional catch basins positioned along the property boundary along Mukilteo Speedway	Catch basin conveyance water	Grab sample	Lateral delineation and migration pathway evaluation	4
		Catch basin solids	Grab sample		

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7.5 MONITORING WELL SURVEY

A survey will be conducted to establish horizontal and vertical control for each newly installed monitoring well and completed soil boring. Surveyed coordinates will be referenced to the applicable horizontal datum, and vertical elevations will be referenced to the North American Vertical Datum of 1988 (NAVD88) vertical datum.

Monitoring well elevations will be surveyed at both the top of monument and top of casing rim to the nearest 0.01 foot (NAVD88). These survey data will be used to calculate groundwater elevations, cross sections, and support interpretation of hydraulic gradients and groundwater flow direction across the Site.

7.6 ANALYTICAL METHODS

Soil, groundwater, surface water, sediment, and catch basin solids samples will be analyzed for PFAS using EPA Method 1633A by a laboratory accredited for the method. Laboratory reporting limits will be consistent with, and where practicable below, applicable PCULs. Analytical methods, reporting limits, quality control procedures and data validation requirements are described in the SAP/QAPP (Appendix B).

For groundwater samples collected from monitoring wells, field parameters including dissolved oxygen, pH, oxidation-reduction potential (ORP), temperature and specific conductance will be measured during purging. Measurements will be recorded and used to assess stabilization prior to sample collection and to support interpretation of geochemical conditions.

7.6.1 Advanced PFAS Analytical Methods (Targeted Evaluation)

In addition to EPA Method 1633A, a subset of groundwater samples will be evaluated after Tier 2 RI sampling using advanced PFAS characterization techniques to further assess plume stability, potential downgradient commingling, and precursor contributions. These analyses are intended to refine the CSM, support evaluation of long-term transport behavior, and inform the FS and future remedial actions.

Two advanced analytical tools are proposed: the Total Oxidizable Precursor (TOP) Assay and PFAS isomer/chain-length profiling. EPA Method 1633A quantifies a defined list of target PFAS compounds; however, it does not directly quantify unidentified precursor compounds that may transform to terminal perfluoroalkyl acids (PFAAs) over time. The TOP Assay applies a controlled oxidative process to convert oxidizable precursor compounds to measurable terminal PFAAs (e.g., PFCA and PFSA compounds), allowing estimation of the potential magnitude of precursor-derived mass that is not captured through conventional target analysis. Comparison of pre- and post-oxidation concentrations provides insight into the presence and relative contribution of precursor compounds that may influence long-term plume persistence and downgradient mass loading.

Isomer and chain-length profiling involves the evaluation of the relative distribution of linear and branched isomers, as well as the carbon-chain length pattern of detected PFAS compounds. Manufacturing processes (e.g., electrochemical fluorination versus telomerization) produce characteristic isomer distributions. Comparison of isomer ratios and homolog patterns between source-area and downgradient samples can provide qualitative lines of evidence regarding plume continuity, potential commingling with off-property sources, and attenuation processes such as sorption or transformation that may preferentially affect specific chain lengths.

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Advanced analyses will be conducted at a targeted subset of groundwater monitoring wells, including two upgradient locations, two wells within the interpreted plume, and two downgradient sample locations where plume commingling is inferred. These advanced sampling events may be implemented following completion of the initial (Tier 1) investigation and evaluation of EPA Method 1633A analytical results, which will be used to refine selection of key wells and sample locations most representative of source conditions, plume core, and downgradient areas of interest. Results will be evaluated to assess similarity of PFAS composition between source-area and downgradient groundwater and to evaluate the potential for precursor transformation to influence plume persistence.

Advanced analyses will be limited to water matrix samples at these locations to address specific decision questions and manage project scope.

7.7 CULTURAL RESOURCES AND INADVERTENT DISCOVERY

Remedial Investigation field activities will include soil borings, monitoring well installation, and other ground-disturbing activities that have the potential to encounter archaeological resources or human remains. An Inadvertent Discovery Plan (IDP) has been prepared in accordance with Ecology requirements and applicable state and federal laws governing cultural resources.

The IDP outlines procedures for stopping work, protecting the discovery, and notifying appropriate agencies and tribes in the event that cultural materials or human skeletal remains are encountered during RI activities. The IDP will be maintained on-site during all field activities, and all field personnel and contractors will be trained on IDP procedures prior to initiating work.

The IDP is included as Appendix D and will be implemented for all on-Site and off-property investigation locations evaluated as part of this RI.

7.8 INVESTIGATION-DERIVED WASTE MANAGEMENT

Investigation-derived waste (IDW) generated during RI field activities will be managed in a manner protective of human health and the environment and consistent with applicable federal, state, and local requirements, including Washington State dangerous waste regulations and Ecology expectations for PFAS-impacted materials. IDW management practices will be implemented to prevent releases, minimize cross-contamination, and ensure proper characterization, storage and disposal.

7.8.1 Types of Investigation-Derived Waste

IDW generated during RI activities may include but is not limited to:

- Soil and sediment cuttings generated during drilling and sampling activities
- Groundwater generated during well development, purging, and sampling
- Decontamination fluids generated during equipment cleaning
- Disposable sampling materials and personal protective equipment (PPE)

Solids (e.g., soil and sediment cuttings) and liquids (e.g., well development water, purge water, and decontamination water) will be managed separately and stored in dedicated, labeled containers.

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7.8.2 Containerization and Storage

PFAS-impacted IDW will be containerized in Department of Transportation (DOT)-approved drums or equivalent containers, as appropriate for the waste type. All containers will be clearly labeled to identify contents, accumulation start date, and project information.

IDW containers will be stored on Airport property in designated, secure locations approved by Snohomish County Airports and consistent with airport operational and security requirements. Containers will be placed on solid ground. Pallets and/or secondary containment will be utilized where practicable to prevent releases.

Drums will be positioned to maintain required clearances from airport infrastructure, including maintaining a minimum three-foot setback from airport perimeter fencing. Storage locations will be selected to minimize interference with airport operations while ensuring accessibility for inspection and waste pickup.

Detailed field handling, container labeling, sampling, and waste characterization procedures are provided in the SAP/QAPP (Appendix B).

7.8.3 Characterization and Regulatory Compliance

IDW will be characterized prior to off-site disposal to determine appropriate waste designation and disposal requirements. Characterization will be based on analytical data, site process knowledge and disposal facility requirements. Analytical parameters will include PFAS and any other analytes required by the selected receiving facility to support waste profiling.

Waste accumulation, storage duration, and handling practices will comply with applicable Washington State dangerous waste requirements, including generator category–specific accumulation time limits. IDW containers will be scheduled for pickup and disposal within applicable regulatory timeframes.

Container inspections will be conducted periodically and documented to verify container integrity, labeling, secondary containment, and overall compliance. Inspection logs will be maintained as part of the project record. Hazardous or dangerous waste tracking and reporting, if applicable, will be completed in accordance with regulatory requirements. Characterization procedures, including drum sampling protocols and analytical methods used to support waste designation and profiling, are described in the SAP.

7.8.4 Decontamination and Incidental Waste

Decontamination water will be collected and stored in labeled containers separate from other liquid IDW, consistent with procedures outlined in the SAP (Appendix B). Disposable PPE and incidental waste (e.g., gloves, wipes) that do not contact investigation media will be disposed of in designated trash receptacles. Materials that contact investigation media or are suspected to be PFAS-impacted will be managed as IDW.

7.8.5 Disposal

All IDW will be transported to and disposed of at appropriately permitted treatment, storage, or disposal facilities in accordance with applicable regulations and facility acceptance criteria. Waste disposal documentation will be retained and made available to Ecology upon request.

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7.9 DATA VALIDATION AND SUBMITTAL TO EIM DATABASE

Analytical data generated during the RI field investigation will be reviewed, verified, and validated to ensure data quality, usability, and defensibility for decision-making under the MTCA. Laboratory analytical data will be validated in accordance with the U.S. Environmental Protection Agency (EPA) National Functional Guidelines for Superfund Organic Methods, as applicable, and consistent with the Washington State Department of Ecology's Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies and Establishing Ecology Guidelines for Verification and Validation of Chemical Data.

At a minimum, all analytical data will undergo data verification, including review of laboratory case narratives, chain-of-custody documentation, sample receipt conditions, holding times, method compliance, calibration criteria, laboratory quality control (QC) results, and reporting limits. A subset of data, or all data as appropriate based on data use and project phase, will undergo independent data validation consistent with Ecology-approved procedures. Data validation will evaluate, at a minimum:

- Sample preservation, holding times, and completeness
- Instrument calibration and continuing calibration verification
- Method blanks, field blanks, and equipment blanks
- Laboratory control samples and matrix spike/matrix spike duplicate results
- Field and laboratory duplicate results
- Surrogate recoveries and internal standard performance
- Reporting limits relative to PFAS Preliminary Cleanup Levels (PCULs)
- Data qualifiers and usability for intended RI objectives

Validated data will be assigned appropriate data qualifiers (e.g., U, J, R) and usability flags consistent with EPA and Ecology guidance. Any data limitations, deviations from method or QA/QC acceptance criteria, or potential impacts to data usability will be clearly documented and discussed in the RI report and supporting data summaries.

Chemical analytical results for soil and groundwater samples collected during the RI will be submitted electronically to Ecology's Environmental Information Management (EIM) database in accordance with Ecology Toxic Cleanup Program Policy 840 and applicable EIM data submittal requirements. EIM submittals will include complete analytical results, associated metadata, and relevant field and laboratory QC data necessary to support data interpretation and regulatory review. Data will be submitted in Ecology-approved electronic formats and within required timeframes following data validation.

All laboratory data packages, validation reports and EIM submittal confirmations will be retained as part of the project record and made available to Ecology upon request, consistent with the recordkeeping and data availability requirements of the AO.

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8.0 Terrestrial Ecological Evaluation

The terrestrial ecological evaluation (TEE) process is required at MTCA sites where a release of a hazardous substance may pose a threat to the terrestrial environment. The TEE procedure is structured to protect terrestrial wildlife at industrial and commercial sites and to protect terrestrial plants, soil biota and terrestrial wildlife at other sites, consistent with WAC 173-340-7490(3)(b).

As part of the RI-FS process, a TEE will be conducted and documented in the RI Report. The Site will be evaluated for eligibility under the exclusion criteria in WAC 173-340-7491, for a simplified TEE under WAC 173-340-7492, or for a site-specific TEE under WAC 173-340-7493, as appropriate based upon site conditions and investigation results.

Consistent with Ecology's direction, separate TEEs may be prepared for on-property and off-property areas if site conditions, land use, or exposure potential differ sufficiently to warrant independent evaluation. The scope and level of evaluation will be determined based on the nature and extent of contamination identified during the RI and applicable MTCA requirements.

9.0 Feasibility Study (FS)

The objective of the FS is to develop and evaluate cleanup action alternatives to enable the selection of a cleanup action that meets requirements in WAC 173-340-350 and WAC 173-340-360 and is consistent with expectations in WAC 173-340-370 and applicable MTCA remedy selection criteria. The FS will be conducted following completion of the RI and will be informed by the nature and extent of contamination, comparison to PCULs, refinement of the CSM, and results of the TEE, if applicable.

The FS of cleanup action alternatives will consist of the following steps:

- **Development of Remedial Action Objectives**. This step will include the identification of Applicable or Relevant and Appropriate Requirements (ARARs), delineation of impacted media requiring remedial action, and development of Remedial Action Objectives (RAOs). The RAOs will describe what the cleanup action is expected to accomplish, focusing on eliminating, reducing or stabilizing the contaminants of concern.
- **Identification of cleanup alternatives and recommendation**. This step will include the identification and screening of cleanup alternatives and components, evaluation of cleanup action alternatives using MTCA criteria including protectiveness, compliance with cleanup standards, long-term effectiveness, short-term effectiveness, implementability, and cost, selection of preferred alternative, disproportionate cost analysis, and recommendation of remedial action alternatives.
- **Reporting of results**. The results of the FS will be presented in the FS report. Ecology approval and public notice of feasibility study report in accordance with WAC 173-340-351, WAC 173-340-840, and 173-340-600.

Specific cleanup technologies or remedial alternatives have not been selected at this time. The identification and evaluation of alternatives will occur following completion of the RI, once the nature and extent of contamination and remedial action objectives are defined.

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Potential remedial technologies may include source control, containment, treatment, monitored natural attenuation, institutional controls, or combinations thereof, as appropriate based on RI findings.

Implementation of selected remedial actions that involve soil excavation, surface disturbance, interim treatment, or other project-level construction activities may constitute actions subject to review under the Washington State Environmental Policy Act (SEPA). If required, SEPA documentation, including preparation of a SEPA checklist, will be completed in coordination with Ecology prior to initiation of such actions.

A treatability or pilot study may be conducted, if necessary, to develop or evaluate cleanup action alternatives in the FS.

10.0 Data Evaluation and Reporting

The results from the RI will be used to prepare an RI Report, which will present the findings of the investigation and present a revised CSM. Data generated during the RI will be evaluated to characterize the nature and extent of contamination at the Site in a manner that is technically defensible, consistent with MTCA requirements, and appropriate for supporting subsequent feasibility study (FS) evaluations. Data interpretation and conclusions will be explicitly bounded by data quality, spatial coverage, and identified uncertainties to ensure that the RI findings do not exceed the resolution or reliability of the available data. The data presented in the RI Report will be used to develop the FS Report, which will include establishment of RAOs, remedial technology screening and an evaluation of remedial action alternatives.

10.1 DATA USABILITY AND INTERPRETATION

Validated analytical data will be assessed for usability based on the investigation objectives established in this Work Plan and implemented through the procedures outlined in the SAP/QAPP (Appendix B), including laboratory data validation and QA/QC review protocols. Field methods, analytical protocols, and validation criteria are described in the SAP, and this section addresses the evaluation of validated data for regulatory decision-making purposes. Data deemed usable for decision-making will be relied upon to support conclusions regarding contaminant distribution, transport mechanisms, and exposure pathways. Any data limitations, including qualified results, spatial gaps, or method-related constraints will be identified and considered during interpretation.

Soil, sediment, surface water (if applicable), and groundwater data will be evaluated to define the lateral and vertical extent of contamination relative to Ecology-established preliminary cleanup levels (PCULs). Concentration trends, depth profiles, and spatial patterns will be evaluated in the context of Site hydrogeology, historical Site operations, and potential release mechanisms. Data interpretation will focus on identifying contaminant source areas, migration pathways, and media-specific extent rather than inferring conditions unsupported by direct measurements.

Quarterly groundwater monitoring data will be evaluated to characterize groundwater elevations, hydraulic gradients, and flow directions, and to assess seasonal variability in groundwater conditions and dissolved contaminant concentrations. These data will be used to refine the conceptual site model (CSM) and to inform the understanding of contaminant transport, recognizing that temporal variability and site heterogeneity may introduce uncertainty into short-term trend interpretation. Groundwater monitoring

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procedures, well construction details, and sampling protocols are provided in the SAP; interpretation of resulting data will be documented in the RI/FS Report.

10.2 CONCEPTUAL SITE MODEL REFINEMENT

The preliminary CSM presented in this Work Plan will be refined based on RI findings. The updated CSM will integrate validated analytical data, hydrogeologic interpretations and observed contaminant distribution to describe contaminant sources, affected media, transport mechanisms, and potential receptors. The refined CSM will be presented in the RI component of the RI-FS Report and will explicitly note assumptions, uncertainties, and data gaps that may influence interpretation.

10.3 SUPPORT FOR FEASIBILITY STUDY DECISION-MAKING

RI results will be used to support FS development by defining the nature and extent of contamination, identifying applicable cleanup standards, and informing the evaluation of remedial action objectives. The RI will not predetermine remedial alternatives; rather, it will provide the technical basis needed to screen and evaluate alternatives during the FS in a manner consistent with MTCA requirements.

The FS component of the RI-FS Report will evaluate remedial alternatives that are protective of human health and the environment, technically feasible, and implementable given Site conditions and constraints. Remedial alternatives will be evaluated using RI-derived data while explicitly acknowledging data uncertainty and the level of confidence associated with each alternative. The selected remedial alternative will be consistent with MTCA requirements and compatible with reasonably anticipated future Site use and development considerations.

10.4 UNCERTAINTY AND DATA GAPS

Uncertainty associated with data quality, spatial coverage, temporal variability, and conceptual assumptions will be identified and discussed in the RI-FS Report. Where data gaps or uncertainty materially affect interpretation or remedy evaluation, these limitations will be clearly described, along with their potential implications for decision-making. If appropriate, recommendations for additional investigation or data refinement will be identified as part of the FS evaluation.

10.5 REPORTING

RI and FS activities and results will be documented in RI and FS Reports prepared in accordance with MTCA requirements, applicable regulatory guidance, and the AO. The RI Report will present validated data, interpretive findings, a refined CSM, and the FS Report will present an evaluation of remedial alternatives supported by the RI results. Conclusions will be presented at a level of certainty commensurate with the quality and resolution of the underlying data, consistent with the AO requirement that investigation and reporting support sound remedial decision-making.

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11.0 Schedule

This RI/FS will be conducted in accordance with the schedule requirements of AO No. DE 23771. Deliverables will be submitted to Ecology as Agency Review Draft, Public Review Draft, and Final versions consistent with Section 7.1 of the AO (Appendix A).

Project milestones and deliverables will be completed in accordance with the schedule requirements specified in AO DE23771. The AO establishes the formal timeline for submittals, key project meetings, public review periods, and reporting obligations. In the event of any discrepancy, the AO governs.

11.1 ANTICIPATED PROJECT SCHEDULE

The anticipated project schedule presented below summarizes key implementation milestones and submittals required under the AO. The schedule reflects logical sequencing of field activities, laboratory analysis and validation, data management (including EIM submittals), and preparation of draft and final reports.

Actual dates for subsequent deliverables will be established following Ecology approval of the Final RI-FS Work Plan and completion of major milestones (e.g., RI field investigation). The schedule may be refined in coordination with Ecology as the project progresses; however, all work will be performed in accordance with the timeframes established in the AO.

MILESTONE	ANTICIPATED TIMING
Progress Reports	Submitted quarterly on 25th of the month following the end of the quarter beginning after the effective date of the AO
Agency Review Draft RI Work Plan	120 calendar days following the effective date of the AO
Final RI-FS Work Plan	45 days after Ecology final comments
Completion of the RI Field Work	365 calendar days following Ecology's approval of the Final RI Work Plan
Agency Review Draft RI Report	180 days after RI field completion
Public Review Draft RI Report	45 calendar days following receipt of Ecology's final comments of the Agency Review Draft RI Report
Final RI Report	No later than 45 days after receipt of Ecology comments, subsequent to public comment
Agency Review Draft FS Report	90 days after Public Review Draft RI Report approval
Public Review Draft FS Report	45 calendar days following receipt of Ecology's final comments on the Agency Review Draft FS report

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11.2 REPORTING AND DATA SUBMITTALS

Reporting and data submittals will be completed in accordance with Section 7 and Section 8 of AO No. DE 23771. Deliverables will be submitted to Ecology as Agency Review Draft, Public Review Draft, and Final versions. Reporting requirements include routine progress reporting, submittal of validated analytical data, and formal technical report deliverables as summarized below.

- **Quarterly Progress Reports**: Submitted quarterly in accordance with the AO. Reports will summarize work completed during the reporting period, deviations from the approved Scope of Work and Schedule (if any), data received, and planned activities for the upcoming quarter.
- **Weekly Status Updates** (During RI Field Activities): Weekly email updates to Ecology during active field investigation periods to summarize progress, schedule adjustments, and notable field observations.
- **Interim Data Reports**: Submittal of validated laboratory data packages and summaries as data become available, including documentation of analytical methods, quality control results and any significant findings.
- **EIM Database Submittals**: Electronic data submittals to Ecology's Environmental Information Management (EIM) system at least 30 days prior to draft report submittals containing applicable data, or as otherwise coordinated with Ecology.
- **Technical Report Submittals**: Submission of Agency Review Draft, Public Review Draft (when required), and Final versions of the following deliverables:
  - RI-FS Work Plan
  - RI Report
  - FS Report
  - Interim Action Work Plan and Report (if applicable)
  - Preliminary Draft Cleanup Action Plan (DCAP)
- **Responsiveness Summary** (If Requested by Ecology): Preparation of a draft Responsiveness Summary addressing public comments on Public Review Draft documents, if requested by Ecology.

12.0 Limitations

We have prepared this RI-FS Work Plan for the exclusive use of Snohomish County Paine Field Airport, its authorized representatives, and regulatory agencies for the purposes described herein. This document may not be relied upon by third parties without the express written consent of the preparer.

This Work Plan has been developed within the scope, schedule and budget authorized for this project and is based on information available at the time of preparation, including existing reports, site data, and discussions with project stakeholders. The proposed scope of work reflects professional judgment informed by current site understanding and regulatory requirements under AO No. DE 23771.

Environmental conditions may vary spatially and temporally. The nature and extent of contamination identified through implementation of this Work Plan may differ from current expectations as additional data

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are collected. If new information becomes available that materially affects the conclusions or recommendations herein, the scope of work may require modification in coordination with Ecology.

Our services have been performed in accordance with generally accepted environmental science and engineering practices applicable in this region at the time of preparation. No warranty, express or implied, is made regarding the discovery or identification of all environmental conditions at the Site.

13.0 References

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Tables

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Table 1

2018 Soil and Groundwater Chemical Analytical Results (CDM 2018)[1]

Per- and Polyfluoroalkyl Substances (PFAS)

Former Fire Training Pit and Big Gulch Creek Study Areas at Snohomish County Airport
Everett, Washington

Sample Identification[2]		Sample Date	Sample Depth (feet bgs)	Sample Type[3]	Analyte Group	Per- and Polyfluoroalkyl Substances													
						Washington PCUL							Carboxylic Acids						
													Perfluoroalkyl Carboxylic Acids						
					Analyte Name	Perfluorooctanoic acid	Perfluorooctanesulfonic acid	Perfluorononanoic acid	Perfluorohexanesulfonic acid	Perfluorobutanesulfonic acid	Perfluorobutanoate	Perfluorohexanoic acid	Perfluoropentanoate	Perfluoroheptanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid
					Abbreviation	PFOA	PFOS	PFNA	PFHxS	PFBS	PFBA	PFHxA	PFPeA	PFHpA	PFDA	PFUnA	PFDoA	PFTrDA	PFTeA
Soil Samples (µg/kg)																			
FP1	FP1-4.5	8/15/2018	4.5	Vadose		**5.07**	**716**	**38.2**	**19.2**	**0.631**	0.864 U	**1.87**	0.432 U	**0.477**	**1.83**	**5.63**	0.211 U	**2.09**	0.211 U
	FP1-10	8/15/2018	10.0	Vadose		**1.52**	**165**	**6.9**	**10.9**	**0.562**	0.864 U	**1.45**	0.432 U	0.216 U	**0.296**	**3.42**	**0.304**	**10.3**	**0.235**
	FP1-16	8/15/2018	16.0	Vadose		**1.85**	**645**	**15.2**	**9.69**	**0.271**	0.934 U	**1.45**	0.467 U	0.234 U	**0.982**	**14.7**	**0.991**	**24.1**	**0.433**
Soil Protective of Potable Groundwater - Preliminary Cleanup Level (µg/kg) - Vadose [4]						0.025	0.046	0.089	0.062	25	44	35	NE	NE	NE	NE	NE	NE	NE
Soil Protective of Potable Groundwater - Preliminary Cleanup Level (µg/kg) - Saturated [4]						0.0016	0.0026	0.0053	0.004	1.7	2.9	2.5	NE	NE	NE	NE	NE	NE	NE
Water Samples (ng/L)																			
FP1	FP1-GW	8/15/2018	NA	Groundwater Grab (CDM)		**348**	**33,300**	**1,900**	**5,680**	**523**	138 U	**506**	**292**	**107**	33.7 UD	33.7 UD	33.7 UD	33.7 UD	33.7 UD
FP2	FP2-GW	8/15/2018	NA	Groundwater Grab (CDM)		**508**	**4,970**	**250**	**5,430**	**758**	**99.8**	**514**	**371**	**144**	3.24 U	**19.8**	3.24 U	**4.12**	3.24 U
FP3	FP3-GW	8/15/2018	NA	Groundwater Grab (CDM)		**115**	**1,310**	**108**	**2,250**	**363**	**51.8**	**215**	**185**	**73.9**	**2.95**	**15.8**	1.97 U	1.97 U	1.97 U
Preliminary Groundwater Cleanup Level (ng/L) [4]						4.0	4.0	10	10	4,800	8,000	8,000	NE	NE	NE	NE	NE	NE	NE

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Sample Identification[2]		Sample Date	Sample Depth (feet bgs)	Sample Type[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued)														
						Sulfonic Acids														
						Perfluoroalkyl Sulfonic Acids					Fluorotelomer Sulfonic Acids			Perfluorooctane Sulfonamides/Amidoacetic Acids/Sulfonamido Ethanols						
					Analyte Name	Perfluoropentanesulfonate	Perfluoroheptanesulfonate	Perfluorononanesulfonate	Perfluorodecanesulfonate	Perfluorododecanesulfonate	4:2 fluorotelomersulfonate	6:2 fluorotelomersulfonate	8:2 fluorotelomersulfonate	Perfluorooctanesulfonamide	N-Methyl perfluorooctanesulfonamide	N-Methyl perfluorooctane sulfonamidoacitic acid	N-Methylperfluorooctanesulfonamidoethanol	N-Ethylperfluorooctanesulfonamide	N-Ethyl perfluorooctanesulonamidoacetic acid	N-Ethylperfluorooctanesulfonamido ethanol
					Abbreviation	PFPeS	PFHpS	PFNS	PFDS	PFDoS	4:2 FTS	6:2 FTS	8:2 FTS	PFOSA	N-MeFOSA	NMeFOSAA	N-MeFOSE	N-EtFOSA	N-EtFOSAA	N-EtFOSE
Soil Samples (µg/kg)																				
FP1	FP1-4.5	8/15/2018	4.5	Vadose		**1.36**	**2.06**	**2.09**	0.216 U	0.2 U	0.843 U	0.759 U	**1.06**	0.527 U	0.211 U	**0.872**	2.15 U	0.211 U	0.242 U	1.61 U
	FP1-10	8/15/2018	10.0	Vadose		**0.821**	**0.815**	**0.491**	0.216 U	0.2 U	0.843 U	0.759 U	0.843 U	0.527 U	0.211 U	**2.76**	2.15 U	0.211 U	0.242 U	1.61 U
	FP1-16	8/15/2018	16.0	Vadose		**0.677**	**1.38**	**1.64**	**0.331**	0.216 U	0.911 U	**1.26**	**6.64**	0.57 U	0.228 U	**8.38**	2.32 U	0.228 U	0.262 U	1.74 U
Soil Protective of Potable Groundwater - Preliminary Cleanup Level (µg/kg) - Vadose [4]						NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Soil Protective of Potable Groundwater - Preliminary Cleanup Level (µg/kg) - Saturated [4]						NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Water Samples (ng/L)																				
FP1	FP1-GW	8/15/2018	NA	Groundwater Grab (CDM)		**943**	**304**	32 U	34.5 U	32 U	135 U	**131**	135 U	84.2 U	33.7 U	38.7 UD	344 U	33.7 U	34.5 UD	258 U
FP2	FP2-GW	8/15/2018	NA	Groundwater Grab (CDM)		**933**	**563**	3.08 U	3.33 U	3.08 U	13 U	**205**	13 U	8.11 U	3.24 U	3.73 U	33.1 U	3.24 U	**4.76**	24.8 U
FP3	FP3-GW	8/15/2018	NA	Groundwater Grab (CDM)		**508**	**77.8**	1.87 UD	2.02 UD	1.87 UD	7.87 UD	**181**	7.87 UD	4.92 UD	1.97 UD	2.26 UD	20.1 UD	1.97 UD	**13.4**	15 UD
Preliminary Groundwater Cleanup Level (ng/L) [4]						NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

[1] Chemical analyses performed by SGS AXYS for CDM Smith.

[2] The approximate sample locations are shown on Figures 3 and 4.

[3] The interpretation of vadose and saturated soil samples was determined by GeoEngineers based on the information presented in the field logs.

[4] Preliminary cleanup levels for PFOA, PFOS, PFNA, PFHxS, PFBS, PFBA, PFHxA, and HFPO-DA (GenX) were established by the Washington State Department of Ecology (July 2024).

[5] Maximum Contaminant Levels for PFOA, PFOS, PFNA, and PFHxS were established by the United States Environmental Protection Agency (April 2024).

bgs = below ground surface

µg/kg = micrograms per kilogram

ng/L = nanograms per liter

U = Analyte not detected at a concentration greater than the listed reporting limit.

D = Analyte not detected at the listed concentrations. Reporting limit elevated due to dilution.

-- = Not analyzed

NE = Not established

Bolded value indicates analyte detected at the concentration shown.

Gray shaded value indicates the detected concentration is greater than the Preliminary Cleanup Level.

Italicized value indicates the analyte was not detected but the reporting limit is greater than the Preliminary Cleanup Level.

Table 2

2022 Soil Chemical Analytical Results (SWI 2023)[1]

Per- and Polyfluoroalkyl Substances (PFAS)

Former Fire Training Pit and Big Gulch Creek Study Areas at Snohomish County Airport
Everett, Washington

Sample Location	Sample Identification[2]	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (µg/kg)						
						Washington PCUL[4]						
					Analyte Name	Perfluorooctanoic acid	Perfluorooctanesulfonic acid	Perfluorononanoic acid	Perfluorohexanesulfonic acid	Perfluorobutanesulfonic acid	Perfluorohexanoic acid	Hexafluoropropylene oxide dimer acid
					Abbreviation	PFOA	PFOS	PFNA	PFHxS	PFBS	PFHxA	HFPO-DA (GenX)
Former Fire Training Pit												
FP-MW1	FP-MW1:0.4	5/24/2022	0.4	Vadose		**0.22**	**75 E J***	**0.47**	**2.70**	0.21 U	**0.24**	*0.21 U*
	FP-MW100:0.4	5/24/2022	0.4	Vadose		**0.25**	**94 E J***	**0.48**	**2.60**	0.21 U	**0.25**	*0.21 U*
	FP-MW1:7.6	5/24/2022	7.6	Vadose		**0.26**	**200 B**	**4.90**	**7.50**	**0.14 J**	**0.34**	*0.22 U*
FP-MW2	FP-MW2:0.5	5/25/2022	0.5	Vadose		**0.06 J**	**0.39**	*0.21 U*	**0.04 J**	0.21 U	**0.053 J**	*0.21 U*
	FP-MW101:0.5	5/25/2022	0.5	Vadose		*0.22 U*	**0.25**	*0.22 U*	**0.04 J**	0.22 U	**0.034 J**	*0.22 U*
	FP-MW2:7.0	5/25/2022	7.0	Vadose		*0.22 U*	**0.22**	*0.22 U*	**0.16 J**	0.22 U	0.22 U	*0.22 U*
FP-MW3	FP-MW3:0.5	5/25/2022	0.5	Vadose		**0.16 J***	**18.00**	**0.16 J***	**3.60**	0.21 U	**0.12 J***	*0.21 U*
	FP-MW102:0.5	5/25/2022	0.5	Vadose		**0.11 J***	**5.00**	**0.09 J***	**2.50**	0.22 U	**0.072 J***	*0.22 U*
	FP-MW3:2.7	5/25/2022	2.7	Vadose		**0.12 J**	**3.10**	**0.085 J**	**1.00**	0.20 U	**0.30**	*0.23 U*
FP-MW4	FP-MW4:105.0	5/27/2022	105.0	Vadose		*0.21 U*	*0.21 U*	*0.21 U*	*0.21 U*	0.21 U	0.21 U	*0.21 U*
FP-SH1	FP-SH1:0.5	5/23/2022	0.5	Vadose		**0.70**	**5.10**	**1.20**	**0.20 J**	0.22 U	**5.90**	*0.22 U*
FP-SH2	FP-SH2:0.5	5/23/2022	0.5	Vadose		**0.50**	**4.70**	**1.80**	**0.26**	0.21 U	**2.00**	*0.21 U*
FP-HA1	FP-HA1:0.8	5/25/2022	0.8	Vadose		**0.15 J**	**1.20**	**1.10**	**0.06 J**	0.21 U	**1.50**	*0.21 U*
	FP-HA1:4.0	5/25/2022	4.0	Vadose		**0.084 J**	**0.38**	**0.13 J**	**0.12 J**	0.22 U	**3.10**	*0.22 U*
FP-P1	FP-P1:0.2	5/23/2022	0.2	Vadose		*0.22 U*	**0.35**	**0.16 J**	**0.032 J**	0.22 U	**0.057 J**	*0.22 U*
	FP-P1:10.2	5/23/2022	10.2	Vadose		*0.24 U*	**0.26 I,J***	*0.24 U*	**0.051 J**	0.24 U	0.24 U	*0.24 U*
FP-P2	FP-P2:0.2	5/23/2022	0.2	Vadose		*0.20 U*	**0.53**	*0.20 U*	**0.14 J**	0.20 U	**0.075 J**	*0.20 U*
	FP-P2:5.3	5/23/2022	5.3	Vadose		**1.20**	**1.60**	*0.22 U*	**24.0**	**0.24**	**1.10**	*0.22 U*
FP-P3	FP-P3-1.2	5/23/2022	1.2	Vadose		**0.082 J**	**7.30**	**0.083 J**	**0.11 I,J***	0.27 U	**6.00**	*0.27 U*
	FP-P3:6.3	5/23/2022	6.3	Vadose		*0.23 U*	**0.11 J**	*0.23 U*	**0.14 J**	0.23 U	**3.00**	*0.23 U*
FP-P4	FP-P4:1.4	5/23/2022	1.4	Vadose		**0.48**	**3.00**	**0.47**	**0.24**	0.20 U	**0.58**	*0.20 U*
	FP-P4:11.6	5/23/2022	11.6	Vadose		**0.53**	**0.12 J**	**0.028 J**	**0.27**	0.25 U	**3.00**	*0.25 U*
FP-P5	FP-P5:0.5	5/24/2022	0.5	Vadose		**0.17 J**	**5.30**	**0.31**	**0.36**	0.20 U	**0.049 J**	*0.20 U*
	FP-P5:7.5	5/24/2022	7.5	Vadose		**1.20**	*0.23 U*	*0.23 U*	**2.40**	**0.14 J**	**0.29**	*0.23 U*
FP-P6	FP-P6:0.5	5/24/2022	0.5	Vadose		*0.22 U*	**28.00**	**0.35**	**0.27**	0.22 U	**0.058 J**	*0.22 U*
	FP-P6:3.4	5/24/2022	3.4	Vadose		**0.17 J**	**0.89**	**0.032 J**	**0.58**	0.25 U	**0.1 J**	*0.25 U*

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Sample Location	Sample Identification[2]	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (µg/kg)						
						Washington PCUL[4]						
					Analyte Name	Perfluorooctanoic acid	Perfluorooctanesulfonic acid	Perfluorononanoic acid	Perfluorohexanesulfonic acid	Perfluorobutanesulfonic acid	Perfluorohexanoic acid	Hexafluoropropylene oxide dimer acid
					Abbreviation	PFOA	PFOS	PFNA	PFHxS	PFBS	PFHxA	HFPO-DA (GenX)
FP-P7	FP-P7:0.5	5/24/2022	0.5	Vadose		**1.5 JH***	**820 B**	**6.7 JH***	**10.00**	**0.26**	**0.63 JH***	*0.20 U*
	FP-P100:0.5	5/24/2022	0.5	Vadose		**1.4 JH***	**720 B**	**6.5 JH***	**9.00**	**0.20**	**0.49 JH***	*0.20 U*
	FP-P7:7.0	5/24/2022	7.0	Vadose		**0.82**	**270 B**	**3.80**	**7.10**	**0.18 J**	**0.63**	*0.22 U*
FP-P8	FP-P8:1.5	5/24/2022	1.5	Vadose		**0.13 J**	**14 B J***	**0.78 J***	**0.18 J***	0.21 U	**0.14 J**	*0.21 U*
	FP-P101:1.5	5/24/2022	1.5	Vadose		**0.19 J**	**25 B J***	**1.6 J***	**0.39 J***	0.21 U	**0.21**	*0.21 U*
	FP-P8:6.3	5/24/2022	6.3	Vadose		**0.31**	**1.20**	**0.049 J**	**0.22**	0.22 U	**0.17 J**	*0.22 U*
FP-P9	FP-P9:0.5	5/23/2022	0.5	Vadose		**0.11 J**	**74.00**	**0.12 J**	**2.90**	**0.06 J**	**0.24**	*0.21 U*
	FP-P9:6.5	5/23/2022	6.5	Vadose		**0.40**	**82.00**	**0.12 J**	**6.70**	**0.20 J**	**0.59**	*0.24 U*
Big Gulch Creek Drainage Sub-Basin 9												
BFG-HA1	BFG-HA1:0.5	5/18/2022	0.5	Saturated		*0.23 U*	**0.11 J**	*0.23 U*	**0.046 J**	*0.23 U*	**0.081 J**	*0.23 U*
BFG-SH1	BFG-SH1:0.5	5/18/2022	0.5	Saturated		*0.24 U*	*0.24 U*	*0.24 U*	*0.24 U*	*0.24 U*	0.24 U	*0.24 U*
	BFG-SH1:1.0	5/18/2022	1.0	Saturated		*0.35 U*	**0.70**	*0.35 U*	*0.35 U*	*0.35 U*	0.35 U	*0.35 U*
BFG-SH2	BFG-SH2:0.5	5/18/2022	0.5	Saturated		*0.30 U*	**0.37 J***	*0.30 U*	*0.30 U*	*0.30 U*	**0.053 J**	*0.30 U*
	BFG-SH2:1.0	5/18/2022	1.0	Saturated		**0.096 J**	**1.60**	**0.047 J**	**0.096 J**	*0.31 U*	**0.17 J**	*0.31 U*
Soil Protective of Groundwater - Preliminary Cleanup Level (µg/kg) - Vadose [4]						0.025	0.046	0.089	0.062	25	35.00	0.12
Soil Protective of Groundwater - Preliminary Cleanup Level (µg/kg) - Saturated [4]						0.0016	0.0026	0.0053	0.0040	1.7	2.5	0.0069

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Sample Location	Sample Identification[2]	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)										
						Carboxylic Acids							Sulfonic Acids			
						Perfluoroalkyl Carboxylic Acids						Perfluoroalkyl Carboxylic Acids	Per- and Polyfluoroether Sulfonic Acids		Perfluorooctane Sulfonamides/Amidoacetic Acids/Sulfonamido Ethanols	
					Analyte Name	Perfluoroheptanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	4.8-Dioxa-3H-perfluorononanoic acid	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	N-Ethyl perfluorooctane sulonamidoacetic acid	N-Methyl perfluorooctane sulfonamidoacitic acid
					Abbreviation	PFHpA	PFDA	PFUnA	PFDoA	PFTrDA	PFTeA	DONA	9Cl-PF3ONS	11Cl-PF3OUdS	NEtFOSAA	NMeFOSAA
Former Fire Training Pit																
FP-MW1	FP-MW1:0.4	5/24/2022	0.4	Vadose		**0.053 J**	**0.29**	**14.00**	**0.41**	**11 J***	**0.19 J***	0.21 U	0.21 U	0.21 U	**0.087 J**	**0.039 J**
	FP-MW100:0.4	5/24/2022	0.4	Vadose		**0.054 J**	**0.40**	**11.00**	**0.27**	**5.6 J***	**0.067 J***	0.21 U	0.21 U	0.21 U	**0.058 J**	0.21 U
	FP-MW1:7.6	5/24/2022	7.6	Vadose		**0.05 J**	**0.055 J**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
FP-MW2	FP-MW2:0.5	5/25/2022	0.5	Vadose		0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
	FP-MW101:0.5	5/25/2022	0.5	Vadose		0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
	FP-MW2:7.0	5/25/2022	7.0	Vadose		0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
FP-MW3	FP-MW3:0.5	5/25/2022	0.5	Vadose		**0.067 J**	0.21 U	**0.14 J**	0.21 U	**0.06 J**	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
	FP-MW102:0.5	5/25/2022	0.5	Vadose		**0.049 J**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
	FP-MW3:2.7	5/25/2022	2.7	Vadose		**0.18 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.21 U	0.22 U	0.20 U	0.20 U
FP-MW4	FP-MW4:105.0	5/27/2022	105.0	Vadose		0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
FP-SH1	FP-SH1:0.5	5/23/2022	0.5	Vadose		**0.97**	**1.90**	**0.74**	**0.32**	**0.097 J**	**0.087 J**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
FP-SH2	FP-SH2:0.5	5/23/2022	0.5	Vadose		**0.84**	**3.50**	**1.40**	**0.26**	**0.085 J**	**0.068 J**	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
FP-HA1	FP-HA1:0.8	5/25/2022	0.8	Vadose		**0.81**	**0.40**	**0.26**	**0.037 J**	**0.066 J**	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
	FP-HA1:4.0	5/25/2022	4.0	Vadose		**1.30**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
FP-P1	FP-P1:0.2	5/23/2022	0.2	Vadose		**0.041 J**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
	FP-P1:10.2	5/23/2022	10.2	Vadose		0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
FP-P2	FP-P2:0.2	5/23/2022	0.2	Vadose		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
	FP-P2:5.3	5/23/2022	5.3	Vadose		**0.40**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
FP-P3	FP-P3-1.2	5/23/2022	1.2	Vadose		**2.80**	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U
	FP-P3:6.3	5/23/2022	6.3	Vadose		**0.63**	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
FP-P4	FP-P4:1.4	5/23/2022	1.4	Vadose		**0.62**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
	FP-P4:11.6	5/23/2022	11.6	Vadose		**1.30**	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U
FP-P5	FP-P5:0.5	5/24/2022	0.5	Vadose		**0.045 J**	**0.076 J**	**0.14 J**	0.20 U	**0.071 J**	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U
	FP-P5:7.5	5/24/2022	7.5	Vadose		**0.22 J**	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
FP-P6	FP-P6:0.5	5/24/2022	0.5	Vadose		**0.055 J**	**0.11 J**	**1.40**	**0.035 J**	**0.51**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
	FP-P6:3.4	5/24/2022	3.4	Vadose		**0.087 J**	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U	0.25 U

Sample Location	Sample Identification[2]	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)										
						Carboxylic Acids							Sulfonic Acids			
						Perfluoroalkyl Carboxylic Acids						Perfluoroalkyl Carboxylic Acids	Per- and Polyfluoroether Sulfonic Acids		Perfluorooctane Sulfonamides/Amidoacetic Acids/Sulfonamido Ethanols	
					Analyte Name	Perfluoroheptanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	4.8-Dioxa-3H-perfluorononanoic acid	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acid	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	N-Ethyl perfluorooctane sulonamidoacetic acid	N-Methyl perfluorooctane sulfonamidoacitic acid
					Abbreviation	PFHpA	PFDA	PFUnA	PFDoA	PFTrDA	PFTeA	DONA	9Cl-PF3ONS	11Cl-PF3OUdS	NEtFOSAA	NMeFOSAA
	FP-P7:0.5	5/24/2022	0.5	Vadose		**0.14 J**	**0.83**	**29.00**	**0.48**	**11.00**	**0.32 J***	0.20 U	0.20 U	0.20 U	**0.32**	**0.13 I JH***
FP-P7	FP-P100:0.5	5/24/2022	0.5	Vadose		**0.11 J**	**0.73**	**23.00**	**0.42**	**7.70**	**0.19 J***	0.20 U	0.20 U	0.20 U	**0.33**	**0.093 I JH***
	FP-P7:7.0	5/24/2022	7.0	Vadose		**0.11 J**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
FP-P8	FP-P8:1.5	5/24/2022	1.5	Vadose		**0.075 J**	0.21 U	**0.13 J**	0.21 U	**0.14 J**	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
	FP-P101:1.5	5/24/2022	1.5	Vadose		**0.093 J**	0.21 U	**0.13 J**	0.21 U	**0.14 J**	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
	FP-P8:6.3	5/24/2022	6.3	Vadose		**0.09 J**	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U	0.22 U
FP-P9	FP-P9:0.5	5/23/2022	0.5	Vadose		0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U
	FP-P9:6.5	5/23/2022	6.5	Vadose		**0.052 J**	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U
Big Gulch Creek Drainage Sub-Basin 9																
BFG-HA1	BFG-HA1:0.5	5/18/2022	0.5	Saturated		0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U
BFG-SH1	BFG-SH1:0.5	5/18/2022	0.5	Saturated		0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	**0.075 J**	0.24 U
	BFG-SH1:1.0	5/18/2022	1.0	Saturated		0.35 U	0.35 U	0.35 U	**0.072 J**	**0.084 J**	**0.081 J**	0.35 U	0.35 U	0.35 U	**2.10**	**0.85**
BFG-SH2	BFG-SH2:0.5	5/18/2022	0.5	Saturated		0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	0.30 U	**0.20 J**	**0.12 J**
	BFG-SH2:1.0	5/18/2022	1.0	Saturated		**0.062 J**	**0.11 J**	**0.098 J**	**0.073 J**	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	**0.68**	**0.31**
Soil Protective of Groundwater - Preliminary Cleanup Level (µg/kg) - Vadose [4]						NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Soil Protective of Groundwater - Preliminary Cleanup Level (µg/kg) - Saturated [4]						NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

Notes:

[1] Chemical analyses performed by Eurofins for Shannon & Wilson

[2] The approximate sample locations are shown on Figures 3 through 5.

[3] The interpretation of vadose and saturated soil samples was determined by GeoEngineers based on the information presented in the field logs.

[4] Preliminary cleanup levels for PFOA, PFOS, PFNA, PFHxS, PFBS, PFBA, PFHxA, and HFPO-DA (GenX) were established by the Washington State Department of Ecology (July 2024).

bgs = below ground surface

µg/kg = micrograms per kilogram

U = Analyte not detected at a concentration greater than the listed reporting limit.

B = Analyte found in the lab blank and sample. Flag applied by laboratory.

J = Analyte detected at less than reporting level but greater than or equal to the method detection limit and the concentration is an approximate value. Flag applied by the laboratory.

J* = Analyte reported as an estimated value, no direction of bias, due to a quality control failure. Flag applied by Shannon & Wilson (*).

JH* = Analyte reported as an estimated concentration, biased high due to quality control failures. Flag applied by Shannon & Wilson (*).

-- = Not analyzed

NE = Not established

Bolded value indicates analyte detected at the concentration shown.

Gray shaded value indicates the detected concentration is greater than the Preliminary Cleanup Level.

Italicized value indicates the analyte was not detected but the reporting limit is greater than the Preliminary Cleanup Level.

Table 3

2022 Groundwater Chemical Analytical Results (SWI 2023)[1]

Per- and Polyflouralkyl Substances (PFAS)

Former Fire Training Pit and Big Gulch Creek Study Areas at Snohomish County Airport
Everett, Washington

Sample Location	Sample Identification[2]	Sample Date	Sample Type (Collected By)	Analyte Group	Per- and Polyfluoroalkyl Substances (ng/L)											
					Washington PCULs							Carboxylic Acids				
												Perfluoroalkyl Carboxylic Acids				
				Analyte Name	Perfluorooctanoic acid	Perfluorooctane sulfonic acid	Perfluorononanoic acid	Perfluorohexane sulfonic acid	Perfluorobutane sulfonic acid	Perfluorohexanoic acid	Hexafluoropropylene oxide dimer acid	Perfluoroheptanoic acid	Perfluorodecanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid
				Abbreviation	PFOA	PFOS	PFNA	PFHxS	PFBS	PFHxA	HFPO-DA	PFHpA	PFDA	PFUnA	PFDoA	PFTrDA
FP-MW1	FP-MW1:GW	6/2/2022	Low-flow (SWI)		**2,300**	**89,000 E,B,J***	**10,000**	**13,000**	**1,100**	**2,900**	3.8 U	**780**	**20**	**3.0**	1.9 U	1.9 U
	FP-MW100:GW	6/2/2022	Low-flow (SWI)		**2,600**	**120,000 E,B,J***	**10,000**	**13,000**	**970**	**2,900**	3.7 U	**630**	**18**	**3.0**	1.8 U	1.8 U
	FP-MW1-12142022	12/14/2022	Low-flow (SWI)		**1,300**	**80,000 E,J***	**5,100**	**9,400**	**670**	**2,000**	3.6 U	**520**	**18**	**1.1 J**	1.8 U	1.8 U
FP-MW2	FP-MW2:GW	6/2/2022	Low-flow (SWI)		**230**	**1,000 B**	**28**	**1,800**	**340**	**1,100**	4.0 U	**360**	2.0 U	2.0 U	2.0 U	2.0 U
	FP-MW2-11232022	11/23/2022	Low-flow (SWI)		**380**	**1,700**	**64**	**3,500**	**630**	**730**	3.6 U	**280**	1.8 U	1.8 U	1.8 U	1.8 U
FP-MW3	FP-MW3:GW	6/2/2022	Low-flow (SWI)		**1,100**	**27,000 B**	**1,600**	**4,100**	**320**	**580**	3.6 U	**220**	**6.5**	**4.4**	1.8 U	1.8 U
	FP-MW3-11232022	11/23/2022	Low-flow (SWI)		**2,100**	**54,000 E,J***	**3,800**	**9,300**	**750**	**1,300**	3.6 U	**510**	**16**	**9.1**	1.8 U	1.8 U
FP-MW4	FP-MW4:GW	6/2/2022	Low-flow (SWI)		**840**	**37,000 E,B,J***	**4,600**	**8,000**	**660**	**1,400**	3.7 U	**300**	**15**	**3.2**	1.8 U	1.8 U
	FP-MW4-11212022	11/21/2022	Low-flow (SWI)		**440**	**26,000**	**2,300**	**4,800**	**570**	**880**	3.7 U	**190**	**7.4**	**1.1 J**	1.8 U	1.8 U
	FP-MW100-11212022	11/21/2022	Low-flow (SWI)		**410**	**27,000**	**2,100**	**6,800**	**540**	**980**	3.7 U	**190**	**7.4**	**1.2 J**	1.8 U	1.8 U
FP-MW5	FP-MW5-11212022	11/21/2022	Low-flow (SWI)		**1.8 J**	**3.5**	**0.49 J**	**1.8 J**	**2.2**	**2.5**	3.7 U	**1.9**	1.9 U	1.9 U	1.9 U	1.9 U
FP-P2	FP-P2:GW	5/23/2022	Grab (SWI)		**3.8**	**19**	1.8 U	**530**	**55**	**99**	3.6 U	**23**	1.8 U	1.8 U	1.8 U	1.8 U
FP-P3	FP-P3:GW	5/23/2022	Grab (SWI)		**12**	**1.9**	1.7 U	**130 J***	**9.4**	**3,500**	3.5 U	**660**	1.7 U	1.7 U	1.7 U	1.7 U
FP-P4	FP-P4:GW	5/23/2022	Grab (SWI)		**180**	**89**	**7.1**	**440**	**79**	**1,000**	3.6 U	**320**	1.8 U	1.8 U	1.8 U	1.8 U
FP-P9	FP-P9:GW	5/23/2022	Grab (SWI)		**6.8**	**290**	**0.92 J**	**120**	**7.3**	**11**	3.6 U	**1.3 J**	1.8 U	1.8 U	1.8 U	1.8 U
Groundwater - Preliminary Cleanup Level (ng/L)[3]					4.0	4.0	10	10	4,800	8,000	10	NE	NE	NE	NE	NE

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Sample Location	Sample Identification[2]	Sample Date	Sample Type (Collected By)	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (ng/L)					
					Carboxylic Acids		Sulfonic Acids			
					Perfluoroalkyl Carboxylic Acids (continued)	Per- and Polyfluoroether Carboxylic Acids	Per- and Polyfluoroether Sulfonic Acids		Perfluorooctane Sulfonamides/Amidoacetic Acids/Sulfonamido Ethanols	
				Analyte Name	Perfluorotetradecanoic acid	4.8-Dioxa-3H-perfluorononanoic acid	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acd	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	N-Methyl perfluorooctane sulfonamidoacitic acid	N-Ethyl perfluorooctane sulonamidoacetic acid
				Abbreviation	PFTeA	DONA	9Cl-PF3ONS	11Cl-PF3OUdS	NMeFOSAA	NEtFOSAA
FP-MW1	FP-MW1:GW	6/2/2022	Low-flow (SWI)		1.9 U	1.9 U	1.9 U	1.9 U	4.7 U	4.7 U
	FP-MW100:GW	6/2/2022	Low-flow (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	4.6 U	4.6 U
	FP-MW1-12142022	12/14/2022	Low-flow (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	**73**	**75**
FP-MW2	FP-MW2:GW	6/2/2022	Low-flow (SWI)		2.0 U	2.0 U	2.0 U	2.0 U	5.0 U	5.0 U
	FP-MW2-11232022	11/23/2022	Low-flow (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	4.4 U	4.4 U
FP-MW3	FP-MW3:GW	6/2/2022	Low-flow (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	4.5 U	4.5 U
	FP-MW3-11232022	11/23/2022	Low-flow (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	4.5 U	4.5 U
FP-MW4	FP-MW4:GW	6/2/2022	Low-flow (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	4.6 U	4.6 U
	FP-MW4-11212022	11/21/2022	Low-flow (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	4.6 U	4.6 U
	FP-MW100-11212022	11/21/2022	Low-flow (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	4.6 U	4.6 U
FP-MW5	FP-MW5-11212022	11/21/2022	Low-flow (SWI)		1.9 U	1.9 U	1.9 U	1.9 U	4.7 U	4.7 U
FP-P2	FP-P2:GW	5/23/2022	Grab (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	4.5 U	4.5 U
FP-P3	FP-P3:GW	5/23/2022	Grab (SWI)		1.7 U	1.7 U	1.7 U	1.7 U	4.4 U	4.4 U
FP-P4	FP-P4:GW	5/23/2022	Grab (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	4.5 U	4.5 U
FP-P9	FP-P9:GW	5/23/2022	Grab (SWI)		1.8 U	1.8 U	1.8 U	1.8 U	4.5 U	4.5 U
Groundwater - Preliminary Cleanup Level (ng/L) [3]					NE	NE	NE	NE	NE	NE

Notes:

[1] Chemical analyses performed by Eurofins for Shannon & Wilson

[2] The approximate sample locations are shown on Figures 3 through 5.

[3] Preliminary cleanup levels for PFOA, PFOS, PFNA, PFHxS, PFBS, PFBA, PFHxA, and HFPO-DA (GenX) were established by the Washington State Department of Ecology (July 2024).

B = Compound was found in the lab blank and sample. Flag applied by the laboratory.

bgs = below ground surface

J = Result is less than the reporting level but greater than or equal to the method detection limit and the concentration is an approximate value. Flag applied by the laboratory.

J* = Result is reported as an estimated value, no direction of bias, due to a quality control failure. Flag applied by SWI.

JH* = Estimated concentration, biased high due to quality control failures. Flag applied by SWI.

ng/L = nanograms per liter

U = Analyte not detected at a concentration greater than the listed reporting limit.

UD = Analyte not detected at a concentration greater than the listed reporting limit. Reporting limit elevated due to dilution (CDM Smith 2018)

-- = Not analyzed; NA = Not available; NE = Not established

Bolded value indicates analyte detected at the concentration shown.

Gray shaded value indicates the detected concentration is greater than the Preliminary Cleanup Level.

Italicized value indicates the analyte was not detected but the reporting limit is greater than the Preliminary Cleanup Level.

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Table 4

2024-2025 Monitoring Well Construction Details and Groundwater Elevations

Paine Field Fire Training Pit PFAS Site at Snohomish Paine Field County Airport

Everett, Washington

Well Identification	Top of Casing Elevation	Screened Interval (ft bgs)	Top of Screen Elevation (ft NAVD 88)	Base of Screen Elevation (ft NAVD 88)	Date Installed	Date Measured	Groundwater Depth (ft BTOC)	Groundwater Elevation (ft NAVD 88)	Ecology Well ID
2025 Monitoring Wells									
FP-MW14	558.83	30.0 - 45.0	528.83	513.83	6/4/2025	6/9/2025	33.49	525.34	BQL-425
FP-MW15	567.92	15.0 - 30.0	552.92	522.92	6/4/2025	6/9/2025	22.87	545.05	BQL-426
FP-MW16	574.46	10.0 - 25.0	564.46	529.46	6/3/2025	6/9/2025	10.76	563.70	BQL-422
FP-MW17	575.62	10.0 - 25.0	565.62	530.62	6/3/2025	6/9/2025	12.35	563.27	BQL-423
FP-MW18	572.22	5.0 - 20.0	567.22	527.22	6/2/2025	6/9/2025	7.85	564.37	BQL-421
FP-MW19	550.15	15.0 - 30.0	535.15	505.15	6/2/2025	6/9/2025	6.15	544.00	BQL-420
FP-MW20	534.46	10.0 - 25.0	524.46	489.46	6/3/2025	6/9/2025	8.32	526.14	BQL-424
Previously Installed Monitoring Wells									
FP-MW1	564.95	15.0 - 24.8	550.3	540.6	5/24/2022	2/8/2024	13.89	551.06	BPK-751
						5/14/2024	16.95	548.00	
						6/9/2025	17.49	547.46	
FP-MW2	559.19	30.0 - 39.8	550.3	520.0	5/25/2022	2/8/2024	31.33	527.86	BPK-752
						5/14/2024	32.29	526.90	
						6/9/2025	32.64	526.55	
FP-MW3	559.55	33.0 - 42.8	526.6	516.8	5/25/2022	2/8/2024	30.49	529.06	BPK-753
						5/14/2024	32.01	527.54	
						6/9/2025	33.17	526.38	
FP-MW4	565.97	22.0 - 31.8	544.4	534.6	5/27/2022	2/8/2024	14.51	551.46	BNL-692
						5/14/2024	17.08	548.89	
						6/9/2025	17.91	548.06	
FP-MW5	523.24	8.7 - 18.5	514.7	504.9	10/24/2022	2/8/2024	9.55	513.69	BPL-660
						5/14/2024	10.75	512.49	
						6/9/2025	10.93	512.31	
FP-MW6	521.91	4.0 - 13.8	518.2	508.4	10/24/2022	2/8/2024	9.75	512.16	BPL-661
						5/14/2024	11.40	510.51	
						6/9/2025	11.92	509.99	
FP-MW7	523.68	10.0 - 20.0	513.7	503.7	2/7/2024	2/8/2024	13.75	509.93	BPX-733
						5/14/2024	14.89	508.79	
						6/9/2025	15.70	507.98	
FP-MW8	564.00	17.0 - 27.0	547.0	537.0	2/6/2024	2/8/2024	11.44	552.56	BPX-732
						5/14/2024	14.24	549.76	
						6/9/2025	15.08	548.92	
FP-MW9	569.08	10.0 - 25.0	559.1	544.1	2/6/2024	2/8/2024	8.90	560.18	BPX-731
						5/14/2024	11.20	557.88	
						6/9/2025	11.58	557.50	
FP-MW10	522.17	10.0 - 20.0	512.2	502.2	2/7/2024	2/8/2024	10.89	511.28	BPX-734
						5/14/2024	11.88	510.29	
						6/9/2025	12.76	509.41	
FP-MW11	562.66	20.0 - 30.0	542.7	532.7	2/5/2024	2/8/2024	19.53	543.13	BPX-729
						5/14/2024	20.06	542.60	
						6/9/2025	20.69	541.97	
FP-MW12	572.24	10.0 - 25.0	562.2	547.2	2/5/2024	2/8/2024	14.41	557.83	BPX-730
						5/14/2024	dry	dry	
						6/9/2025	14.90	557.34	
FP-MW13	528.54	5.0 - 20.0	523.8	508.8	3/26/2024	3/28/2024	3.21	525.33	BQB-615
						5/14/2024	4.18	524.36	
						6/9/2025	6.38	522.16	

Notes:

[1] Approximate locations shown on Figure 4. MW1-MW13 installed during previous investigations. MW14-MW20 installed and surveyed by GeoEngineers, 2025.

[2] MW14 through MW20 well screen elevations are approximated based on surveyed top of casing elevations.

bgs = below ground surface; ft = feet

BTOC = below top of casing

NAVD 88 = North American Vertical Datum of 1988

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Table 5

2024-2025 Soil Chemical Analytical Results[1]

Per- and Polyfluoroalkyl Substances (PFAS)

Paine Field Fire Training Pit PFAS Site at Snohomish Paine Field County Airport
Everett, Washington

Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (µg/kg)									
						Compounds with Washington PCUL[4]									
					Analyte Name	Perfluorooctanoic acid	Perfluorooctanesulfonic acid	Perfluorononanoic acid	Perfluorohexanesulfonic acid	Perfluorobutanesulfonic acid	Perfluorobutanoic acid	Perfluorohexanoic acid	Hexafluoropropylene oxide dimer acid	Perfluorodecanoic acid	6:2 Fluorotelomer sulfonate
					Abbreviation	PFOA	PFOS	PFNA	PFHxS	PFBS	PFBA	PFHxA	HFPO-DA (GenX)	PFDA	6:2FTS
2025 Soil Samples															
FP-MW14	FP-MW14-15-16.6	6/4/2025	15.0	Vadose		*0.20 U*	**0.48**	*0.20 U*	**0.35**	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
	FP-MW14-30-31.5		30.0	Vadose		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.78 U	0.20 U	*0.78 U*	*0.20 U*	0.78 U
	FP-MW14-40-41.5		40.0	Saturated		*0.20 U*	**0.28**	*0.20 U*	*0.20 U*	0.20 U	0.80 U	0.20 U	*0.80 U*	*0.20 U*	0.80 U
FP-MW15	FP-MW15-5-6.5	6/4/2025	5.0	Vadose		*0.20 U*	**0.39**	*0.20 U*	*0.20 U*	0.20 U	0.80 U	0.20 U	*0.80 U*	*0.20 U*	0.80 U
	FP-MW15-20-21.5		20.0	Vadose		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.80 U	0.20 U	*0.80 U*	*0.20 U*	0.80 U
	FP-MW15-25-26.5		25.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.80 U	0.20 U	*0.80 U*	*0.20 U*	0.80 U
	FP-MW15-30-31.5		30.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.80 U	0.20 U	*0.80 U*	*0.20 U*	0.80 U
FP-MW16	FP-MW16-5-6.5	6/3/2025	5.0	Vadose		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.80 U	0.20 U	*0.80 U*	*0.20 U*	0.80 U
	FP-MW16-10-11.5		10.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
	FP-MW16-25-26.5		25.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.80 U	0.20 U	*0.80 U*	*0.20 U*	0.80 U
FP-MW17	FP-MW17-5-6.5	6/3/2025	5.0	Vadose		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.80 U	0.20 U	*0.80 U*	*0.20 U*	0.80 U
	FP-MW17-10-11.5		10.0	Vadose		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
	FP-MW17-25-26.5		25.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.80 U	0.20 U	*0.80 U*	*0.20 U*	0.80 U
FP-MW18	FP-MW18-5-6	6/2/2025	5.0	Vadose		*0.20 U*	**0.21**	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
	FP-MW18-10-11.5		10.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
	FP-MW18-20-20.5		20.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.80 U	0.20 U	*0.80 U*	*0.20 U*	0.80 U
FP-MW19	FP-MW19-5-6	6/2/2025	5.0	Vadose		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
	FP-MW19-10-11		10.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
	FP-MW19-30-30.5		30.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
FP-MW20	FP-MW20-5-6.5	6/3/2025	5.0	Vadose		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
	FP-MW20-10-11.5		10.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
	FP-MW20-20-20.5		20.0	Saturated		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
2024 Soil Samples															
FP-B1	FP-B1-5.0	02/08/2024	5.0	Vadose		**0.26**	**34.6**	**0.25**	**4.8**	0.12 U	0.60 U	**0.45**	*0.35 U*	0.12 U	0.48 U
	FP-B1-10.0	02/08/2024	10.0	Vadose		*0.11 U*	**7.4**	*0.13 U*	**1.4**	0.11 U	0.57 U	0.11 U	*0.33 U*	0.11 U	0.45 U
	FP-B1-15.0	02/08/2024	15.0	Vadose		*0.12 U*	**0.27**	*0.14 U*	**2.3**	0.12 U	0.59 U	0.12 U	*0.34 U*	0.12 U	0.47 U
	FP-B1-20.0	02/08/2024	20.0	Vadose		*0.11 U*	*0.11 U*	*0.13 U*	**0.46**	0.11 U	0.55 U	0.11 U	*0.32 U*	0.11 U	0.44 U
	FP-B1-25.0	02/08/2024	25.0	Vadose		*0.11 U*	*0.11 U*	*0.13 U*	**1.5**	0.11 U	0.56 U	0.11 U	*0.32 U*	0.11 U	0.45 U
	FP-B1-30.0	02/08/2024	30.0	Vadose		*0.11 U*	**5.2**	*0.13 U*	**1.5**	0.11 U	0.56 U	0.11 U	*0.32 U*	0.11 U	0.45 U
FP-B2	FP-B2-5.0	02/08/2024	5.0	Vadose		**1.5**	**92.5**	**1.9**	**1.9**	0.11 U	0.56 U	**0.27**	*0.32 U*	**1.5**	**1.7**
	FP-B2-10.0	02/08/2024	10.0	Vadose		**0.88**	**37.1**	**0.63**	**1.3**	0.11 U	0.54 U	**0.33**	*0.31 U*	**0.15 J**	**0.97**
	FP-B2-15.0	02/08/2024	15.0	Vadose		**0.67**	**51.2**	**1.7**	**1.3**	0.12 U	0.58 U	**0.18 J**	*0.33 U*	0.12 U	0.46 U

Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (µg/kg)									
						Compounds with Washington PCUL[4]									
					Analyte Name	Perfluorooctanoic acid	Perfluorooctanesulfonic acid	Perfluorononanoic acid	Perfluorohexanesulfonic acid	Perfluorobutanesulfonic acid	Perfluorobutanoic acid	Perfluorohexanoic acid	Hexafluoropropylene oxide dimer acid	Perfluorodecanoic acid	6:2 Fluorotelomer sulfonate
					Abbreviation	PFOA	PFOS	PFNA	PFHxS	PFBS	PFBA	PFHxA	HFPO-DA (GenX)	PFDA	6:2FTS
FP-B2 (cont.)	SDUP-2-20240206	02/08/2024	15.0	Vadose		**0.77**	**37.8**	**1.6**	**1.3**	0.12 U	0.58 U	**0.24**	*0.33 U*	0.12 U	0.46 U
	FP-B2-20.0	02/08/2024	20.0	Vadose		**0.42**	**6.4**	*0.14 U*	**0.78**	0.12 U	0.61 U	0.12 U	*0.36 U*	0.12 U	0.49 U
	FP-B2-25.0	02/08/2024	25.0	Vadose		**0.31**	**1.5**	*0.13 U*	**0.45**	0.11 U	0.56 U	0.11 U	*0.32 U*	0.11 U	0.45 U
FP-B3	FP-B3-1.0	03/28/2024	1.0	Vadose		*0.13 U*	**0.19 J**	*0.15 U*	**0.40**	0.13 U	0.65 U	**0.45**	*0.38 U*	0.13 U	0.52 U
	SDUP-240328	03/28/2024	1.0	Vadose		*0.13 U*	**0.13 J**	*0.15 U*	**0.38**	0.13 U	0.66 U	**0.43**	*0.38 U*	0.13 U	0.53 U
FP-MW7	FP-MW-7-5.0	02/07/2024	5.0	Vadose		*0.11 U*	*0.11 U*	*0.13 U*	*0.17 U*	0.11 U	0.55 U	0.11 U	*0.32 U*	0.11 U	0.44 U
	FP-MW-7-10.0	02/07/2024	10.0	Vadose		*0.11 U*	*0.11 U*	*0.13 U*	*0.18 U*	0.11 U	0.56 U	0.11 U	*0.32 U*	0.11 U	0.45 U
	FP-MW-7-15.0	02/07/2024	15.0	Saturated		*0.11 U*	*0.11 U*	*0.13 U*	*0.18 U*	0.11 U	0.57 U	0.11 U	*0.33 U*	0.11 U	0.45 U
	FP-MW-7-20.0	02/07/2024	20.0	Saturated		*0.11 U*	*0.11 U*	*0.13 U*	*0.18 U*	0.11 U	0.55 U	0.11 U	*0.32 U*	0.11 U	0.44 U
FP-MW8	FP-MW-8-5.0	02/06/2024	5.0	Vadose		*0.12 U*	**1.6**	*0.13 U*	*0.18 U*	0.12 U	0.58 U	**0.13 J**	*0.33 U*	0.12 U	0.46 U
	SDUP-1-20240206	02/06/2024	5.0	Vadose		*0.12 U*	**1.6**	*0.13 U*	*0.18 U*	0.12 U	0.58 U	**0.15 J**	*0.33 U*	0.12 U	0.46 U
	FP-MW-8-10.0	02/06/2024	10.0	Vadose		*0.11 U*	**0.18 J**	*0.13 U*	*0.18 U*	0.11 U	0.57 U	**0.12 J**	*0.33 U*	0.11 U	0.45 U
	FP-MW-8-15.0	02/06/2024	15.0	Saturated		*0.12 U*	*0.12 U*	*0.13 U*	*0.18 U*	0.12 U	0.58 U	0.12 U	*0.33 U*	0.12 U	0.46 U
	FP-MW-8-20.0	02/06/2024	20.0	Saturated		*0.12 U*	*0.12 U*	*0.13 U*	**0.23**	0.12 U	0.58 U	**0.13 J**	*0.33 U*	0.12 U	0.46 U
	FP-MW-8-25.0	02/06/2024	25.0	Saturated		*0.12 U*	*0.12 U*	*0.14 U*	**0.25**	0.12 U	0.59 U	**0.13 J**	*0.34 U*	0.12 U	0.47 U
	FP-MW-8-27.5	02/06/2024	27.5	Saturated		*0.11 U*	*0.11 U*	*0.13 U*	*0.18 U*	0.11 U	0.57 U	**0.17 J**	*0.33 U*	0.11 U	**0.54 J**
FP-MW9	FP-MW-9-5.0	02/06/2024	5.0	Vadose		*0.13 U*	**2.9**	*0.15 U*	**0.29**	0.13 U	0.64 U	0.13 U	*0.37 U*	0.13 U	0.51 U
	FP-MW-9-10.0	02/06/2024	10.0	Saturated		*0.12 U*	*0.12 U*	*0.14 U*	*0.19 U*	0.12 U	0.59 U	**0.16 J**	*0.34 U*	0.12 U	**1.7**
	FP-MW-9-15.0	02/06/2024	15.0	Saturated		*0.12 U*	*0.12 U*	*0.13 U*	*0.18 U*	0.12 U	0.58 U	**0.23**	*0.33 U*	0.12 U	**0.99**
	FP-MW-9-20.0	02/06/2024	20.0	Saturated		*0.11 U*	*0.11 U*	*0.13 U*	*0.18 U*	0.11 U	0.55 U	**0.12 J**	*0.32 U*	0.11 U	**0.77 J**
	FP-MW-9-25.0	02/06/2024	25.0	Saturated		*0.11 U*	*0.11 U*	*0.13 U*	*0.18 U*	0.11 U	0.57 U	**0.15 J**	*0.33 U*	0.11 U	**0.75 J**
FP-MW10	FP-MW-10-5.0	02/07/2024	5.0	Vadose		*0.11 U*	*0.11 U*	*0.13 U*	*0.18 U*	0.11 U	0.56 U	0.11 U	*0.32 U*	0.11 U	0.45 U
	FP-MW-10-10.0	02/07/2024	10.0	Vadose		*0.12 U*	*0.12 U*	*0.14 U*	*0.19 U*	0.12 U	0.59 U	0.12 U	*0.34 U*	0.12 U	0.47 U
	FP-MW-10-15.0	02/07/2024	15.0	Saturated		*0.12 U*	**0.18 J**	*0.13 U*	*0.18 U*	0.12 U	0.58 U	0.12 U	*0.33 U*	0.12 U	0.46 U
	FP-MW-10-20.0	02/07/2024	20.0	Saturated		*0.11 U*	**0.3**	*0.13 U*	*0.18 U*	0.11 U	0.56 U	0.11 U	*0.33 U*	0.11 U	0.45 U
FP-MW11	FP-MW-11-5.0	02/05/2024	5.0	Vadose		*0.11 U*	**1.5**	*0.13 U*	*0.18 U*	0.11 U	0.57 U	0.11 U	*0.33 U*	0.11 U	0.46 U
	FP-MW-11-10.0	02/05/2024	10.0	Vadose		*0.12 U*	**3.5**	*0.13 U*	*0.18 U*	0.12 U	0.58 U	0.12 U	*0.33 U*	0.12 U	0.46 U
	FP-MW-11-15.0	02/05/2024	15.0	Vadose		*0.11 U*	**1.8**	*0.13 U*	*0.18 U*	0.11 U	0.56 U	0.11 U	*0.32 U*	0.11 U	0.45 U
	FP-MW-11-20.0	02/05/2024	20.0	Saturated		*0.11 U*	**0.15 J**	*0.13 U*	*0.18 U*	0.11 U	0.56 U	0.11 U	*0.32 U*	0.11 U	0.45 U
FP-MW12	FP-MW-12-5.0	02/05/2024	5.0	Vadose		**0.14 J**	**75.4**	*0.14 U*	**5.7**	**0.16 J**	0.60 U	**0.17 J**	*0.34 U*	0.12 U	0.48 U
	FP-MW-12-10.0	02/05/2024	10.0	Vadose		*0.11 U*	**15.8**	*0.13 U*	**1.4**	0.11 U	0.57 U	0.11 U	*0.33 U*	0.11 U	0.45 U
	FP-MW-12-15.0	02/05/2024	15.0	Saturated		*0.12 U*	**35.3**	*0.14 U*	**2.6**	0.12 U	0.60 U	0.12 U	*0.34 U*	0.12 U	0.48 U
	FP-MW-12-20.0	02/05/2024	20.0	Saturated		*0.12 U*	*0.12 U*	*0.13 U*	*0.19 U*	0.12 U	0.58 U	0.12 U	*0.34 U*	0.12 U	0.47 U
	FP-MW-12-25.0	02/05/2024	25.0	Saturated		*0.11 U*	*0.11 U*	*0.13 U*	*0.18 U*	0.11 U	0.57 U	0.11 U	*0.33 U*	0.11 U	0.46 U
FP-MW13	FP-MW-13-5.0	03/26/2024	5.0	Saturated		*0.12 U*	*0.12 U*	*0.14 U*	*0.19 U*	0.12 U	0.60 U	0.12 U	*0.35 U*	0.12 U	0.48 U
	FP-MW-13-10.0	03/26/2024	10.0	Saturated		*0.11 U*	*0.11 U*	*0.13 U*	*0.18 U*	0.11 U	0.55 U	0.11 U	*0.32 U*	0.11 U	0.44 U
	FP-MW-13-15.0	03/26/2024	15.0	Saturated		*0.12 U*	*0.12 U*	*0.13 U*	*0.18 U*	0.12 U	0.58 U	0.12 U	*0.33 U*	0.12 U	0.46 U
	FP-MW-13-20.0	03/26/2024	20.0	Saturated		*0.11 U*	*0.11 U*	*0.12 U*	*0.17 U*	0.11 U	0.54 U	0.11 U	*0.31 U*	0.11 U	0.43 U

Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (µg/kg)									
						Compounds with Washington PCUL[4]									
					Analyte Name	Perfluorooctanoic acid	Perfluorooctanesulfonic acid	Perfluorononanoic acid	Perfluorohexanesulfonic acid	Perfluorobutanesulfonic acid	Perfluorobutanoic acid	Perfluorohexanoic acid	Hexafluoropropylene oxide dimer acid	Perfluorodecanoic acid	6:2 Fluorotelomer sulfonate
					Abbreviation	PFOA	PFOS	PFNA	PFHxS	PFBS	PFBA	PFHxA	HFPO-DA (GenX)	PFDA	6:2FTS
2025 Wetland Soil Samples															
FP-GEI-1	FP-GEI-1-1.0	6/3/2025	1.0	--		**0.31**	**0.80**	*0.23 U*	*0.23 U*	0.23 U	**0.97**	0.23 U	*0.92 U*	*0.23 U*	0.92 U
FP-GEI-2	FP-GEI-2-1.0	6/3/2025	1.0	--		**0.56**	**2.2**	*0.20 U*	**0.96**	0.20 U	**1.3**	**6.7**	*0.79 U*	*0.20 U*	**2.6**
FP-GEI-3	FP-GEI-3-1.0	6/3/2025	1.0	--		*0.20 U*	*0.20 U*	*0.20 U*	*0.20 U*	0.20 U	0.79 U	0.20 U	*0.79 U*	*0.20 U*	0.79 U
Project Specific PCUL for Soil Protective of Potable Groundwater (µg/kg) - Vadose [4]						0.025	0.046	0.089	0.00004	25	44	35	0.12	0.00038	73.9
Project Specific PCUL for Soil Protective of Potable Groundwater (µg/kg) - Saturated [4]						0.0016	0.0026	0.0053	0.0000026	1.7	2.9	2.5	0.0069	0.000022	3.97

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Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)								
						Carboxylic Acids								
						Perfluoroalkyl Carboxylic Acids		Perfluoroalkyl Carboxylic Acids (continued)				Fluorotelomer Carboxylic Acids		
					Analyte Name	Perfluoropentanoic acid	Perfluoroheptanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	3:3 Fluorotelomer carboxylate	5:3 Fluorotelomer carboxylate	7:3 Fluorotelomer carboxylate
					Abbreviation	PFPeA	PFHpA	PFUnA	PFDoDA	PFTrDA	PFTeDA	3:3FTCA	5:3FTCA	7:3FTCA
2025 Soil Samples														
FP-MW14	FP-MW14-15-16.6	6/4/2025	15.0	Vadose		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	5.0 U	5.0 U
	FP-MW14-30-31.5		30.0	Vadose		0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.98 U	4.9 U	4.9 U
	FP-MW14-40-41.5		40.0	Saturated		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0 U	5.0 U	5.0 U
FP-MW15	FP-MW15-5-6.5	6/4/2025	5.0	Vadose		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0 U	5.0 U	5.0 U
	FP-MW15-20-21.5		20.0	Vadose		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0 U	5.0 U	5.0 U
	FP-MW15-25-26.5		25.0	Saturated		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0 U	5.0 U	5.0 U
	FP-MW15-30-31.5		30.0	Saturated		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0 U	5.0 U	5.0 U
FP-MW16	FP-MW16-5-6.5	6/3/2025	5.0	Vadose		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	5.0 U	5.0 U
	FP-MW16-10-11.5		10.0	Saturated		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	4.9 U	4.9 U
	FP-MW16-25-26.5		25.0	Saturated		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	5.0 U	5.0 U
FP-MW17	FP-MW17-5-6.5	6/3/2025	5.0	Vadose		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0 U	5.0 U	5.0 U
	FP-MW17-10-11.5		10.0	Vadose		0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	4.9 U	4.9 U
	FP-MW17-25-26.5		25.0	Saturated		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	1.0 U	5.0 U	5.0 U
FP-MW18	FP-MW18-5-6	6/2/2025	5.0	Vadose		0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.98 U	4.9 U	4.9 U
	FP-MW18-10-11.5		10.0	Saturated		0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	4.9 U	4.9 U
	FP-MW18-20-20.5		20.0	Saturated		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	5.0 U	5.0 U
FP-MW19	FP-MW19-5-6	6/2/2025	5.0	Vadose		0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.98 U	4.9 U	4.9 U
	FP-MW19-10-11		10.0	Saturated		0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.98 U	4.9 U	4.9 U
	FP-MW19-30-30.5		30.0	Saturated		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	5.0 U	5.0 U
FP-MW20	FP-MW20-5-6.5	6/3/2025	5.0	Vadose		0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.98 U	4.9 U	4.9 U
	FP-MW20-10-11.5		10.0	Saturated		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	4.9 U	4.9 U
	FP-MW20-20-20.5		20.0	Saturated		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	4.9 U	4.9 U
2024 Soil Samples														
FP-B1	FP-B1-5.0	02/08/2024	5.0	Vadose		**0.44 J**	0.12 U	**0.55**	0.12 U	0.12 U	0.12 U	0.61 U	1.4 U	1.5 U
	FP-B1-10.0	02/08/2024	10.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.12 U	0.11 U	0.58 U	1.3 U	1.4 U
	FP-B1-15.0	02/08/2024	15.0	Vadose		0.12 U	0.12 U	0.16 U	0.12 U	0.12 U	0.12 U	0.60 U	1.4 U	1.5 U
	FP-B1-20.0	02/08/2024	20.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.56 U	1.3 U	1.4 U
	FP-B1-25.0	02/08/2024	25.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.57 U	1.3 U	1.4 U
	FP-B1-30.0	02/08/2024	30.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.57 U	1.3 U	1.4 U
FP-B2	FP-B2-5.0	02/08/2024	5.0	Vadose		**0.35 J**	**0.37**	**1.3**	**0.11 J**	**0.95**	0.11 U	0.57 U	1.3 U	1.4 U
	FP-B2-10.0	02/08/2024	10.0	Vadose		**0.32 J**	**0.44**	**0.17 J**	0.11 U	**0.13 J**	0.11 U	0.55 U	1.3 U	1.4 U
	FP-B2-15.0	02/08/2024	15.0	Vadose		**0.18 J**	**0.16 J**	0.15 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U

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Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)								
						Carboxylic Acids								
						Perfluoroalkyl Carboxylic Acids		Perfluoroalkyl Carboxylic Acids (continued)				Fluorotelomer Carboxylic Acids		
					Analyte Name	Perfluoropentanoic acid	Perfluoroheptanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	3:3 Fluorotelomer carboxylate	5:3 Fluorotelomer carboxylate	7:3 Fluorotelomer carboxylate
					Abbreviation	PFPeA	PFHpA	PFUnA	PFDoDA	PFTrDA	PFTeDA	3:3FTCA	5:3FTCA	7:3FTCA
FP-B2 (cont.)	SDUP-2-20240206	02/08/2024	15.0	Vadose		**0.20 J**	**0.19 J**	0.15 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U
	FP-B2-20.0	02/08/2024	20.0	Vadose		0.12 U	0.12 U	0.16 U	0.12 U	0.13 U	0.12 U	0.63 U	1.4 U	1.6 U
	FP-B2-25.0	02/08/2024	25.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.57 U	1.3 U	1.4 U
FP-B3	FP-B3-1.0	03/28/2024	1.0	Vadose		**1.3**	**0.20 J**	0.17 U	0.13 U	0.13 U	0.13 U	0.67 U	1.5 U	1.7 U
	SDUP-240328	03/28/2024	1.0	Vadose		**1.1**	**0.22 J**	0.18 U	0.13 U	0.14 U	0.13 U	0.67 U	1.5 U	1.7 U
FP-MW7	FP-MW-7-5.0	02/07/2024	5.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.56 U	1.3 U	1.4 U
	FP-MW-7-10.0	02/07/2024	10.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.57 U	1.3 U	1.4 U
	FP-MW-7-15.0	02/07/2024	15.0	Saturated		0.11 U	0.11 U	0.15 U	0.11 U	0.12 U	0.11 U	0.58 U	1.3 U	1.4 U
	FP-MW-7-20.0	02/07/2024	20.0	Saturated		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.56 U	1.3 U	1.4 U
FP-MW8	FP-MW-8-5.0	02/06/2024	5.0	Vadose		**0.18 J**	0.12 U	0.15 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U
	SDUP-1-20240206	02/06/2024	5.0	Vadose		0.12 U	0.12 U	0.15 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U
	FP-MW-8-10.0	02/06/2024	10.0	Vadose		**0.19 J**	0.11 U	0.15 U	0.11 U	0.12 U	0.11 U	0.58 U	1.3 U	1.4 U
	FP-MW-8-15.0	02/06/2024	15.0	Saturated		**0.13 J**	0.12 U	0.15 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U
	FP-MW-8-20.0	02/06/2024	20.0	Saturated		**0.19 J**	0.12 U	0.15 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U
	FP-MW-8-25.0	02/06/2024	25.0	Saturated		**0.20 J**	0.12 U	0.16 U	0.12 U	0.12 U	0.12 U	0.60 U	1.4 U	1.5 U
	FP-MW-8-27.5	02/06/2024	27.5	Saturated		**0.28 J**	0.11 U	0.15 U	0.11 U	0.12 U	0.11 U	0.58 U	1.3 U	1.4 U
FP-MW9	FP-MW-9-5.0	02/06/2024	5.0	Vadose		**0.26 J**	0.13 U	**0.31**	0.13 U	**0.28**	0.13 U	0.65 U	1.5 U	1.6 U
	FP-MW-9-10.0	02/06/2024	10.0	Saturated		**0.31 J**	0.12 U	0.16 U	0.12 U	0.12 U	0.12 U	0.60 U	1.4 U	1.5 U
	FP-MW-9-15.0	02/06/2024	15.0	Saturated		**0.47**	0.12 U	0.15 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U
	FP-MW-9-20.0	02/06/2024	20.0	Saturated		**0.24 J**	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.56 U	1.3 U	1.4 U
	FP-MW-9-25.0	02/06/2024	25.0	Saturated		**0.26 J**	0.11 U	0.15 U	0.11 U	0.12 U	0.11 U	0.58 U	1.3 U	1.5 U
FP-MW10	FP-MW-10-5.0	02/07/2024	5.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.57 U	1.3 U	1.4 U
	FP-MW-10-10.0	02/07/2024	10.0	Vadose		0.12 U	0.12 U	0.16 U	0.12 U	0.12 U	0.12 U	0.60 U	1.4 U	1.5 U
	FP-MW-10-15.0	02/07/2024	15.0	Saturated		0.12 U	0.12 U	0.15 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U
	FP-MW-10-20.0	02/07/2024	20.0	Saturated		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.57 U	1.3 U	1.4 U
FP-MW11	FP-MW-11-5.0	02/05/2024	5.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.12 U	0.11 U	0.58 U	1.3 U	1.5 U
	FP-MW-11-10.0	02/05/2024	10.0	Vadose		**0.18 J**	0.12 U	0.15 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U
	FP-MW-11-15.0	02/05/2024	15.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.57 U	1.3 U	1.4 U
	FP-MW-11-20.0	02/05/2024	20.0	Saturated		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.57 U	1.3 U	1.4 U
FP-MW12	FP-MW-12-5.0	02/05/2024	5.0	Vadose		**0.17 J**	0.12 U	0.16 U	0.12 U	0.12 U	0.12 U	0.61 U	1.4 U	1.5 U
	FP-MW-12-10.0	02/05/2024	10.0	Vadose		0.11 U	0.11 U	0.15 U	0.11 U	0.12 U	0.11 U	0.58 U	1.3 U	1.4 U
	FP-MW-12-15.0	02/05/2024	15.0	Saturated		**0.19 J**	0.12 U	0.16 U	0.12 U	0.12 U	0.12 U	0.61 U	1.4 U	1.5 U
	FP-MW-12-20.0	02/05/2024	20.0	Saturated		0.12 U	0.12 U	0.16 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U
	FP-MW-12-25.0	02/05/2024	25.0	Saturated		0.11 U	0.11 U	0.15 U	0.11 U	0.12 U	0.11 U	0.58 U	1.3 U	1.4 U
FP-MW13	FP-MW-13-5.0	03/26/2024	5.0	Saturated		0.12 U	0.12 U	0.16 U	0.12 U	0.12 U	0.12 U	0.61 U	1.4 U	1.5 U
	FP-MW-13-10.0	03/26/2024	10.0	Saturated		0.11 U	0.11 U	0.15 U	0.11 U	0.11 U	0.11 U	0.56 U	1.3 U	1.4 U
	FP-MW-13-15.0	03/26/2024	15.0	Saturated		0.12 U	0.12 U	0.15 U	0.12 U	0.12 U	0.12 U	0.59 U	1.3 U	1.5 U
	FP-MW-13-20.0	03/26/2024	20.0	Saturated		0.11 U	0.11 U	0.14 U	0.11 U	0.11 U	0.11 U	0.55 U	1.3 U	1.4 U

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Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)								
						Carboxylic Acids								
						Perfluoroalkyl Carboxylic Acids		Perfluoroalkyl Carboxylic Acids (continued)				Fluorotelomer Carboxylic Acids		
					Analyte Name	Perfluoropentanoic acid	Perfluoroheptanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	3:3 Fluorotelomer carboxylate	5:3 Fluorotelomer carboxylate	7:3 Fluorotelomer carboxylate
					Abbreviation	PFPeA	PFHpA	PFUnA	PFDoDA	PFTrDA	PFTeDA	3:3FTCA	5:3FTCA	7:3FTCA
2025 Wetland Soil Samples														
FP-GEI-1	FP-GEI-1-1.0	6/3/2025	1.0	--		0.46 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	1.1 U	5.7 U	5.7 U
FP-GEI-2	FP-GEI-2-1.0	6/3/2025	1.0	--		**11.9**	**2.1**	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	**16.0**	4.9 U
FP-GEI-3	FP-GEI-3-1.0	6/3/2025	1.0	--		0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.99 U	5.0 U	5.0 U
Project Specific PCUL for Soil Protective of Potable Groundwater (µg/kg) - Vadose [4]						NE	NE	NE	NE	NE	NE	NE	NE	NE
Project Specific PCUL for Soil Protective of Potable Groundwater (µg/kg) - Saturated [4]						NE	NE	NE	NE	NE	NE	NE	NE	NE

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Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)													
						Carboxylic Acids (continued)				Sulfonic Acids									
						Per- and Polyfluoroether Carboxylic Acids				Perfluoroalkyl Sulfonic Acids					Fluorotelomer Sulfonic Acids		Per- and Polyfluoroether Sulfonic Acids		
					Analyte Name	4.8-Dioxa-3H-perfluorononanoic acid	Nonafluoro-3,6-dioxaheptanoic acid	Perfluoro-3-methoxypropanoic acid	Perfluoro-4-methoxybutanoic acid	Perfluoropentanesulfonic acid	Perfluorohexanesulfonic acid	Perfluorononanesulfonic acid	Perfluorodecanesulfonic acid	Perfluorododecanesulfonic acid	4:2 Fluorotelomer sulfonate	8:2 Fluorotelomer sulfonate	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acd	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	Perfluoro(2-ethoxyethane)sulfonic acid
					Abbreviation	ADONA	NFDHA	PFMPA	PFMBA	PFPeS	PFHpS	PFNS	PFDS	PFDoDS	4:2FTS	8:2FTS	9Cl-PF3ONS (F-53B Major)	11Cl-PF3OUdS (F-53B Minor)	PFEESA
2025 Soil Samples																			
FP-MW14	FP-MW14-15-16.6	6/4/2025	15.0	Vadose		0.79 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.40 U
	FP-MW14-30-31.5		30.0	Vadose		0.78 U	0.39 U	0.39 U	0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.78 U	0.78 U	0.78 U	0.78 U	0.39 U
	FP-MW14-40-41.5		40.0	Saturated		0.80 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.80 U	0.80 U	0.80 U	0.80 U	0.40 U
FP-MW15	FP-MW15-5-6.5	6/4/2025	5.0	Vadose		0.80 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.80 U	0.80 U	0.80 U	0.80 U	0.40 U
	FP-MW15-20-21.5		20.0	Vadose		0.80 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.80 U	0.80 U	0.80 U	0.80 U	0.40 U
	FP-MW15-25-26.5		25.0	Saturated		0.80 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.80 U	0.80 U	0.80 U	0.80 U	0.40 U
	FP-MW15-30-31.5		30.0	Saturated		0.80 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.80 U	0.80 U	0.80 U	0.80 U	0.40 U
FP-MW16	FP-MW16-5-6.5	6/3/2025	5.0	Vadose		0.80 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.80 U	0.80 U	0.80 U	0.80 U	0.40 U
	FP-MW16-10-11.5		10.0	Saturated		0.79 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.40 U
	FP-MW16-25-26.5		25.0	Saturated		0.80 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.80 U	0.80 U	0.80 U	0.80 U	0.40 U
FP-MW17	FP-MW17-5-6.5	6/3/2025	5.0	Vadose		0.80 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.80 U	0.80 U	0.80 U	0.80 U	0.40 U
	FP-MW17-10-11.5		10.0	Vadose		0.79 U	0.39 U	0.39 U	0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.39 U
	FP-MW17-25-26.5		25.0	Saturated		0.80 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.80 U	0.80 U	0.80 U	0.80 U	0.40 U
FP-MW18	FP-MW18-5-6	6/2/2025	5.0	Vadose		0.79 U	0.39 U	0.39 U	0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.39 U
	FP-MW18-10-11.5		10.0	Saturated		0.79 U	0.39 U	0.39 U	0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.39 U
	FP-MW18-20-20.5		20.0	Saturated		0.80 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.80 U	0.80 U	0.80 U	0.80 U	0.40 U
FP-MW19	FP-MW19-5-6	6/2/2025	5.0	Vadose		0.79 U	0.39 U	0.39 U	0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.39 U
	FP-MW19-10-11		10.0	Saturated		0.79 U	0.39 U	0.39 U	0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.39 U
	FP-MW19-30-30.5		30.0	Saturated		0.79 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.40 U
FP-MW20	FP-MW20-5-6.5	6/3/2025	5.0	Vadose		0.79 U	0.39 U	0.39 U	0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.39 U
	FP-MW20-10-11.5		10.0	Saturated		0.79 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.40 U
	FP-MW20-20-20.5		20.0	Saturated		0.79 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.40 U
2024 Soil Samples																			
FP-B1	FP-B1-5.0	02/08/2024	5.0	Vadose		0.40 U	0.29 U	0.24 U	0.24 U	0.19 U	**0.37**	**0.93**	**0.20 J**	0.18 U	0.48 U	0.72 U	0.53 U	0.48 U	0.24 U
	FP-B1-10.0	02/08/2024	10.0	Vadose		0.38 U	0.28 U	0.23 U	0.23 U	0.18 U	0.16 U	0.21 U	0.16 U	0.17 U	0.45 U	0.68 U	0.50 U	0.45 U	0.23 U
	FP-B1-15.0	02/08/2024	15.0	Vadose		0.40 U	0.29 U	0.24 U	0.24 U	0.18 U	0.17 U	0.21 U	0.17 U	0.18 U	0.47 U	0.71 U	0.52 U	0.47 U	0.24 U
	FP-B1-20.0	02/08/2024	20.0	Vadose		0.37 U	0.27 U	0.22 U	0.22 U	0.17 U	0.16 U	0.20 U	0.16 U	0.16 U	0.44 U	0.66 U	0.48 U	0.44 U	0.22 U
	FP-B1-25.0	02/08/2024	25.0	Vadose		0.38 U	0.27 U	0.22 U	0.22 U	0.18 U	0.16 U	0.20 U	0.16 U	0.17 U	0.45 U	0.67 U	0.49 U	0.45 U	0.22 U
	FP-B1-30.0	02/08/2024	30.0	Vadose		0.38 U	0.27 U	0.22 U	0.22 U	**0.22**	0.16 U	0.20 U	0.16 U	0.17 U	0.45 U	0.67 U	0.49 U	0.45 U	0.22 U
FP-B2	FP-B2-5.0	02/08/2024	5.0	Vadose		0.37 U	0.27 U	0.22 U	0.22 U	0.17 U	0.16 U	**2.1**	**0.86**	**0.17 J**	0.45 U	**62.5**	0.49 U	0.45 U	0.22 U
	FP-B2-10.0	02/08/2024	10.0	Vadose		0.37 U	0.27 U	0.22 U	0.22 U	0.17 U	0.16 U	**0.33**	0.16 U	0.16 U	0.44 U	**31.1**	0.48 U	0.44 U	0.22 U
	FP-B2-15.0	02/08/2024	15.0	Vadose		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.17 U	0.17 U	0.46 U	**0.76 J**	0.51 U	0.46 U	0.23 U

Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)													
						Carboxylic Acids (continued)				Sulfonic Acids									
						Per- and Polyfluoroether Carboxylic Acids				Perfluoroalkyl Sulfonic Acids					Fluorotelomer Sulfonic Acids		Per- and Polyfluoroether Sulfonic Acids		
					Analyte Name	4.8-Dioxa-3H-perfluorononanoic acid	Nonafluoro-3,6-dioxaheptanoic acid	Perfluoro-3-methoxypropanoic acid	Perfluoro-4-methoxybutanoic acid	Perfluoropentanesulfonic acid	Perfluoroheptanesulfonic acid	Perfluorononanesulfonic acid	Perfluorodecanesulfonic acid	Perfluorododecanesulfonic acid	4:2 Fluorotelomer sulfonate	8:2 Fluorotelomer sulfonate	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acd	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	Perfluoro(2-ethoxyethane)sulfonic acid
					Abbreviation	ADONA	NFDHA	PFMPA	PFMBA	PFPeS	PFHpS	PFNS	PFDS	PFDoDS	4:2FTS	8:2FTS	9Cl-PF3ONS (F-53B Major)	11Cl-PF3OUdS (F-53B Minor)	PFEESA
FP-B2 (cont.)	SDUP-2-20240206	02/08/2024	15.0	Vadose		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.16 U	0.17 U	0.46 U	0.69 U	0.51 U	0.46 U	0.23 U
	FP-B2-20.0	02/08/2024	20.0	Vadose		0.41 U	0.30 U	0.25 U	0.25 U	0.19 U	0.18 U	0.22 U	0.18 U	0.18 U	0.49 U	0.74 U	0.54 U	0.49 U	0.25 U
	FP-B2-25.0	02/08/2024	25.0	Vadose		0.38 U	0.27 U	0.22 U	0.22 U	0.18 U	0.16 U	0.20 U	0.16 U	0.17 U	0.45 U	0.67 U	0.49 U	0.45 U	0.22 U
FP-B3	FP-B3-1.0	03/28/2024	1.0	Vadose		0.44 U	0.32 U	0.26 U	0.26 U	0.21 U	0.19 U	0.24 U	0.19 U	0.20 U	0.52 U	0.79 U	0.57 U	0.52 U	0.26 U
	SDUP-240328	03/28/2024	1.0	Vadose		0.45 U	0.32 U	0.27 U	0.27 U	0.21 U	0.19 U	0.24 U	0.19 U	0.20 U	0.53 U	0.80 U	0.58 U	0.53 U	0.27 U
FP-MW7	FP-MW-7-5.0	02/07/2024	5.0	Vadose		0.37 U	0.27 U	0.22 U	0.22 U	0.17 U	0.16 U	0.20 U	0.16 U	0.16 U	0.44 U	0.66 U	0.48 U	0.44 U	0.22 U
	FP-MW-7-10.0	02/07/2024	10.0	Vadose		0.37 U	0.27 U	0.22 U	0.22 U	0.18 U	0.16 U	0.20 U	0.16 U	0.17 U	0.45 U	0.67 U	0.49 U	0.45 U	0.22 U
	FP-MW-7-15.0	02/07/2024	15.0	Saturated		0.38 U	0.28 U	0.23 U	0.23 U	0.18 U	0.16 U	0.21 U	0.16 U	0.17 U	0.45 U	0.68 U	0.50 U	0.45 U	0.23 U
	FP-MW-7-20.0	02/07/2024	20.0	Saturated		0.37 U	0.27 U	0.22 U	0.22 U	0.17 U	0.16 U	0.20 U	0.16 U	0.17 U	0.44 U	0.66 U	0.48 U	0.44 U	0.22 U
FP-MW8	FP-MW-8-5.0	02/06/2024	5.0	Vadose		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.16 U	0.17 U	0.46 U	0.69 U	0.51 U	0.46 U	0.23 U
	SDUP-1-20240206	02/06/2024	5.0	Vadose		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.16 U	0.17 U	0.46 U	0.69 U	0.51 U	0.46 U	0.23 U
	FP-MW-8-10.0	02/06/2024	10.0	Vadose		0.38 U	0.28 U	0.23 U	0.23 U	0.18 U	0.16 U	0.21 U	0.16 U	0.17 U	0.45 U	0.68 U	0.50 U	0.45 U	0.23 U
	FP-MW-8-15.0	02/06/2024	15.0	Saturated		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.17 U	0.17 U	0.46 U	0.69 U	0.51 U	0.46 U	0.23 U
	FP-MW-8-20.0	02/06/2024	20.0	Saturated		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.16 U	0.17 U	0.46 U	0.69 U	0.51 U	0.46 U	0.23 U
	FP-MW-8-25.0	02/06/2024	25.0	Saturated		0.40 U	0.29 U	0.24 U	0.24 U	0.19 U	0.17 U	0.21 U	0.17 U	0.18 U	0.47 U	0.71 U	0.52 U	0.47 U	0.24 U
	FP-MW-8-27.5	02/06/2024	27.5	Saturated		0.38 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.16 U	0.17 U	0.46 U	0.68 U	0.50 U	0.46 U	0.23 U
FP-MW9	FP-MW-9-5.0	02/06/2024	5.0	Vadose		0.43 U	0.31 U	0.25 U	0.25 U	0.20 U	0.18 U	0.23 U	0.18 U	0.19 U	0.51 U	0.76 U	0.56 U	0.51 U	0.25 U
	FP-MW-9-10.0	02/06/2024	10.0	Saturated		0.40 U	0.29 U	0.24 U	0.24 U	0.19 U	0.17 U	0.21 U	0.17 U	0.18 U	0.47 U	0.71 U	0.52 U	0.47 U	0.24 U
	FP-MW-9-15.0	02/06/2024	15.0	Saturated		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.16 U	0.17 U	0.46 U	0.69 U	0.51 U	0.46 U	0.23 U
	FP-MW-9-20.0	02/06/2024	20.0	Saturated		0.37 U	0.27 U	0.22 U	0.22 U	0.17 U	0.16 U	0.20 U	0.16 U	0.17 U	0.44 U	0.66 U	0.49 U	0.44 U	0.22 U
	FP-MW-9-25.0	02/06/2024	25.0	Saturated		0.38 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.16 U	0.17 U	0.46 U	0.69 U	0.50 U	0.46 U	0.23 U
FP-MW10	FP-MW-10-5.0	02/07/2024	5.0	Vadose		0.38 U	0.27 U	0.22 U	0.22 U	0.18 U	0.16 U	0.20 U	0.16 U	0.17 U	0.45 U	0.67 U	0.49 U	0.45 U	0.22 U
	FP-MW-10-10.0	02/07/2024	10.0	Vadose		0.39 U	0.29 U	0.24 U	0.24 U	0.18 U	0.17 U	0.21 U	0.17 U	0.18 U	0.47 U	0.71 U	0.52 U	0.47 U	0.24 U
	FP-MW-10-15.0	02/07/2024	15.0	Saturated		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.16 U	0.17 U	0.46 U	0.69 U	0.51 U	0.46 U	0.23 U
	FP-MW-10-20.0	02/07/2024	20.0	Saturated		0.38 U	0.27 U	0.23 U	0.23 U	0.18 U	0.16 U	0.20 U	0.16 U	0.17 U	0.45 U	0.68 U	0.49 U	0.45 U	0.23 U
FP-MW11	FP-MW-11-5.0	02/05/2024	5.0	Vadose		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.16 U	0.17 U	0.46 U	0.69 U	0.50 U	0.46 U	0.23 U
	FP-MW-11-10.0	02/05/2024	10.0	Vadose		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.17 U	0.17 U	0.46 U	0.69 U	0.51 U	0.46 U	0.23 U
	FP-MW-11-15.0	02/05/2024	15.0	Vadose		0.37 U	0.27 U	0.22 U	0.22 U	0.18 U	0.16 U	0.20 U	0.16 U	0.17 U	0.45 U	0.67 U	0.49 U	0.45 U	0.22 U
	FP-MW-11-20.0	02/05/2024	20.0	Saturated		0.37 U	0.27 U	0.22 U	0.22 U	0.18 U	0.16 U	0.20 U	0.16 U	0.17 U	0.45 U	0.67 U	0.49 U	0.45 U	0.22 U
FP-MW12	FP-MW-12-5.0	02/05/2024	5.0	Vadose		0.40 U	0.29 U	0.24 U	0.24 U	**0.34**	**0.93**	0.22 U	0.17 U	0.18 U	0.48 U	0.71 U	0.52 U	0.48 U	0.24 U
	FP-MW-12-10.0	02/05/2024	10.0	Vadose		0.38 U	0.28 U	0.23 U	0.23 U	0.18 U	**0.19 J**	0.21 U	0.16 U	0.17 U	0.45 U	0.68 U	0.50 U	0.45 U	0.23 U
	FP-MW-12-15.0	02/05/2024	15.0	Saturated		0.40 U	0.29 U	0.24 U	0.24 U	0.19 U	**0.31**	0.22 U	**0.18 J**	0.18 U	0.48 U	0.72 U	0.52 U	0.48 U	0.24 U
	FP-MW-12-20.0	02/05/2024	20.0	Saturated		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.17 U	0.17 U	0.47 U	0.70 U	0.51 U	0.47 U	0.23 U
	FP-MW-12-25.0	02/05/2024	25.0	Saturated		0.38 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.16 U	0.17 U	0.46 U	0.68 U	0.50 U	0.46 U	0.23 U
FP-MW13	FP-MW-13-5.0	03/26/2024	5.0	Saturated		0.41 U	0.29 U	0.24 U	0.24 U	0.19 U	0.17 U	0.22 U	0.17 U	0.18 U	0.48 U	0.72 U	0.53 U	0.48 U	0.24 U
	FP-MW-13-10.0	03/26/2024	10.0	Saturated		0.37 U	0.27 U	0.22 U	0.22 U	0.17 U	0.16 U	0.20 U	0.16 U	0.17 U	0.44 U	0.66 U	0.49 U	0.44 U	0.22 U
	FP-MW-13-15.0	03/26/2024	15.0	Saturated		0.39 U	0.28 U	0.23 U	0.23 U	0.18 U	0.17 U	0.21 U	0.17 U	0.17 U	0.46 U	0.69 U	0.51 U	0.46 U	0.23 U
	FP-MW-13-20.0	03/26/2024	20.0	Saturated		0.37 U	0.27 U	0.22 U	0.22 U	0.17 U	0.16 U	0.20 U	0.16 U	0.16 U	0.43 U	0.65 U	0.48 U	0.43 U	0.22 U

Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)													
						Carboxylic Acids (continued)				Sulfonic Acids									
						Per- and Polyfluoroether Carboxylic Acids				Perfluoroalkyl Sulfonic Acids					Fluorotelomer Sulfonic Acids		Per- and Polyfluoroether Sulfonic Acids		
					Analyte Name	4.8-Dioxa-3H-perfluorononanoic acid	Nonafluoro-3,6-dioxaheptanoic acid	Perfluoro-3-methoxypropanoic acid	Perfluoro-4-methoxybutanoic acid	Perfluoropentanesulfonic acid	Perfluoroheptanesulfonic acid	Perfluorononanesulfonic acid	Perfluorodecanesulfonic acid	Perfluorododecanesulfonic acid	4:2 Fluorotelomer sulfonate	8:2 Fluorotelomer sulfonate	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acd	11-Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	Perfluoro(2-ethoxyethane)sulfonic acid
					Abbreviation	ADONA	NFDHA	PFMPA	PFMBA	PFPeS	PFHpS	PFNS	PFDS	PFDoDS	4:2FTS	8:2FTS	9Cl-PF3ONS (F-53B Major)	11Cl-PF3OUdS (F-53B Minor)	PFEESA
2025 Wetland Soil Samples																			
FP-GEI-1	FP-GEI-1-1.0	6/3/2025	1.0	--		0.92 U	0.46 U	0.46 U	0.46 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.92 U	0.92 U	0.92 U	0.92 U	0.46 U
FP-GEI-2	FP-GEI-2-1.0	6/3/2025	1.0	--		0.79 U	0.39 U	0.39 U	0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.39 U
FP-GEI-3	FP-GEI-3-1.0	6/3/2025	1.0	--		0.79 U	0.40 U	0.40 U	0.40 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.40 U
Project Specific PCUL for Soil Protective of Potable Groundwater (µg/kg) - Vadose [4]						NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Project Specific PCUL for Soil Protective of Potable Groundwater (µg/kg) - Saturated [4]						NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

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Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)							Sum of Detected PFAS by EPA 1633[5]
						Sulfonic Acids (continued)							
						Perfluorooctane Sulfonamides/Amidoacetic Acids/Sulfonamido Ethanols							
					Analyte Name	Perfluorooctanesulfonamide	N-Methylperfluorooctanesulfonamide	N-Methylperfluorooctanesulfonamidoacitic acid	N-Methylperfluorooctanesulfonamidothanol	N-Ethylperfluorooctanesulfonamide	N-Ethylperfluorooctanesulonamidoacetic acid	N-Ethylperfluorooctanesulfonamidothanol	
					Abbreviation	PFOSA	MeFOSA	MeFOSAA	MeFOSE	EtFOSA	EtFOSAA	EtFOSE	
2025 Soil Samples													
FP-MW14	FP-MW14-15-16.6	6/4/2025	15.0	Vadose		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	**0.83**
	FP-MW14-30-31.5		30.0	Vadose		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW14-40-41.5		40.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	**0.28**
FP-MW15	FP-MW15-5-6.5	6/4/2025	5.0	Vadose		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	**0.39**
	FP-MW15-20-21.5		20.0	Vadose		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW15-25-26.5		25.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW15-30-31.5		30.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
FP-MW16	FP-MW16-5-6.5	6/3/2025	5.0	Vadose		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW16-10-11.5		10.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW16-25-26.5		25.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
FP-MW17	FP-MW17-5-6.5	6/3/2025	5.0	Vadose		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW17-10-11.5		10.0	Vadose		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW17-25-26.5		25.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
FP-MW18	FP-MW18-5-6	6/2/2025	5.0	Vadose		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	**0.21**
	FP-MW18-10-11.5		10.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW18-20-20.5		20.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
FP-MW19	FP-MW19-5-6	6/2/2025	5.0	Vadose		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW19-10-11		10.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW19-30-30.5		30.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
FP-MW20	FP-MW20-5-6.5	6/3/2025	5.0	Vadose		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW20-10-11.5		10.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
	FP-MW20-20-20.5		20.0	Saturated		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
2024 Soil Samples													
FP-B1	FP-B1-5.0	02/08/2024	5.0	Vadose		**0.45**	0.16 U	0.19 U	1.2 U	0.12 U	0.24 U	1.2 U	**42.66**
	FP-B1-10.0	02/08/2024	10.0	Vadose		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	**8.8**
	FP-B1-15.0	02/08/2024	15.0	Vadose		0.12 U	0.16 U	0.19 U	1.2 U	0.12 U	0.23 U	1.2 U	**2.57**
	FP-B1-20.0	02/08/2024	20.0	Vadose		0.11 U	0.15 U	0.17 U	1.1 U	0.11 U	0.22 U	1.1 U	**0.46**
	FP-B1-25.0	02/08/2024	25.0	Vadose		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	**1.5**
	FP-B1-30.0	02/08/2024	30.0	Vadose		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	**6.92**
FP-B2	FP-B2-5.0	02/08/2024	5.0	Vadose		**1.6**	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	**170.95**
	FP-B2-10.0	02/08/2024	10.0	Vadose		**0.36**	0.15 U	0.17 U	1.1 U	0.11 U	0.21 U	1.1 U	**73.44**
	FP-B2-15.0	02/08/2024	15.0	Vadose		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	**54.87**

Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)							Sum of Detected PFAS by EPA 1633[5]
						Sulfonic Acids (continued)							
						Perfluorooctane Sulfonamides/Amidoacetic Acids/Sulfonamido Ethanols							
					Analyte Name	Perfluorooctanesulfonamide	N-Methylperfluorooctanesulfonamide	N-Methylperfluorooctane sulfonamidoacitic acid	N-Methylperfluorooctanesulfonamidothanol	N-Ethylperfluorooctanesulfonamide	N-Ethylperfluorooctane sulonamidoacetic acid	N-Ethylperfluorooctanesulfonamidothanol	
					Abbreviation	PFOSA	MeFOSA	MeFOSAA	MeFOSE	EtFOSA	EtFOSAA	EtFOSE	
FP-B2 (cont.)	SDUP-2-20240206	02/08/2024	15.0	Vadose		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	**41.71**
	FP-B2-20.0	02/08/2024	20.0	Vadose		0.12 U	0.17 U	0.19 U	1.2 U	0.12 U	0.24 U	1.2 U	**7.6**
	FP-B2-25.0	02/08/2024	25.0	Vadose		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	**2.26**
FP-B3	FP-B3-1.0	03/28/2024	1.0	Vadose		0.13 U	0.18 U	0.21 U	1.3 U	0.13 U	0.26 U	1.3 U	**2.15**
	SDUP-240328	03/28/2024	1.0	Vadose		0.13 U	0.18 U	0.21 U	1.3 U	0.13 U	0.26 U	1.3 U	**1.91**
FP-MW7	FP-MW-7-5.0	02/07/2024	5.0	Vadose		0.11 U	0.15 U	0.17 U	1.1 U	0.11 U	0.22 U	1.1 U	0 U
	FP-MW-7-10.0	02/07/2024	10.0	Vadose		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	0 U
	FP-MW-7-15.0	02/07/2024	15.0	Saturated		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	0 U
	FP-MW-7-20.0	02/07/2024	20.0	Saturated		0.11 U	0.15 U	0.17 U	1.1 U	0.11 U	0.22 U	1.1 U	0 U
FP-MW8	FP-MW-8-5.0	02/06/2024	5.0	Vadose		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	**1.6**
	SDUP-1-20240206	02/06/2024	5.0	Vadose		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	**1.6**
	FP-MW-8-10.0	02/06/2024	10.0	Vadose		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	0 U
	FP-MW-8-15.0	02/06/2024	15.0	Saturated		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	0 U
	FP-MW-8-20.0	02/06/2024	20.0	Saturated		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	**0.23**
	FP-MW-8-25.0	02/06/2024	25.0	Saturated		0.12 U	0.16 U	0.19 U	1.2 U	0.12 U	0.23 U	1.2 U	**0.25**
	FP-MW-8-27.5	02/06/2024	27.5	Saturated		0.11 U	0.15 U	0.18 U	1.1 U	0.12 U	0.22 U	1.1 U	0 U
FP-MW9	FP-MW-9-5.0	02/06/2024	5.0	Vadose		0.13 U	0.17 U	0.20 U	1.3 U	0.13 U	0.25 U	1.3 U	**3.78**
	FP-MW-9-10.0	02/06/2024	10.0	Saturated		0.12 U	0.16 U	0.19 U	1.2 U	0.12 U	0.23 U	1.2 U	**1.7**
	FP-MW-9-15.0	02/06/2024	15.0	Saturated		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	**1.69**
	FP-MW-9-20.0	02/06/2024	20.0	Saturated		0.11 U	0.15 U	0.17 U	1.1 U	0.11 U	0.22 U	1.1 U	0 U
	FP-MW-9-25.0	02/06/2024	25.0	Saturated		0.11 U	0.16 U	0.18 U	1.1 U	0.12 U	0.23 U	1.1 U	0 U
FP-MW10	FP-MW-10-5.0	02/07/2024	5.0	Vadose		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	0 U
	FP-MW-10-10.0	02/07/2024	10.0	Vadose		0.12 U	0.16 U	0.19 U	1.2 U	0.12 U	0.23 U	1.2 U	0 U
	FP-MW-10-15.0	02/07/2024	15.0	Saturated		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	0 U
	FP-MW-10-20.0	02/07/2024	20.0	Saturated		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	**0.3**
FP-MW11	FP-MW-11-5.0	02/05/2024	5.0	Vadose		0.11 U	0.16 U	0.18 U	1.1 U	0.12 U	0.23 U	1.1 U	**1.5**
	FP-MW-11-10.0	02/05/2024	10.0	Vadose		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	**3.5**
	FP-MW-11-15.0	02/05/2024	15.0	Vadose		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	**1.8**
	FP-MW-11-20.0	02/05/2024	20.0	Saturated		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	0 U
FP-MW12	FP-MW-12-5.0	02/05/2024	5.0	Vadose		0.12 U	0.16 U	0.19 U	1.2 U	0.12 U	0.23 U	1.2 U	**82.37**
	FP-MW-12-10.0	02/05/2024	10.0	Vadose		0.11 U	0.15 U	0.18 U	1.1 U	0.11 U	0.22 U	1.1 U	**17.2**
	FP-MW-12-15.0	02/05/2024	15.0	Saturated		0.12 U	0.16 U	0.19 U	1.2 U	0.12 U	0.23 U	1.2 U	**38.21**
	FP-MW-12-20.0	02/05/2024	20.0	Saturated		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	0 U
	FP-MW-12-25.0	02/05/2024	25.0	Saturated		0.11 U	0.16 U	0.18 U	1.1 U	0.12 U	0.22 U	1.1 U	0 U
FP-MW13	FP-MW-13-5.0	03/26/2024	5.0	Saturated		0.12 U	0.16 U	0.19 U	1.2 U	0.12 U	0.24 U	1.2 U	0 U
	FP-MW-13-10.0	03/26/2024	10.0	Saturated		0.11 U	0.15 U	0.17 U	1.1 U	0.11 U	0.22 U	1.1 U	0 U
	FP-MW-13-15.0	03/26/2024	15.0	Saturated		0.12 U	0.16 U	0.18 U	1.2 U	0.12 U	0.23 U	1.2 U	0 U
	FP-MW-13-20.0	03/26/2024	20.0	Saturated		0.11 U	0.15 U	0.17 U	1.1 U	0.11 U	0.21 U	1.1 U	0 U

Sample Location[2]	Sample Identification	Sample Date	Sample Depth (feet bgs)	Vadose or Saturated Samples[3]	Analyte Group	Per- and Polyfluoroalkyl Substances (continued) (µg/kg)							Sum of Detected PFAS by EPA 1633[5]
						Sulfonic Acids (continued)							
						Perfluorooctane Sulfonamides/Amidoacetic Acids/Sulfonamido Ethanols							
					Analyte Name	Perfluorooctanesulfonamide	N-Methylperfluorooctanesulfonamide	N-Methylperfluorooctane sulfonamidoacitic acid	N-Methylperfluorooctanesulfonamidothanol	N-Ethylperfluorooctanesulfonamide	N-Ethylperfluorooctane sulonamidoacetic acid	N-Ethylperfluorooctanesulfonamidothanol	
					Abbreviation	PFOSA	MeFOSA	MeFOSAA	MeFOSE	EtFOSA	EtFOSAA	EtFOSE	
2025 Wetland Soil Samples													
FP-GEI-1	FP-GEI-1-1.0	6/3/2025	1.0	--		0.23 U	0.23 U	0.23 U	2.3 U	0.23 U	0.23 U	2.3 U	**2.08**
FP-GEI-2	FP-GEI-2-1.0	6/3/2025	1.0	--		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	**44.32**
FP-GEI-3	FP-GEI-3-1.0	6/3/2025	1.0	--		0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	0 U
Project Specific PCUL for Soil Protective of Potable Groundwater (µg/kg) - Vadose [4]						NE	NE	NE	NE	NE	NE	NE	NE
Project Specific PCUL for Soil Protective of Potable Groundwater (µg/kg) - Saturated [4]						NE	NE	NE	NE	NE	NE	NE	NE

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Notes:

[1] Chemical analyses performed by Pace Analytical of Minneapolis, Minnesota. PFAS compounds wereanalyzed by EPA Method 1633.

[2] Approximate sample locations are shown on Figure 4.

[3] The interpretation of vadose and saturated soil samples was determined by GeoEngineers using depth to groundwater measured at the time of well construction.

[4] PCULs were established by the Washington State Department of Ecology (updated February 2025). Where laboratory RLs exceeded PCULs, the RLs were adopted as the new PCULs.
Per WAC 173-340-830(2), if the practical quantitation limit is greater than the cleanup level, the cleanup level is considered attained when nondetects meet method and EPA quantitation requirements.

[5] The total detected PFAS concentration reflects only those analytes included in EPA Method 1633. Other PFAS compounds not measured by this method may be present but are not accounted for in these results.

bgs = below ground surface

µg/kg = micrograms per kilogram

PCUL = Preliminary Cleanup Level

U = Analyte not detected at a concentration greater than the listed reporting limit.

NE = Not established

Bolded value indicates analyte detected at the concentration shown.

Gray shaded value indicates the detected concentration is greater than the Preliminary Cleanup Level.

Italicized value indicates the analyte was not detected but the reporting limit is greater than the Preliminary Cleanup Level.

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Table 6

2024-2025 Water Chemical Analytical Results[1]

Per- and Polyfluoroalkyl Substances (PFAS)

Paine Field Fire Training Pit PFAS Site at Snohomish Paine Field County Airport
Everett, Washington

Sample Location[2]	Sample Identification	Sample Date	Analyte Group	Per- and Polyfluoroalkyl Substances (PFAS) (ng/L)											
				Compounds with Washington PCUL											
			Analyte Name	Perfluorooctanoic acid	Perfluorooctanesulfonic acid	Perfluorononanoic acid	Perfluorohexanesulfonic acid	Perfluorobutanesulfonic acid	Perfluorobutanoic acid	Perfluorohexanoic acid	Hexafluoropropylene oxide dimer acid	Perfluorodecanoic acid	6:2 Fluorotelomer sulfonate	Hazard Index (HI; unitless)[3]
			Abbreviation	PFOA	PFOS	PFNA	PFHxS	PFBS	PFBA	PFHxA	HFPO-DA (GenX)	PFDA	6:2FTS	
2025 Surface Water Samples														
FP-SW2	FP-SW2-250604	6/4/2025		*800 U*	*800 U*	*800 U*	*800 U*	800 U	3,200 U	**3,180**	*3,200 U*	*800 U*	3,200 U	**80**
FP-SW6	FP-SW6-250603	6/3/2025		*800 U*	*800 U*	*800 U*	*800 U*	800 U	3,200 U	800 U	*3,200 U*	*800 U*	3,200 U	0
FP-SW7	FP-SW7-250603	6/3/2025		*6.4 U*	**7.2**	6.4 U	*6.4 U*	6.4 U	25.5 U	**6.5**	*25.5 U*	*6.4 U*	25.5 U	**1**
FP-SW8	FP-SW8-250603	6/3/2025		*15.7 U*	*15.7 U*	*15.7 U*	**283**	**33.4**	**349**	**783**	*62.7 U*	*15.7 U*	62.7 U	**29**
2024 Surface Water Samples														
FP-SEEP	FP-SEEP-20240207	2/7/2024		**185**	**1160**	**135**	**844**	**102**	**451**	**1,350**	2.3 U	0.57 U	**992**	**100**
FP-SW1	FP-SW1-20240207	2/7/2024		**83.4**	**151**	**19.2**	**349**	**52.9**	**604**	**2,060**	1.9 U	0.47 U	**1960**	**40**
FP-SW2	FP-SW2-20240206	2/6/2024		**216**	**116**	**15.3**	**345**	**54.3**	**827**	**2,020**	2.0 U	0.50 U	**4300**	**40**
FP-SW3	FP-SW3-240328	3/28/2024		*4.2 U*	*8.3 U*	5.1 U	**89.1**	**17.8**	**105**	**244**	8.3 U	4.2 U	33 U	**10**
FP-SW4	FP-SW4-240328	3/28/2024		**15.7**	**88**	**5.5**	**47.2**	**4.4**	**12.5**	**43.1**	1.1 U	**1.8 J**	**55.4**	**10**
FP-SW5	FP-SW5-240328	3/28/2024		**16.5**	**97.1**	**4.5**	**66.7**	**4.2**	**16.6**	**45.5**	1.2 U	**0.92 J**	**130**	**10**
	WDUP-240328			**16.1**	**125**	**5.3**	**77.9**	**5.2**	**17**	**47.6**	1.1 U	**0.69 J**	**103**	**10**
PCUL for Surface Water, MTCA Method B (ng/L)[4]				4	4	10	0.0064	4,800	8,000	8,000	10	0.032	3,200	1
2025 Groundwater Samples														
FP-MW5	FP-MW5-250610	6/10/2025		**1.6**	1.6 U	1.6 U	*1.6 U*	1.6 U	6.2 U	1.6 U	6.2 U	*1.6 U*	6.2 U	0
FP-MW7	FP-MW7-250610	6/10/2025		1.6 U	1.6 U	1.6 U	**1.9**	1.6 U	6.2 U	1.6 U	6.2 U	*1.6 U*	6.2 U	0
FP-MW8	FP-MW8-250610	6/10/2025		**187**	**301**	**11.5**	**879**	**124**	**179**	**506**	*12.6 U*	*3.1 U*	**630**	**89**
FP-MW10	FP-MW10-250610	6/10/2025		**131**	**357**	**6.7**	**469**	**46.5**	**69.5**	**158**	*12.8 U*	*3.2 U*	**849**	**48**
FP-MW11	FP-MW11-250610	6/10/2025		**18.7**	**303**	**3.7**	**265**	**26.6**	**9.3**	**26.1**	6.2 U	*1.6 U*	6.2 U	**27**
FP-MW12	FP-MW12-250610	6/10/2025		**20.8**	**11.2**	3.2 U	**850**	**64.8**	12.8 U	**26.3**	*12.8 U*	*3.2 U*	12.8 U	**85**
FP-MW14	FP-MW14-250610	6/10/2025		**122**	**316**	**4.0**	**277**	**29.0**	**75.6**	**193**	*12.7 U*	*3.2 U*	**1,580**	**28**
FP-MW15	FP-MW15-250609	6/9/2025		3.2 U	3.2 U	3.2 U	**47.4**	**4.3**	**23.1**	**32.0**	*12.6 U*	*3.2 U*	12.6 U	**5**
FP-MW16	FP-MW16-250609	6/9/2025		**20.6**	**2.2**	1.6 U	**4.8**	1.6 U	**6.4**	**16.2**	6.2 U	*1.6 U*	6.2 U	**1**
	DUP-1-250609			**22.0**	**1.9**	1.6 U	**5.1**	1.6 U	**6.8**	**16.9**	6.2 U	*1.6 U*	6.2 U	**1**
FP-MW17	FP-MW17-250609	6/9/2025		1.6 U	1.6 U	1.6 U	**1.9**	1.6 U	6.2 U	1.6 U	6.2 U	*1.6 U*	6.2 U	0
FP-MW18	FP-MW18-250609	6/9/2025		1.6 U	1.6 U	1.6 U	*1.6 U*	1.6 U	6.2 U	1.6 U	6.2 U	*1.6 U*	6.2 U	0
FP-MW19	FP-MW19-250609	6/9/2025		**1.7**	1.5 U	1.5 U	**28.7**	**3.0**	**8.1**	**5.8**	6.2 U	*1.5 U*	6.2 U	**3**
FP-MW20	FP-MW20-250609	6/9/2025		1.5 U	1.5 U	1.5 U	*1.5 U*	1.5 U	6.1 U	1.5 U	6.1 U	*1.5 U*	6.1 U	0
RB-1	RB-1-250609	6/9/2025		1.5 U	1.5 U	1.5 U	*1.5 U*	1.5 U	6.1 U	1.5 U	6.1 U	*1.5 U*	6.1 U	0

Sample Location[2]	Sample Identification	Sample Date	Analyte Group	Per- and Polyfluoroalkyl Substances (PFAS) (ng/L)										
				Compounds with Washington PCUL										
			Analyte Name	Perfluorooctanoic acid	Perfluorooctanesulfonic acid	Perfluorononanoic acid	Perfluorohexanesulfonic acid	Perfluorobutanesulfonic acid	Perfluorobutanoic acid	Perfluorohexanoic acid	Hexafluoropropylene oxide dimer acid	Perfluorodecanoic acid	6:2 Fluorotelomer sulfonate	Hazard Index (HI; unitless)[3]
			Abbreviation	PFOA	PFOS	PFNA	PFHxS	PFBS	PFBA	PFHxA	HFPO-DA (GenX)	PFDA	6:2FTS	
2024 Groundwater Samples														
FP-MW7	FP-MW7-20240213	2/13/2024		0.44 U	**1 J**	0.54 U	**2.9**	0.88 U	3.5 U	0.44 U	1.8 U	0.44 U	3.5 U	0
FP-MW8	FP-MW8-20240213	2/13/2024		**207**	**270**	**11.1**	**1410**	**302**	**240**	**737**	1.9 U	0.48 U	**1370**	**100**
FP-MW9	FP-MW9-20240213	2/13/2024		**13.6**	**4.5**	**1.5 J**	**10.9**	**1.5 J**	**418**	**1,350**	1.9 U	0.46 U	**4380**	**1**
FP-MW10	FP-MW10-20240213	2/13/2024		**90.2**	**420**	**5.9**	**426**	**48.1**	**66.6**	**156**	1.8 U	0.45 U	**627**	**40**
FP-MW11	FP-MW11-20240214	2/14/2024		**28.3**	**414**	**4.3**	**391**	**26.8**	**9.5**	**20.8**	1.8 U	0.45 U	3.6 U	**40**
	FP-MWDUP-20240214	2/14/2024		**28.5**	**416**	**4**	**375**	**26.6**	**9.7**	**21**	1.8 U	0.45 U	3.6 U	**40**
FP-MW12	FP-MW12-20240214	2/14/2024		**30.8**	**11.5**	0.58 U	**1290**	**189**	**8.6**	**46.2**	1.9 U	0.47 U	3.8 U	**100**
FP-MW13	FP-MW13-240328	3/28/2024		**2.5**	1.2 U	0.71 U	**61.2**	**13.9**	**85.5**	**231**	1.2 U	0.58 U	4.7 U	**10**
Equipment Blanks	EB-20240209	2/9/2024		0.46 U	0.93 U	0.56 U	0.93 U	0.93 U	3.7 U	0.46 U	1.9 U	0.46 U	3.7 U	0
	EB-20240214	2/14/2024		0.45 U	0.89 U	0.54 U	0.89 U	0.89 U	3.6 U	0.45 U	1.8 U	0.45 U	3.6 U	0
	EB1-240328	3/28/2024		0.45 U	0.91 U	0.55 U	0.91 U	0.91 U	3.6 U	0.45 U	0.91 U	0.45 U	3.6 U	0
	FB-240328	3/28/2024		0.45 U	0.89 U	0.54 U	0.89 U	0.89 U	3.6 U	0.45 U	0.89 U	0.45 U	3.6 U	0
PCUL for Groundwater (ng/L)[5,6]				4	4	10	0.0064	4800	8000	8000	10	0.032	3200	1

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Sample Location[2]	Sample Identification	Sample Date	Analyte Group	Per- and Polyfluoroalkyl Substances (PFAS) (ng/L)												
				Carboxylic Acids												
				Perfluoroalkyl Carboxylic Acids						Fluorotelomer Carboxylic Acids			Per- and Polyfluoroether Carboxylic Acids			
			Analyte Name	Perfluoropentanoic acid	Perfluoroheptanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	3:3 Fluorotelomer carboxylate	5:3 Fluorotelomer carboxylate	7:3 Fluorotelomer carboxylate	4,8-Dioxa-3H-perfluorononanoic acid	Nonafluoro-3,6-dioxaheptanoic acid	Perfluoro-3-methoxypropanoic acid	Perfluoro-4-methoxybutanoic acid
			Abbreviation	PFPeA	PFHpA	PFUnA	PFDoDA	PFTrDA	PFTeDA	3:3FTCA	5:3FTCA	7:3FTCA	ADONA	NFDHA	PFMPA	PFMBA
2025 Surface Water Samples																
FP-SW2	FP-SW2-250604	6/4/2025		**7,140**	**883**	800 U	800 U	800 U	800 U	4,000 U	20,000 U	20,000 U	3,200 U	1,600 U	1,600 U	1,600 U
FP-SW6	FP-SW6-250603	6/3/2025		1,600 U	800 U	800 U	800 U	800 U	800 U	4,000 U	20,000 U	20,000 U	3,200 U	1,600 U	1,600 U	1,600 U
FP-SW7	FP-SW7-250603	6/3/2025		12.7 U	6.4 U	6.4 U	6.4 U	6.4 U	6.4 U	31.8 U	159 U	159 U	25.5 U	12.7 U	12.7 U	12.7 U
FP-SW8	FP-SW8-250603	6/3/2025		**1,830**	**240**	15.7 U	15.7 U	15.7 U	15.7 U	78.4 U	392 U	392 U	62.7 U	31.4 U	31.4 U	31.4 U
2024 Surface Water Samples																
FP-SEEP	FP-SEEP-20240207	2/7/2024		**2890**	**398**	0.68 U	0.68 U	0.95 U	0.57 U	**6.8 J**	**24.2 J**	11 U	2.3 U	1.4 U	1.1 U	1.3 U
FP-SW1	FP-SW1-20240207	2/7/2024		**4560**	**518**	0.57 U	0.57 U	0.79 U	0.47 U	**8.4 J**	**16.7 J**	9.4 U	1.9 U	1.1 U	0.94 U	1.1 U
FP-SW2	FP-SW2-20240206	2/6/2024		**4500**	**655**	0.60 U	0.60 U	0.84 U	0.50 U	5.0 U	**17.6 J**	10 U	2.0 U	1.2 U	1.0 U	1.1 U
FP-SW3	FP-SW3-240328	3/28/2024		**573**	**84.5**	5.0 U	5.0 U	7.0 U	4.2 U	42 U	83 U	83 U	17 U	10 U	8.3 U	9.5 U
FP-SW4	FP-SW4-240328	3/28/2024		**42.6**	**14.7**	0.66 U	0.66 U	0.92 U	0.55 U	5.5 U	11 U	11 U	2.2 U	1.3 U	1.1 U	1.3 U
FP-SW5	FP-SW5-240328	3/28/2024		**57.1**	**16.6**	0.72 U	0.72 U	1.0 U	0.60 U	6.0 U	12 U	12 U	2.4 U	1.4 U	1.2 U	1.4 U
	WDUP-240328			**63**	**16.9**	0.65 U	0.65 U	0.91 U	0.54 U	5.4 U	11 U	11 U	2.2 U	1.3 U	1.1 U	1.2 U
PCUL for Surface Water, MTCA Method B (ng/L)[4]				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
2025 Groundwater Samples																
FP-MW5	FP-MW5-250610	6/10/2025		3.1 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	7.8 U	39.0 U	39.0 U	6.2 U	3.1 U	3.1 U	3.1 U
FP-MW7	FP-MW7-250610	6/10/2025		3.1 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	7.8 U	39.0 U	39.0 U	6.2 U	3.1 U	3.1 U	3.1 U
FP-MW8	FP-MW8-250610	6/10/2025		**832**	**237**	3.1 U	3.1 U	3.1 U	3.1 U	15.7 U	78.6 U	78.6 U	12.6 U	6.3 U	6.3 U	6.3 U
FP-MW10	FP-MW10-250610	6/10/2025		**267**	**103**	3.2 U	3.2 U	3.2 U	3.2 U	16.0 U	80.2 U	80.2 U	12.8 U	6.4 U	6.4 U	6.4 U
FP-MW11	FP-MW11-250610	6/10/2025		**22.1**	**7.8**	1.6 U	1.6 U	1.6 U	1.6 U	7.8 U	38.9 U	38.9 U	6.2 U	3.1 U	3.1 U	3.1 U
FP-MW12	FP-MW12-250610	6/10/2025		**7.9**	**4.1**	3.2 U	3.2 U	3.2 U	3.2 U	16.0 U	79.9 U	79.9 U	12.8 U	6.4 U	6.4 U	6.4 U
FP-MW14	FP-MW14-250610	6/10/2025		**341**	**115**	3.2 U	3.2 U	3.2 U	3.2 U	15.9 U	79.5 U	79.5 U	12.7 U	6.4 U	6.4 U	6.4 U
FP-MW15	FP-MW15-250609	6/9/2025		**74.4**	**8.9**	3.2 U	3.2 U	3.2 U	3.2 U	15.8 U	79.0 U	79.0 U	12.6 U	6.3 U	6.3 U	6.3 U
FP-MW16	FP-MW16-250609	6/9/2025		**19.3**	**13.6**	1.6 U	1.6 U	1.6 U	1.6 U	7.8 U	38.9 U	38.9 U	6.2 U	3.1 U	3.1 U	3.1 U
	DUP-1-250609			**19.8**	**14.3**	1.6 U	1.6 U	1.6 U	1.6 U	7.8 U	39.0 U	39.0 U	6.2 U	3.1 U	3.1 U	3.1 U
FP-MW17	FP-MW17-250609	6/9/2025		3.1 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	7.8 U	38.9 U	38.9 U	6.2 U	3.1 U	3.1 U	3.1 U
FP-MW18	FP-MW18-250609	6/9/2025		3.1 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	7.8 U	38.8 U	38.8 U	6.2 U	3.1 U	3.1 U	3.1 U
FP-MW19	FP-MW19-250609	6/9/2025		**5.6**	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	7.7 U	38.7 U	38.7 U	6.2 U	3.1 U	3.1 U	3.1 U
FP-MW20	FP-MW20-250609	6/9/2025		3.1 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	7.7 U	38.4 U	38.4 U	6.1 U	3.1 U	3.1 U	3.1 U
RB-1	RB-1-250609	6/9/2025		3.0 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	7.6 U	37.8 U	37.8 U	6.1 U	3.0 U	3.0 U	3.0 U

Sample Location[2]	Sample Identification	Sample Date	Analyte Group	Per- and Polyfluoroalkyl Substances (PFAS) (ng/L)												
				Carboxylic Acids												
				Perfluoroalkyl Carboxylic Acids						Fluorotelomer Carboxylic Acids			Per- and Polyfluoroether Carboxylic Acids			
			Analyte Name	Perfluoropentanoic acid	Perfluoroheptanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	3:3 Fluorotelomer carboxylate	5:3 Fluorotelomer carboxylate	7:3 Fluorotelomer carboxylate	4.8-Dioxa-3H-perfluorononanoic acid	Nonafluoro-3,6-dioxaheptanoic acid	Perfluoro-3-methoxypropanoic acid	Perfluoro-4-methoxybutanoic acid
			Abbreviation	PFPeA	PFHpA	PFUnA	PFDoDA	PFTrDA	PFTeDA	3:3FTCA	5:3FTCA	7:3FTCA	ADONA	NFDHA	PFMPA	PFMBA
2024 Groundwater Samples																
FP-MW7	FP-MW7-20240213	2/13/2024		0.88 U	0.44 U	0.53 U	0.53 U	0.74 U	0.44 U	4.4 U	8.8 U	8.8 U	1.8 U	1.1 U	0.88 U	1.0 U
FP-MW8	FP-MW8-20240213	2/13/2024		**1160**	**360**	0.58 U	0.58 U	0.81 U	0.48 U	4.8 U	**11.5 J**	9.6 U	1.9 U	1.2 U	0.96 U	1.1 U
FP-MW9	FP-MW9-20240213	2/13/2024		**2620**	**224**	0.56 U	0.56 U	0.78 U	0.46 U	4.6 U	**26 J**	9.3 U	1.9 U	1.1 U	0.93 U	1.1 U
FP-MW10	FP-MW10-20240213	2/13/2024		**272**	**97.5**	0.55 U	0.55 U	0.76 U	0.45 U	4.5 U	9.1 U	9.1 U	1.8 U	1.1 U	0.91 U	1.0 U
FP-MW11	FP-MW11-20240214	2/14/2024		**22.5**	**10.8**	0.54 U	0.54 U	0.75 U	0.45 U	4.5 U	8.9 U	8.9 U	1.8 U	1.1 U	0.89 U	1.0 U
	FP-MWDUP-20240214	2/14/2024		**22.4**	**10.6**	0.54 U	0.54 U	0.75 U	0.45 U	4.5 U	8.9 U	8.9 U	1.8 U	1.1 U	0.89 U	1.0 U
FP-MW12	FP-MW12-20240214	2/14/2024		**14**	**6.9**	0.57 U	0.57 U	0.79 U	0.47 U	4.7 U	9.4 U	9.4 U	1.9 U	1.1 U	0.94 U	1.1 U
FP-MW13	FP-MW13-240328	3/28/2024		**536**	**48.1**	0.70 U	0.70 U	0.98 U	0.58 U	5.8 U	12 U	12 U	2.3 U	1.4 U	1.2 U	1.3 U
Equipment Blanks	EB-20240209	2/9/2024		0.93 U	0.46 U	0.56 U	0.56 U	0.78 U	0.46 U	4.6 U	9.3 U	9.3 U	1.9 U	1.1 U	0.93 U	1.1 U
	EB-20240214	2/14/2024		0.89 U	0.45 U	0.54 U	0.54 U	0.75 U	0.45 U	4.5 U	8.9 U	8.9 U	1.8 U	1.1 U	0.89 U	1.0 U
	EB1-240328	3/28/2024		0.91 U	0.45 U	0.55 U	0.55 U	0.76 U	0.45 U	4.5 U	9.1 U	9.1 U	1.8 U	1.1 U	0.91 U	1.0 U
	FB-240328	3/28/2024		0.89 U	0.45 U	0.54 U	0.54 U	0.75 U	0.45 U	4.5 U	8.9 U	8.9 U	1.8 U	1.1 U	0.89 U	1.0 U
PCUL for Groundwater (ng/L)[5,6]				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE

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Sample Location[2]	Sample Identification	Sample Date	Analyte Group	Per- and Polyfluoroalkyl Substances (PFAS) (ng/L)																	Sum of Detected PFAS by EPA 1633[7]
				Sulfonic Acids																	
				Perfluoroalkyl Sulfonic Acids					Fluorotelomer Sulfonic Acids		Per- and Polyfluoroether Sulfonic Acids			Perfluorooctane Sulfonamides/Amidoacetic Acids/Sulfonamido Ethanols							
			Analyte Name	Perfluoropentanesulfonic acid	Perfluoroheptanesulfonic acid	Perfluorononanesulfonic acid	Perfluorodecanesulfonic acid	Perfluorododecanesulfonic acid	4:2 Fluorotelomer sulfonate	8:2 Fluorotelomer sulfonate	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acd	Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	Perfluoro(2-ethoxyethane)sulfonic acid	Perfluorooctanesulfonamide	N-Methylperfluorooctanesulfonamide	N-Methylperfluorooctanesulfonamidoacitic acid	N-Methylperfluorooctanesulfonamidoethanol	N-Ethylperfluorooctanesulfonamide	N-Ethylperfluorooctanesulonamidoacetic acid	N-Ethylperfluorooctanesulfonamidoethanol	
			Abbreviation	PFPeS	PFHpS	PFNS	PFDS	PFDoDS	4:2FTS	8:2FTS	(F-53B Major)	PF3OUdS (F-53B Minor)	PFEESA	PFOSA	MeFOSA	MeFOSAA	MeFOSE	EtFOSA	EtFOSAA	EtFOSE	
2025 Surface Water Samples																					
FP-SW2	FP-SW2-250604	6/4/2025		800 U	800 U	800 U	800 U	800 U	3,200 U	3,200 U	3,200 U	3,200 U	1,600 U	800 U	800 U	800 U	8000 U	800 U	800 U	8,000 U	**11,203**
FP-SW6	FP-SW6-250603	6/3/2025		800 U	800 U	800 U	800 U	800 U	3,200 U	3,200 U	3,200 U	3,200 U	1,600 U	800 U	800 U	800 U	8000 U	800 U	800 U	8,000 U	0 U
FP-SW7	FP-SW7-250603	6/3/2025		6.4 U	6.4 U	6.4 U	6.4 U	6.4 U	25.5 U	25.5 U	25.5 U	25.5 U	12.7 U	6.4 U	6.4 U	6.4 U	63.7 U	6.4 U	6.4 U	63.7 U	**13.7**
FP-SW8	FP-SW8-250603	6/3/2025		**30.0**	15.7 U	15.7 U	15.7 U	15.7 U	62.7 U	62.7 U	62.7 U	62.7 U	31.4 U	15.7 U	15.7 U	15.7 U	157 U	15.7 U	15.7 U	157 U	**3,548.4**
2024 Surface Water Samples																					
FP-SEEP	FP-SEEP-20240207	2/7/2024		**130**	**42.7**	1.1 U	1.1 U	1.3 U	4.5 U	4.7 U	2.3 U	2.3 U	1.1 U	1.1 U	1.1 U	1.1 U	11 U	1.1 U	1.5 U	11 U	**8779.70**
FP-SW1	FP-SW1-20240207	2/7/2024		**60.5**	**15.4**	0.94 U	0.94 U	1.1 U	3.8 U	3.9 U	1.9 U	1.9 U	0.94 U	0.94 U	0.94 U	0.94 U	9.4 U	0.94 U	1.3 U	9.4 U	**10473.40**
FP-SW2	FP-SW2-20240206	2/6/2024		**75.8**	**13.4**	1.0 U	1.0 U	1.1 U	4.0 U	4.1 U	2.0 U	2.0 U	1.0 U	1.0 U	1.0 U	1.0 U	10 U	1.0 U	1.3 U	10 U	**13177.80**
FP-SW3	FP-SW3-240328	3/28/2024		**14.9 J**	8.3 U	8.3 U	8.3 U	9.5 U	33 U	34 U	17 U	17 U	8.3 U	8.3 U	8.3 U	8.3 U	83 U	8.3 U	11 U	83 U	**1123.40**
FP-SW4	FP-SW4-240328	3/28/2024		**4.7**	**1.4 J**	1.1 U	1.1 U	1.3 U	4.4 U	4.5 U	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	11 U	1.1 U	1.5 U	11 U	**343.80**
FP-SW5	FP-SW5-240328	3/28/2024		**7.9**	**1.3 J**	1.2 U	1.2 U	1.4 U	4.8 U	**12.4**	2.4 U	2.4 U	1.2 U	1.2 U	1.2 U	1.2 U	12 U	1.2 U	1.6 U	12 U	**485.10**
	WDUP-240328			**7.1**	**2.8**	1.1 U	1.1 U	1.2 U	4.3 U	**11.2**	2.2 U	2.2 U	1.1 U	1.1 U	1.1 U	1.1 U	11 U	1.1 U	1.4 U	11 U	**508.10**
PCUL for Surface Water, MTCA Method B (ng/L)[4]				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	--
2025 Groundwater Samples																					
FP-MW5	FP-MW5-250610	6/10/2025		1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	6.2 U	6.2 U	6.2 U	6.2 U	3.1 U	1.6 U	1.6 U	1.6 U	15.6 U	1.6 U	1.6 U	15.6 U	**1.6**
FP-MW7	FP-MW7-250610	6/10/2025		1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	6.2 U	6.2 U	6.2 U	6.2 U	3.1 U	1.6 U	1.6 U	1.6 U	15.6 U	1.6 U	1.6 U	15.6 U	**1.9**
FP-MW8	FP-MW8-250610	6/10/2025		**192**	**30.8**	3.1 U	3.1 U	3.1 U	12.6 U	12.6 U	12.6 U	12.6 U	6.3 U	3.1 U	3.1 U	3.1 U	31.5 U	3.1 U	3.1 U	31.5 U	**4,109.3**
FP-MW10	FP-MW10-250610	6/10/2025		**56.3**	**8.3**	3.2 U	3.2 U	3.2 U	12.8 U	12.8 U	12.8 U	12.8 U	6.4 U	3.2 U	3.2 U	3.2 U	32.1 U	3.2 U	3.2 U	32.1 U	**2,521.3**
FP-MW11	FP-MW11-250610	6/10/2025		**39.7**	**3.0**	1.6 U	1.6 U	1.6 U	6.2 U	6.2 U	6.2 U	6.2 U	3.1 U	1.6 U	1.6 U	1.6 U	15.6 U	1.6 U	1.6 U	15.6 U	**725.0**
FP-MW12	FP-MW12-250610	6/10/2025		**79.4**	**9.2**	3.2 U	3.2 U	3.2 U	12.8 U	12.8 U	12.8 U	12.8 U	6.4 U	3.2 U	3.2 U	3.2 U	32.0 U	3.2 U	3.2 U	32.0 U	**1,073.7**
FP-MW14	FP-MW14-250610	6/10/2025		**28.2**	**3.5**	3.2 U	3.2 U	3.2 U	12.7 U	12.7 U	12.7 U	12.7 U	6.4 U	3.2 U	3.2 U	3.2 U	31.8 U	3.2 U	3.2 U	31.8 U	**3,084.3**
FP-MW15	FP-MW15-250609	6/9/2025		**4.0**	3.2 U	3.2 U	3.2 U	3.2 U	12.6 U	12.6 U	12.6 U	12.6 U	6.3 U	3.2 U	3.2 U	3.2 U	31.6 U	3.2 U	3.2 U	31.6 U	**194.1**
FP-MW16	FP-MW16-250609	6/9/2025		1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	6.2 U	6.2 U	6.2 U	6.2 U	3.1 U	1.6 U	1.6 U	1.6 U	15.5 U	1.6 U	1.6 U	15.5 U	**83.1**
	DUP-1-250609			1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	6.2 U	6.2 U	6.2 U	6.2 U	3.1 U	1.6 U	1.6 U	1.6 U	15.6 U	1.6 U	1.6 U	15.6 U	**86.8**
FP-MW17	FP-MW17-250609	6/9/2025		1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	6.2 U	6.2 U	6.2 U	6.2 U	3.1 U	1.6 U	1.6 U	1.6 U	15.6 U	1.6 U	1.6 U	15.6 U	**1.9**
FP-MW18	FP-MW18-250609	6/9/2025		1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	6.2 U	6.2 U	6.2 U	6.2 U	3.1 U	1.6 U	1.6 U	1.6 U	15.5 U	1.6 U	1.6 U	15.5 U	0 U
FP-MW19	FP-MW19-250609	6/9/2025		**3.1**	1.5 U	1.5 U	1.5 U	1.5 U	6.2 U	6.2 U	6.2 U	6.2 U	3.1 U	1.5 U	1.5 U	1.5 U	15.5 U	1.5 U	1.5 U	15.5 U	**56.0**
FP-MW20	FP-MW20-250609	6/9/2025		1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	6.1 U	6.1 U	6.1 U	6.1 U	3.1 U	1.5 U	1.5 U	1.5 U	15.3 U	1.5 U	1.5 U	15.3 U	**0 U**
RB-1	RB-1-250609	6/9/2025		1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	6.1 U	6.1 U	6.1 U	6.1 U	3.0 U	1.5 U	1.5 U	1.5 U	15.1 U	1.5 U	1.5 U	15.1 U	**0 U**

Sample Location[2]	Sample Identification	Sample Date	Analyte Group	Per- and Polyfluoroalkyl Substances (PFAS) (ng/L)																	Sum of Detected PFAS by EPA 1633[7]
				Sulfonic Acids																	
				Perfluoroalkyl Sulfonic Acids					Fluorotelomer Sulfonic Acids		Per- and Polyfluoroether Sulfonic Acids			Perfluorooctane Sulfonamides/Amidoacetic Acids/Sulfonamido Ethanols							
			Analyte Name	Perfluoropentanesulfonic acid	Perfluoroheptanesulfonic acid	Perfluorononanesulfonic acid	Perfluorodecanesulfonic acid	Perfluorododecanesulfonic acid	4:2 Fluorotelomer sulfonate	8:2 Fluorotelomer sulfonate	9-Chlorohexadecafluoro-3-oxanonane-1-sulfonic acd	Chloroeicosafluoro-3-oxaundecane-1-sulfonic acid	Perfluoro(2-ethoxyethane)sulfonic acid	Perfluorooctanesulfonamide	N-Methylperfluorooctanesulfonamide	N-Methyl perfluorooctane sulfonamidoacitic acid	N-Methylperfluorooctane sulfonamidoethanol	N-Ethylperfluorooctanesulfonamide	N-Ethyl perfluorooctane sulonamidoacetic acid	N-Ethylperfluorooctanesulfonamidoethanol	
			Abbreviation	PFPeS	PFHpS	PFNS	PFDS	PFDoDS	4:2FTS	8:2FTS	(F-53B Major)	PF3OUdS (F-53B Minor)	PFEESA	PFOSA	MeFOSA	MeFOSAA	MeFOSE	EtFOSA	EtFOSAA	EtFOSE	
2024 Groundwater Samples																					
FP-MW7	FP-MW7-20240213	2/13/2024		0.98 U	0.88 U	0.88 U	0.88 U	1.0 U	3.5 U	3.6 U	1.8 U	1.8 U	0.88 U	0.88 U	0.88 U	0.88 U	8.8 U	0.88 U	1.2 U	8.8 U	**2.90**
FP-MW8	FP-MW8-20240213	2/13/2024		**448**	**48.7**	0.96 U	0.96 U	1.1 U	3.8 U	4.0 U	1.9 U	1.9 U	0.96 U	0.96 U	0.96 U	0.96 U	9.6 U	0.96 U	1.3 U	9.6 U	**6663.80**
FP-MW9	FP-MW9-20240213	2/13/2024		**1.7 J**	0.93 U	0.93 U	0.93 U	1.1 U	3.7 U	3.8 U	1.9 U	1.9 U	0.93 U	0.93 U	0.93 U	0.93 U	9.3 U	0.93 U	1.2 U	9.3 U	**9022.00**
FP-MW10	FP-MW10-20240213	2/13/2024		**57.4**	**12.4**	0.91 U	0.91 U	1.0 U	3.6 U	3.7 U	1.8 U	1.8 U	0.91 U	0.91 U	0.91 U	0.91 U	9.1 U	0.91 U	1.2 U	9.1 U	**2319.10**
FP-MW11	FP-MW11-20240214	2/14/2024		**42.9**	**8.5**	0.89 U	0.89 U	1.0 U	3.6 U	3.7 U	1.8 U	1.8 U	0.89 U	0.89 U	0.89 U	0.89 U	8.9 U	0.89 U	1.2 U	8.9 U	**1019.40**
	FP-MWDUP-20240214	2/14/2024		**39.7**	**8**	0.89 U	0.89 U	1.0 U	3.6 U	3.7 U	1.8 U	1.8 U	0.89 U	0.89 U	0.89 U	0.89 U	8.9 U	0.89 U	1.2 U	8.9 U	**1001.50**
FP-MW12	FP-MW12-20240214	2/14/2024		**165**	**24**	0.94 U	0.94 U	1.1 U	3.8 U	3.9 U	1.9 U	1.9 U	0.94 U	0.94 U	0.94 U	0.94 U	9.4 U	0.94 U	1.3 U	9.4 U	**1886.00**
FP-MW13	FP-MW13-240328	3/28/2024		**9.3**	1.2 U	1.2 U	1.2 U	1.3 U	4.7 U	4.8 U	2.3 U	2.3 U	1.2 U	1.2 U	1.2 U	1.2 U	12 U	1.2 U	1.5 U	12 U	**997.50**
Equipment Blanks	EB-20240209	2/9/2024		1.0 U	0.93 U	0.93 U	0.93 U	1.1 U	3.7 U	3.8 U	1.9 U	1.9 U	0.93 U	0.93 U	0.93 U	0.93 U	9.3 U	0.93 U	1.2 U	9.3 U	**0 U**
	EB-20240214	2/14/2024		1.0 U	0.89 U	0.89 U	0.89 U	1.0 U	3.6 U	3.7 U	1.8 U	1.8 U	0.89 U	0.89 U	0.89 U	0.89 U	8.9 U	0.89 U	1.2 U	8.9 U	**0 U**
	EB1-240328	3/28/2024		1.0 U	0.91 U	0.91 U	0.91 U	1.0 U	3.6 U	3.7 U	1.8 U	1.8 U	0.91 U	0.91 U	0.91 U	0.91 U	9.1 U	0.91 U	1.2 U	9.1 U	**0 U**
	FB-240328	3/28/2024		1.0 U	0.89 U	0.89 U	0.89 U	1.0 U	3.6 U	3.7 U	1.8 U	1.8 U	0.89 U	0.89 U	0.89 U	0.89 U	8.9 U	0.89 U	1.2 U	8.9 U	**0 U**
PCUL for Groundwater (ng/L)[5,6]				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	--

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Notes:

[1] Chemical analyses performed by Pace Analytical of Minneapolis, Minnesota. PFAS compounds were analyzed by EPA Method 1633.

[2] Approximate sample locations are shown in Figure 4.

[3] Hazard Index as defined by PFAS National Primary Drinking Water Regulation (EPA, 2024) based on HFPO-DA, PFBS, PFHxS, and PFNA.

[4] Washington State Department of Ecology MTCA Method B PCULs (updated February 2025). Based on United States EPA and Ecology's Water Quality Program published aquatic life water quality criteria for PFOS and PFOA. Other PFAS compounds are compared to the groundwater PCULs until the EPA finalizes the bioaccumulation calculations for other PFAS.

[5] Washington State Department of Ecology MTCA Method B PCULs (February 2025), provided in a project-specific workbook. Values are from CLARC (Column AN), which incorporates ARARs and Method B equations; for PFOA, PFOS, and PFNA, EPA MCLs adopted July 2024 were used.

[5] United States Environmental Protection Agency Maximum Contaminant Levels (MCL) for PFOA, PFOS, PFNA, PFHxS, PFBS, PFBA, and HFPO-DA (GenX), adopted July 2024.

[6] Where laboratory RLs exceeded PCULs, the RLs are italicized and adopted as the new PCULs. Per WAC 173-340-830(2), if the practical quantitation limit is greater than the cleanup level, the cleanup level is considered attained when nondetects meet method and EPA quantitation requirements.

[7] The total detected PFAS concentration reflects only those analytes included in EPA Method 1633. Other PFAS compounds not measured by this method may be present but are not accounted for in these results.

bgs = below ground surface; ng/L = nanograms per liter

U = Analyte not detected at a concentration greater than the listed reporting limit.

J = Analyte detected at less than reporting level but greater than or equal to the method detection limit and the concentration is an approximate value. Flag applied by the laboratory.

NE = Not established

Bolded value indicates analyte detected at the concentration shown.

Gray shaded value indicates the detected concentration is greater than the Washington Ecology Method B Cleanup Level.

Outlined value indicates the detected concentration is greater than the Federal MCL.

Italicized value indicates the analyte was not detected but the reporting limit is greater than the Preliminary Cleanup Level.

Blue-shaded value indicates the analyte was not detected, but the reporting limit exceeded 10x the method detection limit (per WAC 173-340-830[2]); therefore, the cleanup level is considered not attained.

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Table 7

2025 Stormwater Utility Chemical Analytical Results[1]

Per- and Polyfluoroalkyl Substances (PFAS)

Paine Field Fire Training Pit PFAS Site at Snohomish Paine Field County Airport
Everett, Washington

Sample Location[2]	Sample Identification	Sample Date	Analyte Group	Per- and Polyfluoroalkyl Substances (PFAS)											
				Compounds with Washington PCUL											
			Analyte Name	Perfluorooctanoic acid	Perfluorooctanesulfonic acid	Perfluorononanoic acid	Perfluorohexanesulfonic acid	Perfluorobutanesulfonic acid	Perfluorobutanoic acid	Perfluorohexanoic acid	Hexafluoropropylene oxide dimer acid	Perfluorodecanoic acid	6:2 Fluorotelomer sulfonate	Hazard Index (HI; unitless)[3]
			Abbreviation	PFOA	PFOS	PFNA	PFHxS	PFBS	PFBA	PFHxA	HFPO-DA (GenX)	PFDA	6:2FTS	
Catch Basin Solids Samples (µg/kg)														
FP-CB4	FP-CB4-2.0	6/3/2025		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	7.9 U	**2.1**	7.9 U	2.0 U	7.9 U	--
FP-CB5	FP-CB5-6.5-6.75	6/3/2025		0.20 U	**0.22**	0.20 U	0.20 U	0.20 U	0.79 U	0.20 U	0.79 U	0.20 U	0.79 U	--
PCUL for Sediment, Freshwater Sites (µg/kg)[4]				NE	11	NE	NE	NE	NE	NE	NE	NE	NE	NE
Catch Basin Water Samples (ng/L)[5]														
FP-CB1	FP-CB1-250603	6/4/2025		**189**	**2,950**	**256**	**947**	**89.4**	**125**	**404**	24.6 U	6.1 U	**654**	**120**
FP-CB2	FP-CB2-250603	6/4/2025		**4.5**	**26.5**	3.2 U	**39.8**	3.2 U	12.8 U	**9.1**	12.8 U	3.2 U	12.8 U	**4**
FP-CB3	FP-CB3-250603	6/4/2025		**22.7**	**54.4**	**6.5**	**46.0**	6.3 U	25.0 U	**52.5**	25.0 U	6.3 U	**73.3**	**5**
FP-CB4	FP-CB4-250603	6/3/2025		31.6 U	31.6 U	31.6 U	31.6 U	31.6 U	126 U	**185**	126 U	31.6 U	126 U	**3**
FP-CB6	FP-CB6-250603	6/3/2025		6.2 U	6.2 U	6.2 U	**74.0**	**11.4**	**83.0**	**202**	24.9 U	6.2 U	24.9 U	**8**

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Sample Location[2]	Sample Identification	Sample Date	Analyte Group	Per- and Polyfluoroalkyl Substances (PFAS) (continued)												
				Carboxylic Acids												
				Perfluoroalkyl Carboxylic Acids						Fluorotelomer Carboxylic Acids			Per- and Polyfluoroether Carboxylic Acids			
			Analyte Name	Perfluoropentanoic acid	Perfluorohexanoic acid	Perfluoroundecanoic acid	Perfluorododecanoic acid	Perfluorotridecanoic acid	Perfluorotetradecanoic acid	3:3 Fluorotelomer carboxylate	5:3 Fluorotelomer carboxylate	7:3 Fluorotelomer carboxylate	4.8-Dioxa-3H-perfluorononanoic acid	Nonafluoro-3,6-dioxaheptanoic acid	Perfluoro-3-methoxypropanoic acid	Perfluoro-4-methoxybutanoic acid
			Abbreviation	PFPeA	PFHpA	PFUnA	PFDoDA	PFTrDA	PFTeDA	3:3FTCA	5:3FTCA	7:3FTCA	ADONA	NFDHA	PFMPA	PFMBA
Catch Basin Solids Samples (µg/kg)																
FP-CB4	FP-CB4-2.0	6/3/2025		**4.3**	2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	9.9 U	49.4 U	49.4 U	7.9 U	4.0 U	4.0 U	4.0 U
FP-CB5	FP-CB5-6.5-6.75	6/3/2025		0.39 U	0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.98 U	4.9 U	4.9 U	0.79 U	0.39 U	0.39 U	0.39 U
PCUL for Sediment, Freshwater Sites (µg/kg)[4]				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE
Catch Basin Water Samples (ng/L)[5]																
FP-CB1	FP-CB1-250603	6/4/2025		**713**	**161**	6.1 U	6.1 U	6.1 U	6.1 U	30.7 U	154 U	154 U	24.6 U	12.3 U	12.3 U	12.3 U
FP-CB2	FP-CB2-250603	6/4/2025		6.4 U	3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	16.0 U	79.9 U	79.9 U	12.8 U	6.4 U	6.4 U	6.4 U
FP-CB3	FP-CB3-250603	6/4/2025		**65.8**	**16.9**	6.3 U	6.3 U	6.3 U	6.3 U	31.3 U	156 U	156 U	25.0 U	12.5 U	12.5 U	12.5 U
FP-CB4	FP-CB4-250603	6/3/2025		**313**	**77.7**	31.6 U	31.6 U	31.6 U	31.6 U	158 U	791 U	791 U	126 U	63.2 U	63.2 U	63.2 U
FP-CB6	FP-CB6-250603	6/3/2025		**458**	**54.7**	6.2 U	6.2 U	6.2 U	6.2 U	31.1 U	156 U	156 U	24.9 U	12.5 U	12.5 U	12.5 U

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Sample Location[2]	Sample Identification	Sample Date	Analyte Group	Per- and Polyfluoroalkyl Substances (PFAS) (continued)																	
				Sulfonic Acids																	
				Perfluoroalkyl Sulfonic Acids					Fluorotelomer Sulfonic Acids		Per- and Polyfluoroether Sulfonic Acids			Perfluorooctane Sulfonamides/Amidoacetic Acids/Sulfonamido Ethanols							
			Analyte Name	Perfluoropentanesulfonic acid	Perfluoroheptanesulfonic acid	Perfluorononanesulfonic acid	Perfluorodecanesulfonic acid	Perfluorododecanesulfonic acid	4:2 Fluorotelomer sulfonate	8:2 Fluorotelomer sulfonate	Chlorohexadecafluoro-3-oxanonane-1-sulfonic	Chloroeicosafluoro-3-oxaundecane-1-sulfonic	Perfluoro(2-ethoxyethane)sulfonic acid	Perfluorooctanesulfonamide	N-Methylperfluorooctanesulfonamide	N-Methylperfluorooctane sulfonamidoacitic acid	N-Methylperfluorooctanesulfonamidoethanol	N-Ethylperfluorooctanesulfonamide	N-Ethylperfluorooctane sulonamidoacetic acid	N-Ethylperfluorooctanesulfonamidoethanol	Sum of Detected PFAS by EPA 1633[6]
			Abbreviation	PFPeS	PFHpS	PFNS	PFDS	PFDoDS	4:2FTS	8:2FTS	PF3ONS (F-53B Major)	PF3OUdS (F-53B	PFEESA	PFOSA	MeFOSA	MeFOSAA	MeFOSE	EtFOSA	EtFOSAA	EtFOSE	
Catch Basin Solids Samples (µg/kg)																					
FP-CB4	FP-CB4-2.0	6/3/2025		2.0 U	2.0 U	2.0 U	2.0 U	2.0 U	7.9 U	7.9 U	7.9 U	7.9 U	4.0 U	2.0 U	2.0 U	2.0 U	19.8 U	2.0 U	2.0 U	19.8 U	**6.4**
FP-CB5	FP-CB5-6.5-6.75	6/3/2025		0.20 U	0.20 U	0.20 U	0.20 U	0.20 U	0.79 U	0.79 U	0.79 U	0.79 U	0.39 U	0.20 U	0.20 U	0.20 U	2.0 U	0.20 U	0.20 U	2.0 U	**0.22**
PCUL for Sediment, Freshwater Sites (µg/kg)[4]				NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	NE	--
Catch Basin Water Samples (ng/L)[5]																					
FP-CB1	FP-CB1-250603	6/4/2025		**121**	**40.8**	6.1 U	6.1 U	6.1 U	24.6 U	24.6 U	24.6 U	24.6 U	12.3 U	6.1 U	6.1 U	6.1 U	61.4 U	6.1 U	6.1 U	61.4 U	**6,650.2**
FP-CB2	FP-CB2-250603	6/4/2025		3.2 U	3.2 U	3.2 U	3.2 U	3.2 U	12.8 U	12.8 U	12.8 U	12.8 U	6.4 U	3.2 U	3.2 U	3.2 U	32.0 U	3.2 U	3.2 U	32.0 U	**79.9**
FP-CB3	FP-CB3-250603	6/4/2025		6.3 U	6.3 U	6.3 U	6.3 U	6.3 U	25.0 U	25.0 U	25.0 U	25.0 U	12.5 U	6.3 U	6.3 U	6.3 U	62.6 U	6.3 U	6.3 U	62.6 U	**338.1**
FP-CB4	FP-CB4-250603	6/3/2025		31.6 U	31.6 U	31.6 U	31.6 U	31.6 U	126 U	126 U	126 U	126 U	63.2 U	31.6 U	31.6 U	31.6 U	316 U	31.6 U	31.6 U	316 U	**575.7**
FP-CB6	FP-CB6-250603	6/3/2025		**9.2**	6.2 U	6.2 U	6.2 U	6.2 U	24.9 U	24.9 U	24.9 U	24.9 U	12.5 U	6.2 U	6.2 U	6.2 U	62.3 U	6.2 U	6.2 U	62.3 U	**892.3**

Notes:

[1] Chemical analyses performed by Pace Analytical of Minneapolis, Minnesota. PFAS compounds were analyzed by EPA Method 1633.

[2] Approximate sample locations are shown in Figure 4.

[3] Hazard Index as defined by PFAS National Primary Drinking Water Regulation (EPA, 2024) based on HFPO-DA, PFBS, PFHxS, and PFNA.

[4] Washington State Department of Ecology SMS Lower Tier Beach Play Direct Contact SCO SWAC Preliminary Cleanup Levels, updated February 2025.

[5] Screening levels for water samples collected from stormwater utilities has not been provided by the Washington State Department of Ecology.

[6] The total detected PFAS concentration reflects only those analytes included in EPA Method 1633. Other PFAS compounds not measured by this method may be present but are not accounted for in these results.

bgs = below ground surface; ng/L = nanograms per liter

U = Analyte not detected at a concentration greater than the listed reporting limit.

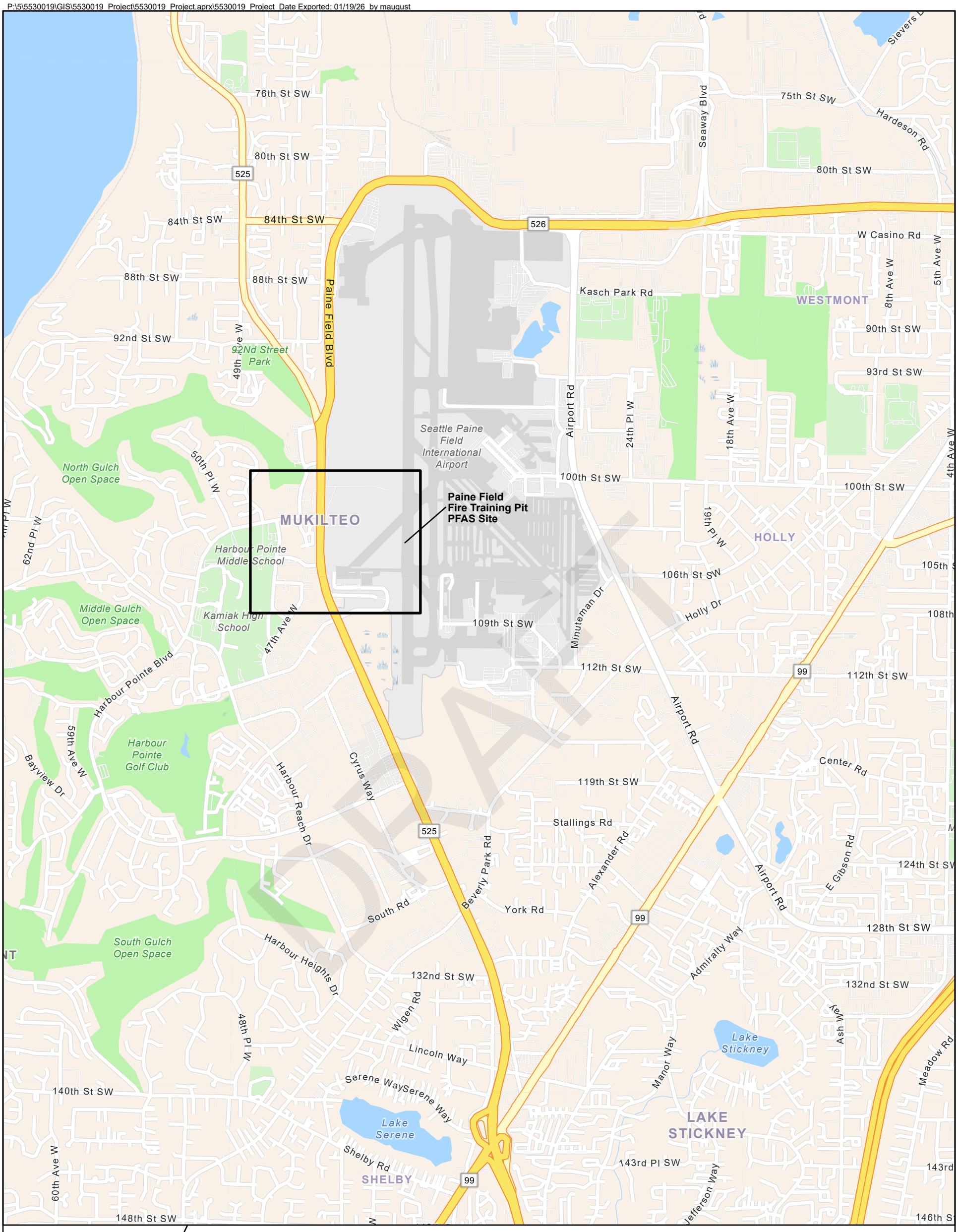
NE = Not established

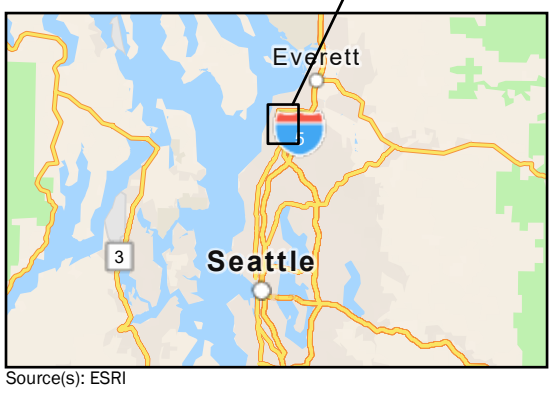
Bolded value indicates analyte detected at the concentration shown.

Figures

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Source(s): ESRI

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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Feet

Vicinity Map

Remedial Investigation and Feasibility Study Work Plan
Snohomish County Paine Field Airport
Everett, Washington

GeoEngineers

Figure 1



Legend

- Catch Basin
- Bioinfiltration Cell
- Pipe Out
- Stormwater Pipe
- Ditch/Swale
- Fence
- Detention Pond; Infiltration Pond; Wet Pond
- Approximate Former Fire Training Pit (FTP) Boundary
- Wetland
- Approximate area shown in Figure 3



Source(s): Azure Maps Aerial Imagery 2022, ESRI, Snohomish County.

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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Feet

Site Plan

Remedial Investigation and Feasibility Study Work Plan
Snohomish County Paine Field Airport
Everett, Washington

GeoEngineers

Figure 2

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Legend

- Existing Monitoring Well (SWI 2023)
- Direct Push Boring (CDM 2018)
- Direct Push Boring and Shovel or Hand Auger Explorations (SWI 2023)
- Lysimeter, (Regenesis 2023)
- Regenesis Soil Boring/Piezometer (Regenesis 2023)
- Catch Basin
- Stormwater Pipe
- Approximate Former Fire Training Pit (FTP) Boundary
- 2023 Regenesis Treatment Area



Source(s): Azure Maps Imagery, ESRI, Snohomish County.

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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Feet

Historical Exploration Locations and Treatment Area

Remedial Investigation and Feasibility Study Work Plan
Snohomish County Paine Field Airport
Everett, Washington

GeoEngineers

Figure 3

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Legend

- Soil Boring (GEI 2024, 2025)
- Surface Water Sample Location (GEI 2024, 2025)
- Monitoring Well (GEI 2024, 2025)
- Catch Basin Sample (GEI 2024, 2025)
- Existing Monitoring Well (SWI 2023)
- Seep Water Sample (GEI 2024)
- Direct Push Boring (CDM 2018)
- Direct Push Boring and Shovel or Hand Auger Explorations (SWI 2023)
- Lysimeter (Regenesis, 2023)
- Monitoring Well (Regenesis, 2023)
- Soil Boring/Piezometer (Regenesis, 2023)
- Stormwater Pipe and Flow Direction
- Pipe Out
- Approximate Former Fire Training Pit (FTP) Boundary
- 2023 Regenesis Treatment Area
- Detention Pond; Infiltration Pond; Wet Pond
- Wetland
- Cross Section Line (Fig. 5)

0 300
Feet

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Source(s): Azure Maps Aerial Imagery, ESRI, Snohomish County.

Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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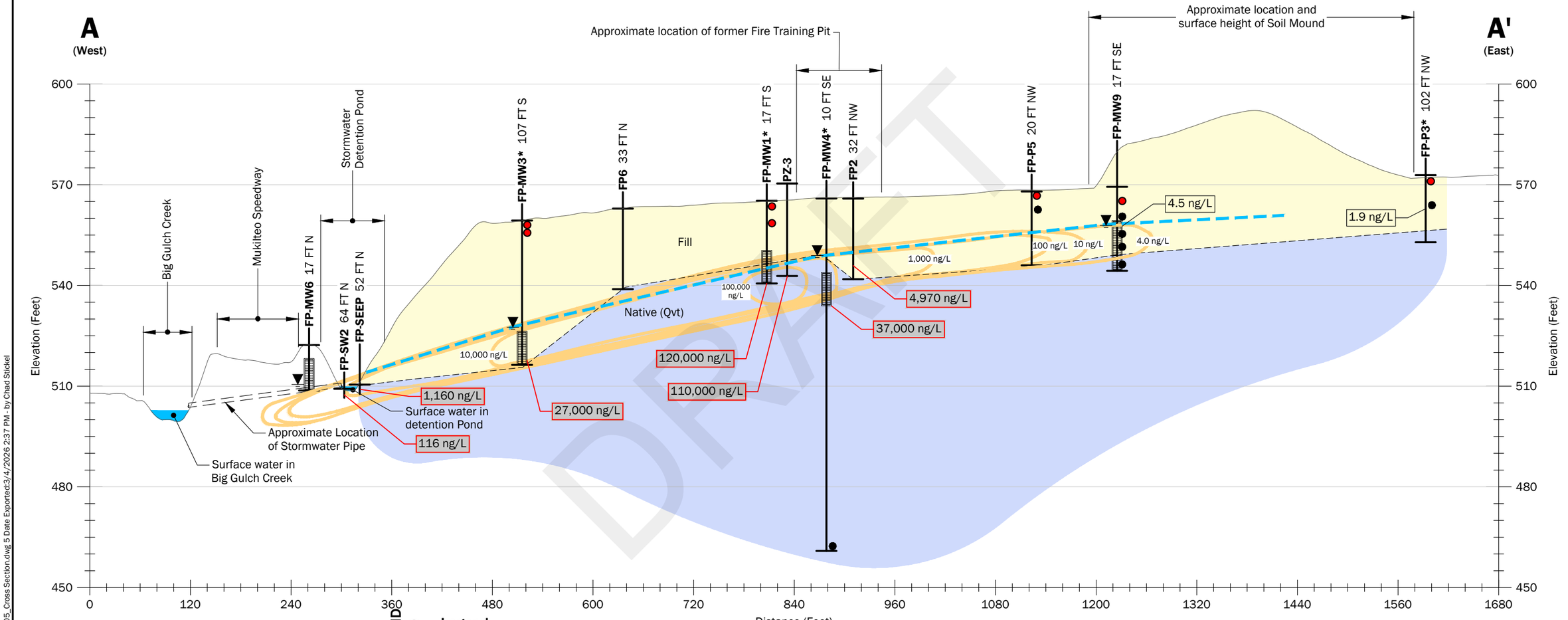
Historical Exploration Locations

Remedial Investigation and Feasibility Study Work Plan
Snohomish County Paine Field Airport
Everett, Washington

GeoEngineers

Figure 4

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Note(s):

1. The subsurface conditions shown are based on interpolation between widely spaced explorations and should be considered approximate; actual subsurface conditions may vary from those shown.

* Groundwater sample collected May/June 2022. Other groundwater samples collected February 2024.

Datum: NAVD88

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Legend

- Boring ID (Offset)
- Boring
- Well Screen
- Groundwater Measured in Monitoring Well (May 2024)
- Soil Sample, PFOS exceedance > PCUL
- Soil Sample, non detect or detected < PCUL
- 116 ng/L — PFOS Concentration in water sample Exceeding PCUL
- 1.9 ng/L — PFOS Concentration in water sample, not exceeding PCUL
- Inferred Groundwater Elevation
- Approximate Fill/Native Soil Boundary
- Stormwater Pipe
- Fill
- Native (Qvt)
- Inferred PFOS Concentrations in Groundwater Based on 2022 and 2024 Groundwater Sample Data. The 4.0 ng/L Contour Line Represents the PCUL for the PFOS

0 120 Horizontal Feet

0 30 Vertical Feet

Vertical Exaggeration = 4X

Cross Section A-A'

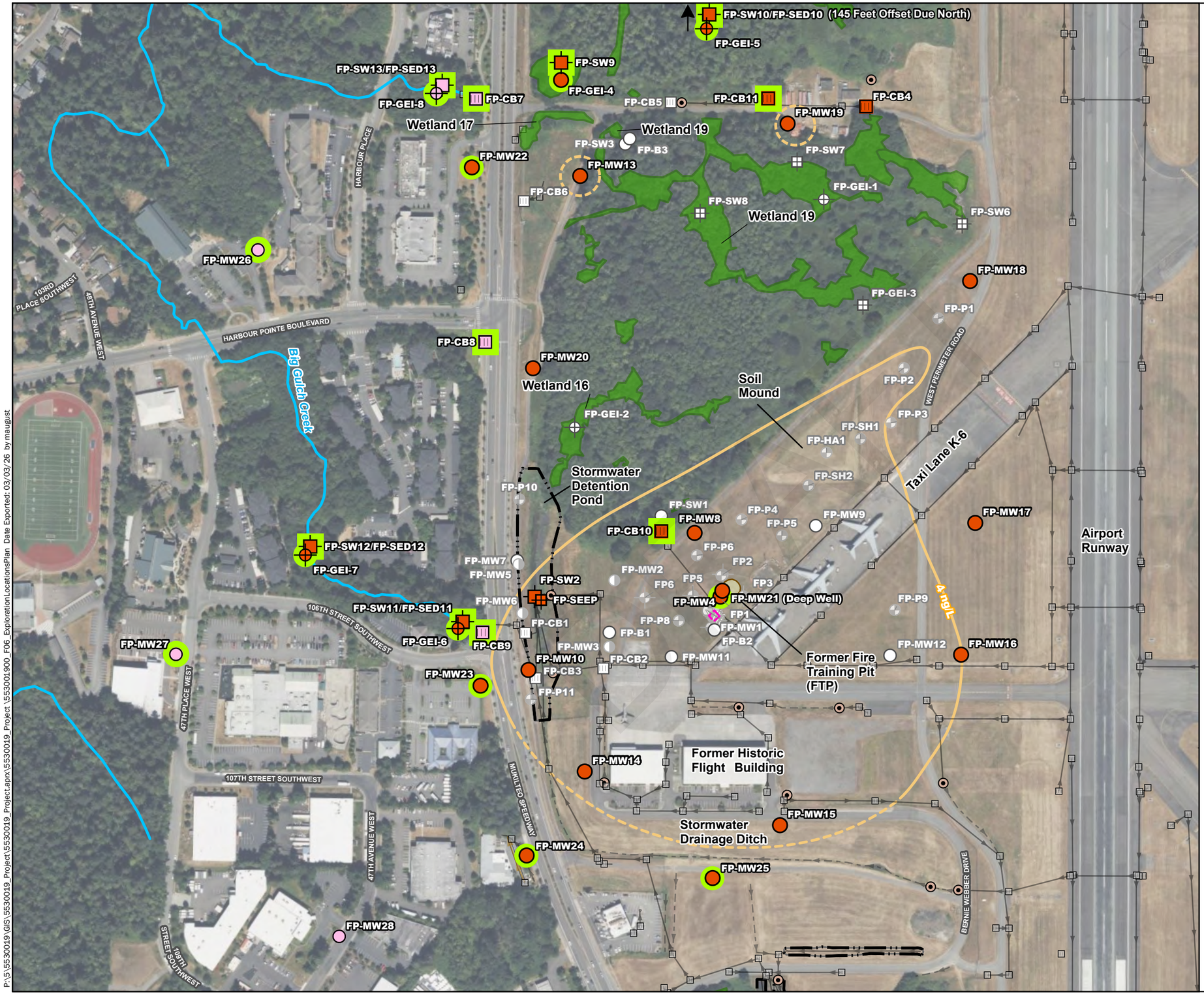
Remedial Investigation and Feasibility Study Work Plan
Snohomish County Paine Field Airport
Everett, Washington

GeoEngineers

Figure 5

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Legend

- Soil Boring (GEI 2024, 2025)
- Surface Water Sample Location (GEI 2024, 2025)
- Monitoring Well (GEI 2024, 2025)
- Catch Basin Sample (GEI 2024, 2025)
- Existing Monitoring Well (SWI 2023)
- Seep Water Sample (GEI 2024)
- Direct Push Boring (CDM 2018)
- Direct Push Boring and Shovel or Hand Auger Explorations (SWI 2023)
- Lysimeter (Regenesis, 2023)
- Monitoring Well (Regenesis, 2023)
- Soil Boring/Piezometer (Regenesis, 2023)
- Stormwater Pipe and Flow Direction
- Pipe Out
- Approximate Former Fire Training Pit (FTP) Boundary
- 2023 Regenesis Treatment Area
- Detention Pond; Infiltration Pond; Wet Pond
- Wetland
- Inferred PFOS Concentrations in Groundwater Based on 2022, 2024, and 2025 Groundwater Sample Data. The 4 ng/L Contour Line Represents the PCUL for PFOS.
- (Dashed where approximate.)

Tier 1 Proposed Explorations and Sample Locations

- Monitoring Well - Soil and Groundwater
- Surface Water and Sediment
- Catch Basin
- Soil Boring
- Seep Water Sample

Tier 2 Step-Out Proposed Locations

- Monitoring Well - Soil and Groundwater
- Surface Water and Sediment
- Catch Basin
- Soil Boring

Note: Tier 1 and Tier 2 Locations with green halos are new wells/sample locations proposed for the RI.

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0 300

Feet

Source(s): Azure Maps Imagery, ESRI, Snohomish County.
Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet

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Proposed Exploration Locations

Remedial Investigation and Feasibility Study Work Plan
Snohomish County Paine Field Airport
Everett, Washington

GeoEngineers

Figure 6

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Appendices

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Appendix A

Agreed Order No. DE 23771

DRAFT

State of Washington
Department of Ecology

In the Matter of Remedial Action by:
Snohomish County
Agreed Order
No. DE 23771

To:

Snohomish County
Attention: Airport Director
3220 100th St SW, Suite A
Everett, WA 98204-1303

DRAFT

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Exhibit A Location Diagram

Exhibit B Scope of Work and Schedule

1. Introduction

The mutual objective of the State of Washington, Department of Ecology (Ecology) and, Snohomish County (County) under this Agreed Order (Order) is to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances. This Order requires the County to provide for remedial action at a facility where there has been a release or threatened release of hazardous substances, as generally shown in the Location Diagram (Exhibit A). This Order requires the County to conduct certain work more specifically outlined in the attached Scope of Work (Exhibit B) and incorporated herein. Ecology believes the actions required by this Order are in the public interest.

2. Jurisdiction

This Order is issued pursuant to the Model Toxics Control Act (MTCA), RCW 70A.305.050(1).

3. Parties Bound

This Agreed Order shall apply to and be binding upon the Parties to this Order, their successors and assigns. The undersigned representative of each Party hereby certifies that he or she is fully authorized to enter into this Order and to execute and legally bind such Party to comply with this Order. The County agrees to undertake all actions required by the terms and conditions of this Order. No change in ownership or corporate status shall alter the County's responsibility under this Order. The County shall provide a copy of this Order to all agents, contractors, and subcontractors retained to perform work required by this Order, and shall ensure that all work undertaken by such agents, contractors, and subcontractors complies with this Order.

4. Definitions

Unless otherwise specified herein, the definitions set forth in RCW 70A.305, WAC 173-204 {include where the Site might include sediments} and WAC 173-340 shall control the meanings of the terms in this Order.

4.1 Agreed Order or Order

Refers to this Order and each of the exhibits to this Order. All exhibits are integral and enforceable parts of this Order.

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4.2 Parties

Refers to the State of Washington, Department of Ecology and the County.

4.3 Potentially Liable Persons (PLP(s))

Refers to the County. Subject to WAC 173-340-500(6), Ecology may name additional PLPs at a future date.

4.4 Site

The Site is referred to as "Paine Field Fire Training Pit PFAS" (Site). Based upon factors currently known to Ecology, the Site includes at least four contiguously owned County parcels located near Highways 525 and 99 in Everett, WA. The Site is generally located in the southern portion of Snohomish County Airport (Airport; a.k.a. Paine Field), Paine Field, as shown in the Location Diagram (Exhibit A) and more fully described in the Findings of Fact.

The Site constitutes a facility under RCW 70A.305.020(8). The Site is defined by where a hazardous substance, other than a consumer product in consumer use, has been deposited, stored, disposed of, or placed, or otherwise come to be located. The boundaries of the Site may change due to investigative results and may be further defined for remedial actions. The term "Paine Field Fire Training Pit PFAS" or "Site" shall herein refer to the releases identified below.

The Site may be defined further under RCW 70A.305D.020(5).

4.5 Subject PLP(s)

Refers to the County as the PLP subject to this Order.

5. Findings of Fact

Ecology makes the following findings of fact, without any express or implied admissions of such facts by the County:

5.1

Based upon factors currently known to Ecology, the Site is generally located in the western portion of Snohomish County Airport (Airport; a.k.a. Paine Field), as shown in the Location Diagram (Exhibit A). The Site is generally located on portions of four contiguous parcels owned by the County. The Site consist primarily of undeveloped areas, including wetlands, stormwater detention ponds, and areas adjacent to Airport ramps, taxilanes, taxiways, and runways.

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5.2

The boundaries of the Site have not been fully delineated and may extend beyond the areas shown in Exhibit A upon further investigation. The Site is listed on Ecology's Contaminated Sites List (CSL) as follows: Paine Field Fire Training Pit PFAS Site (Cleanup Site ID: 16912 and Facility/Site ID: 49626114)

5.3

The Site is impacted by releases of contamination in soil, groundwater, and surface water from past Airport operations and emergency response training activities at an area known as the former Fire Training Pit (FTP) located in the western portion of the Airport.

5.4

Fire training exercises were conducted by public entities at the FTP area using PFAS (per- and polyfluoroalkyl substances)-containing aqueous film-forming foam (AFFF). Fire training exercises historically conducted at the FTP included filling a pit dug into the ground with water, petroleum and other flammable fuels/materials, igniting the materials, and extinguishing the flames using PFAS-containing AFFF. Fire truck calibration and Federal Aviation Administration compliance testing also occurred at the FTP on an annual basis. Fire trucks were required to spray AFFF on the ground to calibrate AFFF concentrations in the fire suppression system. The AFFF discharged in this area consisted primarily of legacy or first generation AFFF that primarily contained PFOS (perflourooctanesulfonic acid) and PFHxS (perflourohexanesulfonic acid) and a fluorotelomer-based AFFF that contained 6:2 fluorotelomer sulfonate (6:2 FTS) and 8:2 fluorotelomer sulfonate (8:2 FTS).

Utility infrastructure near the FTP includes enclosed pipes, catch basins and a stormwater detention pond. The stormwater detention pond at the Site receives outfall from enclosed pipes and open channels on the western side of the Airport that collect stormwater from the surrounding undeveloped fields. Groundwater also enters the detention pond through groundwater seeps.

From the detention pond, water is directed to the west into an enclosed pipe below Mukilteo Speedway and into Big Gulch Creek. Big Gulch Creek flows north and west through Mukilteo and enters surface water in Puget Sound approximately 10,000 feet downstream.

The northern portion of the Site downgradient of the FTP includes several wetlands that collect stormwater from surrounding areas. Surface water in these wetlands generally flows to the north and west, moving through open channels to the northwestern corner of the Site and discharge to the stormwater conveyance system that combines with the discharge from the detention pond at the Site.

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Separate PFAS releases occurred from Airport tenant operations at the Boeing Everett Modification Center (EMC) building and ATS Hangar 1 and 3, located adjacent to the southern end of the main Airport runway. The AFFF discharged in this area likely consisted of two AFFF formulations: a legacy AFFF that contained PFOS and PFHxS and a fluorotelomer-based AFFF that contained 6:2 FTS.

Stormwater from these locations migrates through a network of enclosed pipes, multiple wetlands and open channels, and it co-mingles with releases from the FTP just prior to discharging to Big Gulch Creek.

It is anticipated that the investigation into the nature and extent of PFAS in soil and groundwater at the EMC and ATS Hangar 1 and 3 Building and releases to surface water from the nearby stormwater system outfalls will be required in the future under an amendment to this Order, under a separate Agreed Order, or through the Voluntary Cleanup Program (VCP).

5.5

Prior investigations completed independently at the FTP between 1989 and 2006 identified TPH in soil and surface water sampled within the FTP. That release was identified as the Snohomish County Airport Fire Pit, Facility Site ID: 49626114 and Cleanup Site ID: 3234. Independent remedial actions were completed at the FTP in 2006 to address releases of TPH and lead in soil at concentrations greater than the applicable MTCA CULs. An estimated 170 cubic yards of contaminated soil were excavated and disposed of off-site. Soil confirmation samples showed compliance with the MTCA Method A cleanup levels for unrestricted land use. On June 27, 2007, Ecology's Voluntary Cleanup Program issued a No Further Action opinion confirming that the cleanup met the substantive requirements of MTCA.

5.6

Subsequent investigations completed at the Site between 2018 and 2024 identified PFAS in soil and groundwater at the Site. The nature and extent of impacts at the Site were evaluated using soil, groundwater, and surface water preliminary cleanup levels (PCULs) established by Ecology for eight PFAS compounds.

5.7

PFAS have been detected at concentrations exceeding the PCULs in soil, groundwater, and surface water at the Site. The extent of PFAS in soil, groundwater, and surface water at concentrations greater than the PCULs have not been fully delineated at the Site.

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6. Ecology Determinations

Ecology makes the following determinations, without any express or implied admissions of such determinations (and underlying facts) by the County.

6.1

The County is an "owner or operator" as defined in RCW 70A.305.020(22) of a "facility" as defined in RCW 70A.305.020(8).

6.2

Based upon all factors known to Ecology, a "release" or "threatened release" of "hazardous substance(s)" as defined in RCW 70A.305.020(32), (13), respectively, has occurred at the Site.

6.3

Based upon credible evidence, Ecology issued a Preliminary PLP status letter to the County dated February 21, 2025, pursuant to RCW 70A.305.040, .020(26), and WAC 173-340-500. The County did not object to the Preliminary PLP status letter. Ecology issued a Final PLP determination letter on May 27, 2025.

6.4

Pursuant to RCW 70A.305.030(1), .050(1), Ecology may require PLPs to investigate or conduct other remedial actions with respect to any release or threatened release of hazardous substances, whenever it believes such action to be in the public interest. Based on the foregoing facts, Ecology believes the remedial actions required by this Order are in the public interest.

7. Work to be Performed

Based on the Findings of Fact and Ecology Determinations, it is hereby ordered that the County take the following remedial actions at the Site. These remedial actions must be conducted in accordance with WAC 173-340 and 173-204:

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7.1

The County will prepare a draft work plan for a Remedial Investigation (RI), conduct an RI, and prepare a draft RI Report and draft Feasibility Study (FS) for Ecology Review. Following Ecology review, the County will prepare a Public Review Draft RI Report and FS. The County will submit an Ecology Review preliminary draft Cleanup Action Plan (DCAP) for the Site in accordance with the schedule and terms of the Scope of Work and Schedule (Exhibit B) and all other requirements of this Order. The following naming conventions shall be used for applicable documents: Agency Review Draft (designation for the first time Ecology receives a document); Public Review Draft (designates a document ready for public comment); Final (designation for a document after public comment (if required) and Ecology approval; and the preliminary Draft Cleanup Action Plan (designation for the County's version of the DCAP).

7.2

If the County learns of a significant change in conditions at the Site, including but not limited to a statistically significant increase in contaminant concentrations in any media, the County, within seven (7) days of learning of the change in condition, shall notify Ecology in writing of said change and provide Ecology with any reports or records (including laboratory analyses, sampling results) relating to the change in conditions.

7.3

The County shall submit to Ecology written quarterly Progress Reports that describe the actions taken during the previous quarter to implement the requirements of this Order. All Progress Reports shall be submitted by the tenth (10th) day of the month in which they are due after the effective date of this Order. Unless otherwise specified by Ecology, Progress Reports and any other documents submitted pursuant to this Order shall be sent by email to Ecology's project coordinator. The Progress Reports shall include the following:

7.3.1

A list of on-site activities that have taken place during the quarter.

7.3.2

Detailed description of any deviations from required tasks not otherwise documented in project plans or amendment requests.

7.3.3

Description of all deviations from the Scope of Work and Schedule (Exhibit [B]) during the current quarter and any planned deviations in the upcoming quarter.

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7.3.4

For any deviations in schedule, a plan for recovering lost time and maintaining compliance with the schedule.

7.3.5

All raw data (including laboratory analyses) received during the previous quarter (if not previously submitted to Ecology), together with a detailed description of the underlying samples collected.

7.3.6

A list of deliverables for the upcoming quarter.

7.4

All plans or other deliverables submitted by the County for Ecology's review and approval under the Scope of Work and Schedule (Exhibit [B]) shall, upon Ecology's approval, become integral and enforceable parts of this Order. The County shall take any action required by such deliverable.

7.5

Under WAC 173-340-430, an interim action is a remedial action that is technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance, that corrects a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed, or that is needed to provide for completion of a site hazard assessment, remedial investigation/feasibility study, or design of a cleanup action plan. Any Party may propose an interim action under this Order. If the Parties are in agreement concerning the interim action, the County shall prepare and submit to Ecology an Interim Action Work Plan, including a scope of work and schedule, by the date determined by Ecology. Ecology will provide public notice and opportunity to comment on the Interim Action Work Plan in accordance with WAC 173-340-600(16). The County shall not conduct the interim action until Ecology approves the Interim Action Work Plan. Upon approval by Ecology, the Interim Action Work Plan becomes an integral and enforceable part of this Order, and the County is required to conduct the interim action in accordance with the approved Interim Action Work Plan. If the Parties are not in agreement, Ecology reserves its authority to require interim action(s) under a separate order or other enforcement action under RCW 70A.305, or to undertake the interim action itself.

7.6

If Ecology determines that the County has failed to make sufficient progress or failed to implement the remedial action, in whole or in part, Ecology may, after notice to the

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County, perform any or all portions of the remedial action or at Ecology's discretion allow the County opportunity to correct. In an emergency, Ecology is not required to provide notice to the County, or an opportunity for dispute resolution. The County shall reimburse Ecology for the costs of doing such work in accordance with Section VIII.A (Payment of Remedial Action Costs). Ecology reserves the right to enforce requirements of this Order under Section 10 (Enforcement).

7.7

Except where necessary to abate an emergency situation or where required by law, the County shall not perform any remedial actions at the Site outside those remedial actions required by this Order to address the contamination that is the subject of this Order, unless Ecology concurs, in writing, with such additional remedial actions pursuant to Section 8.11 (Amendment of Order). In the event of an emergency, or where actions are taken as required by law, the County must notify Ecology in writing of the event and remedial action(s) planned or taken as soon as practical but no later than within twenty-four (24) hours of the discovery of the event.

7.8

Ecology hereby incorporates into this Order the previous remedial actions described in Section 5 (Findings of Fact). Reimbursement for specific project tasks under a grant agreement with Ecology is contingent upon a determination by Ecology's Toxics Cleanup Program that the retroactive costs are eligible under WAC 173-332A-320(6), the work performed complies with the substantive requirements of WAC 173-340, and the work is consistent with the remedial actions required under this Order. The costs associated with Ecology's determination on the past independent remedial actions described in Section 5 (Findings of Fact), are recoverable under this Order.

8. Terms and Conditions

8.1 Payment of Remedial Action Costs

The County shall pay to Ecology costs incurred by Ecology pursuant to this Order and consistent with WAC 173-340-550(2). These costs shall include work performed by Ecology or its contractors for, or on, the Site under RCW 70A.305, including remedial actions and Order preparation, negotiation, oversight, and administration. These costs shall include work performed both prior to and subsequent to the issuance of this Order. Ecology's costs shall include costs of direct activities and support costs of direct activities as defined in WAC 173 340 550(2). Ecology has accumulated $10,107 in remedial action costs related to this Site as of June 30, 2025 For all Ecology costs incurred, the County shall pay the required amount within thirty (30) days of receiving from Ecology an itemized statement of costs that includes a summary of costs incurred, an identification

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of involved staff, and the amount of time spent by involved staff members on the project. A general statement of work performed will be provided upon request. Itemized statements shall be prepared quarterly. Pursuant to WAC 173-340-550(4), failure to pay Ecology's costs within ninety (90) days of receipt of the itemized statement of costs will result in interest charges at the rate of twelve percent (12%) per annum, compounded monthly.

In addition to other available relief, pursuant to RCW 19.16.500, Ecology may utilize a collection agency and/or, pursuant to RCW 70A.305.060, file a lien against real property subject to the remedial actions to recover unreimbursed remedial action costs.

8.2 Designated Project Coordinators

The project coordinator for Ecology is:

David Unruh, LHG
PO Box 330316
Shoreline, WA 98133-9716
206-459-6287
david.unruh@ecy.wa.gov

The project coordinator for the County is:

Andrew C. Rardin, CM
9901 24th PL W, Suite A
Everett, WA 98204-1303
425-388-5155
andrew.rardin@snoco.org

Each project coordinator shall be responsible for overseeing the implementation of this Order. Ecology's project coordinator will be Ecology's designated representative for the Site. To the maximum extent possible, communications between Ecology and the County, and all documents, including reports, approvals, and other correspondence concerning the activities performed pursuant to the terms and conditions of this Order shall be directed through the project coordinators. The project coordinators may designate, in writing, working level staff contacts for all or portions of the implementation of the work to be performed required by this Order.

Any Party may change its respective project coordinator. Written notification shall be given to the other Party at least ten (10) calendar days prior to the change.

8.3 Performance

All geologic and hydrogeologic work performed pursuant to this Order shall be under the supervision and direction of a geologist or hydrogeologist licensed by the State of

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Washington or under the direct supervision of an engineer registered by the State of Washington, except as otherwise provided for by RCW 18.43 and 18.220.

All engineering work performed pursuant to this Order shall be under the direct supervision of a professional engineer registered by the State of Washington, except as otherwise provided for by RCW 18.43.130.

All construction work performed pursuant to this Order shall be under the direct supervision of a professional engineer or a qualified technician under the direct supervision of a professional engineer. The professional engineer must be registered by the State of Washington, except as otherwise provided for by RCW 18.43.130.

Any documents submitted containing geologic, hydrogeologic, or engineering work shall be under the seal of an appropriately licensed professional as required by RCW 18.43 and 18.220.

The County shall notify Ecology in writing of the identity of any engineer(s) and geologist(s), contractor(s), subcontractor(s), and other key personnel to be used in carrying out the terms of this Order, in advance of their involvement at the Site.

8.4 Access

Ecology or any Ecology authorized representative shall have access to the secured area of the airport only with an approved airport escort per 49 CFR 1542.203, Security of the air operations area (AOA) and its requirements. Ecology or any Ecology authorized representative shall have access rights at all reasonable times for the purposes of, inter alia: inspecting records, operation logs, and contracts related to the work being performed pursuant to this Order; reviewing the County's progress in carrying out the terms of this Order; conducting such tests or collecting such samples as Ecology may deem necessary; using a camera, sound recording, or other documentary type equipment to record work done pursuant to this Order; and verifying the data submitted to Ecology by the County. Ecology or any Ecology authorized representative shall give one week notice before entering any Secured Area of the Site and reasonable notice for unsecured areas of the Site owned or controlled by the County. All persons who access the Site pursuant to this section shall comply with any applicable security, health and safety plan(s). Ecology employees and their representatives shall not be required to sign any liability release or waiver as a condition of Site property access.

The County shall make best efforts to secure access rights for those properties within the Site not owned or controlled by the County where remedial activities or investigations will be performed pursuant to this Order. As used in this Section, "best efforts" means the efforts that a reasonable person in the position of The County would use so as to achieve the goal in a timely manner, including the cost of employing professional assistance and the payment of reasonable sums of money to secure access and/or use restriction agreements, as required by this Section. If, within 365 days after the effective date of this Order, the County is unable to accomplish what is required through "best efforts," they shall notify Ecology, and include a

description of the steps taken to comply with the requirements. If Ecology deems it appropriate, it may assist the County, or take independent action, in obtaining such access and/or use restrictions. Ecology reserves the right to seek payment from the County for all costs, including cost of attorneys' time, incurred by Ecology in obtaining such access or agreements to restrict land, water, or other resource use.

8.5 Sampling, Data Submittal, and Availability

With respect to the implementation of this Order, the County shall make the results of all sampling, laboratory reports, and/or test results generated by it or on its behalf available to Ecology. Pursuant to WAC 173-340-840(5), all sampling data shall be submitted to Ecology in both printed and electronic formats in accordance with Section VII (Work to be Performed), Ecology's Toxics Cleanup Program Policy 840 (Data Submittal Requirements), and/or any subsequent procedures specified by Ecology for data submittal.

If requested by Ecology, the County shall allow Ecology and/or its authorized representative to take split or duplicate samples of any samples collected by the County pursuant to implementation of this Order. To facilitate the taking of split or duplicate samples, the County shall notify Ecology seven (7) days in advance of any sample collection or work activity at the Site. Ecology shall, upon request, allow the County and/or its authorized representative to take split or duplicate samples of any samples collected by Ecology pursuant to the implementation of this Order, provided that doing so does not interfere with Ecology's sampling. Without limitation on Ecology's rights under Section 8.4 (Access), Ecology shall notify the County prior to any sample collection activity.

In accordance with WAC 173-340-830(2)(a), all hazardous substance analyses shall be conducted by a laboratory accredited under WAC 173-50 for the specific analyses to be conducted, unless otherwise approved by Ecology.

8.6 Public Participation

Ecology shall maintain the responsibility for public participation at the Site. However, the County shall cooperate with Ecology, and shall:

8.6.1

If agreed to by Ecology, develop appropriate mailing lists and prepare drafts of public notices and fact sheets at important stages of the remedial action, such as the submission of work plans, remedial investigation/feasibility study reports, cleanup action plans, and engineering design reports. As appropriate, Ecology will edit, finalize, and distribute such fact sheets and prepare and distribute public notices of Ecology's presentations and meetings.

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8.6.2

Notify Ecology's project coordinator prior to the preparation of all press releases and fact sheets, and before meetings related to remedial action work to be performed at the Site with the interested public and/or local governments. Likewise, Ecology shall notify the County prior to the issuance of all press releases and fact sheets related to the Site, and before meetings related to the Site with the interested public and local governments. For all press releases, fact sheets, meetings, and other outreach efforts by the County that do not receive prior Ecology approval, the County shall clearly indicate to its audience that the press release, fact sheet, meeting, or other outreach effort was not sponsored or endorsed by Ecology.

8.6.3

When requested by Ecology, participate in public presentations on the progress of the remedial action at the Site. Participation may be through attendance at public meetings to assist in answering questions or as a presenter.

8.6.4

When requested by Ecology, arrange and maintain a repository to be located at:

Everett Public Library
2702 Hoyt Ave
Everett, WA 98201

Ecology's Northwest Region Office
15700 Dayton Ave N
Shoreline, WA 98133

At a minimum, copies of all public notices, fact sheets, and documents relating to public comment periods shall be promptly placed in these repositories. A copy of all documents related to this Site shall be maintained in the repository at Ecology's Northwest Regional Office in Shoreline, Washington.

8.7 Access to Information

The County shall provide to Ecology, upon request, copies of all records, reports, documents, and other information (including records, reports, documents, and other information in electronic form) (hereinafter referred to as "Records") within the County's possession or control or that of their contractors or agents relating to activities at the Site or to the implementation of this Order, including, but not limited to, sampling, analysis, chain of custody records, manifests, trucking logs, receipts, reports, sample traffic routing, correspondence, or other documents or information regarding the work.

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The County shall also make available to Ecology, for purposes of investigation, information gathering, or testimony, their employees, agents, or representatives with knowledge of relevant facts concerning the performance of the work.

Nothing in this Order is intended to waive any right the County may have under applicable law to limit disclosure of Records protected by the attorney work-product privilege and/or the attorney-client privilege. If the County withholds any requested Records based on an assertion of privilege, the County shall provide Ecology with a privilege log specifying the Records withheld and the applicable privilege. No Site-related data collected pursuant to this Order shall be considered privileged, including: (1) any data regarding the Site, including, but not limited to, all sampling, analytical, monitoring, hydrogeologic, scientific, chemical, radiological, biological, or engineering data, or the portion of any other record that evidences conditions at or around the Site; or (2) the portion of any Record that Respondents are required to create or generate pursuant to this Order.

Notwithstanding any provision of this Order, Ecology retains all of its information gathering and inspection authorities and rights, including enforcement actions related thereto, under any other applicable statutes or regulations.

8.8 Retention of Records

During the pendency of this Order, and for ten (10) years from the date of completion of the work performed pursuant to this Order, the County shall preserve all records, reports, documents, and underlying data in its possession relevant to the implementation of this Order and shall insert a similar record retention requirement into all contracts with project contractors and subcontractors.

8.9 Resolution of Disputes

8.9.1

In the event that the County elects to invoke dispute resolution the County must utilize the procedure set forth below.

8.9.1.1 Upon the triggering event (receipt of Ecology's project coordinator's written decision or an itemized billing statement), the County has thirty (30) calendar days within which to notify Ecology's project coordinator in writing of its dispute (Informal Dispute Notice).

8.9.1.2 The Parties' project coordinators shall then confer in an effort to resolve the dispute informally. The Parties shall informally confer for up to thirty (30) calendar days from receipt of the Informal Dispute Notice. If the project coordinators cannot resolve the dispute within

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those thirty (30) calendar days, then within fourteen (14) calendar days Ecology's project coordinator shall issue a written decision (Informal Dispute Decision) stating: the nature of the dispute; the County's position with regards to the dispute; Ecology's position with regards to the dispute; and the extent of resolution reached by informal discussion.

8.9.1.3 The County may then request regional management review of the dispute. The County must submit this request (Formal Dispute Notice) in writing to the Northwest Region Toxics Cleanup Section Manager within twenty-one (21) calendar days of receipt of Ecology's Informal Dispute Decision. The Formal Dispute Notice shall include a written statement of dispute setting forth: the nature of the dispute; the County's position with respect to the dispute; and the information relied upon to support its position.

8.9.1.4 The Section Manager shall conduct a review of the dispute and shall endeavor to issue a written decision regarding the dispute (Decision on Dispute) within thirty (30) calendar days of receipt of the Formal Dispute Notice. The Decision on Dispute shall be Ecology's final decision on the disputed matter.

8.9.2

The Parties agree to only utilize the dispute resolution process in good faith and agree to expedite, to the extent possible, the dispute resolution process whenever it is used.

8.9.3

Implementation of these dispute resolution procedures shall not provide a basis for delay of any activities required in this Order, unless Ecology agrees in writing to a schedule extension.

8.9.4

In case of a dispute, failure to either proceed with the work required by this Order or timely invoke dispute resolution may result in Ecology's determination that insufficient progress is being made in preparation of a deliverable, and may result in Ecology undertaking the work under Section 7.1 (Work to be Performed) or initiating enforcement under Section 10 (Enforcement).

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8.10 Extension of Schedule

8.10.1

The County's request for an extension of schedule shall be granted only when a request for an extension is submitted in a timely fashion, generally at least thirty (30) days prior to expiration of the deadline for which the extension is requested, and good cause exists for granting the extension. All extensions shall be requested in writing. The request shall specify:

8.10.1.1 The deadline that is sought to be extended.

8.10.1.2 The length of the extension sought.

8.10.1.3 The reason(s) for the extension.

8.10.1.4 Any related deadline or schedule that would be affected if the extension were granted.

8.10.2

The burden shall be on the County to demonstrate to the satisfaction of Ecology that the request for such extension has been submitted in a timely fashion and that good cause exists for granting the extension. Good cause may include, but may not be limited to:

8.10.2.1 Circumstances beyond the reasonable control and despite the due diligence of the County including delays caused by unrelated third parties or Ecology, such as (but not limited to) delays by Ecology in reviewing, approving, or modifying documents submitted by the County.

8.10.2.2 A shelter in place or work stoppage mandated by state or local government order due to public health and safety emergencies.

8.10.2.3 Acts of God, including fire, flood, blizzard, extreme temperatures, storm, or other unavoidable casualty.

8.10.2.4 Endangerment as described in Section 8.12 (Endangerment).

However, neither increased costs of performance of the terms of this Order nor changed economic circumstances shall be considered circumstances beyond the reasonable control of the County.

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8.10.3

Ecology shall act upon any County written request for extension in a timely fashion. Ecology shall give the County written notification of any extensions granted pursuant to this Order. A requested extension shall not be effective until approved by Ecology. Unless the extension is a substantial change, it shall not be necessary to amend this Order pursuant to Section 8.11 (Amendment of Order) when a schedule extension is granted.

8.10.4

At the County's request, an extension shall only be granted for such period of time as Ecology determines is reasonable under the circumstances. Ecology may grant schedule extensions exceeding ninety (90) days only as a result of one of the following:

8.10.4.1 Delays in the issuance of a necessary permit which was applied for in a timely manner.

8.10.4.2 Other circumstances deemed exceptional or extraordinary by Ecology.

8.10.4.3 Endangerment as described in Section 8.12 (Endangerment).

8.11 Amendment of Order

The project coordinators may verbally agree to minor changes to the work to be performed without formally amending this Order. Minor changes will be documented in writing by Ecology within seven (7) days of verbal agreement.

Except as provided in Section 8.13 (Reservation of Rights), substantial changes to the work to be performed shall require formal amendment of this Order. This Order may only be formally amended by the written consent of both Ecology and the County. Ecology will provide its written consent to a formal amendment only after public notice and opportunity to comment on the formal amendment.

When requesting a change to the Order, the County shall submit a written request to Ecology for approval. Ecology shall indicate its approval or disapproval in writing and in a timely manner after the written request is received. If Ecology determines that the change is substantial, then the Order must be formally amended. Reasons for the disapproval of a proposed change to this Order shall be stated in writing. If Ecology does not agree to a proposed change, the disagreement may be addressed through the dispute resolution procedures described in Section 8.9 (Resolution of Disputes).

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8.12 Endangerment

In the event Ecology determines that any activity being performed at the Site under this Order is creating or has the potential to create a danger to human health or the environment on or surrounding the Site, Ecology may direct the County to cease such activities for such period of time as it deems necessary to abate the danger. The County shall immediately comply with such direction.

In the event the County determines that any activity being performed at the Site under this Order is creating or has the potential to create a danger to human health or the environment, the County may cease such activities. the County shall notify Ecology's project coordinator as soon as possible, but no later than twenty-four (24) hours after making such determination or ceasing such activities. Upon Ecology's direction, the County shall provide Ecology with documentation of the basis for the determination or cessation of such activities. If Ecology disagrees with the County's cessation of activities, it may direct the County to resume such activities.

If Ecology concurs with or orders a work stoppage pursuant to this section, the County's obligations with respect to the ceased activities shall be suspended until Ecology determines the danger is abated, and the time for performance of such activities, as well as the time for any other work dependent upon such activities, shall be extended in accordance with Section 8.10 (Extension of Schedule) for such period of time as Ecology determines is reasonable under the circumstances.

Nothing in this Order shall limit the authority of Ecology, its employees, agents, or contractors to take or require appropriate action in the event of an emergency.

8.13 Reservation of Rights

This Order is not a settlement under RCW 70A.305. Ecology's signature on this Order in no way constitutes a covenant not to sue or a compromise of any of Ecology's rights or authority. Ecology will not, however, bring an action against the County to recover remedial action costs paid to and received by Ecology under this Order. In addition, Ecology will not take additional enforcement actions against the County regarding remedial actions required by this Order, provided the County complies with this Order.

Ecology nevertheless reserves its rights under RCW70A.305, including the right to require additional or different remedial actions at the Site should it deem such actions necessary to protect human health or the environment, and to issue orders requiring such remedial actions. Ecology also reserves all rights regarding the injury to, destruction of, or loss of natural resources resulting from the release or threatened release of hazardous substances at the Site.

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By entering into this Order, the County does not admit to any liability for the Site. Although the County is committing to conducting the work required by this Order under the terms of this Order, the County expressly reserves all rights available under law, including but not limited to the right to seek cost recovery or contribution against third parties, and the right to assert any defenses to liability in the event of enforcement.

8.14 Transfer of Interest in Property

No voluntary conveyance or relinquishment of title, easement, leasehold, or other interest in any portion of the Site shall be consummated by the County without provision for continued implementation of all requirements of this Order and implementation of any remedial actions found to be necessary as a result of this Order.

Prior to the County's transfer of any interest in all or any portion of the Site, and during the effective period of this Order, the County shall provide a copy of this Order to any prospective purchaser, lessee, transferee, assignee, or other successor in said interest; and, at least thirty (30) days prior to any transfer, the County shall notify Ecology of said transfer. Upon transfer of any interest, the County shall notify all transferees of the restrictions on the activities and uses of the property under this Order and incorporate any such use restrictions into the transfer documents.

8.15 Compliance with Applicable Laws

8.15.1 Applicable Laws

All actions carried out by the County pursuant to this Order shall be done in accordance with all applicable federal, state, and local requirements, including requirements to obtain necessary permits or approvals, except as provided in RCW 70A.305.090. At this time, no federal, state, or local requirements have been identified as being applicable to the actions required by this Order; the County has a continuing obligation to identify additional applicable federal, state, and local requirements which apply to actions carried out pursuant to this Order, and to comply with those requirements. As additional federal, state, and local requirements are identified by Ecology or the County, Ecology will document in writing if they are applicable to actions carried out pursuant to this Order, and the County must implement those requirements.

8.15.2 Relevant and Appropriate Requirements.

All actions carried out by the County pursuant to this Order shall be done in accordance with relevant and appropriate requirements identified by Ecology. At this time, no relevant and appropriate requirements have been identified as being applicable to the actions required by this Order. If additional relevant and appropriate requirements are identified by Ecology or the County, Ecology will

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document in writing if they are applicable to actions carried out pursuant to this Order and the County must implement those requirements.

8.15.3

Pursuant to RCW 70A.305.090(1), the County may be exempt from the procedural requirements of RCW 70A.15, 70A.205, 70A.300, 77.55, 90.48, and 90.58 and of any laws requiring or authorizing local government permits or approvals. However, the County shall comply with the substantive requirements of such permits or approvals. For permits and approvals covered under RCW 70A.305.090(1) that have been issued by local government, the Parties agree that Ecology has the non-exclusive ability under this Order to enforce those local government permits and/or approvals. At this time, no state or local permits or approvals have been identified as being applicable but procedurally exempt under this section.

8.15.4

The County has a continuing obligation to determine whether additional permits or approvals addressed in RCW 70A.305.090(1) would otherwise be required for the remedial action under this Order. In the event either Ecology or the County determines that additional permits or approvals addressed in RCW 70A.305.090(1) would otherwise be required for the remedial action under this Order, it shall promptly notify the other Party of its determination. Ecology shall determine whether Ecology or the County shall be responsible to contact the appropriate state and/or local agencies. If Ecology so requires, the County shall promptly consult with the appropriate state and/or local agencies and provide Ecology with written documentation from those agencies of the substantive requirements those agencies believe are applicable to the remedial action. Ecology shall make the final determination on the additional substantive requirements that must be met by the County and on how the County must meet those requirements. Ecology shall inform the County in writing of these requirements. Once established by Ecology, the additional requirements shall be enforceable requirements of this Order. The County shall not begin or continue the remedial action potentially subject to the additional requirements until Ecology makes its final determination.

Pursuant to RCW 70A.305.090(2), in the event Ecology determines that the exemption from complying with the procedural requirements of the laws referenced in RCW 70A.305.090(1) would result in the loss of approval from a federal agency that is necessary for the state to administer any federal law, the exemption shall not apply and the County shall comply with both the procedural

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and substantive requirements of the laws referenced in RCW 70A.305.090(1), including any requirements to obtain permits or approvals.

8.16 Indemnification

To the extent allowed by law, the County agrees to indemnify and save and hold the State of Washington, its employees, and agents harmless from any and all claims or causes of action (1) for death or injuries to persons, or (2) for loss or damage to property, to the extent arising from or on account of acts or omissions of the County, its officers, employees, agents, or contractors in entering into and implementing this Order. However, the County shall not indemnify the State of Washington nor save nor hold its employees and agents harmless from any claims or causes of action to the extent arising out of the negligent acts or omissions of the State of Washington, or the employees or agents of the State, in entering into or implementing this Order.

9. Satisfaction of Order

The provisions of this Order shall be deemed satisfied upon the County's receipt of written notification from Ecology that the County has completed the remedial activity required by this Order, as amended by any modifications, and that the County has complied with all other provisions of this Agreed Order.

10. Enforcement

Pursuant to RCW 70A.305.050, this Order may be enforced as follows:

10.1

The Attorney General may bring an action to enforce this Order in a state or federal court.

10.2

The Attorney General may seek, by filing an action, if necessary, to recover amounts spent by Ecology for investigative and remedial actions and orders related to the Site.

10.3

A liable party who refuses, without sufficient cause, to comply with any term of this Order will be liable for:

10.3.1

Up to three (3) times the amount of any costs incurred by the State of Washington as a result of its refusal to comply.

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10.3.2

Civil penalties of up to twenty-five thousand dollars ($25,000) per day for each day it refuses to comply.

10.4

This Order is not appealable to the Washington Pollution Control Hearings Board. This Order may be reviewed only as provided under RCW 70A.305.070.

Effective date of this Order: December 9, 2025

Snohomish County, Washington



Dave Somers
Snohomish County Executive
3000 Rockefeller Avenue M/S 407
Everett, WA 98201
425-388-3050

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State of Washington
Department of Ecology

Kimberly Wooten, PhD
Section Manager
Toxics Cleanup Program
Northwest Regional Office
206-594-0093

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Exhibit A

Site Diagram

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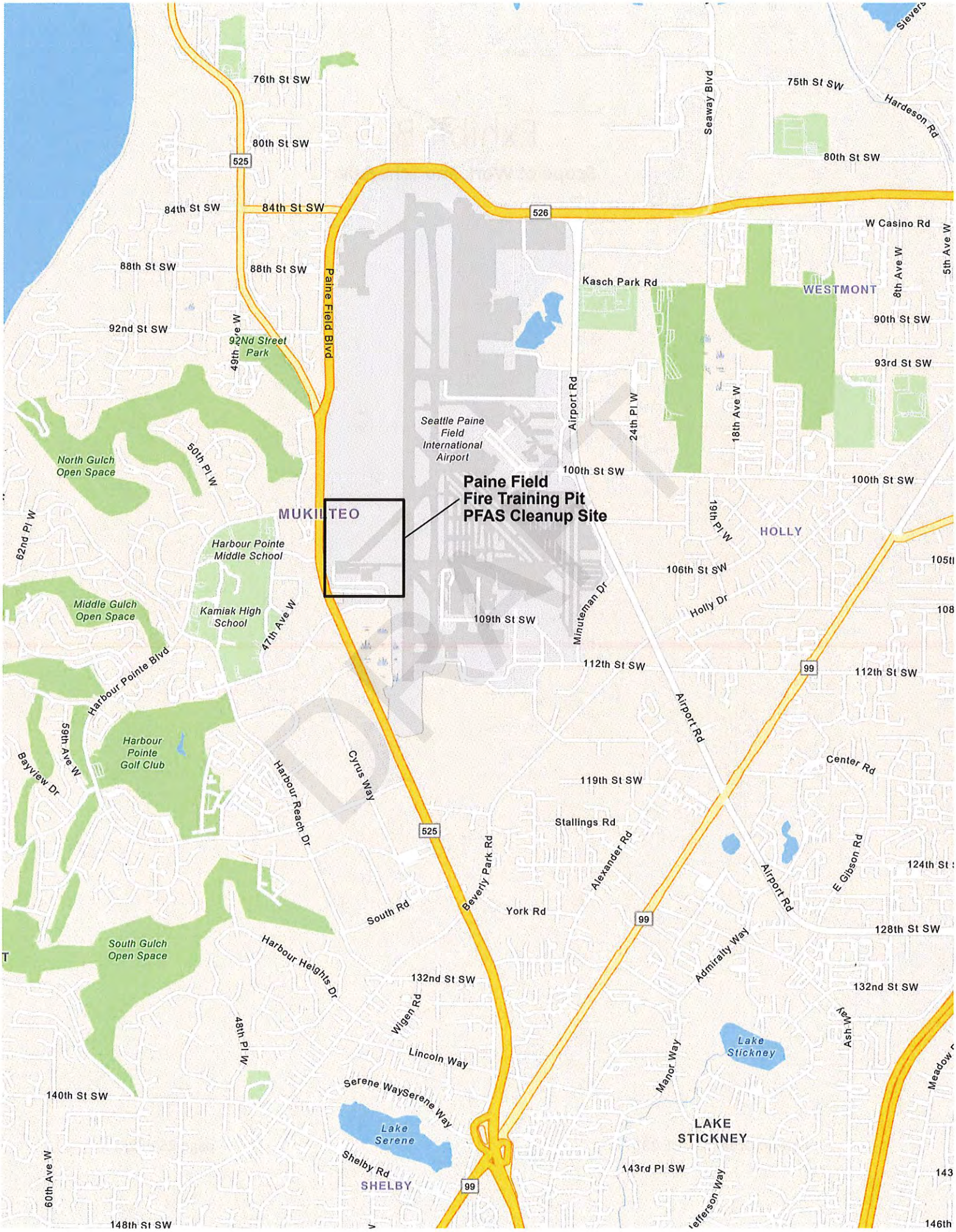

Paine Field
Fire Training Pit
PFAS Cleanup Site
MUKILTEO
HOLLY
WESTMONT
LAKE STICKNEY
SHELBY
Seattle Paine Field International Airport
Paine Field Blvd
Airport Rd
Kasch Park Rd
W Casino Rd
76th St SW
80th St SW
84th St SW
88th St SW
92nd St SW
90th St SW
93rd St SW
100th St SW
106th St SW
109th St SW
112th St SW
119th St SW
Stallings Rd
York Rd
South Rd
132nd St SW
128th St SW
140th St SW
143rd Pl SW
148th St SW
Seaway Blvd
75th St SW
Hardeson Rd
5th Ave W
8th Ave W
18th Ave W
24th Pl W
19th Pl W
Minuteman Dr
Holly Dr
Center Rd
Alexander Rd
Beverly Park Rd
Cyrus Way
Harbour Reach Dr
Harbour Heights Dr
Wigen Rd
Lincoln Way
Serene Way
Admiralty Way
Manor Way
Ash Way
E Gibson Rd
Meadow
Jefferson Way
49th Ave W
50th Pl W
62nd Pl W
47th Ave W
59th Ave W
60th Ave W
48th Pl W
Harbour Pointe Blvd
Bayview Dr
92Nd Street Park
North Gulch Open Space
Middle Gulch Open Space
South Gulch Open Space
Harbour Pointe Middle School
Kamiak High School
Harbour Pointe Golf Club
Lake Serene
Lake Stickney
525
526
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Exhibit B

Scope of Work and Schedule

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EXHIBIT B
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SCOPE OF WORK

PURPOSE

The work under this Agreed Order (AO) involves conducting a Remedial Investigation (RI) and Feasibility Study (FS), conducting interim actions if required or agreed to by the Washington State Department of Ecology (Ecology), and developing a preliminary draft Cleanup Action Plan (DCAP) for the Site. The purpose of the RI, FS, and preliminary DCAP is to provide sufficient data, analysis, and evaluations to enable Ecology to select a cleanup alternative for the Site.

As specified in the AO (Findings of Fact, 5.5), the parties have not completed the investigation of the nature and extent of separate upland releases from tenant Airport operations at the Site in soil and groundwater and migration of those releases to surface water from the nearby stormwater system outfalls. However, the AO and this Scope of Work (SOW) require work only on remedial activities for the releases from firefighting training/calibration in and near the Fire Training Pit. Further remedial activities to investigate and plan cleanup actions for releases at the upland portions of the Site will be required in the future under the Voluntary Cleanup Program, an amendment to this Order, or under a separate Order before a final remedy can be implemented at the Site.

Snohomish County (County) shall coordinate with Ecology throughout the development of the RI, FS, and preliminary DCAP and shall keep Ecology informed of changes to any work plans or other plans, and of any issues or problems as they develop.

The Scope of Work (SOW) is divided into eight major tasks:

Task 1: Remedial Investigation/Feasibility Study Work Plan
Task 2: Remedial Investigation Field Work and Report
Task 3: Interim Action(s) (if required)
Task 4: Feasibility Study Report
Task 5: State Environmental Policy Act (SEPA) Compliance
Task 6: Public Participation
Task 7: Preliminary Draft Cleanup Action Plan
Task 8: Progress Reports

To assist with preparation of these documents, Ecology's Toxics Cleanup Program (TCP) has developed checklists, which the Subject PLPs shall use for the following remedial action reports and plans.

- Remedial Investigation Report Checklist
- Feasibility Study Report Checklist

- Cleanup Action Plan Report Checklist

The subject PLPs can download the checklists directly from the following website: https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/cleanup-report-checklists-and-templates

Department of Ecology Policy 840 Environmental Information Management System (EIM) requires data generated for TCP sites as part of site investigations and cleanups be submitted into EIM at the time of submittal for Ecology review of any report containing this data.

TASK 1: REMEDIAL INVESTIGATION/ FEASIBILITY STUDY WORK PLAN

The County shall prepare a RI/FS Work Plan for the Site. The purpose of the Work Plan is to present the scope and schedule to complete the RI activities. The Work Plan shall describe the project management strategy for implementing and documenting the RI activities. The Work Plan shall present the personnel involved in conducting the RI.

A Key Project Meeting will be held prior to submittal of the RI/FS Work Plan. The purpose of the RI Planning Meeting is to review requirements for the Work Plan and plan RI field work, discuss the preliminary conceptual site model, and identify project data needs and preliminary plans for on-Property interim action. The RI/FS Work Plan shall be completed for the Site and approved by Ecology prior to the submission of an Interim Action Work Plan (IAWP), if applicable.

The RI/FS Work Plan shall include an overall description and schedule of RI activities and will be designed to comply with the requirements of the Model Toxics Control Act (MTCA) cleanup regulation (Remedial Investigation and Feasibility Study) promulgated in Chapter 173-340-350 of the Washington Administrative Code (WAC). The RI/FS Work Plan shall clearly describe the project management strategy for implementing and reporting on RI activities. The responsibility and authority of all organizations and key personnel involved in conducting the RI will be outlined. The main body of the RI/FS Work Plan shall include the following major sections:

- Introduction providing the overall objectives of the RI and FS and an overview of the planned investigation
- Site description and background describing current Site features, current and future land use, current and future groundwater use, and Site history
- Previous investigations and cleanup actions at the Site including a summary of investigation results or reference to previous summaries of investigation results
- Preliminary conceptual Site model including a description of Site geology, hydrogeology, potential contaminants of concern and sources, and contaminant migration pathways and potential receptors
- Screening levels to evaluate RI data
- Planned remedial investigation by investigation area including the specific data gaps, RI objectives, and planned investigation activities for each investigation area. The data gaps will be used as the basis for conducting additional Site

investigations.

- Planned terrestrial ecological evaluation activities
- Feasibility Study describing the major steps to complete an FS for the Site including identification of Applicable or Relevant and Appropriate Requirements (ARARs), delineation of media requiring remedial action, development of remedial action objectives, screening of cleanup alternatives, evaluation of cleanup alternatives, disproportionate cost analysis procedures, and recommendation of remedial action alternatives
- Reporting
- RI and FS activities schedule.

The RI/FS Work Plan will also identify specific data collection procedures in a Sampling and Analysis Plan (SAP) and a Quality Assurance Project Plan (QAPP) prepared in accordance with WAC 173-340-820 and WAC 173-204-600 for defining the nature and extent of contamination. The SAP and QAPP will be prepared as appendices to the RI/FS Work Plan. The County will also submit a Health and Safety Plan (HASP) and Inadvertent Discovery Plan (IDP) for the project.

The SAP will identify methods to be used for well/boring installation, soil, groundwater, soil gas, and air sample collection, and other data collection and field activities (e.g., groundwater elevation measurements, well development). The SAP will also address field screening; sample identification; sample containers, preservation, and holding times; sample documentation; equipment decontamination; and residuals/investigation-derived waste management.

The QAPP will be prepared in accordance with the Guidance for Preparation of Quality Assurance Project Plans, EPA Region 10, Quality Data Management Program, QA/R-5 and requirements of the EPA Contract Laboratory Program. The QAPP will also follow Ecology's Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies (Ecology 2016).[1] The QAPP will specify that laboratories must meet the accreditation standards established in Chapter 173-50 WAC.

The RI/FS Work Plan including the SAP and QAPP will be submitted to Ecology for review and approval. As with all environmental work at the Site, work may not begin without Ecology approval. The plan shall provide seven (7) days' notice to Ecology prior to beginning sampling. Ecology may obtain split samples.

The County or its contractors shall submit all new sampling data generated under this RI/FS Work Plan to Ecology for entry into Ecology's Environmental Information Management System (EIM) in accordance with WAC 173-340-840(5) and Ecology's Toxics Cleanup Program Policy 840: Data Submittal Requirements. Only validated data will be entered into the EIM database within 30 days of submittal.

The County shall provide Ecology with an Agency Review Draft RI/FS Work Plan in both Word (.docx) and Adobe (.pdf) formats. Once Ecology reviews and approves the RI/FS Work Plan, it will be considered the Final RI/FS Work Plan, and the County will provide the Final RI/FS Work Plan to Ecology in Adobe (.pdf) format. Once approved by Ecology, the County will implement the Final RI/FS Work Plan according to the

schedule contained in this Exhibit.

TASK 2: REMEDIAL INVESTIGATION

The County shall conduct a RI that meets the requirements of WAC 173-340-350(7) and WAC 173-204-560 according to the Final RI/FS Work Plan approved by Ecology (Task 1). The RI will determine the nature and extent of contamination exceeding preliminary MTCA screening levels and other regulatory requirements. The RI must provide sufficient data and information to define the nature and extent of contamination and to enable the selection of a cleanup action under WAC 173-340-360 through 173-340-390. The Final RI/FS Work Plan will be included as an appendix to the RI Report.

Field sampling and analysis will be completed in general accordance with the SAP and QAPP. Deviation(s) from the approved SAP and QAPP must be communicated to Ecology immediately and documented as required by Ecology.

The County shall communicate interim data reports and updates to Ecology as new Site data and information become available. Laboratory analysis data shall also be provided in electronic format when they have been validated. Raw laboratory data will be provided to Ecology upon request.

Prior to submittal of the Agency Review Draft RI Report, a Key Project Meeting will be held. During this meeting, Ecology and the County will review available data and an updated conceptual site model and discuss the content and organization of the Draft RI Report. Ecology expects one iteration between preliminary draft and final draft of the Remedial Investigation, Feasibility Study, and draft Cleanup Action Plan.

The County shall compile the results of the Site investigation into an Agency Review Draft RI Report. The County shall submit the draft report in Word (.docx) and Adobe (.pdf) formats, to Ecology for review. The County shall incorporate Ecology's comments and then prepare two (2) hard copies of the Public Review Draft RI Report along with one electronic copy in Word (.docx) and Adobe (.pdf) formats, to Ecology for distribution and public comment. Electronic survey data for monitoring locations, electronic lab data, and GIS maps of contaminant distribution shall also be provided for both the Agency Review Draft RI Report and Public Review Draft RI Reports. The RI Report will not be considered Final until after a public review and comment period. The Agency Review Draft RI Report and/or Public Review Draft FS Report may be submitted in conjunction with the Agency Review Draft FS Report and/or Public Review Draft FS Reports, discussed in Task 4 below.

If the data collected during this investigation is insufficient to define the full nature and extent of contamination, and to select a cleanup action plan, an additional phase of investigation shall be conducted to define the extent of contamination.

TASK 3: INTERIM ACTIONS (if required)

Interim actions deemed necessary by the County or Ecology shall be conducted commensurate with this task description.

Remedial actions implemented prior to completion of the FS, including those that:

- are technically necessary to reduce a threat to human health or the environment by eliminating or substantially reducing one or more pathways for exposure to a hazardous substance;
- correct a problem that may become substantially worse or cost substantially more to address if the remedial action is delayed; or
- are needed to provide for completion of the RI or design of the cleanup action

will be considered interim actions, will be implemented in accordance with WAC 173-340-430 and the AO, and will be designed in a manner that will not foreclose reasonable alternatives for any final cleanup action that may be required.

As detailed in the AO, if required by Ecology, or if proposed by the County and approved by Ecology, the County will implement an interim action. Based upon information obtained during the RI, interim action(s) may be needed to expedite control of releases to environmental media pursuant to WAC 173-340-430.

The scope of the interim actions may include, but not be limited to, typical source control or containment elements such as:

- Soil or sediment removal
- Groundwater remediation
- Repair, slip lining, replacement, or closure of stormwater conveyances or other structures such as conduits, vaults, catch basins, etc.
- Stormwater treatment
- Decommissioning of underground storage tanks and pipes
- Removal of old drain fields or former surface impoundments
- Proper decommissioning of old or unused wells
- Removal of contaminated building or other structural material
- Construction of a treatment facility.

During the Key Project Meeting described in Task 1, the results of historical and current investigations and preliminary plans may be discussed for additional interim action(s), if necessary. If an interim action is to be performed, the County will prepare and submit for Ecology's approval an Agency Review Draft Interim Action Work Plan (IAWP) with detail commensurate with the work to be performed. The Agency Review Draft IAWP shall include, as appropriate:

- Description of the interim action including its purpose, general requirements, and relationship to the (final) cleanup action (to the extent known)
- Summary of relevant RI information, including at a minimum existing Site conditions and alternative interim actions considered
- Information regarding design and construction requirements, including a proposed schedule and personnel roles and responsibilities
- Compliance Monitoring Plan

- SAP/QAPP
- Permits required

The County will also submit a copy of the HASP for the proposed interim action. The County will be responsible for complying with the SEPA rules including preparing and submitting an environmental checklist for the interim action and will assist Ecology with presentations at any additional meetings or hearings that might be necessary for SEPA compliance or as part of the Public Participation Plan.

The County shall submit an Agency Review Draft IAWP in Word (.docx) and Adobe (.pdf) formats, to Ecology for review. The County shall address Ecology's comments and then prepare two (2) hard copies of the Public Review Draft IAWP along with one electronic copy each in Word (.docx) and Adobe (.pdf) formats, to Ecology for distribution and public comment. After a public notice and comment period for the Public Review Draft IAWP (and SEPA determination), Ecology will approve the IAWP (if appropriate) and the document will be considered Final. The County shall submit the Final IAWP in Adobe (.pdf) format. Once approved by Ecology, the County will implement the interim action according to the approved schedule.

Upon successful completion of the work, an Agency Review Draft Interim Action Report will be prepared as a separate deliverable. The County shall submit an Agency Review Draft Interim Action Report in Word (.docx) and Adobe (.pdf) formats, to Ecology for review and approval. After addressing Ecology's comments on the Agency Review Draft Interim Action Report and after Ecology's approval, the County shall submit the Final Interim Action Report in Adobe (.pdf) format, to Ecology.

TASK 4: FEASIBILITY STUDY REPORT

The County shall use the information obtained in the RI to prepare an Agency Review Draft FS report that meets the applicable requirements of WAC 173-340-351 according to the schedule in this exhibit. The Agency Review Draft FS report will summarize the extent of media exceeding the screening levels based on the results of the RI and evaluate remedial alternatives for Site cleanup, consistent with MTCA requirements, to protect human health and the environment by eliminating, reducing, or otherwise controlling risks posed through identified exposure pathways and migration routes.

Prior to beginning the FS report, a Key Project Meeting will be held with project stakeholders to review the results of the RI, the updated conceptual Site model, ARARs, potential remedial alternatives, establish points of compliance and preliminary cleanup levels for impacted media. If appropriate, this Key Project Meeting may be held in conjunction with the RI Pre-Report Planning Key Project Meeting.

The Agency Review Draft FS report will provide a detailed analysis of each remedial alternative according to the applicable requirements of WAC 173-340-351. The remedial alternatives will be evaluated for compliance with the applicable requirements of WAC 173-340-360, Cleanup Action Requirements, including a detailed evaluation of remedial alternatives relative to the following criteria:

- Compliance with Cleanup Standards and Applicable Laws

- Protection of Human Health
- Protection of the Environment
- Provision for a Reasonable Restoration Time Frame
- Use of Permanent Solutions to the Maximum Extent Practicable
- The Degree to which Recycling, Reuse, and Waste Minimization are Employed
- Short-Term Effectiveness
- Long-Term Effectiveness
- Net Environmental Benefit
- Implementability
- Provision for Compliance Monitoring
- Cost-Effectiveness
- Resilience to climate change impacts that have a high likelihood of occurring
- Public concerns including those of likely vulnerable populations and overburdened communities identified under WAC 173-340-600(13-14)
- Tribal rights and interests identified under WAC 173-340-620.

The remedial alternative that is judged to best satisfy the evaluation criteria will be identified and presented as the recommended remedial alternative in the Agency Review Draft FS report.

The County shall prepare the Agency Review Draft FS report and submit it electronically in Word (.docx) and Adobe (.pdf) formats to Ecology for review. After addressing Ecology's comments on the Agency Review Draft FS report, the County shall prepare two (2) printed copies of the Public Review Draft FS report and submit them to Ecology for distribution and public comment. One electronic Word (.docx) and one electronic Adobe (.pdf) formatted file of the report will also be submitted to Ecology. As discussed in Task 2 above, this public comment period may be combined with the comment period for the draft RI report if appropriate. The FS report will not be considered Final until after a public review and comment period. The FS public comment may be combined with the DCAP pursuant to WAC 173-340-600(13)(c).

After the public comment period, the County will incorporate Ecology's and the public's comments on the Public Review Draft FS Report and, after Ecology approval, will submit the Final FS report in Adobe (.pdf) format.

TASK 5: SEPA COMPLIANCE

The County shall be responsible for complying with the SEPA rules including preparing and submitting an environmental checklist. If the result of the threshold determination is a determination of significance (DS), the County shall be responsible for the preparation of draft and final environmental impact statements. The County shall assist Ecology with coordinating SEPA public involvement requirements with MTCA public involvement requirements whenever possible, such that public comment periods and

meetings or hearings can be held concurrently.

TASK 6: PUBLIC PARTICIPATION

The County shall assist Ecology to prepare a draft Public Participation Plan that complies with the provisions of WAC 173-340-600(9).

The County shall support Ecology in presenting the Public Review Draft RI and FS report, Draft Cleanup Action Plan (DCAP), and SEPA evaluations at public meetings or hearings as found necessary by Ecology. If it is found beneficial and Ecology agrees, the public comment periods for the RI, FS, and DCAP may be combined. The County will assist Ecology with presentations at any additional meetings or hearings that might be necessary for SEPA compliance or as part of the Public Participation Plan.

After the public comments periods are completed, at Ecology's request, the County shall prepare a Draft Responsiveness Summary that addresses public comments and if necessary, prepare a second Public Review Draft RI and/or FS Report that addresses public comments. The County shall prepare two (2) copies of the Draft Responsiveness Summary, and if necessary, a second Public Review Draft RI and/or FS Report and submit them to Ecology for review and approval, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats.

After incorporating Ecology's comments and after Ecology approval, the County shall prepare two (2) copies of the Final Responsiveness Summary after public comments are incorporated and submit them to Ecology for distribution, including one electronic copy each in Word (.doc) and Adobe (.pdf) formats.

TASK 7: PRELIMINARY DRAFT CLEANUP ACTION PLAN

Upon Ecology's approval of the Public Review Draft FS report, a Key Project Meeting with project stakeholders will be held regarding the preliminary Draft Cleanup Action Plan (DCAP). The meeting will be used to review plans for developing the Agency Review preliminary DCAP.

The County shall prepare an Agency Review preliminary DCAP in accordance with WAC 173-340-380 that provides a proposed remedial action to address the contamination present at the Site. The preliminary DCAP shall include a general description of the proposed remedial actions, cleanup standards developed from the FS and rationale regarding their selection, a schedule for implementation, description of any institutional controls proposed, and a summary of applicable local, state, and federal laws pertinent to the proposed cleanup actions.

The County will submit an Agency Review preliminary DCAP for Ecology's review and approval. The County shall prepare the Agency Review preliminary DCAP and submit it electronically in Word (.docx) and Adobe (.pdf) formats, to Ecology.

After receiving Ecology's comments on the Agency Review preliminary DCAP, the County shall revise the DCAP to address Ecology's comments and submit two (2) printed copies of the Public Review DCAP to Ecology. One electronic Word (.docx) and one electronic Adobe (.pdf) formatted file of the document will also be submitted to Ecology. Following public comment, Ecology will finalize the DCAP.

Task 8: Progress Reports

The County will submit Progress Reports at a quarterly frequency to Ecology until satisfaction of the AO, in accordance with section VII.(C) of the AO. In addition, during implementation of the RI field investigations and any interim action(s), the County will provide weekly email status updates to Ecology.

Progress Reports will be submitted to the Ecology project coordinator by the twenty- fifth (25th) day of the month following the reporting period. If this day is a weekend or holiday, Progress Reports will be submitted to Ecology on the next business day.

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SCHEDULE OF DELIVERABLES

The schedule for deliverables described in the AO and the Scope of Work is presented below. If the date for submission of any item or notification required by this Schedule of Deliverables occurs on a weekend, or state or federal holiday, the date for submission of that item or notification is extended to the next business day following the weekend or holiday. Where a deliverable due date is triggered by Ecology notification, comments, or approval, the starting date for the period shown is the date the County received such notification, comments, or approval, unless otherwise noted below. Where triggered by Ecology receipt of a deliverable, the starting date for the period shown is the date Ecology receives the deliverable.

Deliverables	**Completion Times**
Progress Reports	Submitted quarterly on the 25th of the month following the end of the quarter beginning after the effective date of the AO
Agency Review Draft RI Work Plan	120 calendar days following the effective date of the AO
Final RI Work Plan	45 calendar days following receipt of Ecology's final comments on the Agency Review Draft RI Work Plan
Completion of RI Field Work	365 calendar days following Ecology's approval of the Final RI Work Plan
Agency Review Draft RI Report	180 calendar days following completion of RI field work
Public Review Draft RI Report	45 calendar days following receipt of Ecology's final comments on the Agency Review Draft RI Report
Final RI Report	No later than 45 days after receipt of Ecology comments, subsequent to public comment
Agency Review Draft FS Report	Within 90 calendar days following Ecology approval of Public Review RI Report
Public Review Draft FS Report	45 calendar days following receipt of Ecology's final comments on the Agency Review Draft FS Report

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Final FS Report	45 calendar days after receipt of Ecology comments, subsequent to public comment
Agency Review Preliminary DCAP	Within 90 calendar days following Ecology's approval of the Final FS Report
Public Review DCAP	45 calendar days following receipt of Ecology's final comments on the Agency Review DCAP

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Appendix B

Sampling Analysis Plan/Quality Assurance Project Plan (SAP/QAPP)

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1.0 Introduction

GeoEngineers, Inc. (GeoEngineers) has prepared this sampling and analysis plan and quality assurance project plan (SAP/QAPP) consistent with the requirements of Washington Administrative Code (WAC) 173340820 on behalf of Snohomish County Airport (the Client) to guide aspects of Remedial Investigation and Feasibility Study (RI/FS) Work Plan and laboratory analytical activities and associated sample collection at the Paine Field Fire Training Pit PFAS Site (Site).

This SAP/QAPP has been prepared consistent with the requirements of the Washington State Department of Ecology (Ecology) Guidance on Sampling and Data Analysis Methods (Ecology, 1994), Guidance for Preparing Quality Assurance Project Plans for Environmental Studies (Ecology, 2004), Guidance for Investigating and Remediating PFAS Contamination in Washington State (Ecology, 2022), and the Model Toxics Control Act (MTCA) (WAC Chapter 173-340). This SAP/QAPP provides details on analytical methods and associated laboratory reporting- and detection-limit needs and defines field and laboratory quality assurance and quality control (QA/QC) requirements and procedures.

The history of the Site are included in Section 2 of the RI/FS Work Plan (Work Plan). This SAP/QAPP is an appendix to the Work Plan. Site characterization activities have been conducted at the Site beginning in the late 1980s and are summarized in Section 2.1 of the Work Plan.

1.1 REMEDIAL INVESTIGATION OBJECTIVES

The primary objective of this investigation is to address data gaps in order to further characterize the nature and extent of per- and polyfluoroalkyl substance (PFAS) impacts at the Site. The Work Plan identifies the media to be sampled and proposed sampling locations and references the relevant procedures and protocols contained in this SAP/QAPP.

This SAP/QAPP is intended to ensure that data collected during the field investigation are of sufficient type, quality, and quantity to support study area and source characterization and the development of the RI/FS. Procedures described herein will be used to direct the investigation process so that the following conditions are met:

- Data collected are of high quality, representative, and verifiable.
- Use of resources is cost-effective.
- Data are suitable for supporting site characterization and remedial decision making.

This SAP/QAPP describes methods and procedures for sampling environmental media, decontaminating equipment, managing investigation-derived waste (IDW), and collecting, analyzing, and evaluating environmental data. It also defines QA procedures for field activities, laboratory QC requirements, and data validation processes.

If a phase of work or an unforeseen change in site conditions requires modification to the methods described herein, a SAP/QAPP addendum describing the specific revisions may be prepared. Alternatively, deviations from this SAP/QAPP and any alternative procedures implemented will be documented in the data gaps report.

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1.2 SAP/QAPP ORGANIZATION

This SAP/QAPP is organized to support regulatory review by presenting the investigation rationale and study design prior to describing field implementation details, followed by data quality requirements and reporting procedures. Sections are structured to allow reviewers to evaluate the investigation logic, technical approach, and data quality controls in a clear and sequential manner.

- **Section 2.0 – RI Study Design.** Provides a brief overview of the tiered investigation framework and media-specific sampling strategy described in the RI/FS Work Plan and summarizes how the Conceptual Site Model (CSM) and identified data gaps are addressed through implementation of this SAP/QAPP.
- **Section 3.0 – Data Quality Objectives and Decision Framework.** Defines the decisions to be supported by the RI, identifies applicable action levels and preliminary cleanup levels (PCULs) from the Work Plan, establishes required reporting limits, outlines data quality indicators, and presents decision rules and contingency sampling provisions.
- **Section 4.0 – Investigation Implementation.** Describes media-specific sampling procedures for soil, groundwater, surface water, sediment, and catch basin solids, including drilling and collection methods, sampling intervals, and sample identification and nomenclature conventions.
- **Section 5.0 – General Field Procedures.** Describes procedures applicable across all media, including site access and preparation, field logging and screening, decontamination, and field documentation, surveying procedures.
- **Section 6.0 – Investigation-Derived Waste Management.** Describes procedures for characterization, containerization, temporary storage, and disposal of soil cuttings, groundwater, sediment, decontamination water, and incidental waste generated during RI activities.
- **Section 7.0 – Project Organization.** Describes the project team organization, roles and responsibilities.
- **Section 8.0 – Analytical Methods and Laboratory Requirements.** Identifies chemicals of concern, required laboratory accreditation, analytical methods, target reporting limits relative to cleanup criteria, sample preservation requirements, and laboratory instrumentation and calibration procedures.
- **Section 9.0 – Quality Assurance and Quality Control.** Describes field and laboratory QA/QC samples, acceptance criteria, calibration verification procedures, and corrective action protocols to ensure data reliability and defensibility.
- **Section 10.0 – Data Management, Validation and Usability Assessment.** Describes field and laboratory data review procedures, level of data validation, handling of qualified and non-detect results, electronic data deliverables, and submittal to Ecology's Environmental Information Management (EIM) database.
- **Section 11.0 – Reporting and Deliverables.** Describes reporting requirements and deliverables associated with the remedial investigation.

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2.0 RI Study Design

The RI study design described in this SAP/QAPP is based on the investigation framework presented in the RI/FS Work Plan and is intended to generate data necessary to characterize PFAS impacts consistent with the requirements of MTCA. The study design focuses on addressing identified data gaps, delineating PFAS impacts relative to PCULs, and refining the CSM. The RI is intended to define the nature and extent of impacts without pre-judging remedial alternatives.

Data generated during the RI will be evaluated relative to applicable PCULs to determine exceedances, delineation needs, and potential migration pathways. Where concentrations exceed applicable criteria, additional step-out sampling may be performed laterally or vertically to define the extent of impacts, as described in this SAP/QAPP.

2.1 DATA GAPS

Previous investigations at the Site have identified the presence of PFAS in soil, groundwater, surface water, and stormwater-related media; however, data gaps identified in Section 6 of the Work Plan limit the current understanding of the distribution and transport of impacts. These data gaps form the basis for the RI field program described in this SAP/QAPP.

The RI is designed to further delineate the lateral and vertical extent of PFAS concentrations exceeding PCULs in soil at the former Fire Training Pit (FTP), further characterize PFAS impacts in groundwater to the southwest of monitoring well FP-MW14 and at locations beyond Airport property boundaries, and further evaluate PFAS impacts in surface water and stormwater infrastructure. The RI field program is designed to address these data gaps and to refine the CSM, reduce uncertainty, and support Site and source characterization under MTCA.

2.2 MEDIA-SPECIFIC INVESTIGATION OBJECTIVES

Media-specific investigation objectives have been developed to address identified data gaps, and to ensure that data collected during the RI are adequate to support site characterization and remedial decision-making. The media-specific objectives presented in Sections 2.2.1 through 2.2.5 define the purpose of sampling each medium and describe how the resulting data will be used to evaluate migration pathways, further delineate PFAS distribution, and inform subsequent phases of site assessment, including evaluation of remedial action alternatives, if warranted.

2.2.1 Soil Investigation Objectives

Soil investigation activities are intended to characterize the presence, concentration, and extent of PFAS in the vadose and saturated zones, and to evaluate soil as a potential continuing source of impacts to other environmental media. Soil data will be used to delineate source area(s) and impacted soil horizons associated with historical activities.

Specific objectives include defining the lateral and vertical extent of soil impacts relative to applicable cleanup criteria, identifying soil intervals with elevated concentrations that may represent residual source material, and assessing potential direct-contact and leaching pathways to underlying groundwater.

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2.2.2 Groundwater Investigation Objectives

Groundwater investigation objectives are intended to characterize the distribution and extent of contaminants in groundwater and to evaluate plume geometry, concentration gradients, and migration potential. Groundwater data will be used to assess potential exposure pathways, including the potential for off-site migration and discharge to surface water or other receptors.

Specific objectives include defining the lateral and vertical extent of groundwater impacts relative to applicable cleanup criteria and evaluating contaminant mobility within identified hydrogeologic units, including the influence of hydraulic gradients and connectivity between source areas and downgradient receptors.

A limited subset of groundwater samples may also be analyzed using advanced PFAS characterization techniques, as described in Section 7.2, to further evaluate plume behavior and potential commingling of contaminants.

2.2.3 Surface Water Investigation Objectives

Surface water investigation objectives are intended to characterize the distribution and extent of contaminants in surface water and migration potential. Surface water data will be used to assess potential exposure pathways, including the potential for off-site migration and discharge to other receptors.

Specific objectives include defining the lateral extent of surface water impacts relative to applicable cleanup criteria and evaluating contaminant mobility within Big Gulch Creek.

A limited subset of surface water samples may also be analyzed using advanced PFAS characterization techniques, as described in Section 7.2, to further evaluate plume behavior and potential commingling of contaminants.

2.2.4 Catch Basin Water and Solids Investigation Objectives

Catch basin investigation objectives are intended to evaluate PFAS impacts in areas potentially influenced by Site-related releases and to assess the potential for contaminant migration and accumulation in other depositional environments. Data from samples collected from the stormwater conveyance system will be used to evaluate transport pathways and, where applicable, support evaluation of potential ecological exposure.

The catch basin investigation will characterize the presence and distribution of PFAS in water and solids from the stormwater conveyance system, in order to improve understanding of contaminant transport and depositional processes and to evaluate whether stormwater infrastructure may act as a sink or secondary source of PFAS.

2.2.5 Sediment Investigation Objectives

Sediment investigation objectives are intended to evaluate sediment from Big Gulch Creek that is potentially influenced by Site-related releases, and to assess the potential for contaminant migration and accumulation in depositional environments. Sediment data will be used to evaluate transport pathways and, where applicable, support evaluation of potential ecological exposure.

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The sediment investigation will characterize the presence and distribution of PFAS in sediments to improve understanding of contaminant transport and depositional processes and to evaluate whether sediments may act as a sink or secondary source of PFAS.

2.3 CONCEPTUAL SITE MODEL CONSIDERATIONS

The RI is designed to test and refine the preliminary CSM as presented in the RI/FS Work Plan, including the presence, distribution, and transport of PFAS across environmental media. Key CSM considerations evaluated through the RI include the extent and connectivity of PFAS impacts, the potential for commingling of PFAS from multiple release areas, and the mechanisms controlling PFAS transport and persistence. Results of the RI will be used to update the CSM, which will inform subsequent phases of site assessment and support remedial decision-making, including evaluation of cleanup action alternatives and identification of any additional data needs, if warranted.

3.0 Investigation Implementation

This section describes the media-specific field procedures that will be used to implement the RI in accordance with the study design and decision framework presented in Section 2.0 and the RI/FS Work Plan. Sampling methods, exploration techniques, and sample handling procedures are defined to ensure that data collected for soil, groundwater, surface water, sediment, and catch basin solids are representative, defensible, and suitable for evaluation relative to applicable cleanup criteria. Detailed procedures are provided to support consistent field execution and to maintain data quality in accordance with this SAP/QAPP.

All field sampling activities described in this section will be conducted in accordance with the project-specific PFAS-Free Sampling Procedures SOP (Attachment B-1), which establishes material restrictions and handling practices applicable to all environmental media to prevent cross-contamination.

3.1 SOIL INVESTIGATION

Subsurface soil samples will be collected from borings. Hollow-stem auger (HSA) and sonic drilling methods will be used at boring locations where monitoring well installation is planned. If additional shallow soil samples are deemed necessary during field observations, samples will be collected from borings using a shovel, hand auger, or direct push drill rig. The drilling equipment will be operated by a Washington State-certified driller using industry-standard techniques.

Soil sampling equipment associated with the respective drilling methods may include:

- Hollow-Stem Auger (HSA): split-spoon sampler or California Modified sampler
- Sonic Drilling: continuous core barrel or split-spoon sampler, as appropriate
- Hand Auger or Direct Push: hand auger flights or acetate liners
- Conductor casing to isolate shallow soil/groundwater from deeper soil/groundwater, if encountered when drilling.

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Soil samples will be collected from discrete depth intervals identified based on lithologic and saturation changes, field screening results, and RI objectives. Sampling intervals and depths will be documented in field boring logs.

All work areas will be outdoors, and field activities will be conducted in accordance with the site-specific Health and Safety Plan (HASP) as presented in Appendix C of the Work Plan. The HASP includes procedures to protect worker health and safety during drilling and sampling activities.

Borings that are not completed as monitoring wells will be decommissioned using bentonite chips or bentonite grout in accordance with the Washington Administrative Code Minimum Standards for Construction and Maintenance of Wells (WAC 173-160) and applicable project standard operating procedures.

Subsurface conditions encountered during drilling will be logged and recorded on boring log forms as further described in Section 5. Boring locations will be documented by measuring from existing site features or by recording coordinates using a global positioning unit capable of submeter accuracy (e.g., Trimble™). Newly installed monitoring wells will be surveyed by a licensed professional land surveyor to establish horizontal and vertical control.

3.1.1 Soil Sampling Procedures

Soil samples will be collected for lithologic characterization, field screening, and chemical analysis. Anticipated sampling intervals, target depths, and analytical parameters are identified in Table B-1 of this SAP/QAPP. Final sampling depths may be refined in the field based on lithologic changes, field screening results, or other observations relevant to project objectives.

Recovered soil will be visually inspected for staining, discoloration, sheens, or other indicators of potential impacts. Headspace vapor screening will be conducted using a photoionization detector (PID) to evaluate the presence of volatile organic compounds. Field screening results and observations will be documented in boring logs and field records.

Additional soil samples may be collected if field observations indicate potential impacts, including elevated PID readings, staining, odor, or other evidence of contamination. Supplemental samples will be preserved and held at the laboratory pending analytical determination, as appropriate.

Samples will be prepared, handled, and documented in a manner that maintains representativeness and sample integrity. All sample containers will be properly labeled, preserved, and stored on ice immediately after collection.

Non-disposable sampling equipment and any reusable materials that contact soil will be decontaminated before and after each sample and between sampling locations to prevent cross-contamination. Investigation-derived waste, including soil cuttings and decontamination fluids, will be containerized and managed in accordance with Section 6.0 of this SAP/QAPP.

Soil samples will be labeled with a prefix to refer to the study area location (Fire Pit = FP). The depth interval will be specified as follows: a soil sample collected from soil boring station FP-GEI-3 with a sampling interval

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from 2 to 3 feet below ground surface (bgs) will have the sample nomenclature of FP-GEI-3-2.0-3.0. Duplicate soil samples will be collected at a rate of one every 20 samples as specified in Table B-2 of the SAP/QAPP.

3.2 GROUNDWATER INVESTIGATION

Groundwater samples will be collected from existing monitoring wells and newly installed monitoring wells in accordance with this SAP/QAPP. Existing wells will be inspected prior to sampling to confirm integrity, accessibility, and suitability for sample collection. New monitoring wells will be installed at designated locations and constructed in accordance with WAC 173-160 Minimum Standards for Construction and Maintenance of Wells.

Quarterly groundwater sampling will be conducted using low-flow sampling procedures to ensure representative sample collection and to maintain sample integrity. Groundwater samples will be collected on a quarterly basis from the newly installed monitoring wells and up to 16 existing monitoring wells (for a total of up to 24 groundwater samples). The first quarterly groundwater sampling event (Q1) will be completed in two phases.

- The first phase of Q1 groundwater monitoring will include sampling of up to 16 existing monitoring wells plus the monitoring wells installed during Tier 1 of RI drilling.
- The second phase of Q1 groundwater monitoring will only include sampling of monitoring wells installed during Tier 2 of RI drilling.

Following the initial two phases of the first quarterly groundwater sampling event, up to 24 select monitoring wells will be sampled during the second (Q2), third (Q3), and fourth (Q4) quarterly RI groundwater monitoring events. Well installation, development, and sampling methods are described in the following subsections.

3.2.1 Monitoring Well Installation and Development

Monitoring wells proposed in the Work Plan will be constructed in accordance with the WAC 173-160 Minimum Standards for Construction and Maintenance of Wells. Wells will be installed as either flush-mount or stick-up completions using HSA or sonic drilling methods, as appropriate for site conditions and target depth.

Each monitoring well will be constructed with PFAS-free casing and screen materials designed to encounter the targeted aquifer. Sand pack, annular seal, and surface completion materials will be installed in accordance with state well construction requirements to prevent vertical migration of contaminants and surface infiltration.

Monitoring well locations will be surveyed by a licensed professional land surveyor. Horizontal coordinates and vertical elevations will be established to an accuracy sufficient to support groundwater elevation measurements. The elevation of the surveyed reference point, including the water level measuring point on the well casing and the top of the monument, will be recorded to the nearest one-hundredth of a foot.

Following installation, each well will be developed to remove sediment introduced during drilling and to improve hydraulic connection with the surrounding formation. Development may include surging, bailing,

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pumping, or a combination of these methods until turbidity is reduced and formation water is representative. Wells will be allowed to equilibrate for a minimum of 24 hours following development prior to sampling.

3.2.2 Groundwater Level Monitoring

Prior to groundwater sampling, water levels will be measured in monitoring wells to characterize groundwater elevations and evaluate groundwater flow conditions across the Site. The gauging event will include all existing accessible monitoring wells and all newly installed monitoring wells. Off-property wells may be considered for access pending property owner agreements.

Groundwater level monitoring will consist of obtaining static water level measurements and total depth measurements from groundwater monitoring wells using an electronic water level indicator. Measurements will be collected relative to a consistent reference point at the surveyed top of well casing and recorded to the nearest 0.01 foot. Measurements will be collected over a short time interval to minimize temporal variability and allow the data to be used to evaluate groundwater gradients, flow direction, and hydraulic relationships between monitoring intervals across the on-property and off-property areas. Surveyed well casing elevations will be used to convert depth-to-water measurements to groundwater elevations relative to the site vertical datum for development of groundwater elevation maps.

Water level measurement equipment will be decontaminated between wells using PFAS-compatible procedures as described in Section 4.5 to minimize the potential for cross-contamination. Newly installed monitoring wells will be developed, as described in Section 3.2.1, prior to gauging. The resulting groundwater elevation data will be used to develop potentiometric surface maps and to refine the CSM by evaluating groundwater flow direction and potential hydraulic connectivity between hydrostratigraphic units. NAPL is not anticipated at the Site based on the known PFAS release history; therefore, product thickness measurements are not included in the gauging procedures.

3.2.3 Monitoring Well Groundwater Sampling

Quarterly groundwater sampling will be conducted using low-flow sampling techniques to obtain representative formation water while minimizing disturbance of the water column. Prior to sampling, static water levels will be measured using an electronic water level indicator to the nearest one-hundredth of a foot. Measurements will be recorded relative to the surveyed measuring point from the top of casing.

Wells will be purged at a low flow rate, typically between approximately 0.1 and 0.5 liters per minute, using a peristaltic pump, submersible bladder pump, or other appropriate device equipped with dedicated or disposable PFAS-free tubing. A minimum of one well volume will be removed, or purging will continue until stabilization of selected field parameters, including temperature, specific conductance, pH, and turbidity. Stabilization will be evaluated based on consistent readings over successive measurements.

If a well dewaters during purging, sampling may occur following adequate recharge, provided sufficient water is present to obtain the required sample volume. Flow rates, purge volumes, water levels, and field parameter measurements will be documented in field forms.

Groundwater samples will be transferred directly into laboratory-supplied containers appropriate for the specified analytical methods. Samples will be preserved, labeled, and stored on ice immediately following collection.

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Non-disposable sampling equipment and any reusable materials that contact groundwater will be decontaminated between wells and sampling events to prevent cross-contamination. Investigation-derived waste, including purge water and decontamination fluids, will be containerized and managed in accordance with Section 5.0 of this SAP/QAPP and the applicable provisions of the Work Plan.

Groundwater samples will be labeled with a prefix to refer to the project site name (Fire Pit = FP). A groundwater sample collected from well location FP-MW21 on June 30, 2026 would have the sample nomenclature of FP-MW21-260630.

Duplicate groundwater samples will be collected at a rate as specified in Table C-2 of the SAP/QAPP and named "FP-GWDUP-" followed by the date. A groundwater duplicate sample collected on July 1, 2026 would have the sample nomenclature FP-GWDUP-260701.

3.3 SURFACE WATER INVESTIGATION

Surface water grab samples will be collected from designated locations including wetlands, streams, outfall pipes, identified seeps, and selected catch basins, as shown in the Work Plan figures and summarized in Table B-1 of this SAP/QAPP. Sampling locations are intended to evaluate PFAS impacts and to assess potential transport pathways from upland source areas and stormwater conveyance features.

Grab samples will be collected directly into laboratory-supplied containers using PFAS-free sampling equipment. Where direct collection is not feasible due to access limitations, depth constraints, or safety considerations, PFAS-free disposable bailers or other approved PFAS-free collection devices will be used. Sampling will be conducted in a manner that minimizes disturbance of bottom sediments unless sediment sampling is specifically intended.

Field staff will document sampling conditions, including flow characteristics, weather conditions, and any observable sheen or turbidity, in field logs. Sample handling, preservation, and transport will be conducted in accordance with Section 4.0 and Section 6.0 of this SAP/QAPP to maintain sample integrity and prevent cross-contamination.

Surface water samples will be labeled with a prefix to refer to the project site name (Fire Pit = FP) and the date. For example, a surface sample collected from location FP-SW9 on June 11, 2026 will have the sample number FP-SW9-260611.

Duplicate surface sample labels will replace the location number with "SWDUP," and the sample will have the same sample time as the primary sample. A duplicate sample of the above mentioned sample would appear as FP-SWDUP-260611.

Relevant sample information will be documented on a water field sampling data sheet. Documentation may include items such as equipment used, observed or measured turbidity, presence of foam or biogenic film, etc.

3.4 SEDIMENT INVESTIGATION

Sediment samples will be collected from designated locations within Big Gulch Creek and other depositional areas identified in the Work Plan figures and summarized in Table B-1 of this SAP/QAPP.

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Sampling locations are intended to evaluate PFAS occurrence in creek sediments influenced by Site-related releases and to assess sediments as potential sinks or secondary sources within the creek system.

Within the active creek channel of Big Gulch Creek, below the Ordinary High Water Mark (OHWM), sediment samples will be collected as three-point composite samples. Individual aliquots will be collected from three discrete locations within the defined sampling area and combined into a stainless steel or other PFAS-free homogenization container. The composited material will be thoroughly homogenized using PFAS-free tools prior to placement into laboratory-supplied containers to ensure representativeness of the sampling interval.

Sampling will be conducted using PFAS-free stainless steel scoops, spoons, or other approved collection devices. Field staff will minimize disturbance of underlying materials and avoid inclusion of excessive surface water during collection. Sample handling, preservation, and transport will be conducted in accordance with Section 4.0 and Section 6.0 of this SAP/QAPP to maintain sample integrity and prevent cross-contamination.

Field observations, including sediment texture, color, moisture content, presence of organic material, and evidence of depositional conditions will be documented in field logs.

Sediment samples will be labeled with a prefix corresponding to the project site name location (e.g., Fire Pit = FP), followed by the sample type identifier "SED," the location number, and the date of collection in YYMMDD format. For example, a sediment sample collected from Big Gulch Creek location 3 on June 11, 2026 would be labeled FP-SED3-260611.

Composite samples collected within the active creek channel will retain a single sample identification number representing the defined composite location.

Duplicate sediment sample labels will replace the location number with "DUP" and will reflect the same sample collection date as the primary sample. For example, a duplicate of the above sample would be labeled FP-SEDDUP-260611.

Relevant sample information will be documented on a sediment field sampling data sheet. Documentation may include items such as sampling depth interval, compositing approach, sediment characteristics, and field observations relevant to sample representativeness.

3.5 CATCH BASIN SOLIDS INVESTIGATION

Catch basin solids samples will be collected from designated stormwater conveyance features, including selected catch basins and related infrastructure, as shown in the RI/FS Work Plan figures and summarized in Table B-1 of this SAP/QAPP. Sampling locations are intended to evaluate PFAS accumulation within stormwater infrastructure and to assess the potential for stormwater systems to function as transport pathways or secondary reservoirs.

Where present, standing water within catch basins or conveyance structures may also be sampled to evaluate dissolved-phase PFAS within the stormwater system prior to discharge to receiving surface waters. Catch basin water samples are intended to characterize PFAS within the stormwater conveyance network and will be distinguished from ambient receiving water samples collected directly from the creek.

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Solids will be collected from accessible sediment accumulation zones within the catch basin sump using PFAS-free stainless steel scoops, spoons, or other approved collection devices. Care will be taken to target representative accumulated material while minimizing inclusion of excessive free water unless otherwise specified. No compositing between multiple catch basins will occur.

Collected material from each catch basin will be placed into a PFAS-free homogenization container and thoroughly mixed to achieve a uniform sample matrix prior to placement into laboratory-supplied containers. Homogenization will be conducted using PFAS-free tools to ensure representativeness and minimize cross-contamination.

Field staff will document catch basin condition, approximate depth of accumulated solids, evidence of flow or sediment layering, and any observable staining or debris in field logs. Sample handling, preservation, and transport will be conducted in accordance with Section 4.0 and Section 6.0 of this SAP/QAPP to maintain sample integrity and prevent cross-contamination.

Catch basin solids samples will be labeled with a prefix corresponding to the study area location (e.g., Fire Pit = FP), followed by the sample type identifier “CB,” the catch basin identification number, and the date of collection in YYMMDD format. For example, a catch basin solids sample collected from catch basin FP-CB4 on June 11, 2026 would be labeled FP-CB4-260611.

Duplicate sample labels will replace the catch basin identification number with “DUP” and will reflect the same sample collection date as the primary sample. For example, a duplicate of the above sample would be labeled FP-CBDUP-260611.

Catch basin water samples, if collected, will be identified using the same location prefix and catch basin identification number, followed by the sample type identifier “CBW” to distinguish water from solids (e.g., FP-CB4-CBW-260611). Duplicate water samples will replace the catch basin identification number with “DUP” (e.g., FP-CBWDUP-260611).

For purposes of laboratory analysis and data reporting, catch basin water samples will be treated as surface water matrix samples; however, in figures and tables they will be identified as “stormwater conveyance (catch basin) water” to distinguish them from ambient receiving water samples collected directly from the creek. This distinction is intended to support interpretation of transport within the stormwater system while maintaining consistency with applicable surface water analytical methods and reporting conventions.

Relevant sample information will be documented on a solids field sampling data sheet. Documentation may include items such as depth of solids within the sump, estimated thickness of accumulated material, evidence of stratification, and other field observations relevant to sample representativeness.

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4.0 General Field Procedures

This section describes the standard field procedures that apply to all RI activities conducted under this SAP/QAPP, regardless of environmental media. These procedures are intended to promote consistency in field execution, maintain sample integrity, and ensure that data collected are representative and defensible. General requirements for site access, field documentation, screening, decontamination, surveying, and sample handling are provided to support implementation of the investigation in accordance with the decision framework and quality assurance requirements established in this SAP/QAPP.

4.1 ACCESS

The Snohomish County Airport property requires a security badging process for access into the Air Operations Area (AOA) where many of the proposed exploration locations exist. The project manager, field coordinator and lead field staff will be AOA badged with escort privileges to manage subcontractors while at the Airport Property.

Access authorization and any required permits for monitoring well installation and sampling activities conducted within or adjacent to public rights-of-way will be obtained in coordination with the City of Mukilteo prior to initiating field work.

Several proposed sampling locations identified in Table B-1 are located off Airport property. Access to these locations will be coordinated in advance with select property owners and other stakeholders, as applicable. Written or documented access agreements will be obtained by Snohomish County Airport prior to mobilization. Field activities at off-property locations will be conducted in a manner that minimizes disruption and restores areas to pre-investigation conditions to the extent practicable.

4.2 SITE PREPARATION

Field preparation activities will include utility locates to identify the presence of subsurface utilities prior to drilling. Public and private utility-locating services will check for underground utilities and features (e.g., pipelines) near the proposed sample locations before drilling activities begin at the study areas. Additionally, GeoEngineers has identified possible on-site utilities, piping and other subsurface obstructions from historical plan sets and publicly available information.

4.3 FIELD LOGGING

The stratigraphy encountered in soil borings will be logged by the field geologist/engineer/scientist on field forms. Information on the boring logs will include the exploration location; general information about the drilling equipment; sampling information such as sample intervals/depths, sample recoveries, stratigraphy, and field screening results. The stratigraphy encountered will generally be described in accordance with ASTM D 2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure). In addition, identification of the Unified Soil Classification System (United State Geological Survey [USGS]) group symbol will be recorded on the field logs.

As applicable, additional information will be recorded on field logs during soil boring drilling including depth to groundwater/saturated soil, heaving conditions, changes in drilling rate, and other noteworthy observations or conditions such as the type and occurrence of anthropogenic materials and qualitative

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description of biota and debris. If debris are encountered, the type of debris (i.e., wood debris, glass, brick, refuse, etc.) and estimated quantity (i.e., observed percent volume) of each type of debris present will be recorded on the field form.

A photograph will be taken of the soil or sediment samples.

4.4 FIELD SCREENING

Field screening will be performed to support selection of sampling intervals, document field conditions, and evaluate the presence of potential co-contaminants. PFAS are not reliably quantified using field screening methods, and PFAS determinations will be based on laboratory analytical results. Field screening results will be recorded on the field logs. The following field screening methods may be used: visual and olfactory, water sheen, headspace vapor screening, and optional qualitative foam observation.

4.4.1 Visual and Olfactory Screening

Soil and sediment will be observed for unusual color and stains and/or odor (e.g., hydrogen sulfide [rotten egg smell], petroleum hydrocarbons) indicative of possible contamination. Visual observation will also include presence of debris type, vegetation, evidence of depositional conditions, disturbance and biological activity.

4.4.2 Water Sheen Screening

Water sheen screening can help identify the presence or absence of petroleum hydrocarbons. A portion of the soil sample will be placed in a pan containing distilled water. The water surface will be observed for signs of sheen. The following sheen classifications will be used:

CLASSIFICATION	IDENTIFIER	DESCRIPTION
No Sheen	(NS)	No visible sheen on the water surface
Slight Sheen	(SS)	Light, colorless, dull sheen; spread is irregular, not rapid; sheen dissipates rapidly
Moderate Sheen	(MS)	Light to heavy sheen; may have some color/iridescence; spread is irregular to flowing, may be rapid; few remaining areas of no sheen on the water surface
Heavy Sheen	(HS)	Heavy sheen with color/iridescence; spread is rapid; entire water surface may be covered with sheen

4.4.3 Headspace Vapor Screening

Headspace vapor screening can help identify the presence or absence of volatile chemicals. Where visual or olfactory screening indicates evidence of contamination (e.g., NAPL, sheen, staining, hydrocarbon odor), headspace vapor screening will be completed as soon as possible after collecting a soil or sediment sample.

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A portion of the sample will be placed in a resealable plastic bag. Ambient air is captured in the bag; the bag is sealed and then shaken gently to expose the soil to the air trapped in the bag. Vapors present within the sample bag headspace are measured by inserting the probe of a photoionization detector (PID) through a small opening in the bag. A PID measures the concentration of organic vapors ionizable by a 10.6 electron volt lamp (standard) in parts per million (ppm) and quantifies organic vapor concentrations in the range between 0.1 ppm and 2,000 ppm (isobutylene-equivalent) with an accuracy of 1 ppm between 0 ppm and 100 ppm. The maximum vapor concentration will be recorded on the field report for each sample. The PID will be calibrated to 100 ppm isobutylene. PID screening is used to evaluate potential VOC impacts and is not used to assess PFAS.

4.5 DECONTAMINATION PROCEDURES

To prevent cross-contamination of collected samples, reusable sampling equipment will be decontaminated prior to collecting each sample using the following procedures. Decontamination procedures are designed to minimize the potential for PFAS cross-contamination and will incorporate PFAS-free materials and handling practices throughout field activities.

4.5.1 Drilling Equipment

For large pieces of drilling equipment (such as sonic core casing, drill rods, drill bits, and those portions of the drill rig that may be positioned directly over a boring location), the following procedure will be used to decontaminate the equipment between borings and upon completion of drilling activities. The equipment will be pressure-washed and, if necessary, scrubbed to remove visible dirt, grime, grease, oil, rust flakes, etc. The equipment will then be rinsed with potable water.

Conductor casing will be used when drilling the deep well planned in the vicinity of the FTP (FP-MW21; see Figure 6) to prevent potential cross-contamination between shallow soil/groundwater and deeper soil/groundwater, as needed.

Where practicable, a final rinse using PFAS-free water will be performed on equipment surfaces that may directly contact environmental media.

Sampling devices will be cleaned using an aqueous Alconox® or Liqui-Nox® solution and a distilled water rinse before each sample is collected.

4.5.2 Sampling Equipment

When possible, disposable sampling equipment will be used to minimize the need for decontaminating equipment. Disposable materials will be verified to be PFAS-free and will not contain fluoropolymer components (e.g., PTFE/Teflon®, fluorinated coatings, or water-resistant treatments). Where plastic sampling equipment is required, materials will be limited to high-density polyethylene (HDPE) or polypropylene (PP), which are generally accepted for PFAS sampling because they do not contain fluoropolymers. Prior to and between sample collection events. Prior to and between sample collection events, reusable sampling equipment that contacts soil, groundwater, sediment, or offshore groundwater will be decontaminated. Reusable sampling equipment may include temporary piezometers, hand augers, Power Grab sediment sampler, groundwater sampling pumps, water quality meter, interface probes, sounding tapes, trowels, spoons, bowls and other hand tools or sampling/measuring devices.

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For sampling equipment, excess soil or sediment will first be removed from the equipment by rinsing. The sampling equipment will then be pressure-washed or washed using an aqueous Alconox® or Liqui-Nox® detergent solution and a brush. Detergent will be used to clean surfaces of sampling tools that directly contact samples (e.g., temporary piezometer, hand auger/tools); equipment that does not directly contact samples (e.g., outer core barrel or casing) will be pressure-washed and rinsed. Decontaminated equipment will be temporarily staged on clean plastic sheeting, wrapped, or covered with aluminum foil, and/or stored in a clean, dry place. Plastic sheeting, foil, and storage materials will be confirmed to be free of fluorinated coatings or treatments.

Electronic water level indicators used for well gauging will be decontaminated before and after use at each well. Decontamination will be performed as follows:

1. Wipe off any visible LNAPL with disposable towels.
2. Clean measurement probe and tape with an aqueous Alconox® or Liqui-Nox® solution.
3. Rinse with distilled water.
4. Perform a final rinse with PFAS-free water prior to use in the next well.

4.5.3 Sample Containers

Pre-cleaned sample bottles and jars will be supplied by the subcontracted analytical laboratory. All sample containers will be certified by the laboratory as appropriate for PFAS analysis and free of fluorinated materials (e.g., PTFE/Teflon® liners or fluoropolymer-coated caps). The sample containers will be protected from contact with dust, dirt, and other potential sources of cross-contamination. Containers will remain sealed in original packaging until immediately prior to use and will be handled with clean nitrile gloves. Sample containers will not be reused.

Coolers used for sample transport will be dedicated for environmental sampling and will not contain materials that could introduce PFAS contamination (e.g., waterproofing sprays, coated ice packs, or consumer products containing fluorinated compounds).

4.5.4 Used Decontamination Water

Used decontamination water will be stored on-property in labeled 55-gallon drums for subsequent characterization and off-property disposal at a permitted facility. Drums will be clearly labeled as investigation-derived waste and will include accumulation start date, project identification, and contents description as described in the IDW Management section of this SAP/QAPP.

4.6 FIELD DOCUMENTATION

Three primary types of field documentation will used for this project: field reports and field forms, sample container labels, and chain of custody (COC) forms. Field documentation will be completed in real time to ensure accurate recording of sampling activities, field observations, and handling procedures, including PFAS-specific contamination control measures. A description of each of these documentation methods is provided in the following sections.

4.6.1 Field Reports

Field reports will be used to document the field and sampling activities performed at the project site for each day of field work. Field reports will include the date, time, description of field activities performed, names of personnel and site visitors, weather conditions, areas where photographs were taken (if

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applicable), and other data pertinent to the project. Field reports will be completed contemporaneously with field activities to ensure accuracy and completeness of the record.

Field reports will also contain sample collection and identification information, and if appropriate, a drawing of each area sampled, along with the locations (coordinates) where samples were collected. Sampling locations will be documented using field-measured coordinates or GPS data and later reconciled with surveyed coordinates, where applicable. Sample data recorded in field reports will include the sample date, time, location, identification number, matrix, collection method, analyses to be performed, any comments and the sampler's name.

Field reports will also document identified safety issues; quality control samples collected (e.g., duplicate samples, trip blanks); calibration checks of field monitoring/measuring instruments (e.g., PID, water quality meter); field measurements; and IDW disposition (e.g., number of drums generated and their contents and location). Field documentation will also record PFAS-specific contamination control measures implemented during sampling (e.g., use of PFAS-free materials, equipment decontamination confirmation, and glove changes between samples).

Soil boring and sediment core information will be recorded on boring logs attached to the field report. Sediment sampling logs will be recorded for surface sediment samples recording the sediment type and field screening results and attached to the field report. A groundwater/well sampling record will be used for each well to record the information collected during water sampling. Field parameter stabilization data collected during low-flow groundwater sampling will be recorded on groundwater sampling forms.

Following review by the Project Manager, the original field records will be scanned and kept in the project file. Original field records will be retained in accordance with company document retention policies and applicable regulatory requirements.

4.6.2 Sample Labels

Sample containers will be clearly labeled with waterproof black ink at the time of sampling. Labels will be completed immediately following sample collection and prior to placing samples into coolers. Sample labels will include the following information:

- Project/site name;
- Sampling date;
- Sampling time;
- Sample identification number; and
- Preservation used, if any.

The same information entered on the sample label will be recorded on the chain of custody form and in the field report. Label information will be verified by field staff prior to shipment to ensure consistency between the sample container, field documentation, and COC form.

4.6.3 Chain of Custody Forms

After samples have been collected and labeled, they will be maintained under chain of custody procedures. These procedures document the transfer sequence of samples from the field to the laboratory. Each sample sent to the laboratory for analysis will be recorded on a COC form.

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The COC form documents sample names, dates, times, and analyses to be performed for each sample, as well as all transfers of sample custody from the field to the analytical laboratory. The COC form will be completed using waterproof ink. Any corrections will be made by drawing a line through and initialing and dating the change, then entering the correct information. No erasures or obscuring of original entries will be permitted.

When transferring custody of samples, the individuals relinquishing and receiving them will sign, date, and note the time on the COC form. Sample coolers shipped by common carrier will have the COC form enclosed in a resealable plastic bag and placed in the sample cooler prior to sealing the cooler for shipping. Custody seals will be used on sample coolers that are shipped by common carrier or delivered by courier to the laboratory. Custody seals will be affixed in a manner that prevents opening of the cooler without breaking the seal.

The sample shipping receipt will be retained in the project files as part of the COC documentation. The shipping company will not sign the COC forms as a receiver; instead, the laboratory will sign as a receiver when the samples are received. Internal laboratory records will document custody of the samples from the time they are received through final disposition. Laboratory confirmation of sample receipt, condition, and temperature upon arrival will be reviewed as part of the data validation process.

4.7 EXPLORATION LOCATION AND SURVEYING

Exploration locations will be documented to establish accurate horizontal and vertical control for soil, groundwater, sediment, and surface water sampling activities. Location data will support mapping, groundwater elevation calculations, and evaluation of contaminant distribution relative to site features and property boundaries.

4.7.1 Exploration Location by Field Crews

The horizontal coordinates of soil and groundwater exploration locations will be determined using a hand-held Trimble DA-2 GPS unit or similar equipment. Field location data will be collected using equipment capable of submeter horizontal accuracy under typical site conditions. GeoEngineers field personnel will log the exploration location names and coordinates in the GPS unit for subsequent downloading to a computer. Location data will be downloaded, reviewed for completeness, and incorporated into the project geospatial database.

For sediment samples collected within Big Gulch Creek, sampling will be conducted on foot within the active creek channel below the Ordinary High Water Mark (OHWM). Sediment sampling locations will be accessed by foot from designated entry points and identified in the field using visual reference to mapped locations and site features.

For three-point composite sediment samples, a single representative coordinate will be recorded for each composite location. The recorded coordinate will represent the approximate centroid of the defined compositing area. Individual aliquot locations within the composite area will generally be within approximately 10 feet of the recorded coordinate unless otherwise documented.

Where satellite reception is limited due to vegetative cover or terrain, location data will be supplemented with field notes, measured offsets from identifiable landmarks, and annotated site maps to ensure

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reproducibility of the sampling location. Recorded coordinates will be downloaded, reviewed for completeness, and incorporated into the project geospatial database.

4.7.2 Surveying by Professional Land Surveyor

Surveying will be performed by a licensed professional land surveyor to establish horizontal coordinates and vertical elevations referenced to a recognized datum (e.g., NAVD88, NAD83, or project-specific datum).

The surveyed measuring point used for groundwater elevation monitoring will be clearly identified and documented to ensure consistency in future water level measurements.

5.0 Investigation-derived Waste Management

Investigation derived waste (IDW) generated during field activities will be managed in a manner protective of human health and the environment and consistent with applicable federal, state, and local requirements. IDW will be characterized and managed in accordance with its final waste designation.

IDW will be placed in Department of Transportation (DOT)-approved 55-gallon drums or equivalent containers appropriate for the waste type. Drums will be stored on Site in a designated staging area. Containers will be stored on a hard, stable surface and elevated on pallets or equivalent supports where practicable to prevent contact with soil and standing water. Secondary containment will be provided for liquid wastes or where otherwise necessary to prevent releases.

Each waste container will be labeled with "Investigation-Derived Waste – Pending Analysis" and the following information:

- A description of the media (i.e., soil, water, sediment)
- Origin of the media
- Accumulation start date
- Site identification
- Generator name
- Contact person
- Drum ID number corresponding to the drum inventory form

Drums will be stored on a hard, flat surface in a secure location pending characterization and disposal in accordance with applicable local, State, and Federal regulations.

IDW containers will be inspected periodically, and at least weekly if designated as dangerous waste, to verify container integrity, labeling, and secondary containment. Inspection records will be maintained in the project file.

Once waste characterization has been completed, drums will then be labeled with Hazardous/Dangerous Waste or Non-Hazardous/Non-Dangerous Waste labels, as appropriate. Placement of these labels will occur no later than 30 days after receipt of the final analytical results used for waste characterization and classification.

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5.1.1 Soil and Sediment

Soil and sediment cuttings generating during drilling and sampling activities will be placed into 55-gallon drums and labeled and stored as described above.

Composite samples will be collected from soil/sediment drums and analyzed for contaminants of concern as necessary to support waste designation and disposal profiling. Analytical parameters may include PFAS by Environmental Protection Agency (EPA) Method 1633A, petroleum hydrocarbons, volatile organic compounds, semi-volatile organic compounds, and metals, as appropriate based on site conditions and disposal facility requirements.

Soil samples may also be archived at the laboratory for potential follow-up TCLP analysis, if required for landfill disposal characterization. Analytical results will be used to develop a waste profile and the drums will be transported and disposed of at an appropriate permitted landfill.

5.1.2 Groundwater and Decontamination Water

Well development and purge water removed from monitoring wells and decontamination water generated during sampling activities will be placed in 55-gallon drums labeled and stored as noted above. For landfill disposal characterization, composite water samples will be collected from the groundwater and decontamination drums. Analytical results will be used to develop a waste profile and the drums will be transported and disposed of at an appropriate permitted landfill.

5.1.3 Incidental Waste

Incidental waste generated during field activities includes items such as disposable personal protective clothing, gloves, and sampling supplies such as paper towels, plastic bags/sheeting, and similar discarded materials. These materials will be placed in plastic garbage bags or other appropriate containers. At the completion of the field investigation, incidental waste will be removed from the staging area and disposed of as municipal waste at a local trash receptacle. Materials that contact investigation media or are suspected to be impacted will be managed as IDW.

6.0 Project Organization

This section describes the project team structure, lines of authority, and responsibilities for implementation of this SAP/QAPP. Clear roles are established for field execution, quality assurance oversight, subcontractor coordination, and data management. Designated personnel have authority to implement corrective actions or stop work, if necessary, to ensure compliance with approved procedures and data quality requirements.

6.1 PROJECT TEAM ORGANIZATION

This section provides the organizational structure, lines of authority and responsibilities of key project roles. Information on individuals assigned to key project roles is provided in Table B-6. Project activities will be performed within the framework of the organization and functions presented in this section. The organizational structure will provide clear lines of responsibility and authority with the following objectives:

- Identify appropriate lines of communication and coordination.

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- Monitor project schedules and performance of subcontractors.
- Coordinate support functions such as laboratory analysis and data management.

6.1.1 GeoEngineers Principal Responsibilities

GeoEngineers personnel includes a designated principal-in-charge who provides senior technical oversight and programmatic review of the project. The acting principal will assist the project manager with overall programmatic planning for the technical components of the data gaps investigation and oversee the development of scopes, schedules and budgets. The principal provides high-level technical direction and ensures that project execution remains consistent with regulatory objectives and company quality standards.

6.1.2 GeoEngineers Project Manager Responsibilities

The project manager will provide direction to GeoEngineers staff and subcontractors to complete the investigation in accordance with this SAP/QAPP. The Project Manager is responsible for overall project implementation, coordination with the client and regulatory agencies, and ensuring that subcontractors comply with the requirements of the RI/FS Work Plan. The Project Manager has authority to implement corrective actions, address procedural deviations, and coordinate communication with Ecology regarding significant changes to scope or data quality concerns.

6.1.3 Field Coordinator/On-Site Safety Officer Responsibilities

The Field Coordinator and On-Site Safety Officer will be designated prior to mobilization. The Field Coordinator is responsible for leading field investigation activities, including verifying that procedures for field activities are executed in the proper manner, activities are properly documented, the prescribed scope of work is completed, and communication protocols are met. The Field Coordinator will report directly to the Project Manager.

The Field Coordinator is responsible for ensuring compliance with PFAS-free sampling procedures and documenting any field deviations from this SAP/QAPP. The Field Coordinator, as well as each field technician, has authority to pause field activities if sampling procedures are not being implemented in accordance with the RI/FS Work Plan.

Additionally, the On-Site Safety Officer will ensure that the appropriate health and safety requirements associated with physical and chemical hazards are in place during the field investigation, as outlined in the Health and Safety Plan (Appendix C of the Work Plan). The On-Site Safety Officer has independent authority to stop work if unsafe conditions are identified. The client will coordinate access for the field coordinator, field staff and subcontractors to the study area to conduct sample collection described in this SAP/QAPP.

6.1.4 Quality Assurance Manager Responsibilities

The GeoEngineers quality assurance (QA) Manager will provide QA oversight for both the field sampling and laboratory programs, confirming that samples are collected and documented appropriately; coordinating with analytical laboratories; reviewing data quality; conducting data validation and supervising project QA coordination.

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The QA Manager performs an independent review of field documentation, laboratory data packages, and quality control results to verify that data meet the requirements of this SAP/QAPP. The QA Manager has authority to recommend corrective actions, require re-sampling where warranted, and elevate data quality concerns to the Project Manager.

The QA Manager oversees the management of analytics, field logs, spatial data and other data transferred to or managed by GeoEngineers. Responsibility for review of laboratory electronic data deliverables (EDDs), database management, and coordination of submittal to Ecology's Environmental Information Management (EIM) system is assigned under the oversight of the QA Manager and Project Manager.

6.1.5 Analytical Laboratory Responsibilities

The contracted laboratories are responsible for the following.

- Performing analyses based on methods described in this SAP/QAPP, including the methods referenced for each procedure.
- Following documentation, custody and sample logbook procedures.
- Meeting reporting and QA/QC requirements.
- Providing electronic data files as specified.

The laboratory subcontractors are responsible for notifying the Project Manager about issues relating to laboratory analysis. The analytical laboratories will provide applicable analytical data to the database administrator at the conclusion of work. Laboratories shall be certified to provide analytical laboratory services for the project-specific methods and matrices under the Washington branch of the National Environmental Laboratory Accreditation Program (including the Washington Environmental Laboratory Accreditation Program). Specific analytical methods, performance criteria and reporting and detection limits that analytical laboratories are required to meet are described in this SAP. The primary analytical laboratory responsible for sample analysis is Pace Analytical.

7.0 Analytical Methods and Laboratory Requirements

This section describes the analytical methods, laboratory accreditation requirements, quality control procedures, and sample handling protocols that will be used to generate defensible data in support of the RI. Analytical activities will be conducted in accordance with applicable method requirements and the data quality objectives established in this SAP/QAPP.

7.1 CONTAMINANTS OF CONCERN

The contaminants of concern (COCs) for the site are PFAS. Target analytes include PFAS identified in the RI/FS Work Plan and consistent with EPA Method 1633A. Special PFAS protocols will be followed as outlined in the project-specific PFAS-Free Sampling Procedures SOP (Attachment B-1).

7.2 LABORATORY ANALYTICAL METHODS AND REPORTING LIMITS

An Ecology-accredited laboratory will perform the soil, groundwater, and surface water analyses in accordance with the laboratory analytical methods and QA/QC requirements set forth in this SAP/QAPP as

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summarized in Table B-1. Targeted PFAS analyses will be conducted using EPA Method 1633A, which includes 40 compounds and is applicable to aqueous and solid matrices. Tables B-1, B-2 and B-3 identify the preferred analytical method and QA/QC requirements for the COCs. As described in Section 7.2.1, a limited subset of groundwater samples will also be analyzed using additional laboratory methods to further characterize PFAS composition.

Laboratory methods were selected with the goal of providing sample results at reporting limits less than or equal to PFAS PCULs published by the Washington State Department of Ecology (Ecology, 2026). If reporting limits exceed applicable PCULs due to matrix interference or analytical limitations, the condition will be documented and evaluated during data validation and data usability assessment. If the lab cannot achieve reporting limits at or below Ecology's PCULs, the reporting limits will still be within typical industry practical quantitation limits (PQLs). Current laboratory report limits and published method detection limits are identified in Table B-4.

7.2.1 Advanced PFAS Analytical Methods (Targeted Subset)

A limited subset of groundwater samples will be analyzed using the following additional laboratory methods:

PFAS Isomer Profiling: Selected groundwater samples will be analyzed using a laboratory method capable of resolving and reporting branched and linear isomer fractions for targeted PFAS analytes. Analysis will be conducted using an EPA Modified Method 537 (EPA 537M) capable of reporting individual isomer distributions for applicable PFAS compounds. Results will include relative percent linear versus branched isomer fractions for reported analytes, where achievable, to support qualitative comparison of source-area and downgradient PFAS composition.

Total Oxidizable Precursor (TOP) Assay: The same groundwater samples will be analyzed using the laboratory's standard operating procedure for the Total Oxidizable Precursor (TOP) assay. The procedure includes sample oxidation followed by analysis using the base PFAS analytical method. Both pre-oxidation and post-oxidation results will be reported. Changes in PFAS concentrations following oxidation will be evaluated to estimate the relative contribution of oxidizable precursor compounds not captured by targeted analysis alone.

Laboratory QA/QC for advanced PFAS analyses will be consistent with the base PFAS analytical method and laboratory SOPs and will include method blanks and laboratory control samples consistent with the requirements of EPA Method 1633A and laboratory SOPs. Matrix spike (MS) and matrix spike duplicate (MSD) analyses are not required under EPA Method 1633A due to the use of isotope dilution quantification; however, they may be performed at the laboratory's discretion or if specifically requested as billable QC samples. For TOP Assay samples, QA/QC will also include evaluation of oxidation efficiency and laboratory control standards specific to the oxidation procedure, consistent with laboratory SOP requirements.

Advanced analytical results will be interpreted as lines of evidence to support refinement of the CSM and evaluation of plume stability, precursor transformation potential, and potential downgradient commingling. These analyses are not intended for direct comparison to regulatory cleanup levels.

Advanced analyses will be performed only on the groundwater samples identified in the RI Work Plan unless otherwise approved.

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7.3 LABORATORY OPERATIONS

QC samples in the laboratory may include laboratory control samples (LCSs), surrogate spike samples and method blanks, as well as other QC samples and procedures as required by the individual methods as outlined in Table B-3 of the SAP/QAPP.

7.4 SAMPLE CONTAINERS, PRESERVATIONS AND HANDLING

7.4.1 Preservation

Samples will be collected in laboratory-supplied containers with method-specific preservatives as generally specified in Table B-5 of the SAP/QAPP. Samples will be stored with ice in coolers at or below 6 degrees Celsius.

7.4.2 Sample Packaging and Shipping

Samples will be packed to avoid cross-contamination and/or breakage of containers and shipped overnight in coolers packed with ice to the analytical laboratory.

7.5 SAMPLE CUSTODY

Sample custody will be tracked from point of origin through analysis and disposal using a chain-of- custody (COC) form filled out with the appropriate sample and analytical information after samples are collected.

The following items will be recorded on the COC form:

- Project name
- Project number
- GeoEngineers project manager
- Sampler name(s)
- Sample identification, date and time collected, media, number of bottles submitted, bottle preservatives
- Requested analyses for each sample
- Turnaround requirements
- Signature, printed name and organization name of persons having custody of samples, and date and time of transfer
- Additional instructions or considerations that would affect analysis (e.g., archiving)

Persons in possession of the samples will be required to sign and date the COC form whenever samples are transferred between individuals or organizations. The COC will be included in the shipping containers. The laboratory will implement its in-house custody procedures that will begin when sample custody is transferred to laboratory personnel.

The signed COC(s) will be packed in shipping containers with the samples if samples are shipped via air or ground transportation (by a third party) and a custody seal will be placed on the container. A designated sample custodian at the analytical laboratory will accept custody of the samples and will verify that the COC

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form matches the samples received. The shipping container or set of containers is given a laboratory identification number and each sample is assigned a unique sequential identification number.

7.6 INSTRUMENTATION

7.6.1 Field Instrumentation

Field instruments may be used during the investigations. The following field equipment may require calibration before use and periodically during sampling activities:

- Water quality meter
- Turbidimeter
- Photoionization detector (PID)

Field-instrument calibration and preventive maintenance will follow the manufacturers' guidelines. Deviations from the established guidelines will be documented.

Generally, field instruments will be calibrated daily before work begins. Field personnel may need to calibrate more than once a day if inconsistent or unusual readings occur, or if conditions warrant more frequent calibration. Calibration activities that occur during field work will be recorded in logbooks or field notebooks. Calibration documentation from rental companies will be included with field documentation. The following procedures will be used to ensure that field instruments are properly calibrated and remain operable.

- Operation, maintenance and calibration will be performed in accordance with the instrument manufacturers' specifications.
- Standards used to calibrate field instruments will meet the minimum requirements for source and purity recommended in the equipment operation manual. Standards will be checked for expiration dates that may be printed on the bottle. Standards that have expired will not be used.
- Acceptable criteria for calibration will be based on the limits set in the operations manual. A schedule of preventive maintenance activities will be followed to minimize downtime and ensure the accuracy of measurement systems. Maintenance will be documented in the field notebook.
- Users of the equipment will be trained in the proper calibration and operation of the instrument.
- Operation and maintenance manuals for each field instrument will be available to persons using the equipment.
- Field instruments will be inspected before they are taken to the Site.
- Calibration procedures (including items such as time, standards used and calibration results) will be recorded in a field notebook. The information will be available if problems are encountered.

7.6.2 Laboratory Instrumentation

Specific laboratory instrument calibration procedures, frequency of calibration and preparation of calibration standards will be according to the method requirements as developed by the U.S. EPA following procedures presented in SW-846 (EPA, 1986).

Preventive maintenance of laboratory equipment will be the responsibility of the laboratory personnel and analysts. This maintenance includes routine care and cleaning of instruments, inspection and monitoring

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of carrier gases, solvents and glassware used in analyses. The preventive-maintenance approach for specific equipment will follow the manufacturers' specifications, good laboratory practices and industry standard techniques.

Precision and accuracy data will be examined for trends and excursions beyond control limits to determine evidence of instrument malfunction. Maintenance will be performed when an instrument begins to change, as indicated by the degradation of peak resolution, shift in calibration curves, decrease in sensitivity or failure to meet any QC criterion.

8.0 Quality Assurance and Quality Control (QA/QC)

8.1 FIELD QA/QC SAMPLES

Field quality control (QC) samples will be collected to evaluate potential contamination introduced during sampling, handling, and transport, and to assess the precision of field and laboratory procedures. Field QC samples, consistent with the general framework of Ecology's Guidance for Investigating and Remediating PFAS Contamination in Washington State (Ecology, 2022), include field duplicates, field blanks, and equipment blanks, as summarized in Table B-2 of this SAP/QAPP. QC sample types and collection frequencies are described below.

8.1.1 Field Duplicates

Field duplicate samples will be collected to assess the combined precision of field sampling and laboratory analytical procedures. Field duplicates will consist of a second sample collected from the same location, at the same time, and using the same equipment and procedures as the primary sample. Duplicate samples will be submitted for analysis under a unique sample identification number and will be analyzed for the same parameters as the associated primary sample.

The frequency of field duplicate collection will be consistent with Table B-2 of this SAP/QAPP and will include a minimum of 10% of samples per sampling event for each matrix collected, but not less than one duplicate per sampling event. The selection of duplicate sample locations will be determined by the Field Coordinator and will represent typical site conditions unless otherwise warranted. Field duplicate results will be evaluated during data validation to assess analytical precision and overall data quality.

8.1.2 Field Blanks

Field blanks will be collected to evaluate the potential for contamination introduced from ambient field conditions and sample handling during PFAS sampling activities. Field blanks consist of laboratory-certified PFAS-free reagent water transferred to sample containers in the field using the same bottles, preservatives (if applicable), and handling procedures used for environmental samples. Field blanks are intended to evaluate potential contamination from airborne sources, sampling personnel, personal protective equipment (PPE), field equipment handling, or other environmental factors present during sample collection.

Field blanks will be prepared in the field and will accompany environmental samples throughout storage, shipment, and laboratory receipt. Because field blanks are opened and handled in the same environment

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as environmental samples and are transported with the sample shipment, they also provide an indirect evaluation of potential contamination introduced during storage and transport.

Field blanks will be collected once per day during sampling, collected where and when the risk for PFAS sample contamination is most likely. This is a reduced frequency relative to Ecology guidance, as described in Section 8.1.4.

Field blanks will be labeled with the prefix "FB" followed by a sequential identification number and the collection date (YYMMDD). For example, the field blank collected on June 11, 2025, would be identified as FB-250611.

Results of field blanks will be evaluated during data validation to assess the potential for contamination introduced during field activities and to support the evaluation of overall data quality and usability.

8.1.3 Equipment Blanks

Equipment blanks (rinsate blanks) will be collected to assess the effectiveness of decontamination procedures for non-dedicated or reusable sampling equipment (e.g., pumps, tubing). Equipment blanks will be prepared by passing laboratory-certified PFAS-free water over or through decontaminated sampling equipment using the same procedures employed during sample collection.

Equipment blanks will be collected at a frequency of one per field mobilization per equipment type. Equipment blanks will be labeled with the prefix "EB" followed by a sequential identification number and the collection date (YYMMDD). For example, the equipment blank collected on June 11, 2025, would be identified as EB-250611.

Analytical results from equipment blanks will be evaluated during data validation to assess potential cross-contamination and overall data usability.

8.1.4 Deviations from Ecology Guidance

Based on site-specific data and the low risk of cross contamination, this plan deviates from the Ecology guidance by eliminating routine trip blanks and pre-field work blanks, and reducing the frequency of field blanks and equipment blanks.

The Washington State Department of Ecology's *Guidance for Investigating and Remediating PFAS Contamination in Washington State* (Ecology 2022, updated 2023) states that any reduction in recommended quality control (QC) samples should be discussed with Ecology prior to implementation (Section 5; p. 35). Consistent with this guidance, the proposed modifications to QC frequency will be reviewed with Ecology and will not be implemented without agency concurrence.

Trip blanks are typically used to evaluate contamination introduced during sample storage and transport; however, PFAS compounds are non-volatile and samples will be stored and transported in sealed high-density polyethylene (HDPE) containers. As a result, the potential for cross-container vapor migration during shipment is considered minimal. Field blanks provide a more direct and conservative evaluation of contamination introduced during sampling, handling, storage, and transport because they are opened in the field environment and accompany environmental samples throughout the sample shipment.

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The proposed deviation is based on the following considerations: (1) prior site sampling has not indicated systemic PFAS cross-contamination in blanks; (2) sampling procedures will follow PFAS-specific best management practices to minimize contamination potential; and (3) laboratory-provided certified PFAS-free materials and dedicated sampling equipment will be used. The reduced QC frequency is intended to maintain data quality while aligning with project scope and risk profile.

If unexpected contamination is observed in QC samples during the investigation, additional QC samples may be implemented in subsequent sampling events in coordination with Ecology.

8.2 LABORATORY QC SAMPLES

The laboratory QC samples will be used to assess the accuracy and precision of the laboratory analysis (see Table B-3 of SAP/QAPP). Each category of laboratory QA/QC will be performed by the laboratory as required by method-specific guidelines. The acceptance criteria presented in the guidelines will be adhered to and samples that do not meet the criteria will be reanalyzed or qualified as appropriate.

Laboratory QA/QC procedures for advanced PFAS analyses, including isomer profiling and TOP assay, will follow laboratory-specific SOPs and will include instrument blanks, method blanks, laboratory control samples, laboratory duplicate analyses, and extracted internal standards consistent with the base PFAS analytical method (EPA Method 1633A).

8.2.1 Calibration Verification

Instruments will initially be calibrated at the start of the project or sample run, as required, and when any ongoing calibration does not meet control criteria. The number of points used in the initial calibration is defined in the analytical method. Calibration will be continued as specified in the analytical method to track instrument performance. Analysis of project samples will be suspended if a continuing calibration does not meet control limits until the source of the control failure is either eliminated or reduced to within control specifications.

8.2.2 Method Blanks

Method blanks are prepared using analyte-free (reagent) water and are processed with the same methodology (e.g., extraction, digestion) as the associated investigative samples. Method blanks are used to document contamination resulting in the laboratory from the analytical process. A method blank shall be prepared and analyzed at a minimum of one per preparatory batch. The method blank results are used to verify that reagents and preparation do not impart unacceptable bias to the investigative sample results. The presence of analytes in the method blank sample will be evaluated against method-specific thresholds. Corrective action will be taken to eliminate the source of contamination before proceeding with analysis if analytes are present in the method blank above the method-specific threshold.

Investigative samples of an analytical batch associated with method blank results outside acceptance limits will be qualified as appropriate by the data validation contractor.

8.2.3 Laboratory Duplicate (Matrix Duplicate) Samples

Laboratory duplicate samples (matrix duplicates [MDs]) are prepared by the laboratory by splitting an investigative sample into two separate aliquots and performing separate sample preparation and analysis

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on each aliquot. Precision is evaluated using relative percent difference (RPD), with an acceptance criterion of less than or equal to 30% between the sample and the matrix duplicate unless both results are below the laboratory reporting limit. The results for relative percent difference of the primary investigative sample and the respective MDs are used to measure precision in the analytical method and laboratory performance. For nonaqueous matrices, sample heterogeneity may affect the measured precision for the MDs.

8.2.4 Laboratory Control Samples and Low-Level Laboratory Control Standards

Laboratory Control Samples (LCSs) and Low-Level Laboratory Control Standards (LLLCS) are prepared by spiking laboratory-certified, reagent-grade water with the analytes of interest or a certified reference material that has been prepared and analyzed. The result for percent recovery of the LCS is a data quality indicator of the accuracy of the analytical method and laboratory performance. Where EPA Method 1633A does not provide recovery acceptance criteria for the matrix under evaluation, laboratory-developed acceptance criteria will be applied. Preliminary recovery acceptance criteria of 40–150% will be used until laboratory-specific criteria are established in accordance with EPA Method 1633A.

8.2.5 Additional Laboratory QA

Additional laboratory QA procedures will follow laboratory-specific SOPs consistent with the most current version of the analytical method (as of December 2024, EPA Method 1633A). These will include, but are not limited to:

8.2.5.1 INSTRUMENT BLANKS

Instrument Blank (IB) samples will be analyzed at the beginning of the analytical sequence and after the analysis of high concentration samples and standards. IBs must demonstrate no analytes above one-half the laboratory reporting limit (½ LOQ).

8.2.5.2 EXTRACTED INTERNAL STANDARD COMPOUNDS

EIS compounds, or isotopically labelled compounds, will be analyzed for every field sample, QC sample, and standard, when isotopically labeled analogs of analytes are commercially available. Where EPA Method 1633A does not provide recovery acceptance criteria for the sample matrix, laboratory-developed acceptance criteria of approximately 20–150% will be applied until laboratory-specific criteria are established.

8.2.5.3 TOP ASSAY OXIDATION CONTROL

For TOP assay analyses, oxidation control samples will be included with each oxidation batch to evaluate oxidation efficiency. Acceptance criteria and performance evaluation will follow laboratory-specific SOPs. If oxidation efficiency criteria are not met, affected samples will be reanalyzed or qualified as appropriate.

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9.0 Data Reduction, Validation and Reporting

The analytical laboratory will submit digital data packages that include laboratory QA/QC results to permit independent validation of data quality. GeoEngineers will determine data quality, using the data evaluation procedures described in this section. The results of the GeoEngineers evaluation will be used to determine if the project data quality objectives are met.

9.1 FIELD DATA REDUCTION

Daily internal QC checks will be performed for field activities. Checks will consist of reviewing field notes and field activity memoranda to confirm that the specified measurements, calibrations and procedures are being followed. The need for corrective action will be assessed on an ongoing basis, in consultation with the project manager.

9.2 LABORATORY EVALUATION

Initial data reduction, evaluation and reporting at the analytical laboratory will be carried out as described in EPA SW-846 manuals for analyses (EPA, 1986; revised 2020), as appropriate. Additional laboratory data qualifiers may be defined and reported to further explain the laboratory's QC concerns about a particular sample result. Additional data qualifiers will be defined in the laboratory's case narrative reports.

Evaluation of advanced PFAS analytical results will include review of isomer distribution consistency, oxidation efficiency (for TOP assay), and comparison of pre- and post-oxidation results to assess precursor contribution.

9.3 DATA DELIVERABLES

Laboratory data deliverables are listed below. Electronic deliverables will contain the same data that are presented in the hardcopy report.

- Transmittal cover letter
- Case narrative
- Analytical results
- COC
- Surrogate recoveries
- Method blank results
- Laboratory duplicate results

9.4 DATA EVALUATION

9.4.1 Data QA/QC Review

GeoEngineers will evaluate the laboratory data for precision, completeness, accuracy and compliance with the analytical method. GeoEngineers will review data according to applicable sections of EPA organics procedures (EPA, 2020), as well as appropriate laboratory-method-specific guidelines (EPA, 1986).

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Data qualifiers, as defined by the EPA, are used to classify sample data according to their conformance to QC requirements. Common qualifiers are listed below:

- **J — Estimate**, qualitatively correct but quantitatively suspect.
- **R — Reject**, data not suitable for any purpose.
- **U —** Not detected at a specified reporting limit.

Poor surrogate recovery, blank contamination or calibration problems, among other things, can require qualification of the sample data. The reasons for sample qualification will be stated in the data evaluation report.

QC criteria not defined in the guidelines for evaluating analytical data are adopted, where appropriate, from the analytical method.

The following information will be reviewed during data evaluation, as applicable:

- Sampling locations and blind sample numbers
- Sampling dates
- Requested analysis
- COC documentation
- Sample preservation
- Holding times
- Method blanks
- Surrogate recoveries
- Laboratory duplicates (if analyzed)
- Field duplicates
- Field blanks
- LCSs and LDSs
- Method reporting limits above requested levels
- Additional comments or difficulties reported by the laboratory
- Overall assessment

The results of the data evaluation review will be summarized for each data package. Data qualifiers will be assigned to sample results based on EPA guidelines (EPA 1986, revised 2020), as applicable.

9.4.2 Data Management and Reduction

The data management system EQuIS™ will be used to manage laboratory data in a project-specific database. The laboratory will provide the analytical results in electronic, EQuIS-compatible format. Following data evaluation, data qualifiers will be entered into the database.

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Data may be reduced to prepare summary data sets and to aid interpretation of the results. Statistical analyses may also be applied to results. Data reduction QC checks will be performed on hand-entered data, calculations and data graphically displayed. Data may be further reduced and managed using one or more of the following computer software applications:

- Microsoft excel (spreadsheet)
- EQuIS (database)
- Microsoft Access (database)
- AutoCAD and/or ArcGIS (graphics)
- EPA ProUCL (statistical software)

10.0 Reporting and Deliverables

This section describes the documentation, data management, validation, and reporting procedures that will be implemented to ensure analytical results generated under this SAP/QAPP are complete, defensible, and suitable for their intended use. Reporting will be conducted in accordance with the Agreed Order and applicable regulatory requirements, and will include field documentation, laboratory data packages, data validation and usability review, EIM submittals, progress reporting, and preparation of the RI and FS reports.

10.1 FIELD DOCUMENTATION

Field activities will be documented in accordance with this SAP/QAPP and standard operating procedures. Field records will include, at a minimum:

- Boring logs and well construction logs (if applicable)
- Sampling logs documenting sample ID, date/time, matrix, depth, preservation, and analytical suite
- Photographic documentation with photo log
- Chain-of-custody records
- Investigation-derived waste (IDW) tracking documentation, disposal receipts, transport manifests
- Survey data and coordinates

10.2 LABORATORY DATA DELIVERABLES

The laboratory will provide complete analytical data packages in electronic format. Data packages will include:

- Sample receipt documentation
- Case narrative
- Analytical results summary
- Reporting limits (RLs), method detection limits (MDLs), and qualifiers
- Surrogate and internal standard recoveries

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- Laboratory control sample (LCS) results
- Method blanks and equipment blanks
- Calibration data
- Raw instrument output

Electronic data deliverables (EDDs) will be provided in a format compatible with the Washington State Environmental Information Management (EIM) database.

10.3 DATA VALIDATION AND USABILITY EVALUATION

Analytical data will be reviewed for completeness, accuracy, precision, representativeness, comparability, and sensitivity to assess overall data quality and usability for site characterization and decision-making. Data validation will include:

- Verification of holding times
- Review of blank contamination and associated data qualification
- Evaluation of surrogate and LCS recoveries
- Review of calibration criteria
- Confirmation that reporting limits meet project-required practical quantitation limits (PQLs)

Data qualifiers will be applied, as appropriate, and summarized in a Data Validation Memorandum. Any significant data quality issues, departures from method criteria, or impacts to usability will be clearly described. Analytical data will be evaluated to confirm that project data quality objectives have been met and that the dataset is suitable for its intended use. A summary of data quality and usability will be included in the RI/FS reports.

10.4 PROGRESS REPORTING

Progress reports will be submitted in accordance with the Agreed Order (AO) schedule. Progress reports will summarize:

- Activities conducted during the reporting period
- Analytical results received
- Data validation status
- Deviations from the SAP/QAPP
- IDW management status
- Schedule updates and upcoming activities

Any significant field or laboratory deviations will be reported to Ecology as soon as practicable and are discussed in further detail below.

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10.5 EIM DATA SUBMITTALS

Validated analytical data will be uploaded to Ecology's EIM database in accordance with current EIM data submission requirements. EIM submittals will include:

- Analytical results
- Sample location information (including coordinates and datum)
- Field measurement data
- Detection limits and qualifiers
- Laboratory case identifiers

Data will be submitted following completion of validation and prior to or concurrent with submittal of the associated technical report, unless otherwise specified in the AO.

10.6 RI AND FS REPORTS

Analytical results generated under this SAP/QAPP will be incorporated into the RI and FS reports in accordance with the AO and applicable regulatory requirements. The RI and FS reports will present validated data and will include, at a minimum:

- A summary of field activities and any deviations from this SAP/QAPP
- Data quality evaluation and discussion of data usability
- Tabulated analytical results with applicable qualifiers and reporting limits
- Comparison to applicable cleanup levels and screening criteria
- Figures depicting sample locations and nature and extent of impacts
- Laboratory data packages and validation documentation

The RI and FS reports will rely on the validated dataset as described in this SAP/QAPP. Interpretation of site conditions, risk, and remedial alternatives is addressed in the RI/FS Work Plan and associated RI/FS framework.

10.7 DEVIATIONS FROM WORK PLAN

Any substantive deviation from this SAP/QAPP will be documented and communicated to the Agency. Minor field adjustments that do not affect the overall study design, sampling approach, or data usability will be documented in field logs. Major deviations that could affect the scope of investigation, sampling methods, analytical approach, or interpretation of results will be communicated to and, when practicable, approved by the Agency prior to implementation.

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11.0 References

Washington State Department of Ecology (Ecology). 1994. Guidance on Sampling and Data Analysis Methods, Publication No. 94-49. Updated January 1995.

U.S. Environmental Protection Agency (EPA). 2020. *National Functional Guidelines for Organic Superfund Methods Data Review.* EPA-540-R-20-005. Office of Superfund Remediation and Technology Innovation, Washington, DC.

U.S. Environmental Protection Agency (EPA). 1986. *Data Quality Objectives for Remedial Response Activities: Development Process.* EPA/540/G-87/003. Office of Emergency and Remedial Response, Washington, DC. Revised 2020.

Washington State Department of Ecology (Ecology). 2004. Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies, Publication No. 04-03-030. Updated December 2016.

Ecology. 2022. Guidance for Investigating and Remediating PFAS Contamination in Washington State. Publication No. 22-09-058. Updated June 2023.

Ecology. 2026. Cleanup Levels and Risk Calculation (CLARC) Master Spreadsheet. Updated February 2026.

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Table B-1

Schedule of Analyses

Remedial Investigation and Feasibility Study Work Plan: Quality Assurance Project Plan (QAPP)

Snohomish County Paine Field Airport

Everett, Washington

Sample Location[1]	Sample Media	Target or Screen Depth[2] (feet bgs)	Per- and Polyfluoroalkyl Substances (PFAS)
			EPA Method 1633A
New Monitoring Wells			
FP-MW21	Groundwater	Approximately 100-120	●
	Soil	Water table, base of boring	●
FP-MW22	Groundwater	20-50	●
	Soil	Above water table, water table, base of boring	●
FP-MW23	Groundwater	20-50	●
	Soil	Above water table, water table, base of boring	●
FP-MW24	Groundwater	20-50	●
	Soil	Above water table, water table, base of boring	●
FP-MW25	Groundwater	20-50	●
	Soil	Above water table, water table, base of boring	●
FP-MW26	Groundwater	20-50	●
	Soil	Above water table, water table, base of boring	●
FP-MW27	Groundwater	20-50	●
	Soil	Above water table, water table, base of boring	●
Existing Monitoring Wells			
FP-MW4	Groundwater	--	●
FP-MW8	Groundwater	--	●
FP-MW10	Groundwater	--	●
FP-MW13	Groundwater	--	●
FP-MW14	Groundwater	--	●
FP-MW15	Groundwater	--	●
FP-MW16	Groundwater	--	●
FP-MW17	Groundwater	--	●
FP-MW18	Groundwater	--	●
FP-MW19	Groundwater	--	●
FP-MW20	Groundwater	--	●
Surface Water and Sediment			
FP-SEEP	Surface Water	--	●
FP-SW2	Surface Water	--	●
FP-SW9 / FP-SED9	Surface Water	--	●
	Sediment	Surface composite	●
FP-SW10 / FP-SED10	Surface Water	--	●
	Sediment	Surface composite	●

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Sample Location[1]	Sample Media	Target or Screen Depth[2] (feet bgs)	Per- and Polyfluoroalkyl Substances (PFAS)
			EPA Method 1633A
FP-SW11 / FP-SED11	Surface Water	--	●
	Sediment	Surface composite	●
FP-SW12 / FP-SED12	Surface Water	--	●
	Sediment	Surface composite	●
FP-SW13 / FP-SED13	Surface Water	--	●
	Sediment	Surface composite	●
Shallow Soil Borings (Wetlands and Creek Embankment)			
FP-GEI-4	Soil	Approximately 1	●
FP-GEI-5	Soil	Approximately 1	●
FP-GEI-6	Soil	Approximately 1	●
FP-GEI-7	Soil	Approximately 1	●
FP-GEI-8	Soil	Approximately 1	●
Stormwater Conveyance System			
FP-CB4	Water	--	●
	Solid	Varies from top of monument	●
FP-CB7	Water	--	●
	Solid	Varies from top of monument	●
FP-CB8	Water	--	●
	Solid	Varies from top of monument	●
FP-CB9	Water	--	●
	Solid	Varies from top of monument	●
FP-CB10	Water	--	●
	Solid	Varies from top of monument	●
FP-CB11	Water	--	●
	Solid	Varies from top of monument	●

Notes:

[1] The proposed sample locations are shown on Figure 6. Existing sample locations are shown on Figure 4.

[2] The proposed depths are approximate and may differ based on encountered field conditions.

bgs = below ground surface

CB = catch basin

EPA = U.S. Environmental Protection Agency

FP = fire pit

MW = monitoring well

SED = sediment

SW = surface water

● = Selected sample for chemical analysis.

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Table B-2

Field Quality Control Sample Summary

Remedial Investigation and Feasibility Study Work Plan: Quality Assurance Project Plan (QAPP)

Snohomish County Paine Field Airport

Everett, Washington

QC Check Sample	Frequency	Acceptance Criteria
Solids[1]		
Field Duplicate	A minimum of 10% (1 per 10) of the samples will be collected in duplicate, but not less than one duplicate per sampling event	50% RPD[2, 3]
Equipment Blank	One equipment blank (rinsate blank) for each type of sampling equipment	Below RL
Water[4]		
Field Duplicate	A minimum of 10% (1 per 10) of the samples will be collected in duplicate, but not less than one duplicate per sampling event	50% RPD[2, 3]
Equipment Blank	One equipment blank (rinsate blank) for each type of sampling equipment	Below RL
Additional		
Field Blank	One daily, collected where the risk for PFAS sample cross-contamination is most likely	Below RL

Notes:

[1] Solids include soil, sediment, and stormwater conveyance system solids samples.

[2] Criteria may change based on data validation.

[3] RPD not evaluated for sample results less than five times the RL.

[4] Water includes groundwater, surface water, and stormwater conveyance system water samples.

°C = degrees Celsius

QC = Quality Control

RL = Reporting Limit (Table B-4)

RPD = Relative percent difference

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Table B-3

Laboratory Quality Control Sample Summary

Remedial Investigation and Feasibility Study Work Plan: Quality Assurance Project Plan (QAPP)

Snohomish County Paine Field Airport

Everett, Washington

QC Element[1]	Frequency	Acceptance Criteria[2]	Corrective Action / Evaluation[3]
Instrument Blank (IB)	At the beginning of the analytical sequence and after the analysis of high concentration samples and standards (e.g., customer samples, highest calibration standard, calibration verification standard).	No analytes detected > ½ LOQ.	If acceptance criteria are not met after the highest calibration standard, calibration must be performed using a lower concentration for the highest standard until acceptance criteria is met. If field sample analyte concentrations exceed the highest calibration standard and the same analytes in the following field sample or in consecutive following field samples also exceed the IB acceptance criteria (i.e., > 1/2 LOQ), the affected samples shall be reanalyzed using a fresh aliquot of the sample extract. If the extract cannot be reanalyzed and reextraction is not possible, apply qualifier to affected results and explain in the case narrative.
Extracted Internal Standard (EIS) Compounds	Every field sample, QC sample, and standard.	Isotopically labeled analogs of analytes must be used when they are commercially available. Where EPA Method 1633A does not provide EIS recovery acceptance criteria for the sample matrix under evaluation, a laboratory shall use laboratory-developed recovery acceptance criteria no wider than any acceptance criteria provided by the customer. Preliminary laboratory-developed acceptance criteria of 20-150% shall be used until laboratory acceptance criteria are developed in accordance with EPA Method 1633A. Where EPA Method 1633A does not provide EIS recovery acceptance criteria for the sample matrix under evaluation, the lower limit of the laboratory-developed acceptance criteria cannot be < 20%.	Follow the requirements listed in EPA Method 1633A, Section 15.3.2 for all samples matrices. If EIS recoveries still fall outside of the acceptance range, the client must be contacted for additional measures to be taken.
Method Blank (MB)	One per preparatory batch.	No analytes detected > ½ LOQ.	Correct the problem. If required, reprepare and analyze MB and all QC samples and affected field samples processed with the contaminated blank if sufficient sample material is available.

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QC Element[1]	Frequency	Acceptance Criteria[2]	Corrective Action / Evaluation[3]
Laboratory Duplicate	For all matrices, one per preparatory batch.	RPD of all analytes ≤ 30% between sample and MD. RPD does not apply if both results are below the LOQ.	If an assignable cause isolated to only the MD is identified, reanalyze the MD or reprepare and analyze the MD if sufficient sample material is available, as indicated by the cause.
Laboratory Control Sample (LCS) and Low-Level Laboratory Control Standard (LLLCS)	One set per preparatory batch. Shall contain all EIS, NIS, and all analytes to be reported.	Where EPA Method 1633A does not provide LCS and LLLCS recovery acceptance criteria for the sample matrix under evaluation, a laboratory shall use laboratory-developed recovery acceptance criteria no wider than any acceptance criteria provided by the customer. Preliminary acceptance criteria of 40-150% shall be used until acceptance criteria are developed by the laboratory in accordance with EPA Method 1633A. Where EPA Method 1633A does not provide LCS and LLLCS recovery acceptance criteria for the sample matrix under evaluation, the laboratory-developed acceptance criteria shall not be < 40%.	Correct problem. If required, reprepare and analyze the LCS and/or LLLCS and all affected QC samples and field samples in the associated preparatory batch for failed analytes if sufficient sample material is available. If the samples cannot be reprepared and analyzed, apply qualifier to affected analyte results of all samples in the associated preparatory batch and explain in the case narrative.
Oxidation Control (TOP Assay Only, if applicable)	Per oxidation batch	Performance consistent with laboratory SOP acceptance criteria	Reanalysis or qualification if oxidation efficiency criteria not met

Notes:

[1] Laboratory QC elements will be conducted in accordance with EPA Method 1633A (EPA 2024) and laboratory standard operating procedures.

[2] Acceptance criteria may be laboratory-specific provided they are consistent with EPA Method 1633A performance requirements.

[3] Additional corrective actions may be implemented at the discretion of the laboratory or data validator if systematic bias or contamination is identified.

IB = instrument blank

EIS = extracted internal standard

MB = method blank; MD = matrix duplicate

NIS = non-extracted internal standard

LCS = laboratory control sample; LLLCS = low-level laboratory control sample; LOQ = limit of quantitation

QC = quality control

RPD = relative percent difference

SOP = standard operating procedure

TOP = total oxidizable precursor

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Table B-4

Reporting Limits, Performance Criteria and Analytical Method for PFAS

Remedial Investigation and Feasibility Study Work Plan: Quality Assurance Project Plan (QAPP)

Snohomish County Paine Field Airport

Everett, Washington

Analyte	CAS Number	Matrix	RL	MDL	Units	Method
Perfluorobutanoic acid (PFBA)	375-22-4	Water	6.4	1.32	ng/L	EPA 1633A
Perfluoropentanoic acid	2706-90-3	Water	3.2	0.39	ng/L	EPA 1633A
Perfluorohexanoic acid (PFHxA)	307-24-4	Water	1.6	0.33	ng/L	EPA 1633A
Perfluoroheptanoic acid	375-85-9	Water	1.6	0.38	ng/L	EPA 1633A
Perfluorooctanoic acid (PFOA)	335-67-1	Water	1.6	0.46	ng/L	EPA 1633A
Perfluorononanoic acid (PFNA)	375-95-1	Water	1.6	0.28	ng/L	EPA 1633A
Perfluorodecanoic acid	335-76-2	Water	1.6	0.31	ng/L	EPA 1633A
Perfluoroundecanoic acid	2058-94-8	Water	1.6	0.38	ng/L	EPA 1633A
Perfluorododecanoic acid	307-55-1	Water	1.6	0.33	ng/L	EPA 1633A
Perfluorotridecanoic acid	72629-94-8	Water	1.6	0.38	ng/L	EPA 1633A
Perfluorotetradecanoic acid	376-06-7	Water	1.6	0.29	ng/L	EPA 1633A
Perfluorobutanesulfonic acid (PFBS)	375-73-5	Water	1.6	0.31	ng/L	EPA 1633A
Perfluoropentanesulfonic acid	2706-91-4	Water	1.6	0.26	ng/L	EPA 1633A
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	Water	1.6	0.38	ng/L	EPA 1633A
Perfluoroheptanesulfonic acid	375-92-8	Water	1.6	0.37	ng/L	EPA 1633A
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	Water	1.6	0.49	ng/L	EPA 1633A
Perfluorononanesulfonic acid	68259-12-1	Water	1.6	0.39	ng/L	EPA 1633A
Perfluorodecanesulfonic acid	335-77-3	Water	1.6	0.41	ng/L	EPA 1633A
Perfluorododecanesulfonic acid	79780-39-5	Water	1.6	0.36	ng/L	EPA 1633A
4:2 Fluorotelomer sulfonate	757124-72-4	Water	6.4	1.65	ng/L	EPA 1633A
6:2 Fluorotelomer sulfonate	27619-97-2	Water	6.4	2.91	ng/L	EPA 1633A
8:2 Fluorotelomer sulfonate	39108-34-4	Water	6.4	2.22	ng/L	EPA 1633A
PFOSA	754-91-6	Water	1.6	0.33	ng/L	EPA 1633A
EtFOSE	1691-99-2	Water	16	3.57	ng/L	EPA 1633A
MeFOSE	24448-09-7	Water	16	2.48	ng/L	EPA 1633A
EtFOSA	4151-50-2	Water	1.6	0.34	ng/L	EPA 1633A
MeFOSA	31506-32-8	Water	1.6	0.58	ng/L	EPA 1633A
EtFOSAA	2991-50-6	Water	1.6	0.40	ng/L	EPA 1633A
MeFOSAA	2355-31-9	Water	1.6	0.41	ng/L	EPA 1633A
PFMPA	377-73-1	Water	3.2	0.57	ng/L	EPA 1633A
PFMBA	863090-89-5	Water	3.2	0.77	ng/L	EPA 1633A
HFPO-DA (GenX)	13252-13-6	Water	6.4	1.13	ng/L	EPA 1633A
NFDHA	151772-58-6	Water	3.2	0.76	ng/L	EPA 1633A
ADONA	919005-14-4	Water	6.4	0.83	ng/L	EPA 1633A
PFEESA	113507-82-7	Water	3.2	0.68	ng/L	EPA 1633A
9Cl-PF3ONS (F-53B Major)	756426-58-1	Water	6.4	1.41	ng/L	EPA 1633A
11Cl-PF3OUdS (F-53B Minor)	763051-92-9	Water	6.4	1.46	ng/L	EPA 1633A
3:3 Fluorotelomer carboxylate	356-02-5	Water	8	1.74	ng/L	EPA 1633A
5:3 Fluorotelomer carboxylate	914637-49-3	Water	40	6.24	ng/L	EPA 1633A
7:3 Fluorotelomer carboxylate	812-70-4	Water	40	4.68	ng/L	EPA 1633A

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Analyte	CAS Number	Matrix	RL	MDL	Units	Method
Perfluorobutanoic acid (PFBA)	375-22-4	Soil	0.8	0.12	µg/kg	EPA 1633A
Perfluoropentanoic acid	2706-90-3	Soil	0.4	0.04	µg/kg	EPA 1633A
Perfluorohexanoic acid (PFHxA)	307-24-4	Soil	0.2	0.04	µg/kg	EPA 1633A
Perfluoroheptanoic acid	375-85-9	Soil	0.2	0.04	µg/kg	EPA 1633A
Perfluorooctanoic acid (PFOA)	335-67-1	Soil	0.2	0.08	µg/kg	EPA 1633A
Perfluorononanoic acid (PFNA)	375-95-1	Soil	0.2	0.04	µg/kg	EPA 1633A
Perfluorodecanoic acid (PFDA)	335-76-2	Soil	0.2	0.04	µg/kg	EPA 1633A
Perfluoroundecanoic acid	2058-94-8	Soil	0.2	0.06	µg/kg	EPA 1633A
Perfluorododecanoic acid	307-55-1	Soil	0.2	0.03	µg/kg	EPA 1633A
Perfluorotridecanoic acid	72629-94-8	Soil	0.2	0.05	µg/kg	EPA 1633A
Perfluorotetradecanoic acid	376-06-7	Soil	0.2	0.04	µg/kg	EPA 1633A
Perfluorobutanesulfonic acid (PFBS)	375-73-5	Soil	0.2	0.03	µg/kg	EPA 1633A
Perfluoropentanesulfonic acid	2706-91-4	Soil	0.2	0.05	µg/kg	EPA 1633A
Perfluorohexanesulfonic acid (PFHxS)	355-46-4	Soil	0.2	0.05	µg/kg	EPA 1633A
Perfluoroheptanesulfonic acid	375-92-8	Soil	0.2	0.07	µg/kg	EPA 1633A
Perfluorooctanesulfonic acid (PFOS)	1763-23-1	Soil	0.2	0.07	µg/kg	EPA 1633A
Perfluorononanesulfonic acid	68259-12-1	Soil	0.2	0.05	µg/kg	EPA 1633A
Perfluorodecanesulfonic acid	335-77-3	Soil	0.2	0.06	µg/kg	EPA 1633A
Perfluorododecanesulfonic acid	79780-39-5	Soil	0.2	0.08	µg/kg	EPA 1633A
4:2 Fluorotelomer sulfonate	757124-72-4	Soil	0.8	0.18	µg/kg	EPA 1633A
6:2 Fluorotelomer sulfonate	27619-97-2	Soil	0.8	0.24	µg/kg	EPA 1633A
8:2 Fluorotelomer sulfonate	39108-34-4	Soil	0.8	0.27	µg/kg	EPA 1633A
PFOSA	754-91-6	Soil	0.2	0.05	µg/kg	EPA 1633A
EtFOSE	1691-99-2	Soil	2	0.39	µg/kg	EPA 1633A
MeFOSE	24448-09-7	Soil	2	0.24	µg/kg	EPA 1633A
EtFOSA	4151-50-2	Soil	0.2	0.06	µg/kg	EPA 1633A
MeFOSA	31506-32-8	Soil	0.2	0.05	µg/kg	EPA 1633A
EtFOSAA	2991-50-6	Soil	0.2	0.07	µg/kg	EPA 1633A
MeFOSAA	2355-31-9	Soil	0.2	0.06	µg/kg	EPA 1633A
PFMPA	377-73-1	Soil	0.4	0.06	µg/kg	EPA 1633A
PFMBA	863090-89-5	Soil	0.4	0.06	µg/kg	EPA 1633A
HFPO-DA (GenX)	13252-13-6	Soil	0.8	0.15	µg/kg	EPA 1633A
NFDHA	151772-58-6	Soil	0.4	0.11	µg/kg	EPA 1633A
ADONA	919005-14-4	Soil	0.8	0.09	µg/kg	EPA 1633A
PFEESA	113507-82-7	Soil	0.4	0.04	µg/kg	EPA 1633A
9Cl-PF3ONS (F-53B Major)	756426-58-1	Soil	0.8	0.14	µg/kg	EPA 1633A
11Cl-PF3OUdS (F-53B Minor)	763051-92-9	Soil	0.8	0.19	µg/kg	EPA 1633A
3:3 Fluorotelomer carboxylate	356-02-5	Soil	1	0.28	µg/kg	EPA 1633A
5:3 Fluorotelomer carboxylate	914637-49-3	Soil	5	0.83	µg/kg	EPA 1633A
7:3 Fluorotelomer carboxylate	812-70-4	Soil	5	0.55	µg/kg	EPA 1633A

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Notes:

[1] The soil and groundwater reporting limits and performance criteria for EPA Method 1633A are from Pace Analytical (March, 2026).

CAS = Chemical Abstract Service

RL = Reporting Limit

MDL = Method Detection Limit

ng/L = nanograms per liter

µg/kg = micrograms per kilogram

Table B-5

Test Methods, Sample Containers, Preservation and Hold Times

Remedial Investigation and Feasibility Study Work Plan: Quality Assurance Project Plan (QAPP)

Snohomish County Paine Field Airport

Everett, Washington

Analysis	Method[1]	Bottle Size[1]	Preservation[1]	Holding Times[1]
PFAS	EPA Method 1633A	**Soil**		
		1x 90 mL PP	≤ 6°C	90 days
		Groundwater		
		2x 250 mL HDPE	≤ 6°C	28 days

Notes:

[1] Test methods, sample containers, preservation and hold times are from Pace Analytical (March 2026).

°C = degree Celsius

EPA = United States Environmental Protection Agency

HDPE = High density polyethylene

mL = milliliter

PFAS = Perfluoroalkyl substance

PP = Polypropylene

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Table B-6

Project Personnel

Remedial Investigation and Feasibility Study Work Plan: Quality Assurance Project Plan (QAPP)

Snohomish County Paine Field Airport

Everett, Washington

Name [1]	Position	Role	Company	Contact Information
Andrew Rardin	Airport Environmental and Wildlife Manager		Snohomish County, Paine Field	425.388.5115
Phil Welker	Principal Environmental Engineer	Principal	GeoEngineers, Inc.	253.203.0039
Jacob M. Letts, LG, LHG	Senior Hydrogeologist	Project Manager		253.722.2419
Katy Ataktürk, LG	Project Geologist	Project Management, Technical Evaluation		425.861.6045
Meredith Bush, PhD	Staff Geologist	Field Program Lead, Technical Evaluation, Reporting		206.239.3243
Nicolette H. Peerman, EIT	Staff Environmental Engineer	Technical Evaluation, Reporting		617.207.2916
Max-Henry Nelson	Staff Geologist	Field Program		253.203.1967
Michael August	Senior GIS Systems Analyst	GIS, Figures		206.239.3259
Erik Strandhagen	Senior Environmental Data Analyst	Data Management and EIM Submittals		503.436.6800
Denell Warren	Environmental Data Analyst	Data Validation and EIM Submittals		253.722.2792
Pace Analytical Services (Pace)	Lab Analysis Subcontractor	Lab Analysis Subcontractor (Mansfield, Massachusetts)	Pace Analytical Services (Pace)	508.822.9300
Holocene Drilling of Puyallup	Driller Subcontractor {Washington)	Drillers	Holocene Drilling of Puyallup	253.848.6500

Notes:

[1] Project roles may shift as project work progresses and subcontractors may change. Changes in personnel will be promptly communicated to Snohomish County and the Washington State Department of Ecology,

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Safety Operating Procedure: Per- and Polyfluoroalkyl Substances (PFAS) Sampling

OBJECTIVE

The objective of this technical standard operating procedure (SOP) is to define the techniques and requirements for PFAS sampling. Techniques discussed in this SOP include field sampling and preservation methods using the protocols intended to be analyzed for per- and polyfluoroalkyl substances (PFAS) by U.S. Environmental Protection Agency (EPA) Test Method 537.1 or by U.S. EPA Test Method 1633A.

BACKGROUND

Discussion

Specialized techniques and procedures are used for collecting and analyzing samples for PFAS. The field procedures are outlined in the following sections showing restricted equipment and materials that can be used when sampling for PFAS. The Modified (Low Level) Test Method 537 provides PFAS results with reporting limits of approximately 2 nanograms per liter for 18 PFAS compounds in drinking water. The Test Method 1633A provides PFAS results with reporting limits of approximately 1 to 100 nanograms per liter and 0.16 to 10 nanograms per gram for 40 PFAS compounds in aqueous samples and solids samples, respectfully. Acceptable materials for both sampling methods include: stainless steel, high density polyethylene (HDPE) and polypropylene.

Additional materials, for both test methods, may be acceptable if proven not to contain PFAS. **NOTE**: Grundfos pumps and bladder pumps are known to contain PFC materials (e.g., Teflon™ washers for Grundfos pumps and low-density polyethylene (LDPE) bladders for bladder pumps). Selection of sampling devices must be carefully researched. All sampling equipment components and sample containers should not come in contact with aluminum foil, LDPE, glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. Standard two step decontamination using detergent and clean water rinse should be considered for equipment that does come in contact with polyfluorinated materials. Clothing that contains PTFE material (including GORE-TEX®) or that have been waterproofed with polyfluorinated materials must be avoided. Many food and drink packaging materials and “plumbers thread seal tape” contain PFAS. All clothing worn by sampling personnel must have been laundered multiple times and dried without using dryer sheets of any type. The sampler must wear nitrile gloves while filling and sealing the sample bottles.

Pre-cleaned sample bottles with closures, coolers, ice, sample labels and a chain of custody form will be provided by the laboratory.

There are special laboratory requirements and sample coolers are clearly identified for PFAS sampling. This SOP outlines the sampling procedure typically used to collect PFAS samples for analysis.

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GENERAL RESPONSIBILITIES

Study area Manager – The study area manager is responsible for ensuring that field personnel are trained in the use of this procedure and the required equipment, and for ensuring that PFAS samples are collected in accordance with this procedure and anyother SOPs pertaining to specific media sampling. The study area manager must also ensure that the quantity and location of PFAS samples collected meet the requirements of the study area -specific sampling and/or work plans.

Field Team Leader – The field team leader is responsible for ensuring that field personnel collect PFAS samples inaccordance with this SOP and other relevant procedures.

Note: All field team member responsibilities are defined in the project-specific quality assurance project plan (QAPP).

RECOMMENDED AND PROHIBITED FIELD EQUIPMENT

Recommended

- Study area-specific plans (e.g., sampling, work, health and safety)
- HDPE and Silicon materials, including tubing, bailers, tape, plumbing paste
- Loose paper
- Masonite or Aluminum Clipboard
- Pens
- Insulated cooler(s) provided by lab with sample containers
- Cotton construction is recommended for field clothing and should be laundered a minimum of six times from time of purchase due to possible PFAS related treatments. Fabric softener and dryer sheets must be avoided. Rain gear should be made from polyurethane and wax-coated materials
- Plastic zip-top bags
- Decontamination supplies – Alconox®/Liquinox®
- Sample chain-of-custody forms
- Custody seals
- Nitrile or appropriate gloves
- Lab supplied and verified “PFAS Free” water to be used for trip and decontamination blanks and decontamination procedures
- Bags of ice
- Labels and appropriate forms/documentation for sample shipment provided by Laboratory

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Prohibited

- Teflon®-containing materials, when possible, should be avoided (e.g., tubing, bailers, tape and plumbing paste). In cases where Teflon® -containing materials are unavoidable, ensure adequate purging is performed prior to sampling (e.g., in-well pumps) and/or rinse blanks are collected prior to sampling
- Paper products such as waterproof field books, plastic clipboards, binders, spiral hard cover notebooks, sticky notes or glue materials
- Water resistant, waterproof, stain-treated clothing or shoes including Gore-Tex™ and Tyvek® materials
- LDPE or polypropylene containing materials (e.g., bags or containers used to transport samples)
- Markers
- Chemical (blue) ice packs
- Decontamination soaps containing fluorosurfactants such as Decon 90
- Water that is not verified to be "PFAS-free" to be used for trip and decontamination blanks and decontamination processes
- Aluminum foil

Soil Sampling Equipment

Acceptable materials for sampling, for both test methods, include stainless steel, HDPE and polypropylene. Additional materials may be acceptable if proven not to contain PFAS. All sampling equipment components and sample containers **should not** come in contact with aluminum foil, LDPE, glass or PTFE, Teflon™ materials including sample bottle cap liners with a PTFE layer. A list of acceptable equipment is provided below, but other equipment may be considered appropriate at a later date.

- Stainless steel spoon
- Stainless steel bowl

PROCEDURES

Preparation

1. Review study area-specific health and safety plan and project plans before initiating sampling activity.
2. Don the appropriate personal protective clothing as indicated in the study area specific health and safety plan.
3. Locate sampling location(s) in accordance with project documents (e.g., work plan) and document pertinent information in the appropriate field logbook. When possible, reference locations back to existing study area features such as buildings, roads, intersections, monitoring wells, etc.
4. Verify sampling depths as specified in the study area specific plans.
5. If decontamination of equipment and/or personnel is required, set up a decontamination zone.
6. Prepare an area near the sampling location to perform sample collection activities.

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Groundwater Sample Collection

The following steps must be followed when collecting PFAS samples for environmental purposes.

- Wear clean Nitrile gloves during handling of all sample containers and sampling devices.
- All clothing worn by sampling personnel must have been laundered multiple times and dried without using dryer sheets of any type. The sampler must wear nitrile gloves while filling and sealing the sample bottles.
- Acceptable materials for sampling include stainless steel, high density polyethylene (HDPE) and polypropylene. Sampling with a Waterra pump and tubing with check valve is the preferred method.
- Purge the well.
- Pre-cleaned sample bottles with closures, coolers, sample labels and a chain of custody form will be provided by the laboratory.
- Fill the laboratory-supplied bottle(s) with the sample.
- Cap the bottles with an acceptable cap and liner closure system.
- Label the sample bottles.
- Fill out the chain of custody.
- Place in a cooler maintained at 4 ± 2° Celsius.
- Decontaminate reusable sampling equipment according using PFAS Free water provided by lab and Alconox/Liquinox before proceeding to other sampling locations.
- Complete the field sampling form, being sure to record all relevant information before leaving the study area. All sampling information, including well ID, sample depth, sample volume and requisite analyses should be recorded in the field form as specified in the study area -specific sampling/work plans. Field Logbooks shall not be used.
- Properly package all samples for shipment to laboratories and complete all necessary sample shipment documentation. Remand custody of the samples to appropriate personnel.

Soil Sample Collection

- The sampler must wear nitrile gloves while conducting field work and handling sample containers
- Sampling is often conducted in areas where a vegetative turf has been established. In these cases, a clean stainless- steel spoon should be used to carefully remove the turf so that it may be replaced at the conclusion of sampling. Surface soil samples (e.g., 0 to 6 inches below surface) shall then be collected using a pre-cleaned, stainless steel spoon.
- Shallow subsurface soil samples (e.g., 6 to ~36 inches below surface) may be collected by digging a hole using a stainless-steel hand auger.
- When the desired subsurface depth is reached, a pre-cleaned hand auger shall be used to obtain the sample.

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Sample Shipment

Place the samples in a cooler with wet ice. The ice should be double bagged. The samples should be shipped for next day delivery. Always include enough ice to keep samples around 4°C, especially during summer months. The cooler drain spout should be closed and taped so that water does not flow out of the cooler.

- Always package samples securely to prevent breakage/spillage.
- Check with laboratory if Saturday delivery of samples is required.
- Be sure to include a completed chain of custody (COC) form in each shipment with all necessary information for both reporting and invoicing.
- Double check to make sure all samples are labeled correctly and correspond with the COC form.

RESTRICTIONS/LIMITATIONS

Acceptable materials for sampling, for both test methods, include stainless steel, high density polyethylene (HDPE) and polypropylene. Additional materials may be acceptable if proven not to contain PFAS. **NOTE**: Grundfos pumps and bladder pumps are known to contain PFC materials (e.g., Teflon™ washers for Grundfos pumps and low-density polyethylene (LDPE) bladders for bladder pumps). Selection of sampling devices must be carefully researched. All sampling equipment components and sample containers should not come in contact with aluminum foil, LDPE, glass or polytetrafluoroethylene (PTFE, Teflon™) materials including sample bottle cap liners with a PTFE layer. Standard two step decontamination using detergent and clean water rinse should be considered for equipment that does come in contact with polyfluorinated materials. Clothing that contains PTFE material (including GORE-TEX®) or that has been waterproofed with polyfluorinated materials must be avoided. Many food and drink packaging materials and “plumbers thread seal tape” contain PFAS.

All clothing worn by sampling personnel must have been laundered multiple times and dried without using dryer sheets of any type. The sampler must wear nitrile gloves while filling and sealing the sample bottles.

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Appendix C
Health and Safety Plan (HASP)

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GeoEngineers, Inc.
Site Health and Safety Plan
Paine Field Fire Training Pit PFAS Site
Snohomish County Paine Field Airport

File No. 5530-019-00

This Health and Safety Plan (HASP) is to be used in conjunction with the GeoEngineers, Inc. (GeoEngineers) Safety Programs. Together, the written GeoEngineers' safety programs and this HASP constitute the site safety plan for this subject site. This HASP is required by the Hazardous Waste Operations and Emergency Response (HAZWOPER) regulation (29 CFR 1910.120) when preforming mandatory or voluntary clean-up operations and initial investigations conducted to determine the presence or absence of hazardous substances unless the employer can demonstrate that the work does not involve employee exposure to safety and health hazards from hazardous substances at the site. This HASP is to be used by GeoEngineers personnel on this site and must be available on site, as well as in project Safety folder on Sharepoint.

Standard HASPs will have to be reviewed and approved at least by the GeoEngineers Project Manager and Site Safety Officer. The Project Manager may need to send an email to GeoEngineers Health and Safety Team indicating the availability of the final copy of the approved standard HASP on SharePoint for review and/or reference upon request.

All HASPs and/or HCPs are to be used in conjunction with current standards and policies outlined in the GeoEngineers Health and Safety Programs.

Liability Clause: If requested by subcontractors, this site HASP may be provided for informational purposes only. In this case, Form 1 of this HASP shall be signed by the subcontractor. Please be advised that this site-specific HASP is intended for use by GeoEngineers employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on this site to use or legally rely on this HASP. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by the company.

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1.0 General Project Information

Project Name:	Paine Field Fire Training Pit PFAS Site – RI-FS Work Plan
Project Number:	5530-019-00
Type of Project:	RI-FS Work Plan – Health and Safety Plan
Site Address:	Snohomish County Paine Field - 3220 100th St SW, Everett, WA 98204
Start/Completion:	2026/To Be Determined
Subcontractors:	Analytical Laboratory; Driller
Client:	Washington State Department of Ecology

CHAIN OF COMMAND	TITLE	NAME	TELEPHONE NUMBERS (O AND C)
1	**Current Property (ies) Owner (s)**	Snohomish County Paine Field – Andrew Rardin (Environmental Manager)	C: 425.388.5115
2	**Client Assigned Site Supervisor**	Meredith Bush	O: 206.239.3243
3	**Health and Safety Manager (HSM)**	Chad Kean	O: 425-284-7256 C: 425-515-5240
4	**Health and Safety Specialist (HSS)**	Connor Jordan	O: 253-722-2426 C: 530-210-5462
5	**Project Manager (PM)**	Jacob Letts	O: 253.722.2419
6	**Site Safety Officer (SSO)**	Meredith Bush	O: 206.239.3243
7	**Field Personnel**	Meredith Bush Max-Henry Nelson	O: 206.239.3243 O: 253.203.1967
8	**Subcontractor(s)**	Analytical Laboratory; Driller	-

1.1 FUNCTIONAL RESPONSIBILITY

Health and Safety Manager (HSM)

GeoEngineers' Health and Safety Manager (HSM) is responsible for implementing and promoting employee participation in the company Health and Safety Program. The HSM has overall responsibility for the general health and safety of GeoEngineers personnel. The HSM issues directives, advisories and information regarding health and safety to the technical staff. Additionally, the HSM has the authority to audit on-site compliance with HASPs, suspend work or modify work practices for safety reasons and dismiss from the site any GeoEngineers or subcontractor employees whose conduct on the site endangers the health and safety of themselves or others.

Health and Safety Specialist (HSS)

GeoEngineers' Health and Safety Specialist (HSS) is a designated safety specialist. The HSS provides technical support to the PM and Site Safety Officer (SSO) to ensure that GeoEngineers staff are following GeoEngineers' safety program and safe work practices during site activities. The HSS works with the PM and SSO to ensure the subcontractors' crews are following the site general HASPs, the activities HASP/JHAs and safe work practices. The HSS may periodically go on-site to perform safety observations and mentor on-site personnel on safety behavior practices. Additionally, the HSS has the authority to suspend work or modify work practices for safety reasons and dismiss from the site any GeoEngineers or subcontractor employees whose conduct on the site endangers the health and safety of themselves or others. The HSS shall keep the PM and HSM informed of the project's health- and safety-related matters, as necessary.

Project Manager (PM)

A PM is assigned to manage the activities of various projects and is responsible to the principal-in-charge of the project. The PM has the responsibility of ensuring the safety of all GeoEngineers personnel on job sites. The PM is responsible for assessing the hazards present at a job site and incorporating the appropriate safety measures for field staff protection into the field briefing and/or Site Safety Plan. He or

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she is also responsible for assuring that appropriate HASPs are developed. The PM will provide a summary of chemical analysis to personnel completing the HASP. PMs shall also see that their project budgets consider health and safety costs. The PM shall keep the HSM and HSS or HSC informed of the project's health- and safety-related matters, as necessary. The PM shall designate the project Site Safety Officer (SSO) and help the SSO implement the specifications of the HASP. The PM is responsible for communicating information in site safety plans and checklists to appropriate field personnel. Additionally, the PM and SSO shall hold a site safety briefing before any field activities begin. The PM is responsible for transmitting health and safety information to the Site Safety Officer (SSO) when appropriate.

Site Safety Officer/HAZWOPER (SSO)

The SSO will have the on-site responsibility and authority to modify and stop work or remove GeoEngineers personnel from the site if working conditions change that may affect on-site and off-site health and safety. The SSO will be the main contact for any on-site emergency situation. The SSO is First Aid and CPR qualified and has current Hazardous Waste Operations and Emergency Response (HAZWOPER) training when working at hazardous waste sites. The SSO is responsible for implementing and enforcing the project safety program and safe work practices during site activities. The SSO shall conduct daily safety meetings, perform air monitoring as required, conduct site safety inspections as required, coordinate emergency medical care and ensure personnel are wearing the appropriate personal protective equipment (PPE). The SSO shall have advanced fieldwork experience and shall be familiar with health and safety requirements specific to the project. The SSO has the authority to suspend site activities if unsafe conditions are reported or observed.

Duties of the SSO include the following:

- Implementing the HASP in the field and monitoring staff compliance with its guidelines.
- Ensuring that all GeoEngineers field personnel have met the training and medical examination requirements. Advising other contractor employees of these requirements.
- Maintaining adequate and functioning safety supplies and equipment at the site.
- Setting up work zones, markers, signs and security systems, if necessary.
- Performing or supervising air quality measurements. Communicating information on these measurements to GeoEngineers field staff and subcontractor personnel.
- Lead the pre-entry briefing (at the beginning of the site activities) and the site safety meetings (daily and/or weekly), with onsite personnel. These meetings should include a discussion of emergency response, site communications and site hazards associated with the planned activities
- Communicating health and safety requirements and site hazards to field personnel, subcontractors and contractor employees, and site visitors.
- Directing personnel to wear PPE and guiding compliance with all health and safety practices in the field.
- Consulting with the PM regarding new or unanticipated site conditions, including emergency response activities. If monitoring detects concentrations of potentially hazardous substances at or above the established exposure limits, notify/consult with the PM. Consult with the PM, the HSC or HSS, and the HSM regarding new or unanticipated site conditions, including emergency response activities. If field

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monitoring indicates concentrations of potentially hazardous substances at or above the established exposure limits, the HSM must be notified and corrective action taken.

- Documenting all site accidents, injuries, illnesses and unsafe activities or conditions and/or near misses, and reporting them to the PM, HSC or HSC and the HSM as soon as practical, but no later than the end of the day.
- Directing decontamination operations of equipment and personnel.

Field Employees

All employees working on site that have the potential of coming in contact with hazardous substances or chemical, biological and/or physical hazards are responsible for participating in the health and safety program and complying with the site-specific health and safety plans. These employees are required to:

- Read, participate and be familiar with the GeoEngineers health and safety programs located in SharePoint. Attend to applicable specific safety training.
- Notify the SSO that when there is need to stop work to address an unsafe situation.
- Comply with the HASP and acknowledge understanding of the plan discussed during the health and safety pre-entry briefing
- Review applicable Job Hazard Analysis (JHAs) prior to starting a new activity and follow the recommended critical actions to mitigate hazards.
- Think through potential hazards at the beginning of a new task, before changing tasks and when conditions change and after a near miss or incident.
- Report to the SSO, PM or HSM any unsafe conditions and all facts pertaining to near misses, incidents or accidents that could result in physical injury or exposure to hazardous materials and/or equipment damage.
- Participate in health and safety training, including initial 40-hour Hazardous Waste Operations and Emergency Response (HAZWOPER) course, annual 8-hour HAZWOPER refresher and First Aid/cardiopulmonary resuscitation (CPR) training.
- Participate in the medical surveillance program, if applicable.
- Any field employee working on site may stop work if the employee believes the work is unsafe.

Contractors Under GeoEngineers Supervision

GeoEngineers will hire contractors for this project? Yes ☒ No ☐

Contractors working on the site directly for the Client will have their own Health and Safety Plans or Job Hazard Analysis. Sub-contractors working on the site under GeoEngineers supervision that have the potential of coming in contact with hazardous substances or chemical, biological and/or physical hazards shall have their own health and safety programs and safety plan that is generally consistent with the requirements of this HASP.

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CONTRACTOR NAME		PREDICTED START/END DATES
1. Driller		2026/To Be Determined
Contractor Scope Summary:	Environmental drilling of soil borings that will be completed as permanent monitoring wells as a part of the RI outlined in the Work Plan and in Section 3.0 herein.	
2. Analytical Laboratory		2026/ To Be Determined
Contractor Scope Summary:	Environmental laboratory to analyze soil/solids and water samples collected as a part of the RI outlined in the Work Plan and in Section 3.0 herein.	

1.2 GEOENGINEERS FIELD PERSONNEL QUALIFICATIONS AND READINESS STATUS

NAME OF EMPLOYEE ON SITE	LEVEL OF HAZWOPER TRAINING (24-HR/40-HR)	DATE OF LAST 8-HR REFRESHER TRAINING	LAST FIRST AID/ CPR TRAINING DATE	PAINE FIELD BADGE EXP.	HAZWOPER MEDICAL SURVEILLANCE REQUIRED?
Michael Ysaguirre	40-hr	2/26/2026	2/5/2025	5/22/2026	No
Max-Henry Nelson	40-hr	6/17/2025	5/15/2024	5/7/2026	No
Meredith Bush	40-hr	6/17/2025	7/7/2025	9/23/2026	No

1.3 GEOENGINEERS FIELD PERSONNEL REQUIRING RESPIRATOR USE ON THIS PROJECT

NAME OF EMPLOYEE REQUIRING A RESPIRATOR	RESPIRATOR FIT TEST DATE	MEDICAL EVALUATION DATE	RESPIRATOR CLEARANCE DATE	DATE OF ANNUAL REFRESHER TRAINING	APPROVED RESPIRATOR TYPE
N/A					

1.4 PERSONNEL MEDICAL SURVEILLANCE

Field personnel on this job site are ☒; are not ☐ entered in a GeoEngineers provided medical surveillance program.

GeoEngineers employees are required to be in a medical surveillance program when they fall into the category of "Employees Covered" in OSHA 1910.120(f)(2) (or Chapter 296-842 WAC). This includes:

1. All employees who are or may be exposed to hazardous substances or health hazards at or above the permissible exposure limits or, if there is no permissible exposure limit, above the published exposure levels for these substances, without regard to the use of respirators, for 30 days or more a year.
2. All employees who wear a respirator for 30 days or more a year or as required by state and federal regulations.
3. All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.
4. Members of HAZMAT teams.

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2.0 Work Site

2.1 SITE DESCRIPTION AND HISTORY

The Site is located at Snohomish County Paine Field Airport (Paine Field; Airport) in Everett, Washington at an elevation of approximately 600 feet above mean sea level (msl), situated along the western boundary of Snohomish County Paine Field Airport (Airport), adjacent to Mukilteo Speedway and north of Bernie Webber Drive in Mukilteo. Taxi Lane K-6 is located along the eastern portion of the Site, and private and commercial aircraft hangars are located along the southern boundary. The majority of the Site is situated on an elevated plateau constructed through placement of fill during historical airport runway development. Local surface topography in the vicinity of the Site is relatively flat, with localized depressions in wetland and drainage areas. The Site is currently developed and actively used as part of Paine Field Airport and consists primarily of airport buildings, runways and taxiways, paved parking, roads and landscaped areas. Please note, references to off-Site investigation areas in this HASP and Work Plan this HASP is an attachment to are intended solely to support delineation of the extent of contamination originating from the Site and do not constitute a determination of site boundaries, ownership, or liability. Areas located downgradient of the Site (off-Site) along the Big Gulch Creek corridor include a mix of transportation infrastructure, open space, residential, wetlands, and publicly owned parcels. As stated previously, these areas are not part of the Site but are included in this RI as off-Site investigation areas to support evaluation of potential exposure pathways and to delineate the extent of Site-related contamination in surface water, sediment, and shallow groundwater.

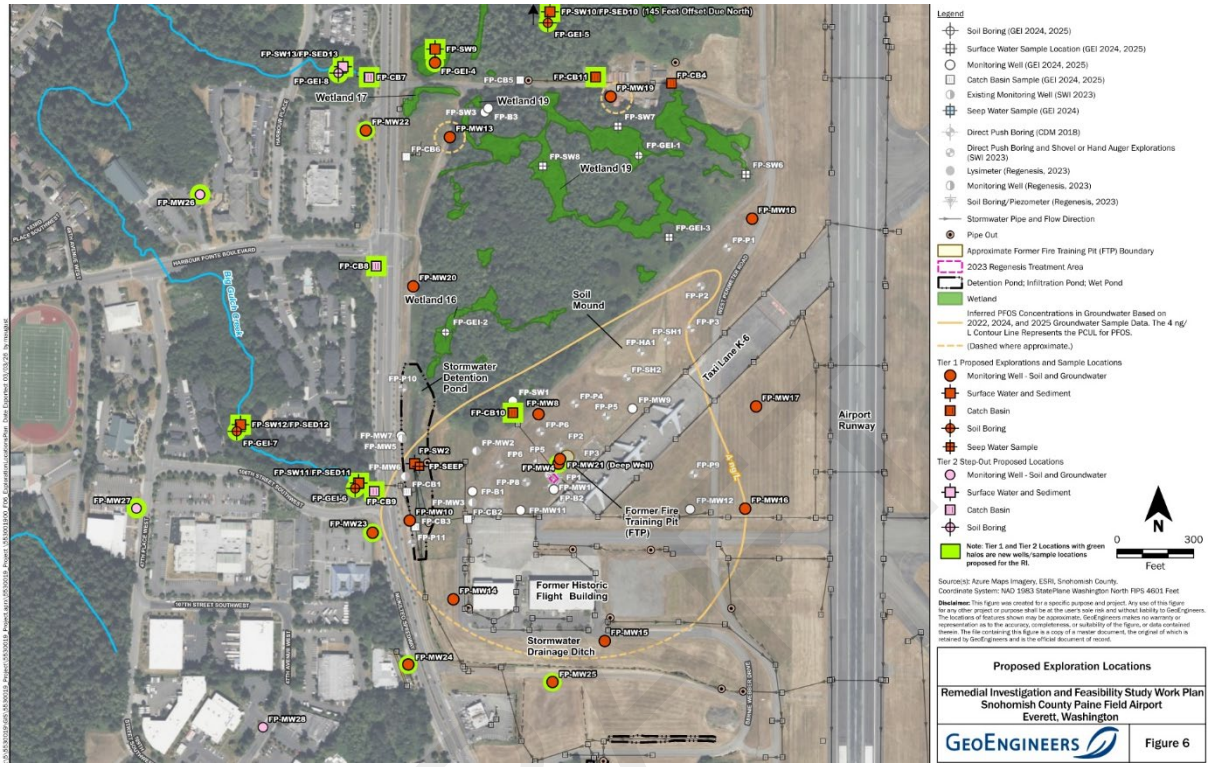
The Site was historically used as a firefighting training site for Paine Field and other local fire departments. Activities at the Site included ignition of flammable materials including petroleum hydrocarbons and other flammable materials in a pit (i.e., FTP or Former FTP) which were extinguished using Aqueous Film Forming Foam (AFFF) containing per- and polyfluoroalkyl substances (PFAS). Prior investigations completed at the Site between 1989 and 2006 identified total petroleum hydrocarbons (TPH) and lead in soil. Remedial actions were completed at the former FTP in 2006 to address TPH and lead in soil at concentrations greater than the applicable Ecology MTCA cleanup levels (CULs) and the FTP received a No Further Action (NFA) determination from Ecology in 2007. Remedial actions included the excavation of the FTP in 2006 and backfilled to clean petroleum impacts as previously described.

The Paine Field Fire Department also conducted annual calibration and compliance testing by spraying AFFF on the ground near the soil mound. These testing practices were modified in June 2019 after acquisition of a closed-loop testing system that does not discharge AFFF to the ground, and routine AFFF application to soil at the Site has since ceased. For more information on Site description and history please refer to Section 2.0 of the Work Plan this HASP is attached to.

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Site Map

Below is the Proposed Exploration Locations (Figure 5), from the Agency Review Draft RI-FS Work Plan.



2.2 PREVIOUS INVESTIGATIONS

Prior investigations completed at the former FTP site between 1989 and 2006 identified total petroleum hydrocarbons (TPH) in soil. Remedial actions were completed at the Site in 2006 to address TPH and lead in soil at concentrations greater than the applicable Ecology Model Toxics Control Act (MTCA) cleanup levels (CULs) and the Site received a No Further Action (NFA) determination from Ecology in 2007. Subsequent investigations completed at the Site by others in 2018, 2022 and 2023 identified PFAS in soil and groundwater. Investigations completed by GeoEngineers in 2024 and 2025 identified PFAS in soil, groundwater, surface water, stormwater conveyance system catch basins (catch basin(s)) water and solids samples at the Site. The former FTP site is listed by Ecology as the Paine Field Fire Training Pit PFAS (Cleanup Site ID: 16912; Facility/Site ID: 49626114) with the status listed as “awaiting cleanup.”

The following table presents the most recent available data of contaminants of concern and was/were collected during the historical Site Investigation(s) conducted at the subject site and/or its vicinity between 1989 and 2025 as presented in the following table.

2.2.1 Previous Investigation Contaminants Data - Worst Case Concentrations

KEY STUDY (NAME/COMPANY/DATE (YEAR)	MAIN CONTAMINANTS OF CONCERN (TPH, VOCS, PAHS, METALS, PCBS, PFAS ETC)	MEDIA (SOIL, GROUNDWATER, SEDIMENTS, AIR) /MAXIMUM CONCENTRATION LEVELS (UNITS)
Environmental Investigation – Dames & Moore (1989)	Free-phase petroleum hydrocarbon Heavy Metals	Surface Water: Detected Soil: Detected *Data not available for review
Environmental Investigation – AGI Technologie (1998)	Lead Diesel- Range Total Petroleum Hydrocarbons Heavy Oil-Range Total Petroleum Hydrocarbons	Groundwater: > MTCA Method A CULs Soil: > MTCA Method A CULs *Data not available for review
Soil Remediation Activities – CDM (2007)	Petroleum Hydrocarbons	Soil: Detected *Data not available for review
PFAS Investigation – CDM Smith (2018)	Perfluorooctanoic acid (PFOA) Perfluorooctane sulfonic acid (PFOS) Perfluorononanoic acid (PFNA) Perfluorohexane sulfonic acid (PFHxS) *Above are the primary PFAS compounds that appeared at the highest concentrations and most frequently	Groundwater: ■ PFOA: 508 ng/L ■ PFOS: 33,300 ng/L ■ PFNA: 5,680 ng/L ■ PFHxS: 758 ng/L Soil: ■ PFOA: 5.07 µg/kg ■ PFOS: 716 µg/kg ■ PFNA: 38.2 µg/kg ■ PFHxS: 19.2 µg/kg
Supplemental PFAS Investigation – Shannon and Wilson Inc. (SWI, 2022)	Perfluorooctanoic acid (PFOA) Perfluorooctane sulfonic acid (PFOS) Perfluorononanoic acid (PFNA) Perfluorohexane sulfonic acid (PFHxS) *Above are the primary PFAS compounds that appeared at the highest concentrations and most frequently	Groundwater: ■ PFOA: 2,600 ng/L ■ PFOS: 37,000 ng/L ■ PFNA: 10,000 ng/L ■ PFHxS: 13,000 ng/L Soil: ■ PFOA: 1.2 µg/kg ■ PFOS: 82 µg/kg ■ PFNA: 4.9 µg/kg ■ PFHxS: 10 µg/kg
Soil Treatment Pilot Study for PFAS Contaminated Soil (Remediation Technology: SourceStop) – REGENESIS (2023, 2024)	PFAS Compounds	Groundwater: 13 PFAS compounds detections and three PFAS compounds below reporting limit Porewater: Detected PFAS compounds decreased from 13 to four compounds Soil Leachate: PFOS detected
Data Gaps Investigations, FTP Study Area – GeoEngineers (2024, 2025)	PFAS Compounds	Groundwater, Soil, Surface Water, and Catch Basin Solids and Water: PFAS Compounds above preliminary cleanup levels (PCULs; levels vary per PFAS compound)

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3.0 Geoengineers Scope of Work

3.1 SUMMARY OF PROJECT SCOPE

GeoEngineers will conduct field activities to investigate soil, groundwater, surface water, and stormwater catch basins water and solids samples at the Paine Field Fire Training Pit PFAS Site (Site; Cleanup Site ID: 16912 and Facility/Site ID: 49626114) and to the west of the Site across Mukilteo Speedway (off-Site). The purpose of the Remedial Investigation and Feasibility Study (RI-FS) Work Plan is to collect additional environmental media data to characterize the nature and extent of contamination (exceeding preliminary cleanup levels (PCULs)) originating from the Site, including evaluation of potential migration beyond the Site boundary, and address the data gaps identified in Section 6.0 of the Work Plan. Proposed exploration locations are identified on Figure 5 of the Work Plan.

As part of the RI-FS Work Plan, our scope includes:

- Locating utilities prior to any earth disturbing activities.
- Sampling media of concern (soil, groundwater, surface water, and catch basin water and solids) to characterize PFAS distribution in soil, groundwater, surface water, sediment, and stormwater infrastructure media, with particular attention to known and suspected source areas and downgradient migration pathways.
- Sampling to delineate the horizontal and vertical extent of PFAS impacts across identified media of concern (i.e., addressing data gaps identified in Section 6.0 of the Work Plan) and generate data necessary to support subsequent feasibility study evaluations.
- Refining the Conceptual Site Model (CSM) through remedial investigation phased sampling program.

For more information on data gaps being addressed as a part of the RI and scope of RI please refer to Section 6.0 and 7.0, respectively, of the Work Plan.

3.2 PRIMARY FIELD TASKS

The primary field tasks of the Work Plan are below. More information regarding sampling analytical plan for soil, catch basin solids and water, surface water, and groundwater samples are included in the Work Plan and associated Sampling and Analysis Plan/Quality Assurance Project Plan (SAP/QAPP) attachment (Appendix B of Work Plan).

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3.2.1 Primary Field Tasks to be Performed by GeoEngineers

TASK #	PRIMARY FIELD TASK		PREDICTED START/END DATES
1	Soil Borings, Soil Sampling, and Survey		Summer 2026
	Task Description:	Advancement of soil borings, including borings to be completed as permanent monitoring wells, are planned to further evaluate and document/delineate the contaminated soil and groundwater identified during prior investigations at the Site. Exploration techniques will include hollow-stem auger (HSA) drilling techniques, sonic drilling techniques, and hand augers. Soil (and groundwater, surface water, and catch basin solids and water) samples will be submitted to an Ecology-accredited laboratory for chemical analysis of PFAS compounds by U.S. EPA Method 1633A following on, at minimum, a standard turnaround time. Additionally, soil samples and all sampling areas will be screened in the field with a photoionization detector (PID). Furthermore, as stated in Section 7.4 of the Work Plan, newly installed monitoring wells and soil borings will be surveyed to establish horizontal and vertical control. For newly installed monitoring wells elevations will be measured at both the top of the monument and top of casing rim to the nearest 0.01 foot.	
2	Monitoring Well Installation		Summer 2026
	Task Description:	Soil borings advanced will be developed into permanent monitoring wells for groundwater sampling and groundwater flow monitoring (except for hand augured borings); see Task 1 for more information.	
3	Monitoring Well Development		Summer 2026
	Task Description:	Development of monitoring wells prior to groundwater sampling.	
4	Groundwater Sampling and Depth Gauging		Summer 2026
	Task Description:	Groundwater samples will be collected from previous wells installed by GeoEngineers and newly installed monitoring wells by U.S. EPA Low-Flow (Minimal Drawdown) Ground-Water Sampling Procedures. Groundwater table will be measured and documented prior to sample collection; additional field parameters documented during sampling are discussed in Section 7.5 of the Work Plan.	
5	Surface Water Sampling		Summer 2026
	Task Description:	Surface water samples will be collected using standard equipment to characterize PFAS impacts.	
6	Catch Basin Solids and Water Sampling		Summer 2026
	Task Description:	Catch basin solids and water will be collected using standard equipment.	

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4.0 Hazard Analysis

From within the Primary Field Tasks (3.2.1 above), identify activities which may pose an elevated risk to worker's health. A list of activities that GeoEngineers recognizes as Elevated Risk Activities (ERA) are included in the dropdowns in the table below. If this project has ERA that are not present there, they are to be added. Each ERA triggers the completion of a separate ERA Job Hazard Analysis (Form 3).

4.1 GENERAL SAFE WORK PRACTICES

- **Daily Tailgate:** At the beginning of the day conduct a tail gate safety meeting discussing the jobs, the hazards, exclusion zone(s) surrounding work area(s), utilities clearance and actions that will be taken to prevent injury and reduce risk. Discuss "Stop Work Authority" as it applies to each site member. Discuss appropriate PPE including high visibility clothing such as reflective vest.

- **Pedestrians:** Traffic cones, beacons, and caution tape will be used to delineate active work areas to prevent the public from entering the work area during field activities. In the event pedestrians approach the work area during field activities, field activities will be safely halted and contact information of the project manager and Ecology will be provided, outside of the work area, to pedestrians.
- **Utility Check**: There may be site-specific procedures for preventing drilling or digging into utilities. Add these procedures to the standard GeoEngineers utility check list. Implement additional utilities clearance activities, if deemed necessary (typically if disturbing drilling work is within 2, 5 and/or 10 feet of underground utilities, for Lower, Medium and Higher Risks, respectively).
- **Lifting Hazards**: Use proper techniques, mechanical devices where appropriate.
- **Terrain Obstacles**: Terrain could be soft, and activities will be conducted to minimize lawn damage and the potential for vehicles to get stuck.

4.2 ELEVATED RISK ACTIVITIES

Does this project have Elevated Risk Activities? Yes ☒ or No ☐

ELEVATED RISK ACTIVITIES	ASSOCIATED PRIMARY FIELD TASK(S)	SEPARATE ERA JHA COMPLETED?
Direct Hazardous Waste/Material Sampling	Environmental sampling will include sampling of soil, solids, surface water, and groundwater potentially impacted by PFAS compounds	Yes, combined
Heat/Cold Injury Risk	Proposed work will be completed in the summer	
Work Near/In Traffic (Traffic Control Plan Required)	A portion of the work will be completed near the Mukilteo Speedway, off-Site.	

Each JHA describes the activity being performed in a helpful chronological order, the inherent risks and their specific control measures. They must be completed before the activity begins and must be updated if any aspect is revised. Any single project may have multiple ERA JHAs.

4.3 GENERAL HAZARD REVIEW

The Primary Field Tasks (excluding the previously identified ERA) identified in Section 3.2.1 are to be included in the following Primary Field Task Hazard Analysis Tables. The Tables list the commonly encountered field hazards for the work we do at GeoEngineers. Hazards are divided in to three categories: (A) Chemical, (B) Biological, (C) Physical. Add others, as necessary. Review each of your Primary Filed Tasks (Section 3.2.1) and indicate which Tasks possess the hazards listed. Once assigned, the review is narrowed by focusing on only those hazards present on this site and how to avoid and/or mitigate them. If some hazards listed are not applicable, they can be removed from the Table. The final Table should include only those hazards and mitigations that are relevant to this project and associated activities.

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4.4 PRIMARY FIELD TASK HAZARD ANALYSIS

PRIMARY FIELD TASKS	
# 1	Soil Borings, Soil Sampling, and Survey
# 2	Monitoring Well Installation
# 3	Monitoring Well Development
# 4	Groundwater Sampling and Depth Gauging
# 5	Surface Water Sampling
# 6	Catch Basin Solids and Water Sampling

TASK HAZARD RECOGNITION – EVALUATE PRIMARY FIELD TASKS FOR HAZARDS					
Chemical Hazards	Task #s	Biological Hazards	Task #s	Physical Hazards	Task #s
Dusts/Fumes	1/2	Insects	All	Heavy Equipment	1/2
Known or Expected Human Carcinogens	All			Vehicular Traffic	All
Dermal Exposure Potential	All			Noise	1/2
				Heat Exposure Risk	All
				Lifting or Repetitive Motions	1/3/4/5/6
				Unstable/Uneven/Slippery Surfaces	All
				Trip/Fall Hazards	All
				Energy Source (electricity, heat, etc)	All

HAZARD DETAILS AND CONTROLS - INCLUDE THOSE ITEMS CHECKED ABOVE		
CHEMICAL HAZARDS		
HAZARD	WHEN/HOW EXPOSURE MAY OCCUR	CRITICAL ACTIONS TO MITIGATE HAZARDS
Dusts	During drilling operations.	5. Wear level D PPE and, when dust levels warrant, wear a KN95 mask. 6. When dust is visible, halt work and employ dust suppression (e.g., water spraying).
Known or Expected Human Carcinogens	During Drilling operations and sampling. Former FTP has PFAS impacted soil, groundwater, surface water, and catch basin solids and water.	1. Wear nitrile gloves and level D PPE when sampling/interacting with environmental media. 2. Wear face shields during sample collection and decontamination activities when splashing is a concern. 3. Wash hands after handling environmental media prior to eating or drinking. 4. Remove work boots before entering car/home to avoid tracking PFAS impacted soil into these spaces.
Dermal Exposure Potential	During drilling operations and sampling. Former FTP has PFAS impacted soil, groundwater, surface water, and catch basin solids and water.	1. Wear nitrile gloves and level D PPE when sampling/interacting with environmental media. 2. Wear face shields during sample collection and decontamination activities when splashing is a concern. 3. Wash hands after handling environmental media or if environmental media has made contact with skin. 4. Shower upon returning home after being on Site.

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BIOLOGICAL HAZARDS		
HAZARD	**WHEN/HOW EXPOSURE MAY OCCUR**	**CRITICAL ACTIONS TO MITIGATE HAZARDS**
Insects	During drilling operations and environmental sampling.	1. Inspect work areas when arriving at site to identify hazard(s). 2. If an employee has bee sting allergy, carry epi-pen. 3. Wear PFAS-free bug spray when outdoors and reapply throughout the day.
Hypodermic Needles	During drilling operations and environmental sampling.	1. Inspect work areas when arriving at site to identify hazard(s). 2. Wear level D PPE and wear leather gloves where needles may be present. 3. Do not pick up or contact.

PHYSICAL HAZARD		
HAZARD	**WHEN/HOW EXPOSURE MAY OCCUR**	**CRITICAL ACTIONS TO MITIGATE HAZARDS**
Heavy Equipment	During drilling operations. When approaching to obtain soil sample.	1. Wear high-visibility clothing and level D PPE. 2. Always make eye contact with a machine operator before entering. 3. Stay at a safe distance away from machine when not collecting soil samples.
Vehicular Traffic	During drilling and sampling operations. Some locations are close to streets.	1. Wear high-visibility clothing and level D PPE. 2. Have safety cones, caution tape, and safety beacons out surrounding the working area. 3. Be aware of surroundings when drilling operations or sampling is occurring.
Noise	During drilling operations.	1. Wear ear protection such as earplugs and muffs. 2. Be aware of surroundings when wearing ear protection and any potential machines that can make similar signaling sounds.
Heat Exposure Risk	Being on-site, outside, in hot weather.	1. Wear appropriate clothing constructed of absorbent, close-weave material that does not allow penetration of sunlight and worn in light layers that can be adjusted for comfort. 2. Wear safety sunglasses (where lighting is not an issue). 3. Wear PFAS-free sunscreen, with high protection factor, and reapply throughout the day. 4. Take cooling down breaks in shaded or cooled areas. 5. Drink cool water and commercial electrolyte replacements throughout the day; recommended to consume fluids approximately every 20 minutes. 6. Avoid alcohol and caffeine (including coffee and tea), which contribute to dehydration. 7. Reduce physical demands of work tasks when possible, through mechanical means.
Lifting or Repetitive Motions	During environmental sampling collection and moving coolers filled with samples.	1. Perform ergonomic motions when possible (e.g., lift with legs, not back); when feasible replace with mechanical means such as hoists, hand trucks, lift-tables etc. 2. Take breaks as needed. 3.

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HAZARD	WHEN/HOW EXPOSURE MAY OCCUR	CRITICAL ACTIONS TO MITIGATE HAZARDS
Unstable/Uneven/ Slippery Surfaces	Being on-site working on or near sloped terrain or in or around wetland area to collect environmental samples.	1. Walk with caution, especially on slippery surfaces such as wet grass, and on sloped ground surfaces and embankments. 2. Wear water and/or slip resistant steel-toed boots.
Trip/Fall Hazards	Various equipment spread out in work area during drilling and sampling.	1. Walk with caution and maintain good housekeeping: keep tools and equipment picked up and out of working area walkways. 2. Mark tripping hazards.
Energy Source (electricity, heat, etc)	During drilling operations and sampling.	1. Have above and below utilities located and marked prior to drilling operations and sampling. 2. Observe all utility markings prior to drilling operations and sampling. 3. Stay a safe distance away from above utilities. 4. Place safety cones near utility markings for additional visibility as needed.

PPE	TASK #S	EQUIPMENT	TASK #S	TOOLS	TASK #S
☒ Hard Hat	All	☒ Safety Beacons	All	☒ Cell Phone/Satellite	All
☒ Eye Protection	All	☒ First Aid Kit	All	☒ Spare Equipment Batteries	All
☒ Hearing Protection	1/2	☒ Fire Extinguisher	1/2	☒ Flashlight	All
☒ Gloves	All	☒ Sunglasses/Sunscreen	All	☒ Hands Tools	All
☒ High Visibility Vest	All	☒ Drinking Water	All	☐ Other	
☒ Steel Toe Boots	All	☒ Eye Wash Kit			
☐ Other		☐ Other	All		

4.5 CHEMICAL HAZARDS

The following table is a summary of the chemicals known to be historically or currently present on the site and their associated occupational exposure limits (OEL). Once Table 4.5.1 is filled out, highlight which of the identified exposure limits will be utilized on this project. GeoEngineers typically uses the most conservative (lowest) of the limits published for the protection of its' workers. Chemicals without published limits should be discussed with the Health and Safety Department.

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4.5.1 Summary of Chemical Hazard Exposure Limits

CHEMICAL COMPOUND/ CAS #	PRIMARY FIELD TASK OR ELEVATED RISK ACTIVITY WITH POTENTIAL EXPOSURES	OSHA PERMISIBLE EXPOSURE LIMIT (PEL)	APPLICABLE* STATE OSHA PLAN (PEL)	ACGIH EXPOSURE LIMITS (TLV AND/OR TWA)	NIOSH EXPOSURE LIMITS (REL AND/OR IDLH)
Per- and poly-fluoroalkyl substances	All	NA	NA	NA	NA
Diesel Fuel	All	NA	NA	100 mg/m³ (as total hydrocarbons)	NA
Gasoline	All	NA	NA	300 ppm	NA

Notes:

*If a State has established a PEL more restrictive than the OSHA limits, then the applicable State limit becomes the legal limit.
IDLH = immediately dangerous to life or health; OSHA = Occupational Safety and Health Administration
ACGIH = American Conference of Governmental Industrial Hygienists; NIOSH = National Institute of Occupational Safety & Health
mg/m3 = milligrams per cubic meter (dust or particulate conc.); ppm = parts per million (vapor conc.)
TWA = time-weighted average (Over 8 hrs.), basis of most exposure limits
PEL = permissible exposure limit, legally enforceable; TLV = threshold limit value (over 8 hrs)
REL= recommended exposure limit (over 10 hrs); STEL = short-term exposure limit (15 min)
Ceiling (C) – concentration never to be exceeded

4.5.2 Descriptive Summaries of Chemicals Present

For those chemicals onsite either historically or currently, complete the following table. For chemicals without a direct pathway for exposure or those cleaned or removed from the site in previous site activities, indicate these conditions or actions. Most of our projects are shorter in duration. In these instances, it is more relevant to provide the acute symptoms of exposure rather than the chronic. Discuss the difference with the Health and Safety Department if unsure.

CHEMICAL COMPOUND	PHYSICAL CHARACTERISTICS OF CHEMICAL	ACUTE ☐ AND/OR CHRONIC ☒ SYMPTOMS OF EXPOSURE
1) Per- and poly-fluoroalkyl substances	Colorless, odorless, and water-soluble.	Decreased antibody response, dyslipidemia, decreased infant and fetal growth, increased risk of kidney cancer
Where and how exposure may occur: Environmental Sampling	*Exposure Pathways:* Ingestion, inhalation, skin absorption, skin and eye contact	
2) Diesel Fuel	Liquid with a characteristic odor.	Irritated eyes, skin, and mucous membrane; fatigue; blurred vision; dizziness; slurred speech; confusion; convulsions; and headache, and dermatitis
Where and how exposure may occur: Environmental Sampling	*Exposure Pathways:* Ingestion, inhalation, skin absorption, skin and eye contact	

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CHEMICAL COMPOUND	PHYSICAL CHARACTERISTICS OF CHEMICAL	ACUTE ☐ AND/OR CHRONIC ☒ SYMPTOMS OF EXPOSURE
3) Gasoline	Clear liquid with a characteristic odor. Motor fuel, motor spirits, natural gasoline. A complex mixture of volatile, hydrocarbons (paraffins, cycloparaffins & aromatics)	Irritated eyes, skin, nose, respiratory system; headache, visual disturbance, lassitude (weakness, exhaustion), dizziness, tremor, drowsiness, nausea, vomiting; gastrointestinal disturbances and diarrhea. convulsions, loss of consciousness, coma, precancerous skin
Where and how exposure may occur: Environmental Sampling	*Exposure Pathways:* Ingestion, inhalation, skin absorption, skin and eye contact	

5.0 Air Monitoring Plan

Air monitoring for personal exposures will ☒, will not ☐ be implemented as part of this HASP.

An air monitoring plan is based on the results of the chemical hazard assessment and the potential for exposures above occupational exposure limits during work tasks. The air monitoring plan provides a framework for limiting worker airborne exposures while on the job site. If air monitoring will not be used, provide a short summary justification for this decision below. Field measurements taken as part of the air monitoring plan will be recorded on Form 5.

5.1 AIR MONITORING INSTRUMENTATION

Personal exposure instrumentation will be used to: estimate exposures ☒; calculate time weighted averages (TWA) ☐; or both ☐.

REASONING FOR ABSENCE OF AIR MONITORING
N/A

All deployed instrumentation will be calibrated and field verified according to manufacturer's recommendation and recorded on the attached form (Attachment 5).

The following table is a list of all instrumentation to be used to monitor air parameters while on site. This list will be updated if new chemicals or other airborne hazards are identified, or scope of work changes necessitate enhanced monitoring.

INSTRUMENTATION TO BE USED	CHEMICALS FROM HAZARD ASSESSMENT TO BE DETECTED WITH INSTRUMENT	BRAND, MODEL, CALIBRATION AND ANY ADDITIONAL ATTACHMENTS
PID (10.6 eV)	Organic Vapors	Brand and Model – To Be Determined Calibrated daily prior to use.
Or PID (11.7 eV)		

5.2 AIR MONITORING ACTION LEVELS

Instrument action levels protect field staff by predetermining how they will respond to the collected field or laboratory exposure data. The action levels for each instrument are organized by the field task performed. It is possible for more than one air hazard to be present during each work task. Examples of completed air monitoring action level tables can be provided upon request by the Health and Safety Team.

Review the Primary Field Tasks (and ER Activities) for air monitoring needs.

5.3 TASKS OR ACTIVITIES REQUIRING PERSONAL EXPOSURE AIR MONITORING

FIELD TASK	DURATION OF TASK	LOCATION(S) OF TASK ON SITE
All Tasks #1 through #6	Varies per location	#1-#4 – Proposed Monitoring Wells Locations (RI/FS Work Plan Figure 5) #5 – Proposed Surface Water Samples Locations (RI/FS Work Plan Figure 5) #6 – Proposed Catch Basin Samples Locations (RI/FS Work Plan Figure 5)

5.4 ACTION LEVEL TABLE

Will an Action Level Table be used during this project? Yes ☐ No ☒ [No Respirators Required]

Action Levels for Volatile Organic Chemicals

- The workspace will be monitored using a photoionization detector (PID). These instruments must be properly maintained, calibrated and charged (refer to the instrument manuals for details). Zero this meter in the same relative humidity as the area in which it will be used and allow at least a 10 minute warm-up prior to zeroing. Do not zero in a contaminated area.
- An initial vapor measurement survey of the site should be conducted to detect "hot spots" if contaminated soil is exposed at the surface. Vapor measurement surveys of the workspace should be conducted at least hourly or more often if persistent petroleum-related odors are detected. Additionally, if vapor concentrations exceed 5 parts per million (ppm) above background continuously for a 5-minute period as measured in the breathing zone, upgrade to Level C personal protective equipment (PPE) or move to a non-contaminated area.
- Standard industrial hygiene/safety procedure is to require that action be taken to reduce worker exposure to organic vapors when vapor concentrations exceed one-half the threshold limit value (TLV). Because of the variety of chemicals, the PID will not indicate exposure to a specific permissible exposure limit (PEL) and is therefore not a preferred tool for determining worker exposure to chemicals. If odors are detected, then employees shall upgrade to respirators with Organic Vapor cartridges and will contact the Health and Safety Program Manager for other sampling options.

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FIELD TASK OR ERA	CHEMICAL OR OTHER HAZARD	MONITORING DEVICE	FREQUENCY OF MONITORING "WORKING" ZONE	ACTION LEVEL	RESPONSE TO MONITORING DATA
All	Organic Vapors	PID	Continuous during soil disturbance activities or handling samples	Background to 5 ppm in breathing zone	1. Use Level D or Modified Level D PPE. 2. Halt task and temporally vacate location. 3. Wait for 15 minutes and recheck working zone. 4. If persisting, call PM/HSM/HSS/HSC for guidance.
All	Organic Vapors	PID	Continuous during soil disturbance activities or handling samples	> 5 ppm in breathing zone for 1 minute	1. Stop work and evacuate the area. 2. Call PM/HSM/HSS/HSC for guidance.

5.5 RESPIRATOR SELECTION, USE AND MAINTENANCE

Respirators will ☐, will not ☒ be utilized to maintain safe work conditions during this project.

If respirators are prescribed in the Action Level Table, site personnel shall be trained before use on the proper use, maintenance and limitations of respirators. Additionally, they must be medically qualified to wear respiratory protection in accordance with 29 CFR 1910.134 (in WA, Chapter 296-842 WAC). Site personnel who will use a tight-fitting respirator must have passed a qualitative or quantitative fit test conducted in accordance with an OSHA-accepted fit test protocol. Fit testing must be repeated annually or whenever a new type of respirator is used.

5.6 WORK TASKS WITH POTENTIAL RESPIRATOR USE

WORK TASK	DURATION OF TASK	CHEMICALS/CONTAMINANTS ASSOC.
N/A		

5.7 RESPIRATOR USE DETAILS

RESPIRATOR TYPE	CARTRIDGE TYPE	CHEMICAL OR HAZARD ASSOCIATED	CARTRIDGE CHANGE OUT FREQUENCY
N/A			

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6.0 Other Personal Protective Equipment

The appropriate personal protective equipment (PPE) will be selected on a daily or task-specific basis; at minimum PPE will consist of standard Level D equipment: steel-toed boots, outdoor work clothing, hard hat, safety glasses, safety vest, gloves, and hearing protection as needed. These PPE selections will be communicated to field personnel during the pre-work briefing **before** the start of site operations.

Potentially exposed personnel will wash gloves, hands, face and other pertinent items to prevent hand-to-mouth contact. This will be done prior to hand-to-mouth activities including eating, smoking, etc. Adequate personnel and equipment decontamination will be used to decrease potential ingestion and inhalation.

GLOVES	CLOTHING
☒ Nitrile ☐ Latex ☐ Liners ☐ Cold Weather	☒ High-vis Vest ☐ Tyvek ☐ Saranex ☐ Snake Chaps
☐ Leather ☐ General Construction Gloves ☒ Cut resistant/Kevlar ☐ Rubber ☐ Other	☐ Fire Retardant Clothing ☒ Long Pants ☒ Rain gear ☒ Long Sleeve Shirt ☐ Other
HEAD	**EYE & FACE**
☒ Hard Hat ☐ Climbing Helmut ☐ Sunhat	☒ Safety Glasses ☒ Face Shield ☐ Goggles ☒ Sun Glasses
HEARING PROTECTION	**FEET**
☒ Ear Plugs ☒ Ear Muffs ☐ Flanges	☒ Safety Toe Work Boot/Shoe ☒ Safety Toe Rubber Boot ☐ Hiking Boot ☒ Hip Wader ☒ Chest Wader

6.1 PERSONAL PROTECTIVE EQUIPMENT INSPECTIONS

PPE ensemble shall be selected daily or before each separate task to provide protection against known or anticipated hazards. To obtain maximum performance from PPE, site personnel shall be trained in the proper use and inspection of PPE. This training shall include, at least, the following:

- Inspect PPE before and during use for imperfect seams, non-uniform coatings, tears, poorly functioning closures or other defects. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone and replace the PPE.
- Inspect PPE during use for visible signs of chemical permeation such as swelling, discoloration, stiffness, brittleness, cracks, tears, or other signs of punctures. If the integrity of the PPE is compromised in any manner, proceed to the contamination reduction zone, and replace the PPE.
- Disposable PPE should not be reused after breaks unless it has been properly decontaminated.

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7.0 Site Control Plan

7.1 TRAFFIC OR VEHICLE ACCESS CONTROL PLANS

A Traffic Control Plan for off-Site activities will be coordinated with the County and a subcontractor. Off-Site activities that require Traffic Control will not be performed prior to a Traffic Control Plan being finalized.

Will vehicles, heavy equipment and/or pedestrians traffic be controlled on this site? Yes ☒ No ☐.

Is GeoEngineers responsible for controlling traffic? Directly ☐ via Subcontractor ☒

Does the proposed work in the Street and/or sidewalks? Yes ☒ No ☐

Outdoor sampling locations should be outside any roadways or walkways and delineated with orange traffic cones for greater visibility.

Police Details required? Yes ☐ No ☐. [To be determined]

RESPONSIBLE GEOENGINEERS STAFF MEMBER	CONTROL APPROACH SUMMARY
To be determined	

NAME OF SUBCONTRACTOR	SAFETY PERFORMANCE / EMR VERIFIED?	NEW CONTRACTOR?
To be determined	Yes ☐ No ☐	Yes ☐ No ☐

Method of Delineation / Excluding Non-Site Personnel	
	Fence
X	Traffic Cones (minimum), and flags, caution tapes and/or warning signs
X	Other Road Work Signs: Survey Tape

7.2 SITE WORK ZONES

Work zones will be considered to be within 50 feet of the drill rig, backhoe or other equipment. Employees should work upwind of the machinery if possible. To the extent practicable, use the buddy system. Do not approach heavy equipment unless you are sure the operator sees you and has indicated it is safe to approach.

Exclusion zones will be established within approximately 10 feet around each working area which includes around each boring or well drilling set up during drilling/sampling. Only persons with the appropriate training will enter this perimeter while work is being conducted there.

Traffic cones and/or caution tapes will be used to cordon off any working areas (borings, monitoring well installation and/or groundwater sampling, surface water sampling, and catch basin solids and water sampling) to restrict public vehicles, heavy equipment and pedestrian access. If working on the streets and sidewalks, refer to the site specific to Traffic Control Plan (TCP), as deemed necessary or required by the municipality.

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In addition, an exclusion zone, contamination reduction zone and support zone should be established when the project involves significant chemical contamination and potential for exposure to contaminants to on-site personnel. Passage through zones or out of the site should be consistent with the level of decontamination required.

Decontamination, at a minimum, should include removing and disposing of PPE when exiting the exclusion zone and washing your hands. Decontamination may also consist of removing outer protective gloves and washing soiled boots and gloves using bucket and brush provided on site in the contamination reduction zone. If needed, inner gloves will then be removed, and hands and face will be washed in either a portable wash station or a bathroom facility at the site. Employees will perform decontamination procedures and wash before eating, drinking or leaving the site.

The contamination reduction zone, at a minimum, should consist of garbage bags into which used PPE should be disposed. Personnel should wash hands before eating or leaving the reduction zone.

Drinking, eating, smoking and using phone are not allowed in the Exclusion and Reduction Zones.

Please note, work activities are anticipated to not include open excavations and trenching or entering/exiting confined spaces.

A site control / site layout map was included in Section 2.0. Yes ☒ or No ☐.

7.2.1 Work Zone Parameters and Decontamination Procedures

Equipment or tools operated or maintained by GeoEngineers on a contaminated site may need to undergo decon procedures as they travel through site work zones. The following table summarizes the steps needed to safely move these items through zones.

ZONE	SIZE/LOCATION OF ZONE	STEPS REQUIRED TO ENTER	STEPS REQUIRED TO EXIT
Exclusion	N/A	1. 2.	1. 2.
Reduction		1. 2.	1. 2.
Support Zone		1. 2.	1. 2.
Other			

As mentioned previously, decontamination, at a minimum, should include removing and disposing of PPE when exiting the exclusion zone and washing your hands. Decontamination may also consist of removing outer protective gloves and washing soiled boots and gloves using bucket and brush provided on site in the contamination reduction zone. If needed, inner gloves will then be removed, and hands and face will be washed in either a portable wash station or a bathroom facility at the site. Employees will perform decontamination procedures and wash before eating, drinking or leaving the site. At minimum scrub brushes, spray rinse applicator, plastic garbage bags, container of Alconox/water solution and Alconox power will be made available to perform decontamination activities.

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7.2.2 Work Zone Parameters for Equipment or Tools

ZONE	STEPS REQUIRED TO ENTER	STEPS REQUIRED TO EXIT
Exclusion	1. N/A 2.	1. 2.
Reduction	1. 2.	1. 2.
Support Zone	1. 2.	1. 2.
Other		

7.3 BUDDY SYSTEM

Personnel on site should use the buddy system (pairs), particularly whenever communication is restricted. If only one GeoEngineers employee is on site, a buddy system can be arranged with subcontractor/ contractor personnel.

7.4 SITE COMMUNICATION PLAN

COMMUNICATION EQUIPMENT	LOCATION USED	PHONE #S/CHANNELS
Cellphones (Work and/or Personal)	On site for drilling and sampling navigation and office communication	Numbers above in beginning of HASP

Positive communications (within sight and hearing distance or via radio) should be maintained between workers on site, with the pair remaining in proximity to assist each other in case of emergencies. The field team should prearrange other emergency signals for communication when voice communication becomes impaired (including cases of dropped cell phone or radio breakdown) and an agreed upon location for an emergency assembly area.

All personnel from GeoEngineers and subcontractor(s) should be made aware of safety features during safety tailgate meeting (drill rig shutoff switch, location of fire extinguishers, cell phone numbers, etc.).

On-site personnel will be visible to the operator at all times and will remain out of the swing and/or direction of the equipment apparatus. (drilling rig, CPT unit and/or excavator) only when they are certain the operator has indicated it is safe to do so. (“Show My Hands Technique” or another agreed sign language).

In instances where communication cannot be maintained, you should consider suspending work until it can be restored. If this is not an option, the following are some examples for communication:

- Hand gripping throat: Out of air, can’t breathe.
- Gripping partner’s wrist or placing both hands around waist: Leave area immediately, no debate.
- Hands on top of head: Need assistance.
- Thumbs up: Okay, I’m all right; or I understand.

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- Thumbs down: No, negative.

7.5 INVESTIGATIVE DERIVED WASTE (IDW) DISPOSAL OR STORAGE

As discussed in Work Plan, Section 7.7, IDW generated during RI field activities will be managed in a manner protective of human health and the environment and consistent with applicable federal, state, and local requirements, including Washington State dangerous waste regulations and Ecology expectations for PFAS-impacted materials. IDW management practices will be implemented to prevent releases, minimize cross-contamination, and ensure proper characterization, storage, and disposal.

PFAS-impacted IDW will be containerized in Department of Transportation (DOT)-approved drums or equivalent containers, as appropriate for the waste type. All containers will be clearly labeled to identify contents, accumulation start date, and project information. IDW containers will be stored on Airport property in designated, secure locations approved by Snohomish County Airports and consistent with airport operational and security requirements.

IDW TYPE	ACTION
Drilling Tailings/Cores	☒ On site, pending analysis and further action
	☒ Secured (list method): DOT-approved 55-gallon drums or equivalent containers and stored on Site in a designated containment area.
	☐ Other (describe destination, responsible parties):
Well Water	☒ On site, pending analysis and further action
	☒ Secured (list method): DOT-approved 55-gallon drums or equivalent containers and stored on Site in a designated containment area.
	☐ Other (describe destination, responsible parties):
Decontamination Fluid	☒ On site, pending analysis and further action
	☒ Secured (list method): DOT-approved 55-gallon drums or equivalent containers and stored on Site in a designated containment area.
	☐ Other (describe destination, responsible parties):
PPE	☐ On site, pending analysis and further action
	☐ Secured (list method):
	☒ Other (describe destination, responsible parties): Used PPE is to be placed in a plastic bag for disposal.

7.6 SPILL CONTAINMENT PLANS

Will spill containment contingencies be needed on this project? Yes ☐ or No ☒

Site topography is relatively flat, with localized depressions in wetland and drainage areas; off-Site topography includes the Big Gluch Creek corridor and wetlands. Wetlands are located at the central, western, and northern portions of the Site with a stormwater detention pond located at the southwestern portion of the Site with groundwater flowing approximately northwest to west near the upper wetlands and approximately southwest to west towards the detention pond near the lower wetlands. The stormwater detention pong connects to Big Gulch Creek, extending off-Site in a west/northwest direction. If

investigation-related fluids are spilled from work areas on Site and off-Site, the area should be identified and noted in the field report/correspondence. If a significant volume of fluid is spilled, absorbent should be used for the spill area and the project manager contacted. Spent absorbent material will need to be stored in suitable drums within the designated containment area, which will be enclosed by fencing.

If containment is required, complete the summary table below

LOCATION TO PROTECTED	METHOD OF PROTECTION	MAX. CAPACITY OR BACK-UP DEVICE

7.7 SAMPLING, MANAGING AND HANDLING DRUMS AND CONTAINERS

Will there be drums or sealed containers on site during this project? Yes ☒ or No ☐

Drums and containers used during the investigation and/or cleanup activities shall meet the appropriate Department of Transportation (DOT), OSHA, U.S. Environmental Protection Agency (EPA) and applicable state regulations for the waste that they contain. Site operations shall be organized to minimize the amount of drum or container on-site temporary storage and movement. When practicable, drums and containers shall be inspected, and their integrity shall be ensured before they are moved. Unlabeled drums and containers shall be considered to contain hazardous substances and handled accordingly until the contents are positively identified and labeled. Before drums or containers are moved, all employees involved in the transfer operation shall be warned of the potential hazards associated with the contents. Personnel involved with the coordination of the drum or container's off-site disposal shall ensure that the off-site disposal facility is approved by the GEO Project Manager and the Client.

Drums or containers and suitable quantities of proper absorbent shall be kept available and used where spills, leaks or rupturing may occur. Where major spills may occur, a spill containment program shall be implemented to contain and isolate the entire volume of the hazardous substance being transferred.

Fire extinguishing equipment shall be on hand and ready for use to control incipient fires.

For more information, please refer to Section 7.7 of Work Plan and associated SAP/QAPP (Appendix B).

7.8 SANITATION

Sanitary facilities are available on site and in quantities required by staffing levels and placed in location safely away from equipment or traffic patterns.

OR

Field staff and subcontractors must go off site to access sanitation facilities or may use the on-site building restroom.

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7.9 LIGHTING

Work is anticipated to be performed during daylight hours. Work may extend slightly into the evening provided adequate lighting is used (e.g., portable flood lights). However, in the event that work must occur early or late in the day, the contractor will be required to provide adequate artificial lighting to safely perform investigation activities.

8.0 Emergency Response

EMERGENCY EVENT	RESPONSE PLAN
Medical	1. Entire field crew safety halts work immediately and move upwind (if necessary); follow instructions of SSO. 2. Call 9-1-1 and follow their instructions/protocol; if feasible, assign field crew member to contact PM otherwise contact later when able. 3. Take field crew member to ER identified in HASP OR accompany in ambulance/ driving to ER separately. 4. Stay with field crew member until they have stabilized, contact PM if not already and file relevant safety report with 24 hours.

8.1 GENERAL RESPONSE GUIDANCE

- If any member of the field crew experiences any adverse exposure symptoms while on site or an injury, the entire field crew should immediately halt work and act according to the instructions provided by the SSO.
- The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated should result in the evacuation of the field team, contact of the PM and reevaluation of the hazard and the level of protection required.
- As soon as feasible, notify GeoEngineers' PM and follow the GeoEngineers' Incident Reporting and Investigation Program, and Health and Safety Injury Management Procedures Flowchart (see page 12 of the Incident Reporting and Investigation Program).
- If an accident occurs, the Site Safety Officer and the injured person are to complete, within 24 hours, an Incident Report (Form 4) for submittal to the PM, the HSPM and HR. The PM should ensure that follow-up action is taken to correct the situation that caused the accident or exposure.

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Hospital Name and Address: **Swedish Edmonds Campus Emergency Room**
21601 76th Ave W, Edmonds, WA 98026

Phone Numbers (Hospital ER): **Phone**: (425)-640-4000

Distance: 9 to 11 Miles **Directions Link:** https://maps.app.goo.gl/ynjeB1mf7ygebwVf7

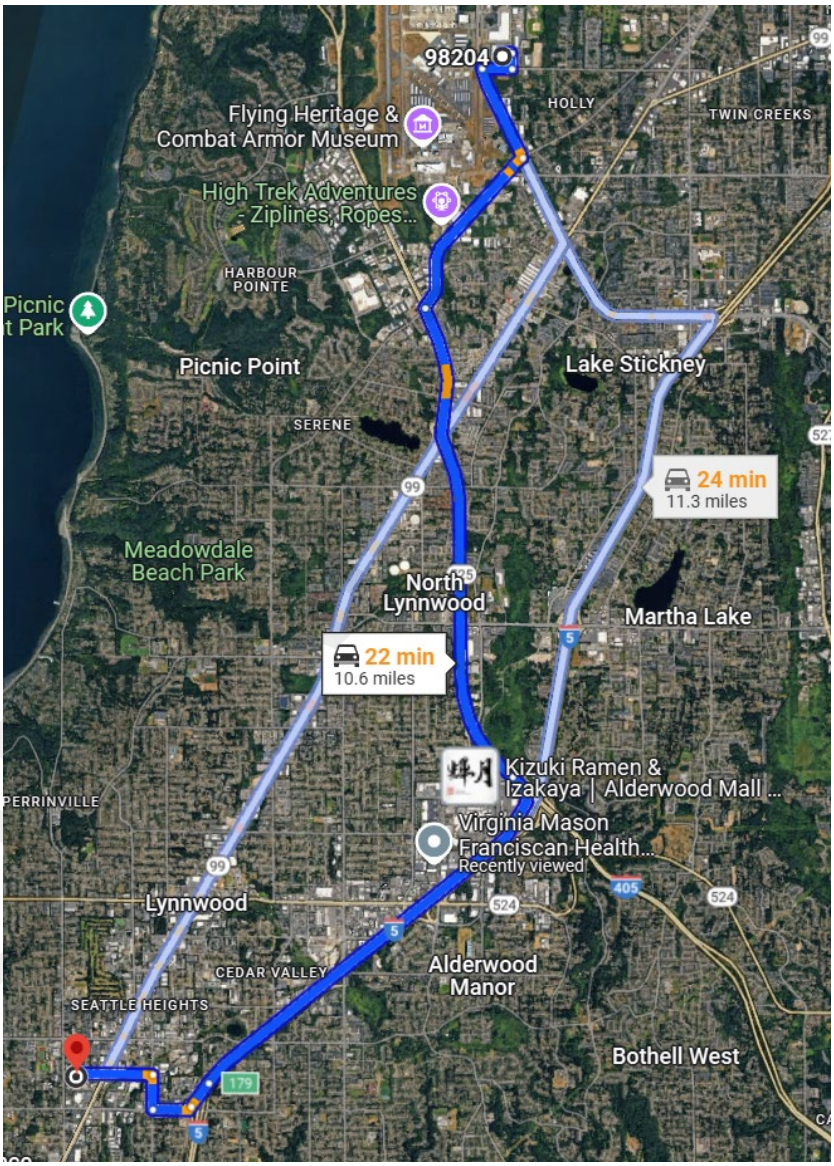
Route to Hospital:

Everett, WA 98204

- Take Airport Rd and Beverly Park Rd to WA-525 S/Mukilteo Speedway
  - 6 min (2.5 mi)
  - Head north toward 24th Pl W
  - 118 ft
  - Turn right onto 27th Ave W
  - 374 ft
  - Turn right onto 24th Pl W
  - 0.1 mi
  - Turn right onto 100th St SW
  - 0.2 mi
  - Turn left onto Airport Rd
  - 0.7 mi
  - Turn right onto Beverly Park Rd
  - 1.3 mi
- Continue on WA-525 S. Take I-5 S to 220th St SW in Mountlake Terrace. Take exit 179 from I-5 S
  - 8 min (7.0 mi)
  - Use the left 2 lanes to turn left after Papa Murphy's | Take 'N' Bake Pizza (on the left)
  - Continue to follow WA-525 S
  - 3.5 mi
  - Use the right lane to merge onto I-5 S
  - 3.3 mi
  - Take exit 179 for 220th St SW
  - 0.2 mi
- Continue on 220th St SW to your destination in Edmonds
  - 4 min (1.1 mi)
  - Turn right onto 220th St SW
  - 0.3 mi
  - Turn right onto 66th Ave W
  - 0.2 mi
  - Turn left onto 216th St SW
  - 0.5 mi
  - Continue straight
  - Destination will be on the left
  - 144 ft

Swedish Edmonds Campus
21601 76th Ave W, Edmonds, WA 98026

Map to Hospital:



Ambulance: 9-1-1

Poison Control: Seattle (206) 253-2121; Other (800) 732-6985

Police: 9-1-1

Fire: 9-1-1

Location of Nearest Telephone:	Cell phones are carried by field personnel. Check connectivity at work site location.
Nearest Fire Extinguisher:	Located in the GeoEngineers vehicle on site.
Nearest First-Aid Kit:	Located in the GeoEngineers vehicle on site.

8.2 STANDARD EMERGENCY PROCEDURES

Get help

- Send another worker to phone 9-1-1 (if necessary)
- As soon as feasible, notify the GeoEngineers' Project Manager and/or GeoEngineers HSM and follow the GeoEngineers' Incident Reporting and Investigation Program, and Health and Safety Injury Management Procedures Flowchart (see page 12 of the Incident Reporting and Investigation Program).

Reduce risk to injured person

- Turn off equipment.
- Move person from injury location to safer area (if in life-threatening situation only)
- Keep person warm or cool as necessary
- Perform CPR (if necessary)

Transport injured person to medical treatment facility (if necessary)

- By ambulance (if necessary) or GeoEngineers vehicle.
- Stay with person at medical facility.
- Keep GeoEngineers Project Manager apprised of situation and notify Human Resources Manager of situation
- Accidents involving injuries requiring professional medical attention must be reported as soon as feasible to the Site Safety Officer and/or Health and Safety Team.
- First aid cases not involving professional medical attention must be reported within 24 hours after occurrence.
- Incidents involving property damage must be reported within 24 hours of occurrence.
- After hours illnesses must be reported within 24 hours (i.e., flu, rashes)

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9.0 Documentation to be Completed for HAZWOPER Projects

- PM Checklist (recommended only)
- Daily Field Log
- FORM 1—Health and Safety Pre-Entry Briefing and Acknowledgment of Site Health and Safety Plan for use by employees, subcontractors and visitors
- FORM 2—Safety Meeting Record
- FORM 3—Elevated Risk Job Hazard Analyses (ERA-JHA) Form (as needed)
- FORM 4—Near Miss Form (as needed) OR Incident Report Form (as needed)
- FORM 5—Direct Reading Instrument Monitoring Log (as needed)

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10.0 Approvals – HASP

Remedial Investigation and Feasibility Study
Paine Field Fire Training Pit PFAS Site
Snohomish County Paine Field Airport
File No. 5530-019-00

NOTE: THIS HASP IS NOT CONSIDERED APPROVED OR ACTIVE UNTIL AT LEAST LINES 1 THROUGH 2 HAVE BEEN SIGNED by the designated personnel. For HASPs with elevated risk tasks including but not limited to confined spaces, working over water, hazardous atmospheres, chemical hazards, extreme weather conditions, fall protection/rope access or respirator usage the Health and Safety Team must review and sign lines 3 and/or 4. The Health and Safety Team may review other JHAs/HASPs as they have time upon request and will sign lines 3 and/or 4.

1. Plan Prepared by

Signature	Date

2. Project Manager Plan Approval

PM Signature	Date

3. Health and Safety Specialist or Consultant

HSS or HSC Signature	Date

4. Health and Safety Manager

HSM Signature	Date

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Appendix C Attachments

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FORM 1
HEALTH AND SAFETY PRE-ENTRY BRIEFING AND ACKNOWLEDGEMENT

FOR GEOENGINEERS' EMPLOYEES, SUBCONTRACTORS AND VISITORS
Remedial Investigation and Feasibility Study
Paine Field Fire Training Pit PFAS Site
Snohomish County Paine Field Airport
File No. 5530-019-00

Inform GeoEngineers employees, contractors and subcontractors or their representatives about:

- The nature, level and degree of exposure to hazardous substances and other hazards they are likely to encounter;
- All site-related emergency response procedures; and
- Any identified potential fire, explosion, health, safety or other hazards.

Conduct safety pre-entry briefing meeting with GeoEngineers on-site employees, contractors and subcontractors, or their representatives as follows:

- A pre-entry briefing before any site activity is started.
- Additional briefings, as needed, to make sure that the Site-specific HASP is followed, especially prior starting new activities and/or when new on-site personnel is planning to work at the site.
- Make sure all employees (GeoEngineers, contractors, subcontractors and equipment/material delivery companies) working on the Site are informed of any risks identified and trained on how to protect themselves and other workers against the Site hazards and risks.
- Update all information to reflect current site activities and hazards.
- All personnel participating in this project must receive "initial" health and safety orientation. Thereafter, brief daily or weekly tailgate safety meetings will be held as deemed necessary by the Site Safety Officer.
- The orientation and the tailgate safety meetings shall include a discussion of emergency response, site communications and site hazards associated with the planned activities and activities performed concurrently by others at the site in the vicinity of the working areas.
- Have all personnel attending the pre-entry briefing meeting sign Form 2 of the HASP.

(All of GeoEngineers' Site workers shall complete this Form 1, which should remain attached to the HASP and be filed with other project documentation). Please be advised that this site-specific HASP is intended for use by GeoEngineers employees only. Nothing herein shall be construed as granting rights to GeoEngineers' subcontractors or any other contractors working on this site to use or legally rely on this HASP. GeoEngineers specifically disclaims any responsibility for the health and safety of any person not employed by the company.

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FORM 1 (CONT)
HEALTH AND SAFETY PRE-ENTRY BRIEFING AND ACKNOWLEDGEMENT

I hereby verify that a copy of the current HASP has been provided by GeoEngineers, Inc., for my review and personal use. I have read the document completely and acknowledge an understanding of the safety procedures and protocol for my responsibilities on site. I agree to comply with all required, specified safety regulations and procedures.

Remedial Investigation and Feasibility Study
Paine Field Fire Training Pit PFAS Site
Snohomish County Paine Field Airport, Everett Washington
File No. 5530-019-00

Print Name	Company	Signature	Date

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FORM 2
SITE SAFETY MEETING RECORD (DAILY OR WEEKLY)

Remedial Investigation and Feasibility Study
Paine Field Fire Training Pit PFAS Site
Snohomish County Paine Field Airport
File No. 5530-019-00

Site Safety meetings should include a discussion of emergency response, site communications and site hazards associated with the planned activities. Site safety meeting should be completed prior to implementing site activities at a minimum at the beginning of each day and/or at a minimum weekly for similar activities performed few consecutive days.

- Use in conjunction with the HASP Hazard Review and ERA Job Hazard Analyses (JHA) Form 3 to help identify hazards with the planned activities and activities performed concurrently by others at the site in the vicinity of the working areas.

Date: _____ **Site Safety Officer (SSO):** _____

Topics: _____

_____

Attendees:

Print Name	**Company**	**Signature**

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FORM 3
ELEVATED RISK ACTIVITY JHA FORM

Remedial Investigation and Feasibility Study
Paine Field Fire Training Pit PFAS Site
Snohomish County Paine Field Airport
File No. 5530-019-00

This ERA JHA Form is to be used when the project's Principal Field Tasks (Section 4.1) include elevated risk activities. Complete a separate ERA JHA for each identified elevated risk activity. Add activities manually if not included in drop down. Activity Phases may include staging / set-up / initiation / operations / shutdown / clean-up or others specific to this project. If all phases of this activity have the same controls, indicate this by including all applicable phase names in single row.

Project Name: RI-FS Study - Paine Field Fire Training Pit PFAS Site, Snohomish County Paine Field Airport **File No:** 5530-019-00	**Date:**	**Site Location:**

Development Team:	**Position/Title:**	**Reviewed by:**	**Position/Title:**
		Jacob Letts	Project Manager
		Connor Jordan	Health and Safety Specialist

Minimum Required Protective Equipment: (see Critical Actions for task-specific requirements)

Mandatory PPE	**Safety Equipment**	**Additional Job Tools**	**Actions**	**Elevated Risk Activities**
☐ Hard Hat	☐ Safety Beacons	☐ Cell Phone/Satellite	☐ Stay Visible	Direct Hazardous Waste/Material Sampling
☐ Eye Protection	☐ Safety Cones	☐ Digital Camera	☐ Equipment Inspection	Heat/Cold Injury Risk
☐ Hearing Protection	☐ First Aid Kit	☐	☐ Work in Pairs	
☐ Gloves	☐ Fire Extinguisher	☐	☐ Safety Control/Traffic Plan	
☐ High Visibility Vest	☐ Eye Wash/ Drinking Water	☐	☐	
☐ Safety Toe Boots	☐	☐	☐	

Job Steps	**Potential Hazards**	**Critical Actions to Mitigate Hazards**
Pre-Job Activities	Unfamiliar Locations, Congestion, Unpaved Roads, Mechanical Failure, Flat Tires Vehicle Fire, Exhaust Leaks, Vehicle Collision, Internal Projectiles	■ Inspect the vehicle before departure: ☐ Check for tire cuts, fluid leaks, flat tires, body damage, windshield cracks, and other damage. ☐ Check lights, wipers, fluid levels, and seat belts. ■ Study the area maps, photos and use GPS. ■ Identify the safest spot to park field vehicles.
Drive to Work Site Location	Type of Vehicle or Unfamiliar With Vehicle.	■ Select appropriate vehicle for work needs, driving conditions expected and location. Familiarize yourself with the vehicle and know where the controls are. ■ Place heavy objects behind a secure safety cage if they must be carried in a passenger compartment.

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		■ Carry and use chock blocks, use parking brake, and do not leave vehicle unattended while it is running. ■ Ensure vehicle has fuel to get you to and from your destinations. ■ Carry extra nonperishable food, water and clothing to be entirely self-sufficient for 24 to 48 hours. ■ Fasten seatbelts. GeoEngineers requires that drivers' and passengers' seatbelts be fastened at all times. ■ Adjust mirrors before driving. ■ Ensure vehicle has a complete and current first aid kit and fire extinguisher.
	Unfamiliar locations, congestion, unpaved roads, mechanical failure, flat tires, vehicle fire, exhaust leaks, vehicle collision, internal projectiles	■ Inspect the vehicle before departure: ☐ Check for tire cuts, fluid leaks, flat tires, body damage, windshield cracks, and other damage. ☐ Check lights, wipers, fluid levels, and seat belts. ☐ Ensure the vehicle has a complete and current First Aid kit and fire extinguisher. ☐ Ensure the vehicle is equipped with warning signs and/or flares and that the warning flashers operate. ■ Review maps and photos, plan route, and use GPS and compass skills prior to beginning the trip. ■ Drive defensively. Completion of Defensive Driver Training within the last 12 months is required. ■ Use only vehicles appropriate for the work needs and the driving conditions expected. ■ Place heavy objects behind a secure safety cage if they must be carried in a passenger compartment. ■ Carry and use chock blocks, use parking brake, and do not leave vehicle unattended while it is running. ■ Ensure vehicle has fuel to get you to and from your destinations. ■ Inspect area behind vehicle prior to backing and use spotter. ■ Inform your Project Manager of your destination and estimated time of return. ■ Carry extra food, water and clothing.
Driving to Work Site Location (Highway Driving)	Unfamiliar road, Mechanical Failure, Flat Tires, Vehicle Fire, Vehicle Collision. Other Hazards	■ Inspect the vehicle before departure: ■ Study the area maps, photos and use GPA and compass skills, ■ Use only vehicles appropriate for the work needs and the driving conditions expected. ■ Ensure the vehicle has a complete and current first air kit and fire extinguisher. ■ Place heavy objects behind a secure safety cage if they must be carried in a passenger compartment. ■ Use parking brake, and do not leave vehicle unattended white it is running. Ensure vehicle has fuel to get to and from your destinations. ■ Inform your Project Manager of your destination and estimated time of return. ■ Carry extra food, water, and clothing. ■ Drive defensively.
Driving to Work Site Location (Driving on Forest Roads/Off-Highway)	Large vehicles; narrow, rough roads; animal/object collision; running/skidding off road; icy/muddy conditions; flying debris (rocks, etc.); poor visibility; backing; run-away vehicle; roadway obstacles	■ Drive on maintained trails when possible. ■ Drive with care in tall brush and grass. Watch for wildlife, fallen trees, rocks, and other obstacles. ■ Stay on the main roadway. Pull over on firm ground and avoid soft shoulders if a stop is necessary.

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		■ Slow down, especially on corners. Maintain a safe speed at all times. ■ Follow from a safe distance. ■ Know when and how to use 4-wheel/all-wheel drive. ■ Use only vehicles appropriate to the known road conditions. ■ Pull over to allow larger vehicles (i.e.: trucks/trailers) to pass from either direction. ■ Do not travel the road at all if there is high potential for vehicle damage. ■ Try to park so that backing up will not be necessary. Use a spotter or get out to check behind vehicle. ■ When removing debris from the roadway, use care, lift properly, and use proper equipment and PPE. ■ When descending a long grade, use lower gears instead of brakes to control speed. ■ When idling or heating for a period, keep vehicle well-ventilated by opening a window at least 6 inches. ■ Keep all windows clear of snow, ice, mud, and anything else obstructing your view. ■ Keep vehicle windows clean, inside and out, and washer fluid full. Replace damaged or worn wipers.
On-Site Reconnaissance	Being hit by a moving vehicle	■ Use safety beacons, warning triangles and/or safety cones to warn other traffic that you are working in the area. ■ Identify a spotter to watch oncoming traffic and to identify changing conditions. ■ Stay clear of traffic. Do not assume that shoulder areas are automatically safe. Distracted, aggressive or impaired drivers may encroach. ■ Look both ways before moving into traffic. (Do not run across or dodge traffic in live lanes.) ■ Preform a Job Hazard Analysis mid-point of field recon to identify new risks. ■ Perform work on one side of the road and then move vehicles to other side to perform work on that side.
Familiarize crew with the task and location of Site	Crew does not notify site owner / manager. Unaware of the job site hazards and steps to prevent injury. Appropriate personnel protective equipment not worn.	■ Conduct a tailgate safety meeting discussing the jobs, the hazards and actions that will be taken to prevent injury. ■ Discuss “Stop Work Authority” as it applies to each Site member. ■ Discuss appropriate PPE including high visibility clothing such as reflective vest. ■ Notify attendant and/or Site owner/manager of work activities and location. ■ Set up exclusion zone surrounding work area.
Rig Movement	Pre-Job Activities	■ Conduct a tailgate safety meeting discussing the jobs, the hazards and the actions that will be taken to prevent injury. ■ Discuss “Stop Work Authority” as it applies to each site member. ■ Discuss appropriate PPE including high visibility clothing such as reflective vest. ■ Notify attendant and/or site owner/manager of work activities and location. ■ Set up exclusion zone surrounding work area.
	Rig Placement	■ Heavy equipment should be equipped with back-up alarm or horn to be used when backing. ■ Stay clear of operating equipment and rig when moving.

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		■ Use correct lifting techniques, and mechanical or physical assistance when needed. Be aware of all pinch points. ■ Do not trap yourself between equipment and stationary objects. Keep hand, feet and clothing clear of all rotating parts or equipment.
Drill Rig Set-Up	Rig Roll Over	■ Do not move rig with mast raised. ■ Set riggers prior to raising mast. ■ Cross all hills and obstructions head on. ■ Evaluate for soil stability to ensure safe conditions prior to the start of work.
	Contact with overhead line and other obstacles	■ Position rig to avoid overhead utility lines by distance defined by voltage and local regulations. ■ Use a "Safety Watch" to maintain Minimum Approach Distance (MAD) to electrical lines when raising mast to confirm clearance of overhead lines and other obstructions. ■ Clear all underground utilities.
	Preparing the drilling equipment at the job site	■ Remove or put cones around trip hazards. ■ Be aware of your surroundings and ensure proper footing. Keep "eyes on task" and keep hands out of pinch points and clear of rotating parts. Use good body positioning. ■ Maintain visual and verbal communication with drill rig helper. ■ Work slowly and take your time.
Travel on Foot	Falls, foot injuries, and stress and impact injuries.	■ Identify and use safe travel routes. Do not exceed physical abilities or equipment design. Travel on maintained trails when possible. ■ Use pack equipment properly. Carry weight on hips, not back. ■ Warm up and stretch appropriate muscle groups before and after hitting the trail. ■ Test and use secure footing. Move cautiously and deliberately. Never run. ■ Take extra precautions when encountering steep, loose, wet trail conditions. ■ In heavy undergrowth, particularly off-trail, slow down and watch carefully. ■ Carry tools on the downhill side. ■ Wear boots with good, non-skid soles that are tall enough to support ankles. ■ Know basic First Aid. Completion of a basic First Aid course is required. ■ Use footwear appropriate to the terrain and load being carried. ■ Know how to fall. Roll, protect the head and neck, and do not extend arms to break the fall. ■ Use a flashlight or headlamp after dark. ■ Travel after dark only in an emergency.
Drill/Boring Activities	Slips, Trips, Falls	■ Keep work area free of excess material and debris. ■ Remove all trip hazards by keeping materials/objects organized and out of walkways. ■ Keep work surfaces dry when possible. ■ Wear appropriate PPE including non-slip rubber boots if working on wet or slick surfaces. ■ Stay aware of footing and do not run.
	Sharp and/or Elevated Equipment	■ Wear appropriate PPE including steel-toed safety boots, leather gloves and hard hat.

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		■ Establish communication system between workers involved in moving/attaching sections.
	Heavy Equipment: Lifting/Carrying	■ Use proper lifting technique--at least 2 people to lift and carry sections; use mechanical lift devices whenever possible; bend and lift with legs and arms, not back. ■ Carry samples close to your body and at waist height. Make several trips if necessary. Be aware of your surroundings when walking. ■ Wear nitrile gloves.
	Rotating equipment, abrasions	■ Always use a shovel. Do not use feet or hands to clear cuttings away from drill string.
Environmental Sampling	Back or muscle strain, contact with contaminated water/soil/solids/material, contact with sample preservatives, breathing fumes, cuts from broken glass sample jars	■ Use proper lifting techniques when lifting pumps and sampling equipment. ■ Wear appropriate PPE (safety boots, protective gloves, long pants, long-sleeved shirt, safety glasses, hard hat, and waders) for the job to avoid direct skin contact with contaminated water and sample preservatives. ■ Always work in a well-ventilated area to avoid breathing fumes from the sample preservatives. ■ If sample jars are broken, take extra precaution to dispose of preservative and broken glass by approved methods.
Use of Hand Augers	Lifting, pinch points, and muscle strain.	■ Wear appropriate PPE for the job – safety boots, leather work gloves, long pants and long-sleeved shirt, safety glasses and hard hat. ■ Use correct lifting techniques. Be aware of pinch points. ■ Remove excavated soil only after stopping the hand auger. ■ Check for underground utilities before starting hand augering operations. ■ Employ hand movements that exert minimum pressure on wrist.
Heavy Equipment Movement (e.g., hand auger equipment, coolers with environmental samples)	Injuring back and hands when lifting individually.	■ Use proper lifting techniques: ☐ Size up the load. ☐ Warm up to minimize chance of pulled/strained muscles. ☐ Consider wearing a Velcro abdominal/back support. ☐ Clear your route of travel. ☐ Stand close to load with feet apart. ☐ Bend knees, keeping back as straight as possible. ☐ Firmly grip under the load. ☐ Lift with the legs, arms and shoulders, in a gradual and smooth motion. Do not rely on back and stomach muscles. ☐ When lifting to or from an elevated surface such as a table or shelf, slide the object to the edge of the surface and lift properly. ☐ Keep load close to the body. ☐ Avoid twisting motions. ☐ Do not let the load block your vision. ☐ Face the spot where the load is to be placed. ☐ While keeping back as straight as possible, lower the load by bending the knees. ☐ Avoid placing heavy and unwieldy objects overhead. ☐ Watch hands and feet when lifting and lowering objects. ■ Do not try to lift too much weight. Ask for assistance with heavy/cumbersome object. Use a mechanical device such as hand trucks or wheelbarrows for heavy objects.

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	Injuring back and hands when lifting with a partner.	■ In addition to using proper lifting techniques, it is important to COMMUNICATE with others to coordinate lifting, moving, and lowering objects with prearranged signals (Example: "on the count of 3").
	Maintaining footing—slipping or tripping.	■ Wear lug sole boots. ■ Watch your step. ■ Slow down. Do not be in a hurry. ■ Step over obstacles, not on them. Ensure footing is firm and stable. ■ Exercise extra care on steep slopes with cut brush. ■ Clear a place for footing first.
Physical Hazards	Fire/Explosion	■ Post "No Smoking" signs around work area and establish designated smoking area off-site. ■ Ensure type ABC, 20-lb, fully-charged fire extinguisher within 25 feet of operation. ■ As site conditions/activities warrant, use direct-reading, real-time instruments to monitor for LEL/O2 meter.
	Hearing Protection	■ Wear hearing protection during drilling operations.
	Traffic (including pedestrian)	■ Notify attendant and/or site owner/manager of work activities and location. ■ Watch out for moving vehicles and equipment. Inspect area behind vehicle prior to backing. Use a spotter. ■ Use flaggers and traffic control measures (cones, signs, flags) as outlined in the Traffic Control Plan to reduce hazards. ■ Set up exclusion zone surrounding work area. ■ Be alert to potential hazards that may be created by others. ■ Work within the line of sight of the equipment operator and maintain visual contact when approaching. Wear appropriate PPE including a high visibility vest.
	Heat/Cold Stress	■ Take breaks as needed. ■ Consume adequate food and beverages. ■ If possible, adjust work schedule to avoid heat/cold stresses.
Biological Hazards	Insects, Snakes, Wildlife, Vegetation	■ Inspect work areas when arrive at site to identify hazard(s). ■ Use insect PFAS-free repellant, as necessary. ■ If employee has bee sting allergy, carry epi-pen. ■ Use caution when opening enclosures. ■ Identify potential for poison ivy/oak/sumac. ■ Stay alert and safe distance away from biological hazards. ■ Wear appropriate PPE including leather gloves, long sleeves and pants, and snake chaps if probability of encountering.
Hypodermic Needles	Exposure to hypodermic needles	■ Wear heavy lug soled boots when working in the field (i.e., not soft soled office shoes). Around drill rigs, steel toed boots with high traction lug soles are typically required. ■ Do not pick up used needles. ■ Notify the property owner (SPR) of their presence, location and amount. They should initiate disposal or flag area off from pedestrian traffic.
Environmental Hazards	Hydraulic Leaks and Spills	■ Ensure equipment is properly maintained and does not leak. ■ Clean up environmental spills using spill pads to absorb the contaminated soil. ■ Properly dispose of material following I.A.W. local and environmental requirements.

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Communications	No communication in case of emergency	■ Verify cell phone is working. ■ Maintain communication with Project Manager throughout job task. ■ Learn the location of geographic dead spots and find alternative transmission locations. ■ Verify location and contact numbers for emergency medical assistance or 911.
	Emergency	■ **Dial 911** ■ Hospital Route (Attached)

Required Control Measures: (check the box when complete)

- ☐ Perform a pre-work vehicle inspection (First Aid kit, fire extinguisher).
- ☐ Drive defensively looking out for "the other guy."
- ☐ Conduct a pre-work safety meeting.
- ☐ Use a Safety Watch to monitor equipment Minimum Approach Distance (MAD) and to keep personnel clear if needed.
- ☐ Wear Personal Protective Equipment (PPE).
- ☐ Ensure training is current (First Aid, defensive driving, etc.).
- ☐ Conduct Task Safety Assessments throughout the job.
- ☐
- ☐
- ☐

Additional Comments:

No piece of equipment can operate closer than 15 feet on circuits operating at voltages up to 345kV or 20 feet on circuits operating at 500kV. If this distance cannot be maintained, the Safety Watch will be used to maintain Minimum Approach Distance (MAD). Clearances may vary depending on terrain conductor sag due to line loading conditions and/or weather. Contractor must utilize proper loading/offloading procedures in proximity of power lines and energized equipment to avoid violations of the MAD.

Job tasks and procedures shall be performed in accordance with State/Federal OSHA safety regulations, and GeoEngineers Health and Safety Program

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DAILY JHA RECORD OF SAFETY MEETINGS

Signature	Date	Signature	Date

HOSPITAL ROUTE

Hospital Name and Address:
Swedish Edmonds Campus Emergency Room
21601 76th Ave W, Edmonds, WA 98026

Phone: (425)-640-4000

Directions Link:
https://maps.app.goo.gl/ynjeB1mf7ygebwVf7

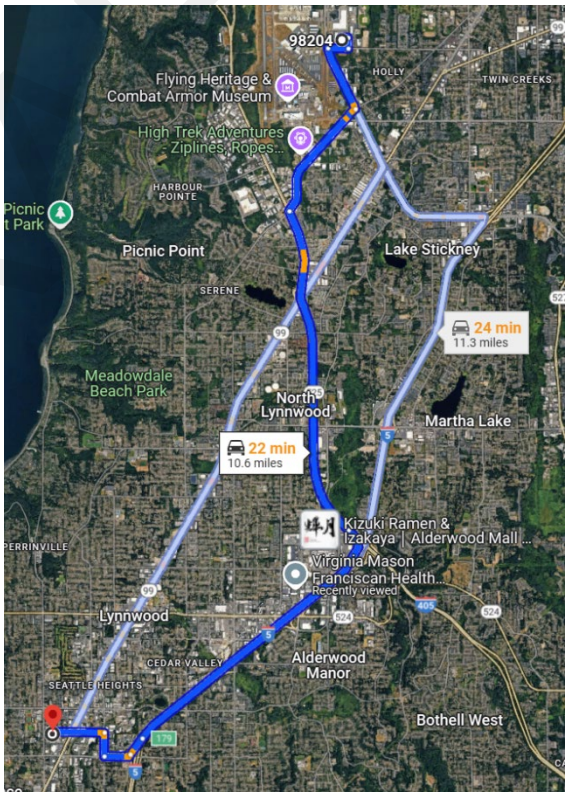
Route to Hospital:

Everett, WA 98204

- Take Airport Rd and Beverly Park Rd to WA-525 S/Mukilteo Speedway — 6 min (2.5 mi)
  - Head north toward 24th Pl W — 118 ft
  - Turn right onto 27th Ave W — 374 ft
  - Turn right onto 24th Pl W — 0.1 mi
  - Turn right onto 100th St SW — 0.2 mi
  - Turn left onto Airport Rd — 0.7 mi
  - Turn right onto Beverly Park Rd — 1.3 mi
- Continue on WA-525 S. Take I-5 S to 220th St SW in Mountlake Terrace. Take exit 179 from I-5 S — 8 min (7.0 mi)
  - Use the left 2 lanes to turn left after Papa Murphy's | Take 'N' Bake Pizza (on the left) — Continue to follow WA-525 S — 3.5 mi
  - Use the right lane to merge onto I-5 S — 3.3 mi
  - Take exit 179 for 220th St SW — 0.2 mi
- Continue on 220th St SW to your destination in Edmonds — 4 min (1.1 mi)
  - Turn right onto 220th St SW — 0.3 mi
  - Turn right onto 66th Ave W — 0.2 mi
  - Turn left onto 216th St SW — 0.5 mi
  - Continue straight — Destination will be on the left — 144 ft

Swedish Edmonds Campus
21601 76th Ave W, Edmonds, WA 98026

Map to Hospital:



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FORM 4
NEAR MISS OR INCIDENT REPORT FORM

Remedial Investigation and Feasibility Study
Paine Field Fire Training Pit PFAS Site
Snohomish County Paine Field Airport
File No. 5530-019-00

Electronic Version Available at: https://safety.geoengineers.com/nearmisses/new or https://safety.geoengineers.com/incidents/new

NEAR MISS

Near Miss Date

Reported By

Location

Location Type

Incident Details

How did the incident happen?

What led to the Near Miss occurring? (Contributing factors, constraints, the setting, behaviors, etc.)

What is the most important thing you learned from this Near Miss that others could learn from?

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INCIDENT REPORT

Basic Information

Incident Date

Reported By

Location

Location Type

Business Unit

Office Information

Project Manager

Group Leader

Office Manager

Other Emails

Incident Type (more than one OK)

_____ Injury

_____ Vehicle

_____ Utility Strike

_____ Damaged Property

_____ Stolen Equipment

Incident Details

What happened? Describe how the incident occurred. Where the employee was located at the time of the incident.

Project Number (if project related)

Date & Time employee started working

Date & Time supervisor notified

Supervisor Name

Notified Project Manager/PA ___ Yes ___ No

Client Notified ___ Yes ___ No

Supervisor Comments (Optional. These are usually filled out later.)

Supervisor Comments Date

Project Manager Comments (Optional. These are usually filled out later.)

Project Manager Comments Date

Health and Safety Comments (Optional. These are usually filled out later.)

Health & Safety Rep Name

Health & Safety Comments Date

Corrective Action (Optional. These are usually filled out later.)

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FORM 5
DIRECT READING INSTRUMENT MONITORING LOG

Location _____ Page _____ of _____

Recorded By: _____ Calibration Date: _____

Instrument Type: Model: _____ Calibration Standard/Expiration Date: _____

Serial No.: _____ Chemical(s) of Interest: _____

DATE	LOCATION	WORK TASK	SAMPLE TIME HOUR: IN	RESULT	UNITS	MAX (PPM)	AVERAGE		COMMENTS
							TWA	OTHER	

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Appendix D

Inadvertent Discovery Plan (IDP)

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INADVERTENT DISCOVERY PLAN

PLAN AND PROCEDURES FOR THE DISCOVERY OF CULTURAL RESOURCES AND HUMAN SKELETAL REMAINS

To request ADA accommodation, including materials in a format for the visually impaired, call Ecology at 360-407-6000 or visit https://ecology.wa.gov/accessibility. People with impaired hearing may call Washington Relay Service at 711. People with a speech disability may call TTY at 877-833-6341.

Site Name(s): Paine Field Fire Training Pit PFAS Location: Everett, Washington

Project Lead/Organization: Snohomish County County: Snohomish

If this Inadvertent Discovery Plan (IDP) is for multiple (batched) projects, ensure the location information covers all project areas.

1. INTRODUCTION

The IDP outlines procedures to perform in the event of a discovery of archaeological materials or human remains, in accordance with applicable state and federal laws. An IDP is required, as part of Agency Terms and Conditions for all grants and loans, for any project that creates disturbance above or below the ground. An IDP is not a substitute for a formal cultural resource review (Executive 21-02 or Section 106).

Once completed, **the IDP should always be kept at the project site** during all project activities. All staff, contractors, and volunteers should be familiar with its contents and know where to find it.

2. CULTURAL RESOURCE DISCOVERIES

A cultural resource discovery could be prehistoric or historic. Examples include (see images for further examples):

- An accumulation of shell, burned rocks, or other food related materials.
- Bones, intact or in small pieces.
- An area of charcoal or very dark stained soil with artifacts.
- Stone tools or waste flakes (for example, an arrowhead or stone chips).
- Modified or stripped trees, often cedar or aspen, or other modified natural features, such as rock drawings.
- Agricultural or logging materials that appear older than 50 years. These could include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, and many other items.
- Clusters of tin cans or bottles, or other debris that appear older than 50 years.
- Old munitions casings. ***Always assume these are live and never touch or move.***
- Buried railroad tracks, decking, foundations, or other industrial materials.
- Remnants of homesteading. These could include bricks, nails, household items, toys, food containers, and other items associated with homes or farming sites.

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The above list does not cover every possible cultural resource. When in doubt, assume the material is a cultural resource.

3. ON-SITE RESPONSIBILITIES

If any employee, contractor, or subcontractor believes that they have uncovered cultural resources or human remains at any point in the project, take the following steps to ***Stop-Protect-Notify***. **If you suspect that the discovery includes human remains, also follow Sections 5 and 6.**

STEP A: Stop Work.

All work must stop immediately in the vicinity of the discovery.

STEP B: Protect the Discovery.

Leave the discovery and the surrounding area untouched and create a clear, identifiable, and wide boundary (30 feet or larger) with temporary fencing, flagging, stakes, or other clear markings. Provide protection and ensure integrity of the discovery until cleared by the Department of Archaeological and Historical Preservation (DAHP) or a licensed, professional archaeologist.

Do not permit vehicles, equipment, or unauthorized personnel to traverse the discovery site. Do not allow work to resume within the boundary until the requirements of this IDP are met.

STEP C: Notify Project Archaeologist (if applicable).

If the project has an archaeologist, notify that person. If there is a monitoring plan in place, the archaeologist will follow the outlined procedure.

STEP D: Notify Project and Washington Department of Ecology (Ecology) contacts.

Project Lead Contacts

Primary Contact		Alternate Contact	
Name:	Jacob Letts	Name:	Meredith Bush
Organization:	GeoEngineers	Organization:	GeoEngineers
Phone:	206.228.4375	Phone:	206.239.3243
Email:	jletts@geoengineers.com	Email:	mbush@geoengineers.com

Ecology Contacts (completed by Ecology Project Manager)

Ecology Project Manager		Alternate or Cultural Resource Contact	
Name:	David Unruh	Name:	
Program:	Toxics Cleanup Program	Program:	
Phone:	206.459.6287	Phone:	
Email:	david.unruh@ecy.wa.gov	Email:	

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STEP E: Ecology will notify DAHP.

Once notified, the Ecology Cultural Resource Contact or the Ecology Project Manager will contact DAHP to report and confirm the discovery. To avoid delay, the Project Lead/Organization will contact DAHP if they are not able to reach Ecology.

DAHP will provide the steps to assist with identification. DAHP, Ecology, and Tribal representatives may coordinate a site visit following any necessary safety protocols. DAHP may also inform the Project Lead/Organization and Ecology of additional steps to further protect the site.

Do not continue work until DAHP has issued an approval for work to proceed in the area of, or near, the discovery.

DAHP Contacts:

Name: Rob Whitlam, PhD
Title: State Archaeologist
Cell: 360-890-2615
Email: Rob.Whitlam@dahp.wa.gov
Main Office: 360-586-3065

Human Remains/Bones:

Name: Guy Tasa, PhD
Title: State Anthropologist
Cell: 360-790-1633 (24/7)
Email: Guy.Tasa@dahp.wa.gov

4. TRIBAL CONTACTS

In the event cultural resources are discovered, the following tribes will be contacted. See Section 10 for Additional Resources.

Tribe:	Muckleshoot Indian Tribe	Tribe:	Tulalip Tribes
Name:	Laura Murphy	Name:	Richard Young
Title:	Archaeologist Cultural Resources	Title:	Cultural Center & Natural History Preserve
Phone:	253 876-3272	Phone:	(425) 239-0182
Email:	laura.murphy@muckleshoot.nsn.us	Email:	ryoung@tulaliptribes-nsn.gov
Tribe:		Tribe:	
Name:		Name:	
Title:		Title:	
Phone:		Phone:	
Email:		Email:	

Please provide contact information for additional tribes within your project area, if needed, in Section 11.

5. FURTHER CONTACTS (if applicable)

If the discovery is confirmed by DAHP as a cultural or archaeological resource, or as human remains, and there is a partnering federal or state agency, Ecology or the Project Lead/Organization will ensure the partnering agency is immediately notified.

Federal Agency:		State Agency:	
Agency:		Agency:	
Name:		Name:	
Title:		Title:	
Phone:		Phone:	
Email:		Email:	

6. SPECIAL PROCEDURES FOR THE DISCOVERY OF HUMAN SKELETAL MATERIAL

Any human skeletal remains, regardless of antiquity or ethnic origin, will at all times be treated with dignity and respect. Follow the steps under ***Stop-Protect-Notify.*** For specific instructions on how to handle a human remains discovery, see: *RCW 68.50.645: Skeletal human remains—Duty to notify—Ground disturbing activities—Coroner determination—Definitions*.

Suggestion: If you are unsure whether the discovery is human bone or not, contact Guy Tasa with DAHP, for identification and next steps. Do not pick up the discovery.

Guy Tasa, PhD State Physical Anthropologist
Guy.Tasa@dahp.wa.gov
(360) 790-1633 (Cell/Office)

For discoveries that are confirmed or suspected human remains, follow these steps:

1. Notify law enforcement and the Medical Examiner/Coroner using the contacts below. **Do not call 911** unless it is the only number available to you.

   Enter contact information below (required):
   - Local Medical Examiner or Coroner name and phone: SnoCo Medical Examiner & Coroner 425 438-6200
   - Local Law Enforcement main name and phone: SnoCo Sheriff's Office (425) 388-3393
   - Local Non-Emergency phone number (911 if without a non-emergency number): (425) 388-3393
2. The Medical Examiner/Coroner (with assistance of law enforcement personnel) will determine if the remains are human or if the discovery site constitutes a crime scene and will notify DAHP.
3. **DO NOT speak with the media, allow photography or disturbance of the remains, or release any information about the discovery on social media.**
4. If the remains are determined to be non-forensic, Cover the remains with a tarp or other materials (not soil or rocks) for temporary protection and to shield them from being photographed by others or disturbed.

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Further activities:

- Per RCW 27.44.055, RCW 68.50, and RCW 68.60, DAHP will have jurisdiction over non-forensic human remains. Ecology staff will participate in consultation. Organizations may also participate in consultation.
- Documentation of human skeletal remains and funerary objects will be agreed upon through the consultation process described in RCW 27.44.055, RCW 68.50, and RCW 68.60.
- When consultation and documentation activities are complete, work in the discovery area may resume as described in Section 8.

If the project occurs on federal lands (such as a national forest or park or a military reservation) the provisions of the Native American Graves Protection and Repatriation Act of 1990 (NAGPRA) apply and the responsible federal agency will follow its provisions. Note that state highways that cross federal lands are on an easement and are not owned by the state.

If the project occurs on non-federal lands, the Project Lead/Organization will comply with applicable state and federal laws, and the above protocol.

7. DOCUMENTATION OF ARCHAEOLOGICAL MATERIALS

Archaeological resources discovered during construction are protected by state law RCW 27.53 and assumed eligible for inclusion in the National Register of Historic Places under Criterion D until a formal Determination of Eligibility is made.

The Project Lead/Organization must ensure that proper documentation and field assessment are made of all discovered cultural resources in cooperation with all parties: the federal agencies (if any), DAHP, Ecology, affected tribes, and the archaeologist.

The archaeologist will record all prehistoric and historic cultural material discovered during project construction on a standard DAHP archaeological site or isolate inventory form. They will photograph site overviews, features, and artifacts and prepare stratigraphic profiles and soil/sediment descriptions for minimal subsurface exposures. They will document discovery locations on scaled site plans and site location maps.

Cultural features, horizons, and artifacts detected in buried sediments may require the archaeologist to conduct further evaluation using hand-dug test units. They will excavate units in a controlled fashion to expose features, collect samples from undisturbed contexts, or to interpret complex stratigraphy. They may also use a test unit or trench excavation to determine if an intact occupation surface is present. They will only use test units when necessary to gather information on the nature, extent, and integrity of subsurface cultural deposits to evaluate the site's significance. They will conduct excavations using standard archaeological techniques to precisely document the location of cultural deposits, artifacts, and features.

The archaeologist will record spatial information, depth of excavation levels, natural and cultural stratigraphy, presence or absence of cultural material, and depth to sterile soil, regolith, or bedrock for each unit on a standard form. They will complete test excavation unit level forms, which will include plan maps for each excavation level and artifact counts and material types, number, and vertical provenience (depth below

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surface and stratum association where applicable) for all recovered artifacts. They will draw a stratigraphic profile for at least one wall of each test excavation unit.

The archaeologist will screen sediments excavated for purposes of cultural resources investigation through 1/8-inch mesh, unless soil conditions warrant 1/4-inch mesh.

The archaeologist will analyze, catalogue, and temporarily curate all prehistoric and historic artifacts collected from the surface and from probes and excavation units. The ultimate disposition of cultural materials will be determined in consultation with the federal agencies (if any), DAHP, Ecology, and the affected tribe(s).

Within 90 days of concluding fieldwork, the archaeologist will provide a technical report describing any and all monitoring and resultant archaeological excavations to the Project Lead/Organization, who will forward the report to Ecology, the federal agencies (if any), DAHP, and the affected tribe(s) for review and comment.

If assessment activities expose human remains (burials, isolated teeth, or bones), the archaeologist and Project Lead/Organization will follow the process described in **Section 6**.

8. PROCEEDING WITH WORK

The Project Lead/Organization shall work with the archaeologist, DAHP, and affected tribe(s) to determine the appropriate discovery boundary and where work can continue.

Work may continue at the discovery location only after the process outlined in this plan is followed and the Project Lead/Organization, DAHP, any affected tribe(s), Ecology, and the federal agencies (if any) determine that compliance with state and federal laws is complete.

9. ORGANIZATION RESPONSIBILITY

The Project Lead/Organization is responsible for ensuring:

- This IDP has complete and accurate information.
- This IDP is immediately available to all field staff at the sites and available by request to any party.
- This IDP is implemented to address any discovery at the site.
- That all field staff, contractors, and volunteers are instructed on how to implement this IDP.

10. ADDITIONAL RESOURCES

Informative Video

Ecology recommends that all project staff, contractors, and volunteers view this informative video explaining the value of IDP protocol and what to do in the event of a discovery. The target audience is anyone working on the project who could unexpectedly find cultural resources or human remains while excavating or digging. The video is also posted on DAHP's inadvertent discovery language website.

Ecology's IDP Video (https://www.youtube.com/watch?v=ioX-4cXfbDY)

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Informational Resources

DAHP (https://dahp.wa.gov)

Washington State Archeology (DAHP 2003)
(https://dahp.wa.gov/sites/default/files/Field%20Guide%20to%20WA%20Arch_0.pdf)

Association of Washington Archaeologists (https://www.archaeologyinwashington.com)

Potentially Interested Tribes

Interactive Map of Tribes by Area
(https://dahp.wa.gov/archaeology/tribal-consultation-information)

WSDOT Tribal Contact Website
(https://wsdot.wa.gov/tribal/TribalContacts.htm)

11. ADDITIONAL INFORMATION

Please add any additional contact information or other information needed within this IDP.

Implement the IDP if you see…

Chipped stone artifacts.

Examples are:

- Glass-like material.
- Angular material.
- “Unusual” material or shape for the area.
- Regularity of flaking.
- Variability of size.



Stone artifacts from Oregon.



Stone artifacts from Washington.



Biface-knife, scraper, or pre-form found in NE Washington. Thought to be a well knapped object of great antiquity. Courtesy of Methow Salmon Rec. Foundation.

Implement the IDP if you see…

Ground stone artifacts.

Examples are:

- Unusual or unnatural shapes or unusual stone.
- Striations or scratching.
- Etching, perforations, or pecking.
- Regularity in modifications.
- Variability of size, function, or complexity.



Above: Fishing Weight - credit CRITFC Treaty Fishing Rights website.



Artifacts from unknown locations (left and right images).



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Implement the IDP if you see…

Bone or shell artifacts, tools, or beads.

Examples are:

- Smooth or carved materials.
- Unusual shape.
- Pointed as if used as a tool.
- Wedge shaped like a “shoehorn”.
- Variability of size.
- Beads from shell (dentalium) or tusk.









Upper Left:*Bone Awls from Oregon.*

Upper Center: *Bone Wedge from California.*

Upper Right: *Plateau dentalium choker and bracelet, from Nez Perce National Historical Park, 19th century, made using Antalis pretiosa shells Credit: Nez Perce - Nez Perce National Historical Park, NEPE 8762, Public Domain.*

Above: *Tooth Pendants. Right: Bone Pendants. Both from Oregon and Washington.*



Implement the IDP if you see…

Culturally modified trees, fiber, or wood artifacts.

Examples are:

- Trees with bark stripped or peeled, carvings, axe cuts, de-limbing, wood removal, and other human modifications.
- Fiber or wood artifacts in a wet environment.
- Variability of size, function, and complexity.





Left and Below: *Culturally modified tree and an old carving on an aspen (Courtesy of DAHP).*

Right, Top to Bottom: *Artifacts from Mud Bay, Olympia: Toy war club, two strand cedar rope, wet basketry*.







Implement the IDP if you see…

Strange, different, or interesting looking dirt, rocks, or shells.

Human activities leave traces in the ground that may or may not have artifacts associated with them. Examples are:

- "Unusual" accumulations of rock (especially fire-cracked rock).
- "Unusual" shaped accumulations of rock (such as a shape similar to a fire ring).
- Charcoal or charcoal-stained soils, burnt-looking soils, or soil that has a "layer cake" appearance.
- Accumulations of shell, bones, or artifacts. Shells may be crushed.
- Look for the "unusual" or out of place (for example, rock piles in areas with otherwise few rocks).



Shell Midden pocket in modern fill discovered in sewer trench.



Underground oven. Courtesy of DAHP.

Shell midden with fire cracked rock.





Hearth excavated near Hamilton, WA.

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Implement the IDP if you see…

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Agricultural or logging equipment. May include equipment, fencing, canals, spillways, chutes, derelict sawmills, tools, etc.
- Domestic items including square or wire nails, amethyst colored glass, or painted stoneware.





Left: Top to Bottom: *Willow pattern serving bowl and slip joint pocket knife discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*

Right: *Collections of historic artifacts discovered during excavations in eastern Washington cities.*





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Implement the IDP if you see…

Historic period artifacts (historic archaeology considered older than 50 years).

Examples are:

- Railway tokens, coins, and buttons.
- Spectacles, toys, clothing, and personal items.
- Items helping to understand a culture or identity.
- Food containers and dishware.



Main Image: *Dishes, bottles, workboot found at the North Shore Japanese bath house (ofuro) site, Courtesy Bob Muckle, Archaeologist, Capilano University, B.C. This is an example of an above ground resource.*





Right, from Top to Bottom: *Coins, token, spectacles and Montgomery Ward pitchfork toy discovered during Seattle Smith Cove shantytown (45-KI-1200) excavation.*





Implement the IDP if you see…

- Old munition casings – if you see ammunition of any type – ***always assume they are live and never touch or move!***
- Tin cans or glass bottles with an older manufacturer's technique – maker's mark, distinct colors such as turquoise, or an older method of opening the container.



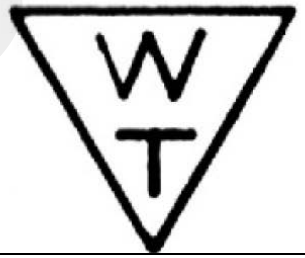


Far Left: .303 British cartridge found by a WCC planting crew on Skagit River. Don't ever touch something like this!
Left: Maker's mark on bottom of old bottle.

Right: *Old beer can found in Oregon. ACME was owned by Olympia Brewery. Courtesy of Heather Simmons.*







Logo employed by Whithall Tatum & Co. between 1924 to 1938 (Lockhart et al. 2016).



Can opening dates, courtesy of W.M. Schroeder.

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Implement the IDP if you see…

You see historic foundations or buried structures.

Examples are:

- Foundations.
- Railroad and trolley tracks.
- Remnants of structures.









Counter Clockwise, Left to Right: *Historic structure 45KI924, in WSDOT right of way for SR99 tunnel. Remnants of Smith Cove shantytown (45-KI-1200) discovered during Ecology CSO excavation, City of Spokane historic trolley tracks uncovered during stormwater project, intact foundation of historic home that survived the Great Ellensburg Fire of July 4, 1889, uncovered beneath parking lot in Ellensburg.*

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Implement the IDP if you see...

Potential human remains.

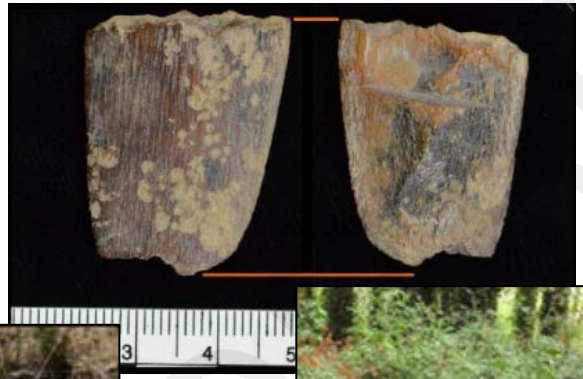
Examples are:

- Grave headstones that appear to be older than 50 years.
- Bones or bone tools--intact or in small pieces. It can be difficult to differentiate animal from human so they must be identified by an expert.
- These are all examples of animal bones and are not human.



Center: *Bone wedge tool, courtesy of Smith Cove Shantytown excavation (45KI1200).*

Other images (Top Right, Bottom Left, and Bottom) Center: Courtesy of DAHP.









Directly Above: This is a real discovery at an Ecology sewer project site.

What would you do if you found these items at a site? Who would be the first person you would call?

Hint: *Read the plan!*

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Appendix E
Soil Boring Logs

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SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
				SP	POORLY-GRADED SANDS, GRAVELLY SAND
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

- Modified California Sampler (6-inch sleeve) or Dames & Moore
- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab
- Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point load test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
UU	Unconsolidated undrained triaxial compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

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Key to Exploration Logs

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Figure A-1

Drilled Start 2/8/2024 End 2/8/2024	Total Depth (ft) 31.5	Logged By MAB Checked By JML	Driller Holocene		Drilling Method Hollow-stem Auger
Surface Elevation (ft) Undetermined Vertical Datum NAVD88		Hammer Data N/A		Drilling Equipment Diedrich D-50	
Latitude Longitude		System Datum N/A		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0						SP-SM	Brown fine sand with silt and occasional gravel (moist) (fill)			
	5	0.5	2	FP-B1-5.0					NS	<1	
	10	0.5	3	FP-B1-10.0				Becomes gray-brown	NS	1.2	
	15	0.5	3	FP-B1-15.0			SP	Gray fine sand with trace silt and occasional gravel, mottling (moist) (fill)	NS		
	20	0.5	9	FP-B1-20.0			SM	Gray silty fine sand with occasional gravel mixed till (moist)	NS	1.1	
	25	0.5	5	FP-B1-25.0				Wood layer at approximately 26 feet bgs			
	30	0.5	13	FP-B1-30.0				Becomes with increased gravel	NS	<1	

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Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring FP-B1

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-2
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled Start 2/8/2024 End 2/8/2024	Total Depth (ft) 26.5	Logged By MAB Checked By JML	Driller Holocene		Drilling Method Hollow-stem Auger
Surface Elevation (ft) Undetermined Vertical Datum NAVD88		Hammer Data N/A		Drilling Equipment Diedrich D-50	
Latitude Longitude		System Datum N/A		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet) / Depth (feet)	FIELD DATA: Interval Recovered (in)	Blows/foot	Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
0					GP	Fine to medium gravel (moist)			
					SM	Brown silty fine sand (moist)			
5	0.5	4	FP-B2-5.0		SP-SM	Brown gray fine sand with silt and occasional gravel, mottled (moist) (fill)	NS	<1	
10	0.5	7	FP-B2-10.0		SP	Gray fine sand with trace silt and occasional gravel (moist) (fill)	NS	<1	
15	1.5	13	FP-B2-15.0		SM	Gray silty fine sand with fine to medium gravel, mottled orange (moist)	NS	<1	
20		9	FP-B2-20.0			Gray silty sand, mottled (moist) Becomes wet	NS	<1	
25		48	FP-B2-25.0		SP	Fine sand with fine gravel (wet) (native)	NS	<1	

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Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring FP-B2

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-3
Sheet 1 of 1

Date:6/7/24 Path:P:\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled	Start 3/28/2023	End 3/28/2024	Total Depth (ft)	1	Logged By / Checked By	MAB / JML	Driller	N/A	Drilling Method	Hand Auger
Surface Elevation (ft) / Vertical Datum	Undetermined / NAVD88				Hammer Data	N/A	Drilling Equipment	Hand Auger		
Latitude / Longitude					System Datum	N/A	Groundwater not observed at time of exploration			

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		12			FP-B3-1.0		SM	Dark brown silty fine sand with wood fragments (wet)			

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Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Hand Auger FP-B3

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-4
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled	Start 3/28/2023	End 3/28/2024	Total Depth (ft) 1	Logged By MAB / Checked By JML	Driller N/A	Drilling Method Hand Auger
Surface Elevation (ft) / Vertical Datum	Undetermined / NAVD88		Hammer Data	N/A	Drilling Equipment	Hand Auger
Latitude / Longitude			System Datum	N/A	Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		12			FP-B4-0.5		SM	Dark brown silty fine sand with gravel (wet)			

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Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Hand Auger FP-B4

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-5
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled	Start 3/28/2023	End 3/28/2024	Total Depth (ft) 1	Logged By MAB / Checked By JML	Driller N/A	Drilling Method Hand Auger
Surface Elevation (ft) / Vertical Datum	Undetermined / NAVD88		Hammer Data	N/A	Drilling Equipment	Hand Auger
Latitude / Longitude			System Datum	N/A	Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		12			FP-B5-0.5		SM	Dark brown silty fine sand with gravel and roots (wet)			

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Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Hand Auger FP-B5

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-6
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	2/7/2024	2/7/2024	20.5	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	523.68
Latitude Longitude		Horizontal Datum	N/A

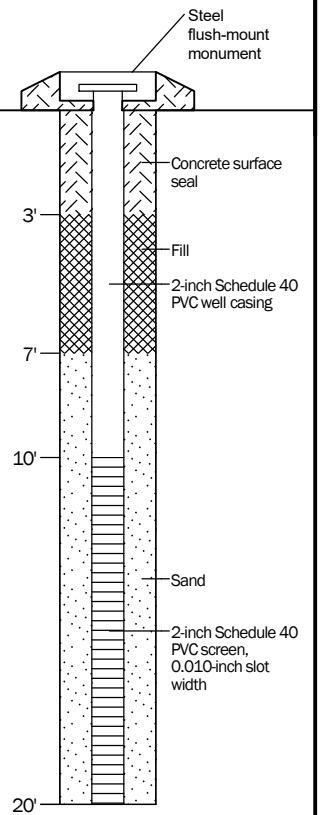
A 2-in well was installed on 2/7/2024 to a depth of 20 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
2/8/2024	13.75	

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								SP	Brown-gray fine to medium sand with trace silt, occasional gravel and trace mottling (moist) (fill)		
	5		12	20		FP-MW7-5.0					NS	<1
									SP-SM	Gray fine sand with silt (moist) (fill)		
	10		18	51		FP-MW7-10.0			SM	Gray silty fine sand with fine well-rounded gravel (moist) (native)	NS	1.2
	15		18	47		FP-MW7-15.0					NS	<1
	20		0	50/6"		FP-MW7-20.0					NS	<1

WELL LOG



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Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW7

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-7
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	2/6/2024	2/6/2024	29	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	564.00
Latitude Longitude		Horizontal Datum	N/A

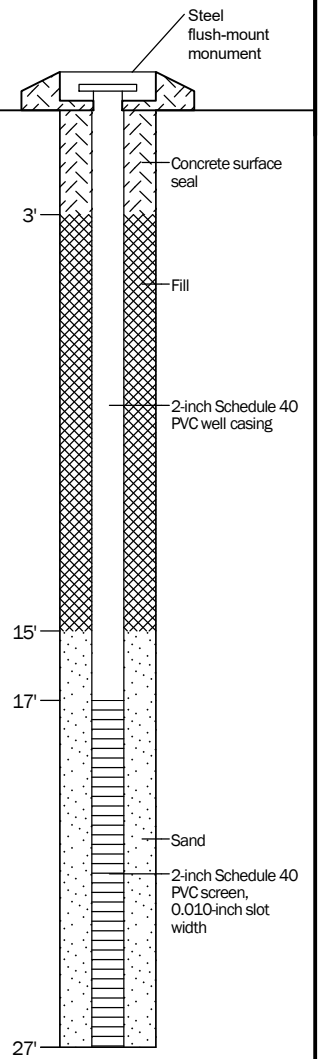
A 2-in well was installed on 2/6/2024 to a depth of 27 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
2/8/2024	11.44	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								SM	Gray-brown silty fine sand with occasional gravel (moist) (fill)		
	5		10	3		FP-MW8-5.0					SS	0.2
	10		12	2		FP-MW8-10.0	▼				NS	<1
	15		18	1		FP-MW8-15.0			SP-SM	Gray sand with silt and occasional fine gravel (moist)	NS	<1
	20		18	19		FP-MW8-20.0				Becomes wet	NS	<1
	25		4	33		FP-MW8-25.0			SP	Gray fine to coarse sand with trace silt and gravel (moist) (native)	NS	<1
				32		FP-MW8-27.5				Becomes wet	NS	<1

WELL LOG



DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW8

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-8
Sheet 1 of 1

Date:6/7/24 Path:P:\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	2/6/2024	2/6/2024	26	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	569.08
Latitude Longitude		Horizontal Datum	N/A

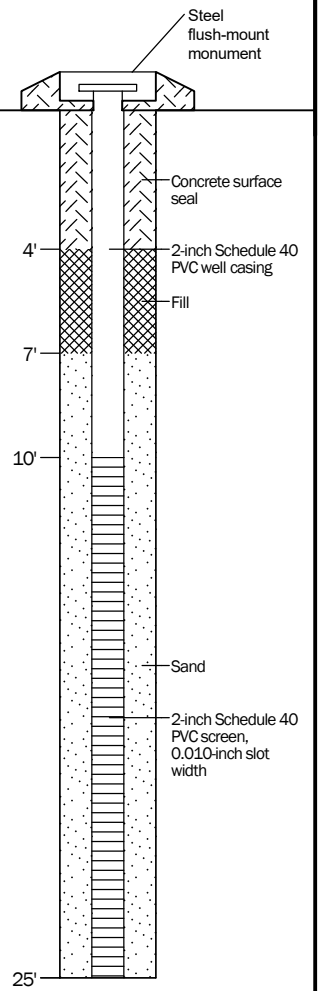
A 2-in well was installed on 2/6/2024 to a depth of 25 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
2/8/2024	8.90	

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								SM	Brown silty fine sand (moist) (fill)		
	5	1		5		FP-MW9-5.0					NS	<1
	10	10		6		FP-MW9-10.0			SP-SM	Gray fine sand with silt and occasional gravel, mottling (wet) (fill)	SS	<1
	15	12		10		FP-MW9-15.0				With fine gravel	NS	<1
	20	16		50/6"		FP-MW9-20.0			SP	Gray fine sand with trace silt and occasional fine gravel (moist) (native)	NS	<1
	25	12		50/6"		FP-MW9-25.0				Occasional fine well-rounded gravel, with mottling (wet)	NS	<1

WELL LOG



DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW9

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-9
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	2/7/2024	2/7/2024	21.5	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	522.17
Latitude Longitude		Horizontal Datum	N/A

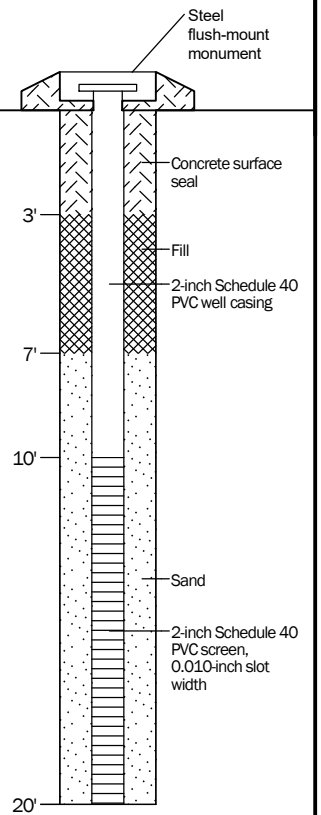
A 2-in well was installed on 2/7/2024 to a depth of 20 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
2/8/2024	10.89	

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								SP	Brown-gray fine to coarse sand with trace silt and occasional well-rounded fine gravel (moist) (fill)		
	5		0.7	5		FP-MW10-5.0					NS	<1
	10		1.5	2		FP-MW10-10.0	▼			Becomes gray, fine and with increased gravel	NS	<1
	15		0.5	5		FP-MW10-15.0				Becomes wet	NS	<1
	20			77		FP-MW10-20.0			SM	Gray silty fine sand with occasional fine gravel (dense, wet)	NS	

WELL LOG



DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW10

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-10
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	2/5/2024	2/5/2024	30	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	562.66
Latitude Longitude		Horizontal Datum	N/A

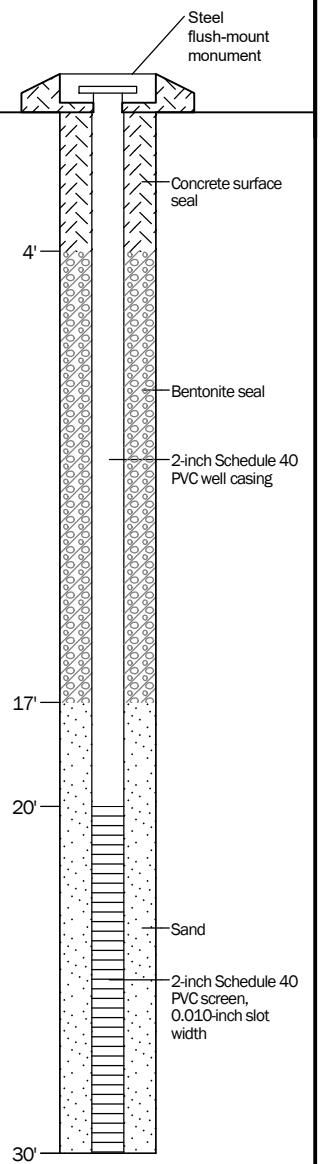
A 2-in well was installed on 2/5/2024 to a depth of 30 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
2/8/2024	19.53	

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								SM	Brown to gray silty fine sand (moist) (fill)		
	5		10	5		FP-MW11-5.0					NS	<1
	10		4	4		FP-MW11-10.0					NS	<1
	15		8	8		FP-MW11-15.0					NS	<1
							▼		SP-SM	Brown to gray silty sand with gravel (moist) (fill)		
	20		15	4		FP-MW11-20.5			SM	Gray silty sand with occasional fine gravel	NS	<1
	25											
	30											

DRAFT



Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW11

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-11
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	2/5/2024	2/5/2024	26.5	MAB	JML	Holocene	Hollow-stem Auger

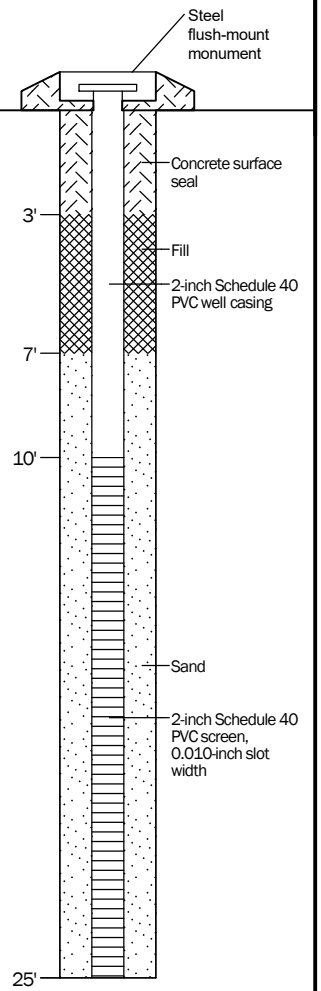
Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	572.24
Latitude Longitude		Horizontal Datum	N/A

A 2-in well was installed on 2/5/2024 to a depth of 25 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
2/8/2024	14.41	

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								SM	Black organic/burnt wood layer below grass Brown silty fine sand (moist) (fill)		
	5		3	4		FP-MW12-5.0					NS	<1
	10		3	4		FP-MW12-10.0				Becomes gray brown	NS	<1
	15		0.5	1		FP-MW12-15.0	▼					
	20		18	37		FP-MW12-20.0			SP	Fine to medium sand with trace silt and occasional fine gravel (wet) (native)	NS	<1
	25		18	37		FP-MW12-25.0				Becomes gray	NS	<1



DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW12

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-12
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	3/26/2024	3/26/2023	20.5	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	Undetermined NAVD88	Top of Casing Elevation (ft)	528.54
Latitude Longitude		Horizontal Datum	N/A

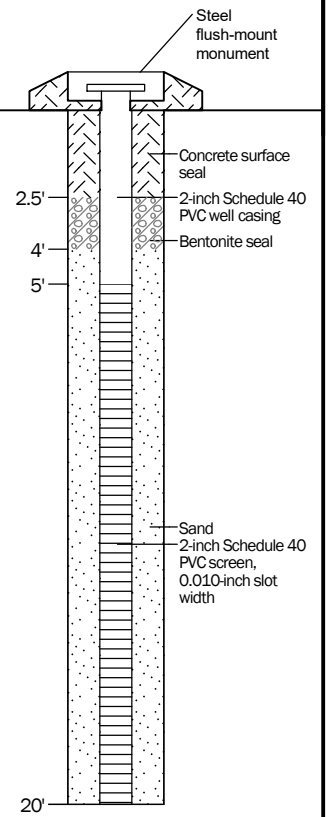
A 2-in well was installed on 3/26/2024 to a depth of 20 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
3/28/2024	3.21	

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								SP	Brown fine to coarse sand with silt and occasional gravel (moist) (fill)		
	5		12	17		FP-MW13-5.0			SP	Gray fine to coarse sand with trace silt and occasional gravel (moist)	NS	<1
	10		15	50/3"		FP-MW13-10.0			SP-SM	Gray fine to coarse sand with silt and occasional gravel (moist)	NS	<1
	15		4	50/4"		FP-MW13-15.0			SP	Gray fine to coarse sand with fine to medium gravel and trace silt (wet)	NS	<1
	20		6	50/5"		FP-MW13-20.0				Becomes moist	NS	<1

WELL LOG



DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW13

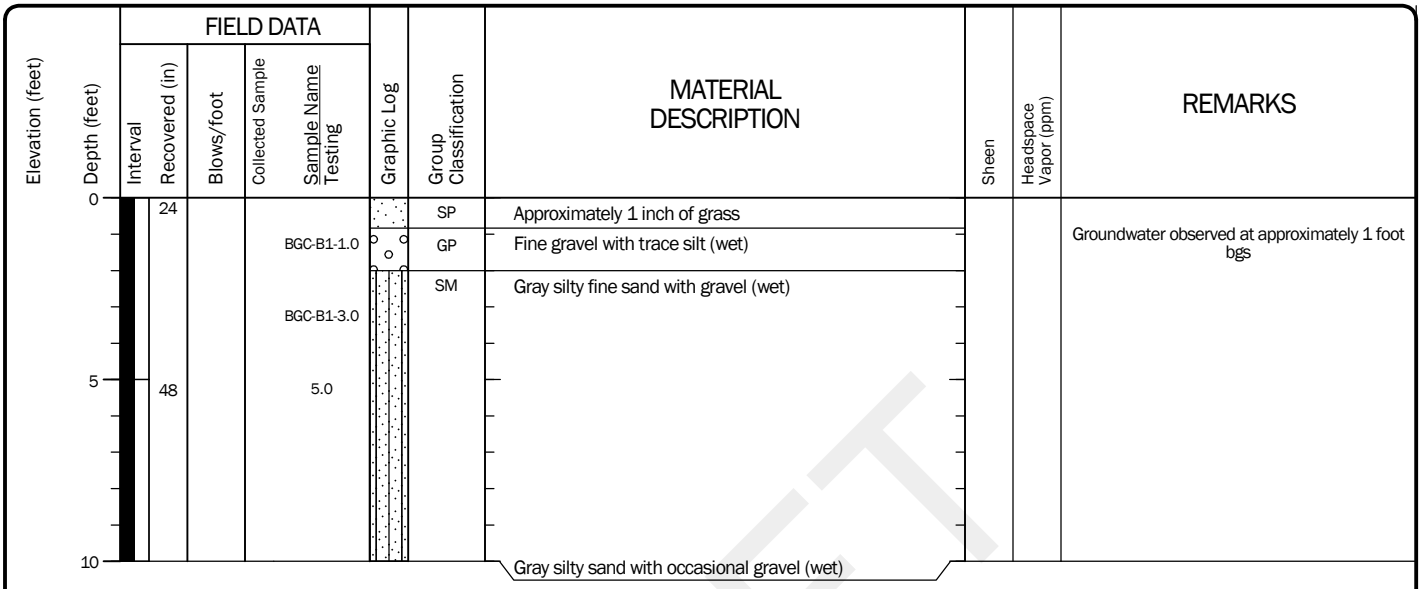
GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-13
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled Start 2/9/2024 End 2/9/2024	Total Depth (ft) 10	Logged By MAB Checked By JML	Driller Holocene	Drilling Method Direct Push	
Surface Elevation (ft) Undetermined Vertical Datum NAVD88		Hammer Data Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment 6011 DT Geoprobe	
Latitude Longitude		System Datum N/A		See "Remarks" section for groundwater observed	
Notes:					



DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring BGC-B1

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-14
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled Start 2/9/2024 End 2/9/2024	Total Depth (ft) 7	Logged By MAB Checked By JML	Driller Holocene	Drilling Method Direct Push	
Surface Elevation (ft) Undetermined Vertical Datum NAVD88		Hammer Data Autohammer 140 (lbs) / 30 (in) Drop		Drilling Equipment 6011 DT Geoprobe	
Latitude Longitude		System Datum N/A		See "Remarks" section for groundwater observed	
Notes:					

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		24			BGC-B2-1.5		SM	Organic matter layer			Groundwater observed at approximately 1 foot bgs
								SP-SM	Gray fine sand with silt and occasional gravel (wet) Becomes brown			
			36									
	5					BGC-B2-5.0		SM	Gray silty fine sand with occasional gravel (moist)			

DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Boring BGC-B2

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-15
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled Start 2/9/2024 End 2/9/2024	Total Depth (ft) 3	Logged By MAB Checked By JML	Driller N/A		Drilling Method Hand Auger
Surface Elevation (ft) Undetermined Vertical Datum NAVD88		Hammer Data N/A		Drilling Equipment Hand Auger	
Latitude Longitude		System Datum N/A		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36			BGC-B3-1.0 BGC-B3-3.0		SM	Dark brown silty fine to medium sand with roots, high organic content (wet)			

DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Hand Auger BGC-3

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-16
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled Start 2/9/2024 End 2/9/2024	Total Depth (ft) 3	Logged By MAB Checked By JML	Driller N/A		Drilling Method Hand Auger
Surface Elevation (ft) Undetermined Vertical Datum NAVD88		Hammer Data N/A		Drilling Equipment Hand Auger	
Latitude Longitude		System Datum N/A		Groundwater not observed at time of exploration	
Notes:					

Elevation (feet) / Depth (feet)	FIELD DATA: Interval Recovered (in)	FIELD DATA: Blows/foot	FIELD DATA: Collected Sample / Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
0	36		BGC-B4-1.0		SM	Black silty fine to medium sand with roots, high organic content (wet)			
			BGC-B4-3.0						

DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Hand Auger BGC-4

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-17
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled	Start 2/9/2024	End 2/9/2024	Total Depth (ft) 3	Logged By MAB / Checked By JML	Driller N/A	Drilling Method Hand Auger
Surface Elevation (ft) / Vertical Datum	Undetermined / NAVD88		Hammer Data	N/A	Drilling Equipment	Hand Auger
Latitude / Longitude			System Datum	N/A	Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36			BGC-B5-1.0		SM	Dark brown to black silty fine to medium sand with roots, high organic content (wet)			
						BGC-B5-3.0						

DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Hand Auger BGC-5

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-18
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

Drilled Start 2/9/2024 End 2/9/2024	Total Depth (ft) 3	Logged By MAB Checked By JML	Driller N/A		Drilling Method Hand Auger
Surface Elevation (ft) Undetermined Vertical Datum NAVD88		Hammer Data N/A		Drilling Equipment Hand Auger	
Latitude Longitude		System Datum N/A		Groundwater not observed at time of exploration	

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)	REMARKS
	0		36			BGC-B6-1.0 BGC-B6-3.0		SM	Black silty fine to medium sand with roots, high organic content (wet)			

DRAFT

Note: See Figure A-1 for explanation of symbols.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Hand Auger BGC-6

GeoEngineers

Project: Snohomish Co Airports - Paine Field Former Fire Pit Investigation
Project Location: Everett, Washington
Project Number: 5530-015-00

Figure A-19
Sheet 1 of 1

Date:6/7/24 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_STANDARD_NO_GW

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE			GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% RETAINED ON NO. 200 SIEVE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS
	MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE			SP	POORLY-GRADED SANDS, GRAVELLY SAND
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS, ROCK FLOUR, CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% PASSING NO. 200 SIEVE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS AND SILTS OF MEDIUM TO HIGH PLASTICITY
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: Multiple symbols are used to indicate borderline or dual soil classifications

Sampler Symbol Descriptions

- Modified California Sampler (6-inch sleeve) or Dames & Moore
- Standard Penetration Test (SPT)
- Shelby tube
- Piston
- Direct-Push
- Bulk or grab
- Continuous Coring

Blowcount is recorded for driven samplers as the number of blows required to advance sampler 12 inches (or distance noted). See exploration log for hammer weight and drop.

"P" indicates sampler pushed using the weight of the drill rig.

"WOH" indicates sampler pushed using the weight of the hammer.

ADDITIONAL MATERIAL SYMBOLS

SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
	AC	Asphalt Concrete
	CC	Cement Concrete
	CR	Crushed Rock/ Quarry Spalls
	SOD	Sod/Forest Duff
	TS	Topsoil

Groundwater Contact

Measured groundwater level in exploration, well, or piezometer

Measured free product in well or piezometer

Graphic Log Contact

Distinct contact between soil strata

Approximate contact between soil strata

Material Description Contact

Contact between geologic units

Contact between soil of the same geologic unit

Laboratory / Field Tests

%F	Percent fines
%G	Percent gravel
AL	Atterberg limits
CA	Chemical analysis
CP	Laboratory compaction test
CS	Consolidation test
DD	Dry density
DS	Direct shear
EI	Expansion index
HA	Hydrometer analysis
MC	Moisture content
MD	Moisture content and dry density
Mohs	Mohs hardness scale
OC	Organic content
PM	Permeability or hydraulic conductivity
PI	Plasticity index
PL	Point load test
PP	Pocket penetrometer
SA	Sieve analysis
TX	Triaxial compression
UC	Unconfined compression
UU	Unconsolidated undrained triaxial compression
VS	Vane shear

Sheen Classification

NS	No Visible Sheen
SS	Slight Sheen
MS	Moderate Sheen
HS	Heavy Sheen

NOTE: The reader must refer to the discussion in the report text and the logs of explorations for a proper understanding of subsurface conditions. Descriptions on the logs apply only at the specific exploration locations and at the time the explorations were made; they are not warranted to be representative of subsurface conditions at other locations or times.

DRAFT

Key to Exploration Logs

GeoEngineers

Figure A-1

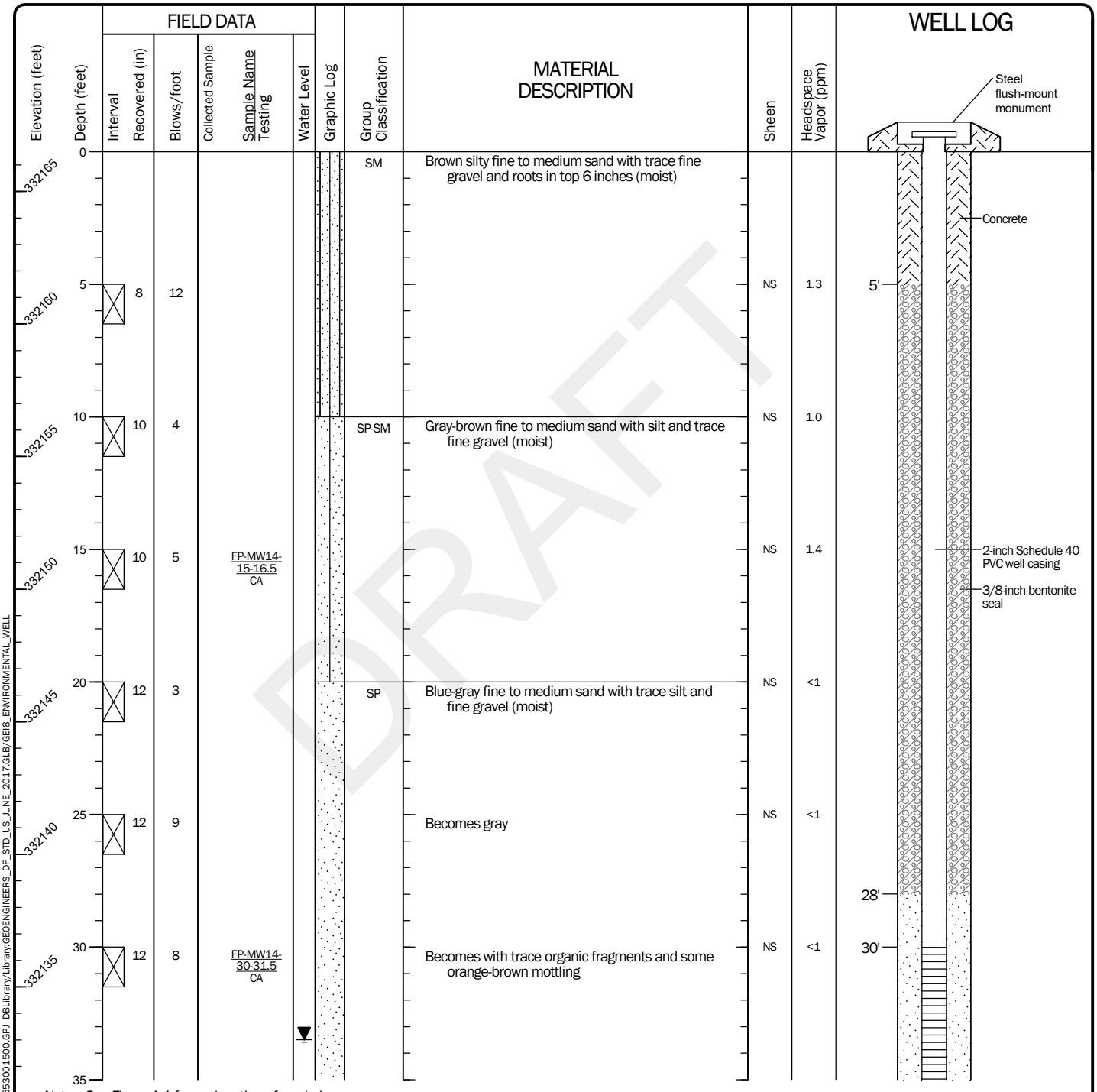
Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	6/4/2025	6/4/2025	45.5	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	332166.5	Top of Casing Elevation (ft)	558.83
Easting (X) Northing (Y)	-1282683.716	Horizontal Datum	NAD83 (feet)

DOE Well I.D.: BQL-425
A 2-in well was installed on 6/4/2025 to a depth of 45.5 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
6/9/2025	33.49	525.34

Notes:



Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered boring logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

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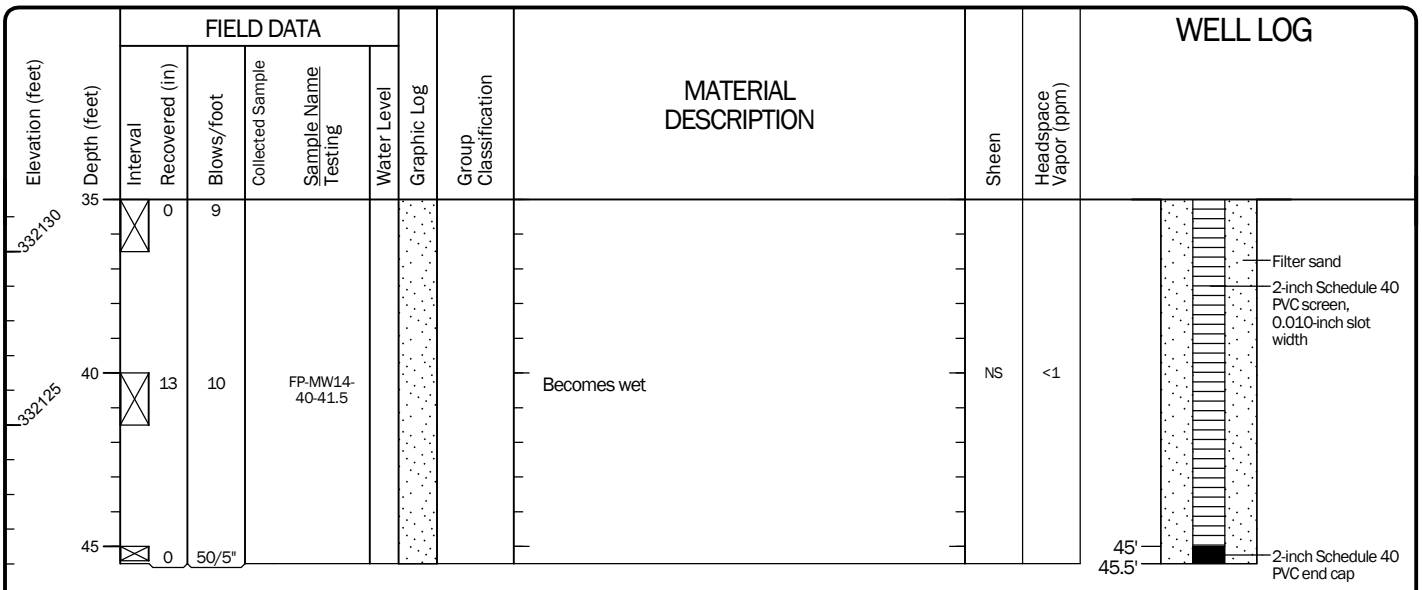
Log of Monitoring Well FP-MW14

GeoEngineers

Project: Snohomish County Airport - Paine Field FTP Supplemental Data Gaps Investigatic
Project Location: Everett, Washington
Project Number: 5530-015-01

Figure B-2
Sheet 1 of 2

Date:9/3/25 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL



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Log of Monitoring Well FP-MW14 (continued)

GeoEngineers

Project: Snohomish County Airport - Paine Field FTP Supplemental Data Gaps Investigatic
Project Location: Everett, Washington
Project Number: 5530-015-01

Figure B-2
Sheet 2 of 2

Date:9/3/25 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	6/4/2025	6/4/2025	31.5	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	332003.4	Top of Casing Elevation (ft)	567.92
Easting (X) Northing (Y)	-1283276.235	Horizontal Datum	NAD83 (feet)

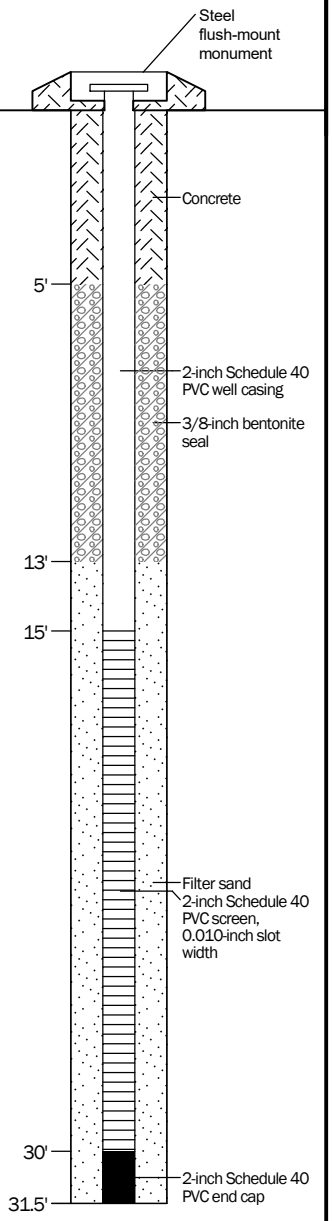
DOE Well I.D.: BQL-426
A 2-in well was installed on 6/4/2025 to a depth of 31.5 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
6/9/2025	22.87	545.05

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								SM	Dark brown silty fine to medium sand with trace fine gravel and roots in top 6 inches (moist)		
332000												
	5		4	6		FP-MW15-5-6.5					NS	<1
331995												
	10		8	13					SP-SM	Green-gray fine to medium sand with silt and trace fine gravel (moist)	NS	<1
331990										Becomes with trace blackened organic fragments		
	15		12	4							NS	<1
331985												
	20		12	4		FP-MW15-20-21.5					NS	<1
331980												
	25		18	20		FP-MW15-25-26.5			SP	Green-gray fine to medium sand with trace silt, trace fine gravel and trace blackened organic fragments (wet)	NS	<1
331975												
	30		15	50/5"		FP-MW15-30-31.5				Becomes with fine to coarse gravel	NS	<1

WELL LOG



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Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered boring logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW15

GeoEngineers

Project: Snohomish County Airport - Paine Field FTP Supplemental Data Gaps Investigatic
Project Location: Everett, Washington
Project Number: 5530-015-01

Figure B-3
Sheet 1 of 1

Date:9/3/25 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	6/3/2025	6/3/2025	26.5	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	332521	Top of Casing Elevation (ft)	574.46
Easting (X) Northing (Y)	-1283825.617	Horizontal Datum	NAD83 (feet)

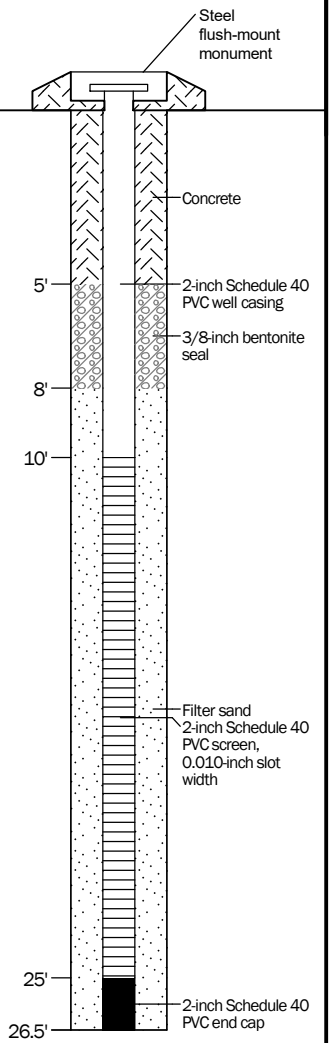
DOE Well I.D.: BQL-422
A 2-in well was installed on 6/3/2025 to a depth of 26.5 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
6/9/2025	10.76	563.70

Notes:

Elevation (feet)	Depth (feet)	FIELD DATA: Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
332520	0								SM	Brown silty fine to medium sand with occasional fine gravel and roots in the top 6 inches		
332515	5		12	5		FP-MW16-5-6.5 CA			SP-SM	Becomes gray-brown Gray fine to medium sand with silt and occasional fine gravel (moist)	NS	<1
332510	10		12	11		FP-MW16-10-11.5 CA	▼		SP	Dark brown fine to medium sand with trace silt (moist) (lens)	NS	<1
									SP-SM	Gray fine to medium sand with silt and occasional fine gravel (mixed till)		
332505	15		0	24					SP	Dark gray fine to medium sand with trace silt and occasional fine gravel (wet)	NS	1.3
332500	20		18	29					SP	Gray fine to coarse sand with trace silt and occasional fine gravel (wet)	NS	1.1
332495	25		18	62		FP-MW16-25-26.5 CA					NS	1.1

WELL LOG



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Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered boring logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW16

GeoEngineers

Project: Snohomish County Airport - Paine Field FTP Supplemental Data Gaps Investigatic
Project Location: Everett, Washington
Project Number: 5530-015-01

Figure B-4
Sheet 1 of 1

Date:9/3/25 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	6/3/2025	6/3/2025	26.5	MAB	JML	Holocene	Hollow-stem Auger

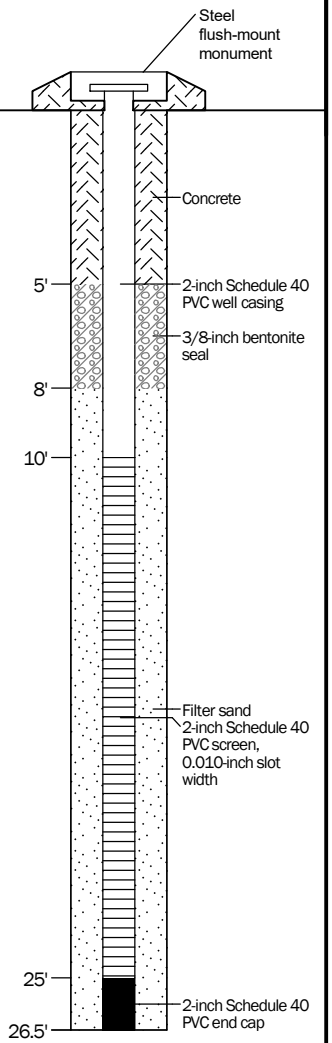
Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	332920.8	Top of Casing Elevation (ft)	575.62
Easting (X) Northing (Y)	-1283868.575	Horizontal Datum	NAD83 (feet)

DOE Well I.D.: BQL-423
A 2-in well was installed on 6/3/2025 to a depth of 26.5 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
6/9/2025	12.35	563.27

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
332920	0								SM	Brown silty fine to medium sand with occasional fine to medium gravel and roots in the top 2 inches (moist)		
332915	5		8	22		FP-MW17-5-6.5 CA				Becomes light gray-brown	NS	2.1
332910	10		12	8		FP-MW17-10-11.5 CA	▼		SP-SM	Light gray-brown fine to medium sand with silt and fine gravel (loose, moist)	NS	2.3
332905	15		4	8					SP	Gray fine to coarse sand with trace silt and occasional fine gravel (wet)	NS	1.9
332900	20		18	23					SP	Gray-brown fine to medium sand with trace silt and fine gravel (wet)	NS	2.1
332895	25		18	54/4"		FP-MW17-525-26.5 CA				Becomes gray (till)	NS	1.8



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Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered boring logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW17

GeoEngineers

Project: Snohomish County Airport - Paine Field FTP Supplemental Data Gaps Investigatic
Project Location: Everett, Washington
Project Number: 5530-015-01

Figure B-5
Sheet 1 of 1

Date:9/3/25 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	6/2/2025	6/2/2025	20.75	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	333655	Top of Casing Elevation (ft)	572.22
Easting (X) Northing (Y)	-1283852.983	Horizontal Datum	NAD83 (feet)

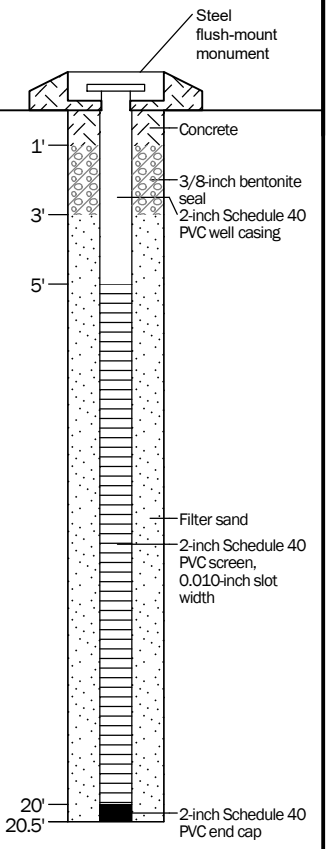
DOE Well I.D.: BQL-421
A 2-in well was installed on 6/2/2025 to a depth of 20.5 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
6/9/2025	7.85	564.37

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								SM	Dark brown silty fine to medium sand with trace fine gravel (moist)		
333650	5		8	11		FP-MW18-5-6.5 CA	▼				NS	1.1
333645	10		18	11		FP-MW18-10-11.5 CA			SP-SM	Dark gray fine sand with silt and occasional fine gravel (moist)	NS	1.2
333640	15		18	50/5"					SP	Gray fine sand with trace silt and trace fine gravel (wet)	NS	2.0
333635	20		9	50/3"		FP-MW18-20-21.5 CA					NS	1.4

WELL LOG



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Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered boring logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW18

GeoEngineers

Project: Snohomish County Airport - Paine Field FTP Supplemental Data Gaps Investigatic
Project Location: Everett, Washington
Project Number: 5530-015-01

Figure B-6
Sheet 1 of 1

Date:9/3/25 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	6/2/2025	6/2/2025	30.75	MAB	JML	Holocene	Hollow-stem Auger

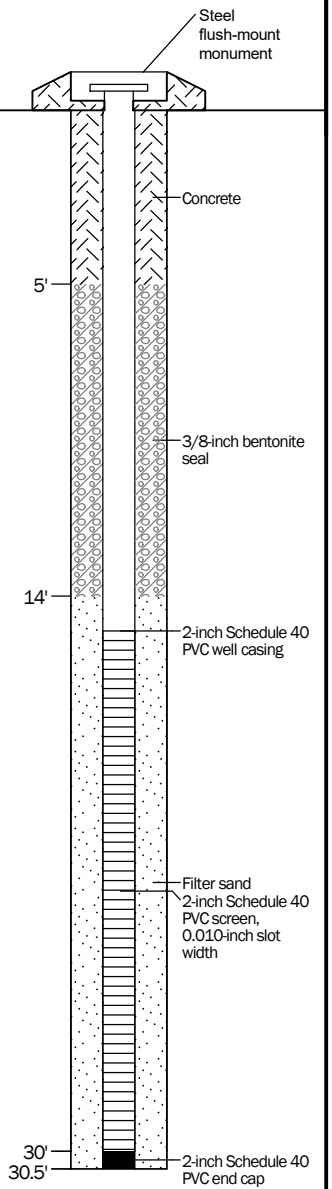
Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	334132.8	Top of Casing Elevation (ft)	550.15
Easting (X) Northing (Y)	-1283299.23	Horizontal Datum	NAD83 (feet)

DOE Well I.D.: BQL-420
A 2-in well was installed on 6/2/2025 to a depth of 30.5 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
6/9/2025	6.15	544.00

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
	0								SM	Light gray-brown silty fine to medium sand with fine rounded gravel (moist)		
334130												
	5		6	10		FP-MW19-5-6.5 CA	▼			Becomes occasional fine gravel (fill)	NS	
334125												
	10		18	73		FP-MW19-10-11.5 CA			SP-SM	Gray fine to coarse sand with silt and occasional gravel (moist)	NS	
334120												
	15		12	51					SP	Blue-gray fine to medium sand with trace silt and occasional fine gravel (moist)	NS	
334115												
	20		2	50/3"								
334110												
	25											
334105												
	30		8	50/2"		FP-MW19-30-31.5 CA			SP	Blue-gray fine to coarse sand with fine to medium gravel and trace silt (wet)	NS	



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Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered boring logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW19

GeoEngineers

Project: Snohomish County Airport - Paine Field FTP Supplemental Data Gaps Investigatic
Project Location: Everett, Washington
Project Number: 5530-015-01

Figure B-7
Sheet 1 of 1

Date:9/3/25 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary:Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Drilled	Start	End	Total Depth (ft)	Logged By	Checked By	Driller	Drilling Method
	6/3/2025	6/3/2025	25.5	MAB	JML	Holocene	Hollow-stem Auger

Hammer Data	Autohammer 140 (lbs) / 30 (in) Drop	Drilling Equipment	Diedrich D-50
Surface Elevation (ft) Vertical Datum	333390.3	Top of Casing Elevation (ft)	534.46
Easting (X) Northing (Y)	-1282526.98	Horizontal Datum	NAD83 (feet)

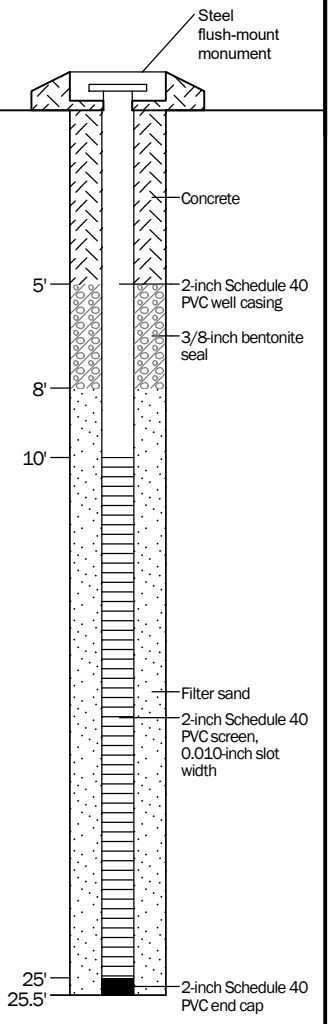
DOE Well I.D.: BQL-424
A 2-in well was installed on 6/3/2025 to a depth of 25.5 ft.

Groundwater Date Measured	Depth to Water (ft)	Elevation (ft)
6/9/2025	8.32	526.14

Notes:

Elevation (feet)	Depth (feet)	Interval	Recovered (in)	Blows/foot	Collected Sample	Sample Name / Testing	Water Level	Graphic Log	Group Classification	MATERIAL DESCRIPTION	Sheen	Headspace Vapor (ppm)
333390	0								SM	Brown silty fine to medium sand with occasional fine to medium gravel (roots) (moist)		
333385	5		10	17		FP-MW20-5-6.5 CA				Becomes olive-brown with occasional coarse sand and without roots	NS	2.2
333380	10		12	73		FP-MW20-10-11.5 CA			SP	Gray poorly graded fine to coarse sand with trace silt and fine to medium gravel (moist)	NS	2.2
333375	15		7	50/3"							NS	
333370	20		8	50/2"		FP-MW20-20-21.5 CA					NS	2.0
333365	25											

WELL LOG



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Notes: See Figure A-1 for explanation of symbols.
The depths on the hand-augered boring logs are based on an average of measurements across the hand-auger and should be considered accurate to ½ foot.
Coordinates Data Source: Horizontal approximated based on . Vertical approximated based on .

Log of Monitoring Well FP-MW20

GeoEngineers

Project: Snohomish County Airport - Paine Field FTP Supplemental Data Gaps Investigatic
Project Location: Everett, Washington
Project Number: 5530-015-01

Figure B-8
Sheet 1 of 1

Date:9/3/25 Path:P:\5\5530015\GINT\553001500.GPJ DBLibrary/Library:GEOENGINEERS_DF_STD_US_JUNE_2017.GLB/GEI8_ENVIRONMENTAL_WELL

Appendix F

PCULs Workbook

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PCUL Modifications since March 10, 2017

Date	Sheet	Chemical/Parameter Modified	Modification	Consequences
February 21, 2025	SW, SW-FW	State WQC Human Health WAC 173-201A-240, Table 240	Updated all values based on December 2024 WQC update.	The values in the December 2024 WQC updates were taken from the Washington Toxics Rule (40 CFR 131.45), which is located in the next column. Minimum ARARs and surface water PCULs didn't change.
	SL-Eq, GW-Eq, AR-Eq	Chromium VI	Hand-entered cancer equation values from CLARC because it's mutagenic. This was an oversight from the previous PCUL update.	Most stringent soil and groundwater PCULs increased by a factor of 3. Air PCUL increased by a factor of 7.7. Most stringent sediment PCULs didn't change.
February 2025	All	PFDA, 6:2FTS	Added new PFAS to workbook per CLARC update.	There are now PCULs for PFDA and 6:2FTS.
	All	TBT	Split the TBT oxide line into two lines: TBT and TBT oxide.	Some of the PCULs that were previously reported on the TBT oxide line have been moved to the TBT line. Values haven't changed.
	Multiple	Sulfate, 4-isopropyltoluene, delta-BHC	Incorporated CLARC updates to toxicity parameters and chemical properties.	There are now soil and groundwater PCULs for all three chemicals and air and soil gas PCULs for 4-isopropyltoluene.
	SL-Det	Arsenic	Modified site-specific TEE values to reflect As V, which is the most common form in soils, per advice from Policy.	Site-specific TEE value increased from 7 to 132 mg/kg.
	SL-Det	Total low and high MW PAHs	Added EPA's Eco-SSLs to site-specific TEE columns based on advice from Policy.	There are now site-specific TEE CULs for these PAH groups.
	Hard-pH	All	Deleted page to reduce level of effort for updates. Use the Water Quality Program's spreadsheet to calculate site-specific values.	No PCULs changed.
	SW-FW	Thallium	Moved entry of 0.24 ug/L from NRWQC aquatic life column to State human health column to correct an error.	Surface water PCUL didn't change.
	SW	2,4,5-TP	Added CWA human health criterion to correct oversight.	There is now a marine surface water PCUL for 2,4,5-TP.
	SW-FW	All	Called drinking water PCULs (GW-1) from the PW page into the SW-FW page. The PCUL for protection of surface water (GW-2) is now the minimum of the surface water PCUL for noncancer effects (column M), the surface water PCUL for cancer effects (column Q), and the drinking water PCUL (GW-1, column R). This corrects an oversight in the original design of the page.	PCULs for protection of surface water (GW-2) didn't change for 112 chemicals. PCULs decreased for 31 chemicals, including arsenic (factor of 0.71), cadmium (0.58), copper (0.16), nickel (0.21), silver (0.053), zinc (0.24), naphthalene (0.12), and several PFAS. There are now PCULs for 84 chemicals that didn't have them before.
	SW, SW-FW	Multiple	Updated state criteria for aquatic life and added Clean Water Act aquatic life criteria for PFOS and PFOA, per CLARC update.	The aquatic life criteria previously listed for tributyltin oxide were moved to the newly listed tributyltin. The marine surface water PCUL for silver decreased by a factor of 0.48. Fresh surface water PCULs for the following chemicals decreased: cyanide (factor of 0.48), cadmium (0.58), trivalent chromium (0.82), copper (0.11), nickel (0.21), selenium (0.3), silver (0.053), zinc (0.24), and PFOS (0.11).
	SedMMA, SedMMA-FW	Multiple	Eliminated sediment contact calculations for mutagens that aren't bioaccumulative. For the LDW, the only mutagens that are considered bioaccumulative are cPAHs. For non-LDW sites, chromium VI is also considered bioaccumulative.	No PCULs changed because sediment contact PCULs weren't being reported for chemicals that aren't bioaccumulative.
	SedEq, SedEqFW	All	Revised calculations for sediment contact scenarios so they occur only if a chemical is bioaccumulative.	Fewer chemicals have calculated sediment contact PCULs. But nothing on the Sed and SedFW pages changed because sediment contact PCULs were not being reported for chemicals that aren't bioaccumulative.
	Param	Target organs	Eliminated the columns for oral and inhalation target organs to reduce the level of effort for updates.	No PCULs changed.

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	Param	3,3'-Dichlorobenzidine	Corrected Koc value.	Soil leaching PCULs increased by a factor of 6.
	Param	Arsenic, PFHxS	Updated oral toxicity values per IRIS update that occurred after the January 2025 CLARC update.	Most stringent PCULs for arsenic didn't change because they default to natural background, PQLs, or benthic criteria that didn't change. Most stringent PCULs for PFHxS in potable groundwater and soil that leaches to potable groundwater decreased by a factor of 0.00064. Most stringent PCULs for PFHxS in soil that leaches to nonpotable groundwater decreased by a factor of 0.00092.
	Param	cPAH TEQ	Updated entries for BCF and IUR to draw from the benzo(a)pyrene row.	There are now PCULs for surface water and air.
	Param	Bis(chloromethyl)ether	Corrected error in calculation of Kd.	There are now soil leaching PCULs.
	Param	Chromium VI, formaldehyde, chloroform	Updated all chromium VI toxicity values and inhalation toxicity values for formaldehyde and chloroform per CLARC update.	Most stringent PCULs for chromium VI didn't change. Air and groundwater vapor intrusion SL didn't change for chloroform because they're driven by the cancer toxicity value which didn't change. The air PCUL for formaldehyde increased by a factor of 1.8.
	Param	Hexachloroethane, PFBA, PFBS	Updated Hcc values per CLARC update.	Groundwater vapor intrusion SL for hexachloroethane increased by a factor of 2.7. There are no VI SLs for PFAS.
	Param	Formaldehyde	Listed as mutagenic per CLAR update. Hand-entered Method B cancer equation values from CLARC for soil contact, groundwater ingestion, and air inhalation.	Most stringent soil PCULs decreased by a factor of 0.26 for potable groundwater and 0.19 for nonpotable. Most stringent groundwater PCUL for potable water decreased by a factor of 0.26. Air PCUL decreased by a factor of 0.46.
July 2024	Param	PFOS & PFOA	Updated oral RfDs and CPFs consistent with the values developed by EPA's Office of Drinking Water for MCLs per CLARC update.	Soil direct contact CULs for PFOS decreased by a factor of 0.03 and for PFOA by a factor of 0.00014.
	PW	GenX, PFBS, PFHxS, PFNA, PFOS, PFOA	Retired state action levels and input EPA's MCLs per CLARC update.	Groundwater CULs to protect drinking water decreased by the following factors: GenX 0.4, PFHxS 0.15, PFOS 0.11, and PFOA 0.003. CULs increased for PFNA and PFBS increased by factors of 1.1 and 14, respectively. Although the calculated groundwater CUL for PFBS is 4.8 ug/L, the MCL requirement to meet an HI of 1 for GenX, PFBS, PFHxS, and PFNA will require PFBS concentrations to be no higher than 2 ug/L. No changes to CULs for PFBA and PFHxA.
	Param	TCDD TEQ	Added the natural soil background concentration of 5.2 ng/kg from Ecology's (2010) Implementation Memo 8.	Most stringent soil PCULs now adjust up to natural background.
	SL-Det	Column Q	Added TSCA CUL for PCBs in restricted access areas, which is used for industrial soil CULs.	Direct contact soil CUL for industrial sites decreased from 66 to 10 mg/kg.
	Param	2,3,4,5-Tetrachlorophenol	Added Kd values for pH 6.8 and 8.0 from MTCA Table 747-2.	There are now leaching and partitioning CULs for 2,3,4,5-tetrachlorophenol.
	Param	Natural Background Freshwater Sediment	Added new column, which is the minimum of marine natural background (column AR) and soil natural background (column AQ).	The freshwater sediment PCUL for partitioning calculations for selenium increased from 0.1 mg/kg (based on PQL) to 0.78 mg/kg (based on natural background).
	All	Ammonia, chloride, fluoride	Added three new chemicals.	These three chemicals now have PCULs.
	SW, SW-FW	Multiple	Checked all water quality criteria (WQC) against CLARC and updated/corrected multiple values.	Groundwater CULs to protect marine surface water changed for lead, DDD, DDE, diazinon, and dieldrin. Groundwater CULs to protect fresh water changed for cyanide, bis(chloromethyl)ether, nitrate, and aluminum.
	SedDet, SedDetFW	Multiple	Restructured page to 1) remove direct contact CULs for nonbioaccumulative chemicals per advice from Policy to be consistent with SCUM and 2) focus on deriving dry weight PCULs that can be used for partitioning calculations.	These combined changes corrected an error in the March 2024 version, where the minimum sediment PCUL on the Sed page didn't match the minimum

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	Sed, SedFW	Multiple	Restructured page to 1) provide dry weight PCULs that can be used for partitioning calculations and 2) provide three categories of PCULs for evaluating sediment data. The three categories are: human health (contact and bioaccumulative) for SWAC comparisons; benthic dry weight for point by point comparisons; and benthic OC normalized for point by point comparisons (marine only).	sediment PCUL on the SedDet page. There are now no sediment PCULs for chemicals that are not bioaccumulative and do not have benthic criteria.
	Param	alpha-BHC/alpha-HCH	Added RfD per CLARC update.	No changes to PCULs because they're driven by cancer effects.
	Param	Chromium, total	Added Kd value per CLARC update.	There are now leaching PCULs for total chromium.
	PW	Chromium, VI	Adjusted drinking water PCUL from 0.046 to 0.46 ug/L per CLARC update. This reflects a Policy decision to use a cancer risk of 1E-5.	Most stringent groundwater PCUL for potable groundwater increased from 0.046 ug/L (based on protection of drinking water) to 0.36 ug/L (based on protection of surface water).
	Param	1-Methylnaphthalene	Added inhalation RfD and updated oral CPF per CLARC update.	The PCUL for potable groundwater and the most stringent soil PCULs for potable groundwater decreased by a factor of 0.57. The most stringent soil PCUL for nonpotable groundwater and the saturated zone increased by a factor of 10 because there are now no sediment PCULs (see discussion above re changes to sediment pages).
	Param	Vanadium	Corrected RfDo to be consistent with CLARC.	Soil contact PCUL decreased from 720 to 400 mg/kg. Drinking water PCUL decreased from 140 to 80 ug/L.
	Param	cis- and trans-1,3-Dichloropropene, dibromomethane	Corrected Hcc values to be consistent with CLARC.	Groundwater screening levels for VI increased from 1.6 to 8 ug/L.
	Param	2-Butoxyethanol	Corrected INH value to be consistent with CLARC.	Drinking water PCUL increased from 800 to 1,600 ug/L.
	Param	Noncancer target organs	Updated multiple entries per CLARC update.	No changes to PCULs.
	Param	Dibromomethane	Corrected Koc to be consistent with CLARC.	The groundwater PCUL for protection of sediment increased from 1.4E6 to 2.4E6 mg/kg. The soil leaching PCUL to protect drinking water (vadose zone) decreased from 0.42 to 0.36 mg/kg. Minor change to the soil leaching PCUL in the saturated zone (0.028 to 0.025 mg/kg).
	Param	1-Methylnaphthalene	Updated entry in column AK (Listed on CLARC VI Page) to YES per CLARC update.	A groundwater VI screening level is now available.
March 2024	All	Acetaldehyde, PFHxA, carbaryl	Added new chemicals to all pages.	PCULs available for three new chemicals.
	Param	alpha-BHC (alpha-HCH) Acrylonitrile Nickel	Removed oral RfD for alpha-BHC per CLARC update in August 2023. Updated oral RfD for acrylonitrile and RfC for nickel per CLARC update in February 2024.	Most stringent PCULs didn't change.
	Param	GenX	Updated Koc based on February 2024 CLARC update.	Most stringent soil PCULs based on potable groundwater increased. Most stringent soil PCUL for saturated zone based on nonpotable groundwater decreased.
	Param	Mercury, hexachloroethane, 1-methylnaphthalene, PFOS, phenol, pyridine, styrene, 1,2,3-trichloropropane, vinyl acetate	Updated Hcc values per CLARC update in August 2023.	Groundwater SLs for VI decreased as follows (all in ug/L): mercury 1.1 to 0.29, hexachloroethane 3.8 to 1.4, 1,2,3-trichloropropane 21 to 20. Groundwater SLs for VI increased as follows (all in ug/L): styrene 8.2E3 to 8.5E3, vinyl acetate 7.8E3 to 8.1E3. Others don't have SLs for VI.
	Param	4,4'-DDT and total DDT	Changed ABS to 0.1 and GI to 0.5 per CLARC update in August 2023.	No changes to most stringent PCULs.
	Param	Hexachloroethane	Removed Hcc at 13 oF per CLARC update in August 2023.	Groundwater SL for VI decreased from 3.8 to 1.4 ug/L.

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	Param	New columns AQ through AV	Added new columns for natural background soil and sediment and regional background sediment. Linked Sed, SedFW, SL, and SL-FW pages to appropriate columns. Obtained natural background soil concentrations from Chapter 11 of Ecology's (1994) *Natural Background Soil Metals Concentrations in Washington State* rather than from summary tables in Executive Summary or Chapter 6.	Natural background concentration of soil lead increased from 17 to 24 mg/kg. Natural background concentration of soil nickel increased from 38 to 48 mg/kg.
	SW	Cyanide	Removed aquatic life criteria under 173-201A WAC per CLARC update in August 2023.	No changes to most stringent PCULs.
	SW-FW	Methylmercury	Removed aquatic life criteria under CWA per CLARC update in August 2023.	There is now no groundwater PCUL for protection of fresh surface water.
	Param	Multiple	Updated target organs to be consistent with current version of CLARC.	No PCULs changed.
	Param	PFAS	Corrected INH values to 1 for all PFAS except GenX and PFBA	Drinking water PCULs decreased by a factor of 2 for PFAS without state action levels. PCULs for PFAS with state action levels didn't change.
	SL-Det, SW, SW-FW	PFAS	Added concentrations protective of ecological receptors.	Most stringent soil and groundwater PCULs based on potable groundwater didn't change. Most stringent soil and groundwater PCULs based on nonpotable groundwater decreased to levels similar to those based on potable groundwater.
	Param	New columns AG and AH	Added new columns to deal with differences in default values for dermal and gastrointestinal absorption between MTCA and SMS. Original column Q provides GI values for MTCA, used to calculate dermal RfDs and CPFs for MTCA soil and water CULs. The dermal pathway is rarely considered under MTCA. New column S provides GI values for SMS, used to calculate dermal RfDs and CPFs for SMS sediment CULs. The dermal pathway is routinely considered under SMS. Column AG provides dermal absorption (ABS) values for MTCA soil CULs, again rarely used. Column AI provides ABS values for SMS sediment CULs, used routinely.	The most stringent sediment PCULs for 151 chemicals increased by factors up to 4; 56 remained the same; and 2 decreased by factors up to 0.1. Bioaccumulative PCULs, which default to natural background or PQL, and benthic criteria are usually lower than direct contact PCULs, which explains the most stringent sediment PCULs that didn't change.
	PW	All	Corrected decision logic in column Y (MCL Adj. HQ=1).	No PCULs changed.
	SW	All	Added new column AB to identify cases where the WQC needs to be adjusted to achieve HQ=1.	No PCULs changed.
	Multiple Sed sheets	All	Renamed Sed to SedDet and SedFW to SedFW-Det. These sheets provide the details of sediment PCUL derivation. Created new sheets Sed and SedFW which show only the final PCULs. Sed and SedFW sheets show the minimum dry weight PCULs and OC-normalized benthic criteria.	No PCULs changed.
February 2023	--	--	Updated the supplemental information document to include discussions of the South Lake Union version of the PCUL workbook and how to develop PCULs for marine sediment sites outside the LDW.	No changes to PCULs.
	Param	GI and ABS	Updated all values consistent with CLARC revisions released in September 2022. For SVOCs and herbicides not listed in CLARC, assumed default values of 0.8 for GI and 0.03 for ABS. For VOCs not listed in CLARC, assumed default values of 0.5 for GI and 0.1 for ABS.	Minor or no noticeable changes to PCULs.
	AR-Eq	Gasoline and diesel range hydrocarbons	Corrected Method C air noncancer values to 1,500 ug/m3 and commercial worker noncancer values to 390 ug/m3.	Method C air CULs increased by a factor of 30. There are now commercial worker screening levels.
	All	gamma-BHC	Eliminated this chemical because it's redundant with lindane.	No PCULs changed.
	PW	Nickel	Removed state MCL because it has been withdrawn.	The drinking water PCUL for nickel increased from 100 to 320 ug/L.

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	PW and SW	cPAH TEQ	Set minimum ARAR value equal to minimum ARAR for benzo(a)pyrene based on advice from Policy	The drinking water PCUL for cPAH TEQ increased from 0.023 to 0.2 ug/L. The surface water PCUL decreased from 0.0097 to 1.6E-5 ug/L.
	Leach	Arsenic	Added 8 ug/L (natural background concentration) in the User Defined column and linked the leaching PCULs for protection of drinking water and surface water into the SL page.	Vadose zone leaching PCULs increased from 0.34 and 0.082 mg/kg (protect drinking and surface water, respectively) to 4.67 mg/kg. Saturated zone leaching PCULs increased from 0.017 and 0.0041 mg/kg (protect drinking water and surface water, respectively) to 0.234 mg/kg. Arsenic soil PCULs ultimately adjust up to the natural background concentration of 7.3 mg/kg, so there's no change in the most stringent PCULs.
	All	PFBA	Added new chemical to all pages.	There are now PCULs for PFBA.
	Param	DDD, DDE, cis-1,2-DCE	Updated toxicity values consistent with CLARC updates.	DDD and DDE PCULs are driven by cancer effects so most stringent PCULs didn't change. There are now cis-1,2-DCE PCULs for air and vapor intrusion.
August 2022	Param	Listed on CLARC VI Page	Updated values for 1,2,3-trichloropropane, 1,4-dioxane, and sulfide from 'no' to 'YES' consistent with CLARC.	Soil vapor screening levels now calculate for these chemicals.
	PW	Tetrahydrofuran	Correction: there are no MCLs for this chemical.	Groundwater PCUL for drinking water increased from 6 to 7,200 ug/L.
	AR	Tetrahydrofuran	Corrected a copy-down error.	Air & soil vapor PCULs decreased by a factor of about 2.
	AR-Eq, AR-Det	All chemicals	Added commercial VI screening levels consistent with CLARC guidance.	These screening levels aren't called into the AR summary page but they are available for site-specific evaluations.
	All	Lindane, PFBS, PFHxS, PFOS, PFOA, PFNA, GenX	Added new chemicals to all pages.	PCULs are now calculated for 7 new chemicals.
	AR-Det, AR, VI	TCE	Added new columns for short-term action levels to protect against cardiac birth defects for both unrestricted and commercial worker scenarios, consistent with VI Guidance Appendix A.	Use the action levels to determine whether immediate action (further sampling or mitigation) is needed per VI Guidance Appendix A. The action levels do not replace cleanup levels.
	Param	Chlordane	Updated toxicity and chemical property values for cis and trans forms to be consistent with CLARC. Previously, the cis and trans forms weren't in CLARC and the PCUL spreadsheet used the values for chlordane.	No changes to most stringent groundwater PCULs. Most stringent soil PCULs for saturated zone increased by a factor of 1.3. Air PCULs are no longer being calculated because there are no inhalation toxicity values.
	Param	Multiple	Updated ABS values to be consistent with CLARC.	Changes to some sediment PCULs for chemicals not included in the LDW ROD.
	Param	Dibenzofuran	Removed ABS value to be consistent with CLARC.	Most stringent PCULs didn't change.
	Param	4-Chlorotoluene	Updated toxicity and chemical property values to be consistent with CLARC.	Soil and groundwater PCULs are now being calculated.
	Param	Manganese	Revised oral RfD to 4.67E-2 mg/kg-day for nondietary exposures (drinking water, soil, and sediment) to be consistent with the notes in CLARC. The dietary RfD of 1.4E-1 mg/kg-day is hard-entered into the calculation for Equation 730-1 on the GW-Eq page. However this calculation can't be performed because there is no BCF value.	No changes to most stringent PCULs.
	Param	Mutagens	Added column indicating whether the chemical is listed as a mutagen in CLARC. PCULs for mutagens were already hand-entered from CLARC to ensure the adjustments for mutagenicity were included	No changes to PCULs.
	Param	All chemicals	Added RfCs and IURs and calculated inhalation RfDs and CPFs. Previously, inhalation RfDs and CPFs were hand-entered from CLARC.	The calculated values for inhalation RfDs and CPFs look the same as the hand-entered values used previously when presented with three significant digits, but there are differences beyond the third digit that affect downstream calculations. PCULs calculated using MTCA equations now match CLARC more closely.

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	AR-Det, AR	All chemicals	Removed deep soil gas screening levels and re-named shallow soil gas screening levels to simply soil gas screening levels, consistent with Ecology's (2022) updated vapor intrusion guidance.	All soil gas results will be screened against the same screening levels regardless of depth.
January 2022	SL, GW, Sed, AR	Multiple chemicals	Net result of multiple modifications noted below for chemicals of particular interest.	PCULs for hexavalent chromium decreased up to 4 orders of magnitude due to addition of new oral CPF and classification as a mutagen. Sediment PCULs for cPAH TEQ increased by factor of 6.5 due to EPA's Explanation of Significant Differences. Soil PCULs for PCBs decreased five-fold due to increase in the Koc.
	All	diisopropyl ether, tetrahydrofuran	Added two new chemicals.	There are now PCULs for these two chemicals.
	PW	PCB TEQ	Removed MCL because it applies only to TCDD, not TEQ.	Most stringent PCUL didn't change because it's driven by protection of surface water.
	SL-Eq, GW-Eq, AR-Eq	Mutagenic chemicals	Hand-entered soil, groundwater, and air equation values from July CLARC for hexavalent chromium, benzidine, n-nitrosodimethylamine, and 1,2-dibromo-3-chloropropane. These CULs have adjustments to account for higher cancer risk during childhood because they cause cancer via a mutagenic mode of action. Equation values for additional mutagens had been hand-entered during previous updates.	Air CULs decreased by a factor of 3.8. Soil contact CULs decreased but most stringent soil PCULs are driven by leaching. Most stringent groundwater PCULs didn't change for some of the mutagens because they were driven by water quality criteria that didn't change. Most stringent groundwater PCULs for n-nitrosodimethylamine, 1,2-dibromo-3-propane, and ethylene oxide decreased. Most stringent groundwater PCUL for chromium VI decreased primarily because there is now an oral CPF (see other modifications made in this version).
	SedMMA	Mutagenic chemicals	New page that calculates sediment CULs for beach play scenario for mutagenic chemicals hexavalent chromium, benzo(a)pyrene, benzidine, n-nitrosodimethylamine, 1,2-dibromo-3-chloropropane, ethylene oxide, methylene chloride, trichloroethene, and 1,2,3-trichloropropane.	Sediment PCUL for benzo(a)pyrene didn't change because the LDW CUL is preferred. Sediment PCULs for other mutagens decreased by factor of 5.3.
	Param	PCB TEQ	Changed values for ABS and AB1 to be consistent with dioxins.	Most stringent soil PCULs decreased by 75%. Most stringent groundwater and sediment PCULs didn't change.
	Param	Multiple chemicals	Per July CLARC update, revised Hcc for about 75 chemicals, Koc or Kd for about 25 chemicals, and INH for about 30 chemicals.	Many leaching and VI PCULs changed.
	Sed	PCP, dibenzofuran, n-nitrosodiphenylamine	Corrected unit errors on benthic criteria.	Most stringent PCULs didn't change because the LDW ROD CULs were entered correctly and they take precedence.
	Param	Chromium VI	Added oral CPF per July CLARC update.	There are now cancer-based CULs for chromium via oral exposure pathways (soil contact, drinking water, and surface water).
	Param	Acetone	Deleted inhalation RfD per November RSL update.	There is now no air CUL for acetone.
	All	2,3,7,8-TCDD	Added a row for 2,3,7,8-TCDD because MCLs and WQC are for this congener only.	Air PCULs and most stringent soil PCULs are the same for dioxin/furan TEQ and TCDD. Sediment PCULs and most stringent groundwater PCULs are different.
	Sed	Multiple chemicals	Added new columns H for organic carbon-normalized benthic SCOs and K for organic carbon-normalized benthic CSLs. These columns are for information only and are not used for calculating groundwater partitioning to sediment.	No PCULs changed.
	Param	1,2,3-Trichlorobenzene	Corrected previous error by adding oral RfD.	There are now equation values for groundwater and soil.
	Sed	cPAH TEQ	Updated CULs & RALs based on the LDW Explanation of Significant Difference.	Minimum sediment CUL increased from 0.09 to 0.59 mg/kg.
	Sed	1,2-Dichlorobenzene	Corrected typo in CUL for RAO 3 from 0.036 to 0.035 mg/kg.	Sediment PCUL decreased slightly.
	SW	Methylmercury	Updated ARARs to be consistent with CLARC.	Most stringent ARAR didn't change.

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	Sed	Multiple chemicals	For nonbioaccumulative chemicals, revised lower tier (column Q) and upper tier (column R) risk-based concentrations to adjust up to PQL (column F) when the risk-based concentration falls below the PQL.	Some sediment PCULs increased.
	SL-Det	Hexachlorobenzene	Added 31 mg/kg for simplified TEE columns K and L.	Most stringent PCUL didn't change.
	SL	Lead & nickel	Corrected natural background concentrations (SL-10 in column Q) to 24 mg/kg for lead and 48 mg/kg for nickel.	Most stringent PCUL didn't change for lead but increased for nickel.
May 2021	GW, SW	Multiple	Removed columns indicating which aquatic life WQC are for the dissolved fraction because program policy is to use total analyses even when the WQC is based on the dissolved fraction.	No PCULs changed
	SW	Cyanide	Added state WQC.	Minimum ARAR didn't change.
	SW	Aquatic Life Literature Values	Added values for BTEX from Implementation Memo 23.	No changes to PCULs for benzene or ethylbenzene. PCUL to protect surface water for toluene decreased from 130 to 102 ug/L. There is now a PCUL to protect surface water for xylenes.
	GW-Eq	Weathered gas	Corrected a typo in the Method B surface water equation value based on Method A: from 100 to 1,000 ug/L.	Most stringent PCUL for weathered gas increased from 100 to 1,000 ug/L.
	Leach	GRO, DRO, ORO	Copied PCULs for SL-2 to SL-3 and PCULs for SL-5 to SL-6.	There are now soil leaching PCULs for protection of surface water.
	SL	Individual cPAHs	Eliminated soil CULs for individual cPAHs. TCP policy is to set soil CULs only for cPAH TEQ.	There are now no soil PCULs for individual cPAHs. The soil PCULs for cPAH TEQ did not change. There is an individual TEE PCUL for benzo(a)pyrene, but it is higher than the most stringent cPAH TEQ PCUL. In most cases, the cPAH TEQ PCUL will over-ride the benzo(a)pyrene TEE PCUL.
	Param	Multiple	Updated the following toxicity data consistent with the February 2021 CLARC update: RfDo value for 1,3-dichloropropane; RfDi values for bromochloromethane, trans-1,2-dichloroethene, and molybdenum; CWA aquatic life criteria for lead and methylmercury.	There are now soil, ground water, and sediment PCULs for 1,3-dichloropropane. Ground water PCULs for lead decreased from 8.1 to 5.6 ug/L. There is now an air PCUL for moybdenum (it's not volatile so the PCUL would apply to airborne dust). There are now air and VI PCULs for trans-1,2-DCE.
	Param	Multiple	Reclassified multiple chemicals as to whether they are subject to vapor intrusion based on the February 2021 CLARC update.	The list of chemicals that have values on the AR page changed. This affects ground water PCULs for vapor intrusion. The ground water PCULs for hexachlorocyclopentadiene decreased from 1 to 0.22 ug/L. The nonpotable ground water PCUL for acetone decreased from 3.6E8 to 1.5E7 ug/L. The ground water PCULs for trans-1,2-dichloroethylene decreased from 100 ug/L (potable) and 1,000 ug/L (nonpotable) both to 80 ug/L. There are now nonpotable ground water PCULs for dibromomethane, n-propylbenzene, and 1,3,5-trimethylbenzene.
	Param	Multiple	Updated Koc and Hcc values consistent with the February CLARC update.	Many Koc and Hcc values changed, some barely noticeably. About 60 chemicals have Koc values for the first time, allowing leaching PCULs to be calculated, including cyanide, TBT, benzyl alcohol, dimethylphthalate, and 1,4-dioxane.
September 2020	SW, GW	New columns	New columns indicate which aquatic life WQC apply to dissolved fraction and the cases where the surface water PCUL is driven by aquatic life WQC that apply to dissolved fraction.	No PCULs changed.
	All	2,3,7,8-TCDD	Removed because it's redundant with dioxin/furan TEQ.	Dioxin/furan TEQ PCULs didn't change.
	All	Sulfide, n-hexane, weathered gas	Added new chemicals.	PCULs are available for three new chemicals. PCULs for gasoline range hydrocarbons now differentiate between fresh and weathered.

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	Sed	Upper Tier Risk-Based Concentration for Bioaccumulatives	Added new column to incorporate regional background into calculation for bioaccumulatives or default to natural background if regional not available. Revised logic in SMS Upper Tier Sediment PCUL to point to new column.	No PCULs changed because there are no regional background concentrations.
	Param	Multiple	Made the following updates consistent with CLARC: new RfDi for antimony; revised Kd/Koc values for PCBs, benzene, bis-2-chloroethyl ether, chloroform, 1,1-dichloroethane, 1,3-dichloropropene, diethyl phthalate, and TCE; revised Hcc values for mercury, 1-methylnaphthalene, and total xylenes.	The mercury PCUL for vapor intrusion increased by a factor of 2.8. Other PCULs did not change by noticeable amounts.
	Sed-Eq	Multiple	Reorganized columns to show sediment contact PCULs for each scenario (beach play, clamming, and netfishing) as well as the overall minimum scenario.	No PCULs changed.
	SL-Eq	Vinyl chloride	Revised Method C cancer calculation to use default CPFo of 1.5 per mg/kg-day rather than the hand-entered CPFo of 0.75 per mg/kg-day. The previous CPFo assumed that no pregnant women would be present in industrial workplaces.	Method C soil direct contact PCUL for vinyl chloride decreased by 2.
	SL-Det	Site-specific TEE for ORO	Added 1,600 mg/kg for plants and 260 mg/kg for soil biota under the site-specific TEE for ORO alone per advice from Policy.	The most stringent soil PCUL for ORO decreased from 2,000 to 260 mg/kg.
May 2020	Multiple	Sheet name	Changed several sheet names to shorten and/or clarify.	No changes to PCULs.
	Param	Listed on CLARC VI Page	New column that indicates whether a chemical is considered volatile for the purpose of calculating ground water and soil vapor VI screening levels. The VI and AR-Det pages link to this column.	Some chemicals that had VI screening levels before do not have screening levels now and vice versa.
	PW	MCL, MCLG	Based on advice from Policy, deleted federal secondary MCLs and added state secondary MCLs.	Potable ground water PCUL for aluminum increased from 50 to 16,000 ug/L; associated soil leaching PCULs also increased. No other ground water PCULs changed.
	SL, GW	Protect Sediment is 'TBD'	Eliminated column because only four chemicals had X's in this column and it wasn't adding much useful information.	No PCULs changed.
	SL-Eq	Method C direct contact CULs for all petroleum mixtures	Added 29,000 mg/kg based on MTCATPH11 calculation for most toxic fraction (aromatics EC >10-12).	Method C direct contact soil PCULs now available for petroleum mixtures, but concentrations this high are likely to be greater than residual saturation, in which case the PCUL must default to residual saturation.
	Sed-Eq	cPAH TEQ	Hand-entered CULs from SCUM Table 9-3 because SCUM includes adjustments for early life exposures to mutagens.	The PCULs for sediment contact changed, but the sediment PCUL for cPAH TEQ is based on the ROD value so it didn't change.
	SL	Natural Background	Previous values came from the executive summary of Ecology's (1994) *Natural Background Soil Metals Concentrations in Washington State* . Updated values to the 90th percentile values found in Table 7, which is considered more accurate.	Background concentrations changed as follows: arsenic increased from 7 to 7.3 mg/kg; cadmium decreased from 0.8 to 0.77 mg/kg; lead decreased from 24 to 16.83 mg/kg; and nickel decreased from 48 to 38 mg/kg.
	Param	PBT and DMMP	Corrected benzo(g,h,i)perylene to indicate bioaccumulative under PBT. Updated cadmium, copper, nickel, silver, and zinc to indicate not bioaccumulative under 2018 edition of DMMP.	No impacts for LDW sites because these chemicals were not considered bioaccumulative based on results of EPA's human health and ecological risk assessments.
	Param	ABS	Changed dermal absorption from the default values in MTCA Eq. 740-3 to the default values in EPA's Risk Assessment Guidance for Superfund Vol. 1 Part E text and Exhibit 3-4 to be consistent with SCUM.	Combined results of these two changes: Sediment PCULsfor 44 chemicals didn't change. PCULs for 61 chemicals increased by a factor of less than 1.2. PCULs for 13 chemicals increased by a factor of 1.6. PCULs for 4,4'-DDD and total DDD increased by a factor of 1.9. PCULs for 4,4'-DDE and total DDE increased by a factor of 2.5.
	Param	GI	Changed the default gastrointestinal absorption fraction (AB1 in MTCA, GI in SCUM) (aka relative bioavailability) for certain metals to chemical-specific values in EPA's Risk Assessment Guidance for Superfund Vol. 1 Part E Exhibit 4-1.	

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	SL-Eq, GW-Eq, SW-Eq, AR-Eq	Methylene chloride, 1,2,3-trichloropropane	Updated Method B cancer equation values by hand-entering from CLARC to include age-dependent adjustment factors because these chemicals are mutagenic. Adjusted the surface water value to account for the LDW fish consumption rate of 97.5 g/day.	Air PCUL for methylene chloride decreased from 250 to 66 ug/m3 but most stringent soil and ground water PCULs didn't change. Most stringent soil PCULs for 1,2,3-trichloropropane decreased from 0.033 to 0.0063 mg/kg, most stringent ground water PCULs from 0.0015 to 0.00038 ug/L.
	Param	4-Nitroaniline	Added oral CPF from the January 2020 CLARC update.	The most stringent soil PCUL decreased from 320 to 50 mg/kg. The most stringent ground water PCUL decreased from 64 to 4.4 ug/L.
	Param	Ethylene	Changed listing to ethylene oxide and input toxicity values from CLARC.	There are now PCULs for ethylene oxide.
	Sed	SCOs and CSLs	Added the regular SCO and CSL benthic criteria (in addition to AETs) for use in developing site-specific CULs. No calculations key off these columns.	No changes to PCULs.
	Sed	Total PCB congeners	Removed benthic criteria because they don't apply to total congeners.	Sediment PCUL didn't change because it was based on natural background due to bioaccumulation.
	Param	RfDi for arsenic	Updated to 4.29E-6 mg/kg-day per CLARC.	Noncancer PCULs decreased by a factor of 0.13, but arsenic PCULs are driven by natural background so no change in final PCULs.
	SW	cis and trans 1,3-Dichloropropene	Added values for Washington Toxics Rule.	ground water PCULs decreased from 2 to 1.2 ug/L.
	PW SW Leach	cPAHs	Removed MCLs and WQC for cPAH TEQ because they are specific to individual cPAHs rather than TEQ. Based on advice from Policy, eliminated leaching calculations for individual cPAHs. Set the ground water PCUL for protection of surface water for cPAH TEQ to the PCUL for benzo(a)pyrene.	cPAH TEQ PCULs for drinking water and ground water to surface water are now calculated based on Method B equations rather than ARARs. The TEQ drinking water CUL decreased from 0.2 to 0.0023 ug/L. The TEQ ground water PCUL to protect surface water increased from 1.6E-5 to 1.19E-2 ug/L. However, the PCULs to protect surface water for individual cPAHs range from 1.6E-5 to 1.6E-2 ug/L. There is a soil PCUL for protection of surface water via ground water for cPAH TEQ but not for individual cPAHs.
	Param	INH for mercury	Changed to 1 because the vapor pressure is less than benzene.	The potable ground water PCUL for mercury increased by a factor of 2.
	Param	CPFi for arsenic	Updated the value from 2.1 to 15.	The air PCUL for arsenic decreased by approximately a factor of 7.
	All	All	Added 2,3,4,5-tetrachlorophenol, bis(chloromethyl)ether, cyanide, sulfates, nitrates, and weathered diesel. Added 10 new chemicals in Method 8151A (chlorinated herbicides): 2,4-D, 2,4,-DB, 2,4,5-TP, 2,4,5-T, dalapon, dicamba, dichloroprop, dinoseb, MCPA, MCPP.	PCULs available for 15 new chemicals. New distinction between fresh & weathered diesel for protection of aquatic life. Pentachlorophenol and 4-nitrophenol are also on 8151 analyte list, but were already covered in the SVOC section.
	Param	Soil foc and sediment foc	Added cells at top of page which are linked to Eqtn page. Calculation of Kd for organics is keyed to these cells, except for ionizing organics which are hand-entered in the Kd inorganics column.	No PCULs changed.
	SW	PCB TEQ	Used ARARs for dioxin/furan TEQ instead of PCB Aroclors.	PCUL to protect surface water decreased from 7E-6 to 4.4E-9 ug/L.
	SW	Petroleum	Added values from Implementation Memo 23 in the Aquatic Life: Literature Values column. Added Method A values in WA State WQC Human Health column [WAC 173-340-730(3)(b)(iii)(C)].	Ground water PCULs for protection of surface water are now available.
	Param	Soil Koc and Kd	For ionizing organics, transferred values in Kd column to Koc column	No changes to PCULs.
	Sed	Total Aroclors	Added average PQL from SCUM Appendix D.	Allows PQL to be used as sediment PCUL instead of defaulting to text message "PQL".
June 2019	SL-Eq	TPH-G	Added 1,500 mg/kg default direct contact PCUL from *Model Remedies for Sites with Petroleum Contaminated Soils* .	Most stringent soil PCUL didn't change because it's driven by the leaching pathway.

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	747-1	TPH rows	Added 30 mg/kg as leaching PCUL for TPH-G in vadose and saturated zones to protect drinking water. Added 2,000 mg/kg as leaching PCUL for all other petroleum rows in vadose and saturated zones to protect drinking water. There are no leaching PCULs to protect surface water.	The most stringent TPH-G soil PCUL for nonpotable ground water increased from 30 mg/kg to 120 mg/kg. There are now no PCULs for TPH-O for nonpotable ground water.
	All	--	Added column on far right that allows specific chemicals of interest to be identified for easy filtering.	No PCULs changed.
	Mods	--	Re-ordered list of modifications to show most recent modifications first.	No PCULs changed.
	Chems	multiple	Added additional synonyms from May 2019 CLARC update.	No PCULs changed.
	GW-Eq Sed-Eq	Benzo(a)pyrene, cPAH TEQ	Hand-entered the cancer-based CULs for surface water and beach play scenario to include age-dependent adjustment factors because cPAHs are mutagenic. Calculations are shown in Attachment 1a and 1b of the supplemental information paper.	Surface water PCULs decreased from 0.060 to 0.012 µg/L, but ground water PCULs for protection of surface water didn't change because they're driven by the WQC of 1.6E-5 µg/L. SMS CUL for benzo(a)pyrene decreased from 0.85 to 0.27 mg/kg, but sediment PCUL didn't change because it prefers LDW ROD CUL of 1.6 mg/kg. SMS CUL for cPAH TEQ remained unchanged at 9E-3 mg/kg, based on PQL, because cPAHs are bioaccumulative.
	Param	Endosulfan sulfate	Added oral RfD of 6E-3 mg/kg-day from EPA's May 2019 regional screening level update.	The most stringent soil PCUL changed from no value to 480 mg/kg. No changes to ground water or air PCULs.
	Param	Vanadium	Replaced toxicity values for vanadium with those for vanadium pentoxide because the latter come from higher quality sources. Vanadium is unlikely to be present in metallic form in the environment.	No change in the most stringent soil PCULs. Most stringent PCUL for potable ground water increased from 80 ug/L to 140 ug/L. Sediment PCUL increased from 1,100 mg/kg to 1,970 mg/kg.
	Param	Manganese	Revised oral RfD from 0.14 to 0.0467 mg/kg-day; a modifying factor of 3 was included to account for nondietary exposures per CLARC. The full RfD of 0.14 mg/kg-day would be used to calculate surface water CULs, but such a calculation isn't possible due to a lack of BCF.	No change in most stringent PCULs for ground water. PCULs for soil decreased from 1,200 to 1,100 mg/kg due to a revision in natural background rather than the change in the RfD.
	Param	Benzaldehyde	Added oral CPF from the May 2019 CLARC update.	Potable ground water PCUL decreased from 800 to 11 ug/L. All of the soil PCULs decreased from 8,000 to 250 mg/kg.
	Param	Target organs	Added new columns for target organs for oral and inhalation exposures per the May 2019 CLARC update.	No PCULs changed. The target organs can be used for evaluating additive hazards.
	Param	DDD, DDE	Added oral RfDs from the May 2019 CLARC update.	No PCULs changed because they are driven by cancer effects.
	Param	Dibromochloro-methane	Removed inhalation CPF because it's not in the May 2019 CLARC update.	There are now no PCULs for air or soil vapor.
	Param	Formaldehyde	Added oral CPF from the May 2019 CLARC update.	PCUL for potable ground water decreased from 1,600 to 2.1 ug/L. All soil PCULs decreased from 16,000 to 48 mg/kg.
	Param	Bromobenzene	Added Koc and Hcc from the May 2019 CLARC update.	No change in ground water PCULs. It's now possible to calculate soil leaching PCULs. The most stringent soil PCUL for the vadose zone, potable ground water, decreased from 640 mg/kg (direct contact) to 0.56 mg/kg (leaching). The most stringent soil PCUL for the saturated zone, potable ground water, decreased from 640 to 0.033 mg/kg.
	Param	4-Nitroaniline	Added oral RfD from the May 2019 CLARC update.	There are now PCULs for soil and potable ground water.
	Param	Trichlorotrifluoro-ethane; 1,2,4-trimethylbenzene	Changed the references for toxicity values per the May 2019 CLARC update.	No PCULs changed.
	SL	Natural background	Corrected natural background concentrations for iron and manganese from the body of Ecology's 1994 report. The values in the executive summary have typos.	The PCULs for iron didn't change because they weren't adjusted to background. The PCULs for manganese decreased from 1,200 mg/kg to 1,100 mg/kg.

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	All	Diesel & oil range hydrocarbons	Added a row for total diesel and oil range hydrocarbons because the Method A soil and ground water CULs apply to the sum of diesel and oil.	PCULs are now expressed for diesel alone, oil alone, and diesel plus oil combined.
	All	Xylenes	Removed rows for m-, m,p-, and o-xylenes so that only total xylenes is listed. The MCL is specified for total xylenes, so it doesn't make sense to screen individual isomers.	PCULs are available only for total xylenes.
April 2019	All	Di(2-ethylhexyl)adipate; 1,2-, 1,3-, and 1,4-dinitrobenzene; 3-methylphenol; and 2,3,4,6-tetrachlorophenol	Added 6 new chemicals detected at LDW sites.	PCULs now available for 6 new chemicals
	All	Chromium	Added a new line to separate total and trivalent chromium.	Separate PCULs are provided for total and trivalent chromium
	Param	cPAH TEQ	Removed the RfDs for benzo(a)pyrene from the cPAH TEQ line per advice from Jim White.	Soil and ground water PCULs were not affected because they're driven by the cancer endpoint. Air and soil vapor PCULs for cPAH TEQ increased because they were driven by the noncancer endpoint.
December 2018	Param	RfDo for toxaphene	Updated from "na" to 9E-5 mg/kg-day based on EPA's November 2018 Regional Screening Level update.	PCULs now available for noncancer effects, but PCULs for cancer effects are lower so no change in most stringent PCULs.
	747-1	Arsenic	Added a reference to Table 1, where issues related to natural background concentrations are discussed.	No PCULs changed.
	All	CAS No.	Deleted this column on all sheets except 'Chems' to save space.	No PCULs changed.
	Sed	SMS Upper Tier (columns R and BB)	Corrected coding to use regional background rather than natural background	There are no established regional background concentrations so no PCULs changed.
	GW-VI	Column C	Updated title of column from Ecology's 2009 guidance document to the CLARC vapor intrusion web page and updated values to be consistent with that page.	No PCULs changed.
	GW-Detail-PW	Federal MCLs	Added secondary MCLs per the 2001 *Concise Explanatory Statement* (page 173).	The potable water PCUL for aluminum decreased from 16,000 to 50 ug/L. Iron decreased from 11,000 to 300 ug/L. Manganese decreased from 2,200 to 50 ug/L.
	SL	Natural Background	Modified values to be consistent with the number of significant digits in the executive summary of Ecology's (1994) *Natural Background Soil Metals Concentrations in Washington State* .	Small changes in the significant digits to soil PCULs adjusted to natural background.
June 2018	Multiple	Representative PQLs	Eliminated PQL columns on all pages except Sed page. Changed PQL column on Sed page from a link to a hard entry.	No changes to PCULs.
	Multiple	Multiple	Miscellaneous editing and formatting to keep spreadsheet and white paper clear and internally consistent.	No changes to PCULs.
	Param	1,2-Dichloropropane	Corrected calculation of CPFi from inhalation unit risk.	CPFi decreased by a factor of 10. Air and soil gas PCULs increased 10X.
	Param	Methyl isobutyl ketone	Updated the references for the RfDs to CLARC because toxicity data have been removed from EPA's regional screening levels but not from CLARC.	No changes to PCULs.
	Param	bis(2-Chloro-1-methylethyl) ether	Removed CPFs and RfDi because they've been removed from EPA's regional screening levels	Soil and ground water PCULs increased by factors ranging 2.7 to 508. PCULs no longer available for air or soil gas.
	GW-Eq	Surface water CULs for TCE	Over-wrote calculated values with values from CLARC guidance.	Surface water equation value increased by a factor of 4, but the PCUL didn't change because the ARAR is lower.
	GW	Natural background for arsenic	Method A CUL replaced by the 90th percentile for the Puget Sound Basin in Ecology's (2013) draft *Ambient Ground Water Arsenic Concentrations in Washington State.*	Most stringent ground water PCULs increased from 5 ug/L to 8 ug/L. Soil leaching PCULs increased accordingly.

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	SL-Detail	GRO and DRO	Updated ecological indicator soil concentrations for protection of plants and soil biota from Ecology's (2017) Implementation Memo 17.	Minimum TEE PCULs increased slightly. The increased TEE PCUL for DRO is the most stringent soil PCUL.
	AR-Eq	GRO and DRO	Added Method B and C noncancer air PCUL of 140 ug/m3 from Implementation Memo 18 (Ecology 2018).	Air PCULs and soil gas PCULs are now available for GRO and DRO.
	AR-Eq	Vinyl chloride	The Method C cancer calculation had been using a hand-entered CPFi for exposures during adulthood only. It was modified to use the CPFi for exposures from childhood to account for the possibility of a pregnant woman being exposed in the workplace.	The Method C air PCUL for vinyl chloride decreased by a factor of 2. The ground water and soil gas screening levels decreased accordingly.
December 2017	AR	--	Re-named soil gas PCULs for vapor intrusion to SG-1 and SG-2 and re-labed them as screening levels rather than PCULs. No changes to PCUL or screening level values.	No changes to PCULs.
	GW GW-Detail-PW	--	Re-labeled ground water PCUL for vapor intrusion to a screening level rather than a PCUL. No changes to PCUL or screening level values.	No changes to PCULs.
	Param	LDW COC for human consump seafood	Changed entry for 4,4'-DDT from "no" to "YES" to be consistent with the entry for total DDT.	Sediment PCUL for 4,4'-DDT now defaults to the PQL.
	Param	RfDo	Added oral RfDs for 4,4'-DDD and 4,4'-DDE based on the November 2017 regional screening level update.	Noncancer PCULs now calculated for 4,4'-DDD and 4,4'-DDE. The soil direct contact PCUL for 4,4'-DDD is driven by the new noncancer value.
	Param	PQLs for total DDD, DDE, DDT	Copied down PQLs from 4,4'- analytes for consistency.	Sediment PCUL for total DDT now has a numerical value based on the PQL instead of the text message "PQL."
October 2017	Param	Carcinogenic PAHs	Updated the Koc values to be consistent with Table 2 of Implementation Memo 10 (2015).	PCULs didn't change noticeably.
	Param	Ethylbenzene	Removed the CPFi value because Ecology decided not to treat ethylbenzene as a carcinogen.	Air PCUL and VI screening levels increased because the cancer calculation was removed.
	SL-Detail SL	TEE screening levels	Added site-specific TEE screening levels to the SL-Detail page and linked the minimum into the SL summary page instead of the simplified TEE screening levels, because the site-specific screening levels are more conservative. Double-checked and corrected the simplified TEE screening levels on the SL-Detail page.	Many TEE PCULs decreased.
September 2017	Param	Mercury, inorganic	Changed INH value to 2.	No change to the drinking water PCUL because it's driven by the MCL.
	SL-Eq	Benzo(a)pyrene, cPAH TEQ	Hand-entered new Method B carcinogen equation values to account for early life stage exposures because cPAHs are mutagenic. Method C carcinogen equation values weren't updated because they assume industrial land use where children aren't exposed.	Soil direct contact CULs decreased by a factor of 5.
	GW-Eq	Benzo(a)pyrene, cPAH TEQ	Hand-entered new Method B drinking water carcinogen equation values to account for early life stage exposures because cPAHs are mutagenic. Method B carcinogen equation values for surface water weren't updated due to a lack of fish consumption rates for appropriate child age ranges.	No changes to drinking water PCULs because they're driven by the MCL. Surface water PCULs wouldn't change even if the equation values were updated because they would be driven by the WQC.
	Air-Eq	Benzo(a)pyrene, cPAH TEQ	Hand-entered new Method B carcinogen equation values to account for early life stage exposures because cPAHs are mutagenic. Method C carcinogen equation values weren't updated because they'll be used primarily at industrial sites where children aren't exposed.	No changes to air CULs, soil gas SLs, or ground water SLs for VI because they're driven by the noncancer values.

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	SL-Eq	Vinyl chloride	Hand-entered an oral CPF of 0.75 per mg/kg-day in the Method C carcinogen equation to account for lack of childhood exposure at industrial sites. Vinyl chloride is considered mutagenic.	Soil direct contact CUL increased by a factor of 2.
	Air-Eq	Vinyl chloride	Hand-entered an inhalation CPF of 0.0155 per mg/kg-day in the Method C carcinogen equation to account for lack of childhood exposure at industrial sites. Vinyl chloride is considered mutagenic.	Air CUL increased by a factor of 2.
August 2017	SL-Detail	Method C CUL (column J)	Entered the Method A industrial land use CUL.	There is now a Method C direct contact CUL for lead.
	Eq.1(VI)	Listed in Table B-1 Ecology (2009) VI Guidance?	Added this new column and populated it according to Ecology's updated VI guidance. Ground water PCULs to protect indoor air via vapor intrusion for both Method B (GW-4, Column G) and Method C (Column I) occur only when the answer in this new column is "Yes."	Decreased the number of chemicals for which PCUL GW-4 was calculated.
	Param	Total PCB TEQ	Copied Koc and BCF from Total PCB Aroclors and Total PCB congeners.	Leaching PCULs now calculated for PCB TEQ.
	GW-Detail-SW	Total PCB TEQ	Copied the ARARs from PCBs rather than dioxin/furan TEQ, per recommendation of Jim White.	No effect on ground water PCULs.
July 2017	SL GW	--	Added horizontal lines in "Basis" columns to aid in read-across.	No changes to PCULs.
	GW-Detail-PW	--	Corrected typo in heading for Column M.	No changes to PCULs.
	GW-Detail-SW	--	Corrected typos in headings for Columns L and P.	No changes to PCULs.
	Chems	Chem Class	Eliminated columns because it wasn't being used.	No changes to PCULs.
	All	--	Unhid Columns A (sort order), updated values, corrected links, and corrected borders.	No changes to PCULs.
	Param	Toxicity values	The following chemicals and parameters were updated consistent with USEPA's revised Regional Screening Levels, June 2017. 123-, 124-, and 135-Trimethylbenzene: RfDo and RfDi Trichlorotrifluoroethane: RfDi 12-Dichloropropane: RfDo, CPFo, and CPFi	Associated PCULs on multiple pages changed.
June 2017	Param	Total dioxin/furan TEQ	Added BCF of 5,000 (from 2,3,7,8-TCDD).	Surface water PCUL now calculated for dioxin/furan TEQ.
	GW-Detail-SW	40 CFR 131.45	Changed name to Washington Toxics Rule per discussion with Water Quality Program.	No PCULs changed.
	GW-Detail-SW	40 CFR 131.45	In cases where EPA approved Washington's modified WQC for human health (Aug 2016), removed the (duplicate) values from the WA Toxics Rule column.	These values remain in the WA State column, so no PCULs changed.
	GW-Detail-SW	40 CFR 131.36	Removed column because it's no longer applicable per discussion with Water Quality Program.	These values were present in other aquatic life columns, so no PCULs changed.
	Param	Arsenic	Corrected oral carcinogenic potency factor from 1 to 1.5 per mg/kg-day.	All PCULs for arsenic changed.
May 2017	SL-Eq	TCE	Hand-entered Method C cancer PCUL for soil contact from CLARC guidance. Other soil PCULs were entered correctly from the guidance.	Method C direct contact soil PCULs for TCE changed.
	AR-Eq	TCE	Hand-entered Method B and C, noncancer and cancer, PCULs for air from CLARC guidance. PCULs were being calculated per default equation which is incorrect for TCE.	Method B and C air PCULs for TCE changed.
April 2017	All	Formaldehyde	Added to all pages	

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Sort Order	Chemical (all concentrations in mg/kg)	Most Stringent Soil PCUL Vadose Zone Potable GW SL #s 1-4, 8-10	Most Stringent Soil PCUL Saturated Zone Potable GW SL #s 1, 5-10	SL-1 Direct Contact SL-Det	SL-2 Protect Drinking Water Vadose Zone LeachFW	SL-3 Protect Surface Water via Ground Water Vadose Zone LeachFW	SL-4 Protect Sediment via Ground Water Vadose Zone LeachFW	SL-5 Protect Drinking Water Saturated Zone LeachFW	SL-6 Protect Surface Water via Ground Water Saturated Zone LeachFW	SL-7 Protect Sediment via Ground Water Saturated Zone LeachFW	SL-8 Protect Sediment via Erosion SMS Lower Tier SedFW	SL-9 Site-Specific TEE Unrest. Land Use SL-Det	SL-10 Natural Background Ecology (1994)
1	***PCBs***												
2	Total PCB Aroclors	1.1E-05	5.5E-07	1.0E+00	3.4E-01	1.1E-05	4.8E-02	1.7E-02	5.5E-07	2.4E-03	1.2E-02	6.5E-01	na
3	Total PCB congeners	1.1E-05	5.5E-07	1.0E+00	3.4E-01	1.1E-05	1.4E-02	1.7E-02	5.5E-07	7.0E-04	3.5E-03	6.5E-01	na
4	Total PCB TEQ	6.9E-09	3.5E-10	1.3E-05	5.3E-06	6.9E-09	2.8E-06	2.6E-07	3.5E-10	1.4E-07	7.0E-07	na	na
5	***Dioxins/Furans***												
6	Total dioxin/furan TEQ	5.2E-06	5.2E-06	1.3E-05	1.7E-05	2.5E-08	2.0E-05	8.4E-07	1.2E-09	1.0E-06	5.0E-06	na	5.2E-06
7	2,3,7,8-TCDD	5.2E-06	5.2E-06	1.3E-05	1.7E-05	2.5E-08	1.1E-04	8.4E-07	1.2E-09	5.7E-06	2.9E-05	na	5.2E-06
8	Total chlorinated dioxins	2.0E-06	2.0E-06	na	na	na	na	na	na	na	na	2.0E-06	na
9	Total chlorinated furans	2.0E-06	2.0E-06	na	na	na	na	na	na	na	na	2.0E-06	na
10	***Inorganics***												
11	Ammonia	na	na	na	na	na	na	na	na	na	na	na	na
12	Chloride	na	na	na	na	na	na	na	na	na	na	na	na
13	Cyanide, free	3.8E-01	1.9E-02	5.0E+01	1.0E+00	3.8E-01	na	5.1E-02	1.9E-02	na	na	na	na
14	Fluoride	2.9E+03	1.4E+02	4.8E+03	2.9E+03	2.9E+03	na	1.4E+02	1.4E+02	na	na	na	na
15	Nitrate	1.3E+05	1.3E+05	1.3E+05	na	na	na	na	na	na	na	na	na
16	Nitrite	8.0E+03	8.0E+03	8.0E+03	na	na	na	na	na	na	na	na	na
17	Sulfate	na	na	na	na	na	na	na	na	na	na	na	na
18	Sulfide	3.9E+01	3.9E+01	na	na	na	na	na	na	na	3.9E+01	na	na
19	***Metals***												
20	Aluminum	3.3E+04	3.3E+04	8.0E+04	4.8E+05	9.1E+03	na	2.4E+04	4.5E+02	na	na	5.0E+01	3.3E+04
21	Antimony	5.2E+00	5.2E+00	3.2E+01	5.4E+00	5.1E+00	na	2.7E-01	2.5E-01	na	na	5.0E+00	5.2E+00
22	Arsenic	7.3E+00	7.3E+00	3.1E-02	4.7E+00	4.7E+00	1.9E+00	2.3E-01	2.3E-01	9.8E-02	9.8E-02	1.0E+01	7.3E+00
23	Barium	2.5E+02	2.5E+02	1.6E+04	1.6E+03	8.2E+02	na	8.3E+01	4.1E+01	na	na	1.0E+02	2.5E+02
24	Beryllium	1.0E+01	3.2E+00	1.6E+02	6.3E+01	6.3E+01	na	3.2E+00	3.2E+00	na	na	1.0E+01	6.1E-01
25	Cadmium	7.7E-01	7.7E-01	8.0E+01	6.9E-01	5.8E-02	1.5E+01	3.5E-02	2.9E-03	7.7E-01	7.7E-01	4.0E+00	7.7E-01
26	Chromium, total	4.8E+01	4.8E+01	na	2.0E+03	2.0E+03	1.4E+03	1.0E+02	1.0E+02	7.2E+01	7.2E+01	4.2E+01	4.8E+01
27	Chromium, trivalent	1.2E+03	6.1E+01	1.2E+05	4.8E+05	1.2E+03	na	2.4E+04	6.1E+01	na	na	na	na
28	Chromium, hexavalent	4.4E-01	2.2E-02	1.2E+00	5.4E-01	4.4E-01	1.4E+02	2.7E-02	2.2E-02	7.2E+00	7.2E+00	na	na
29	Cobalt	1.1E+01	1.1E+01	2.4E+01	4.3E+00	4.3E+00	na	2.2E-01	2.2E-01	na	na	2.0E+01	1.1E+01
30	Copper	3.6E+01	3.6E+01	3.2E+03	2.8E+02	8.0E-01	8.0E+03	1.4E+01	4.0E-02	4.0E+02	4.0E+02	5.0E+01	3.6E+01
31	Iron	3.6E+04	3.6E+04	5.6E+04	1.5E+02	1.5E+02	na	7.6E+00	7.6E+00	na	na	na	3.6E+04
32	Lead	2.4E+01	2.4E+01	2.5E+02	3.0E+03	5.0E+02	4.2E+02	1.5E+02	2.5E+01	2.1E+01	2.1E+01	5.0E+01	2.4E+01
33	Manganese	1.1E+03	1.1E+03	3.7E+03	6.5E+01	6.5E+01	na	3.3E+00	3.3E+00	na	na	1.1E+03	1.1E+03
34	Mercury, inorganic	7.0E-02	7.0E-02	na	2.1E+00	1.3E-02	1.4E+00	1.0E-01	6.3E-04	7.0E-02	7.0E-02	1.0E-01	7.0E-02
35	Methylmercury	4.0E-01	4.0E-01	8.0E+00	2.2E+02	2.2E+02	1.3E+03	1.1E+01	1.1E+01	6.7E+01	6.7E+01	4.0E-01	na
36	Molybdenum	2.0E+00	1.6E+00	4.0E+02	3.2E+01	3.2E+01	na	1.6E+00	1.6E+00	na	na	2.0E+00	na
37	Nickel	4.8E+01	4.8E+01	1.6E+03	4.2E+02	1.4E+01	5.2E+02	2.1E+01	7.2E-01	2.6E+01	2.6E+01	3.0E+01	4.8E+01
38	Selenium	7.8E-01	7.8E-01	4.0E+02	5.2E+00	1.6E-01	1.5E+01	2.6E-01	7.9E-03	7.8E-01	7.8E-01	3.0E-01	7.8E-01
39	Silver	6.1E-01	6.1E-01	4.0E+02	1.4E+01	2.9E-02	1.1E+01	6.9E-01	1.5E-03	5.7E-01	5.7E-01	2.0E+00	6.1E-01
40	Thallium	8.8E-02	4.4E-03	8.0E-01	2.3E-01	8.8E-02	na	1.1E-02	4.4E-03	na	na	1.0E+00	na
41	Tin	5.0E+01	5.0E+01	4.8E+04	4.8E+04	4.8E+04	na	2.4E+03	2.4E+03	na	na	5.0E+01	na
42	Vanadium	4.5E+01	4.5E+01	4.0E+02	1.6E+03	1.6E+03	na	8.0E+01	8.0E+01	na	na	2.0E+00	4.5E+01
43	Zinc	8.5E+01	8.5E+01	2.4E+04	6.0E+03	3.0E+01	6.4E+04	3.0E+02	1.5E+00	3.2E+03	3.2E+03	8.6E+01	8.5E+01
44	***Metals - Butyltins***												
45	Monobutyltin	5.4E-01	5.4E-01	na	na	na	na	na	na	na	5.4E-01	na	na
46	Dibutyltin	9.1E-01	9.1E-01	na	na	na	na	na	na	na	9.1E-01	na	na
47	Trybutyl tin	1.2E-02	4.3E-04	na	na	1.6E-02	1.2E-02	na	6.0E-04	4.3E-04	4.7E-02	na	na
48	Tributyltin oxide	2.1E-03	4.2E-04	2.4E+01	2.5E+03	2.5E+03	8.4E-03	1.2E+02	1.2E+02	4.2E-04	2.1E-03	na	na
49	Tetrabutyltin	9.7E-02	9.7E-02	na	na	na	na	na	na	na	9.7E-02	na	na
50	***SVOCs - PAHs***												
51	Acenaphthene	3.1E+00	1.6E-01	4.8E+03	4.9E+01	3.1E+00	na	2.5E+00	1.6E-01	na	na	2.0E+01	na
52	Acenaphthylene	na	na	na	na	na	na	na	na	na	na	na	na
53	Anthracene	4.7E+01	2.4E+00	2.4E+04	1.1E+03	4.7E+01	na	5.7E+01	2.4E+00	na	na	na	na
54	Benzo(a)anthracene	1.1E-03	5.7E-05	na	na	1.1E-03	3.6E-02	na	5.7E-05	1.8E-03	9.0E-03	na	na
55	Benzo(b)fluoranthene	1.9E-03	9.6E-05	na	na	1.9E-03	3.6E-02	na	9.6E-05	1.8E-03	9.0E-03	na	na
56	Benzo(k)fluoranthene	9.0E-03	9.4E-04	na	na	1.9E-02	3.6E-02	na	9.4E-04	1.8E-03	9.0E-03	na	na
57	Total benzofluoranthenes	1.2E-02	1.2E-02	na	na	na	na	na	na	na	1.2E-02	na	na
58	Benzo(g,h,i)perylene	5.0E-03	5.0E-03	na	na	na	na	na	na	na	5.0E-03	na	na
59	Benzo(a)pyrene	3.1E-04	1.6E-05	1.9E-01	3.9E+00	3.1E-04	3.6E-02	1.9E-01	1.6E-05	1.8E-03	9.0E-03	1.2E+01	na
60	Chrysene	9.0E-03	1.8E-03	na	na	5.9E-02	3.6E-02	na	2.9E-03	1.8E-03	9.0E-03	na	na
61	Dibenz(a,h)anthracene	5.7E-04	2.9E-05	na	na	5.7E-04	3.6E-02	na	2.9E-05	1.8E-03	9.0E-03	na	na
62	Dibenzofuran	2.0E-01	4.1E-02	8.0E+01	1.5E+00	1.5E+00	8.1E-01	7.6E-02	7.6E-02	4.1E-02	2.0E-01	na	na
63	Fluoranthene	5.0E-03	1.0E-03	3.2E+03	6.3E+02	5.9E+00	2.0E-02	3.2E+01	3.0E-01	1.0E-03	5.0E-03	na	na
64	Fluorene	1.6E+00	8.0E-02	3.2E+03	5.1E+01	1.6E+00	na	2.6E+00	8.0E-02	na	na	3.0E+01	na
65	Indeno(1,2,3-cd)pyrene	6.2E-03	3.1E-04	na	na	6.2E-03	3.6E-02	na	3.1E-04	1.8E-03	9.0E-03	na	na
66	Methyl isopropyl phenanthrene (retene)	na	na	na	na	na	na	na	na	na	na	na	na
67	1-Methylnaphthalene	4.7E-02	2.4E-03	2.0E+01	4.7E-02	4.7E-02	na	2.4E-03	2.4E-03	na	na	na	na

Basis - Vadose, Potable GW							Basis - Saturated, Potable GW						
Direct Contact	Drinking Water	Surface Water via GW	Sediment via GW	Bank Erosion	TEE	Nat. Background	Direct Contact	Drinking Water	Surface Water via GW	Sediment via GW	Bank Erosion	TEE	Nat. Background
PCBs													
		X							X				
		X							X				
		X							X				
Dioxins/Furans													
						X							X
						X							X
					X							X	
					X							X	
Inorganics													
		X							X				
	X	X						X	X				
X							X						
X							X						
				X							X		
Metals						X							X
						X							X
						X							X
						X							X
				X						X	X		
					X							X	
						X			X	X			
						X							X
				X						X	X		
						X							X
						X							X
						X							X
						X							X
						X							X
						X							X
Metals - Butyltins													
				X							X		
				X							X		
			X							X			
				X							X		
				X							X		
SVOCs - PAHs													
		X							X				
		X							X				
		X							X				
		X							X				
				X					X				
				X							X		
		X							X				
		X							X				
		X							X				
		X							X				
		X							X				
		X							X				
		X							X				
		X							X				
		X							X				
		X							X				
		X							X				
		X							X				
	X	X						X	X				

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68	2-Methylnaphthalene	1.7E+00	8.9E-02	3.2E+02	1.7E+00	1.7E+00	na	8.9E-02	8.9E-02	na	na	na	na			X	X					X	X								
69	Naphthalene	4.5E+00	2.4E-01	1.6E+03	4.5E+00	4.5E+00	na	2.4E-01	2.4E-01	na	na	na	na			X	X					X	X								
70	Phenanthrene	na	na	na	na	na	na	na	na	na	na	na	na																		
71	Pyrene	5.0E-03	1.0E-03	2.4E+03	3.3E+02	1.1E+01	2.0E-02	1.6E+01	5.5E-01	1.0E-03	5.0E-03	na	na						X						X						
72	Total LPAHs	2.9E+01	2.9E+01	na	na	na	na	na	na	na	na	2.9E+01	na					X									X				
73	Total HPAHs	1.1E+00	1.1E+00	na	na	na	na	na	na	na	na	1.1E+00	na					X									X				
74	Total PAHs	1.7E+01	1.7E+01	na	na	na	na	na	na	na	1.7E+01	na	na				X									X					
75	Total cPAH TEQ	2.1E-02	4.2E-03	1.9E-01	3.9E+00	1.9E-01	8.4E-02	1.9E-01	9.4E-03	4.2E-03	2.1E-02	na	na				X								X						
76	***Other SVOCs***													***Other SVOCs***																	
77	Aniline	8.3E-02	5.5E-03	1.8E+02	8.3E-02	8.3E-02	na	5.5E-03	5.5E-03	na	na	na	na			X	X					X	X								
78	Azobenzene	3.1E-02	1.6E-03	9.1E+00	3.1E-02	3.1E-02	na	1.6E-03	1.6E-03	na	na	na	na			X	X					X	X								
79	Benzidine	5.6E-07	3.0E-08	8.2E-04	2.8E-06	5.6E-07	na	1.5E-07	3.0E-08	na	na	na	na				X						X								
80	Benzoic acid	2.9E+00	2.9E+00	3.2E+05	2.6E+02	2.6E+02	4.0E+01	1.8E+01	1.8E+01	2.9E+00	2.9E+00	na	na						X						X						
81	Benzyl alcohol	7.1E+00	4.9E-01	8.0E+03	7.1E+00	7.1E+00	na	4.9E-01	4.9E-01	na	na	na	na			X	X					X	X								
82	Bis(2-chloroethoxy)methane	2.1E-01	1.4E-02	2.4E+02	2.1E-01	2.1E-01	na	1.4E-02	1.4E-02	na	na	na	na			X	X					X	X								
83	Bis(2-chloroethyl)ether	1.1E-04	7.3E-06	9.1E-01	2.2E-04	1.1E-04	na	1.4E-05	7.3E-06	na	na	na	na				X						X								
84	Bis(chloromethyl)ether	6.5E-07	4.4E-08	4.5E-03	8.7E-07	6.5E-07	na	5.9E-08	4.4E-08	na	na	na	na				X						X								
85	Bis(2-chloro-1-methylethyl)ether	3.5E-03	2.3E-04	1.4E+01	3.5E-03	3.5E-03	na	2.3E-04	2.3E-04	na	na	na	na			X	X					X	X								
86	2,6-Bis(1,1-dimethylethyl) phenol	na	na	na	na	na	na	na	na	na	na	na	na																		
87	Bis(2-ethylhexyl) phthalate	1.0E-01	5.0E-03	7.1E+01	1.3E+01	1.0E-01	2.0E+00	6.7E-01	5.0E-03	1.0E-01	5.0E-01	na	na				X						X								
88	4-Bromophenyl phenyl ether	na	na	na	na	na	na	na	na	na	na	na	na																		
89	Butyl benzyl phthalate	3.6E-03	1.8E-04	5.3E+02	1.3E+01	3.6E-03	na	6.4E-01	1.8E-04	na	na	na	na				X						X								
90	Butyl diphenyl phosphate	na	na	na	na	na	na	na	na	na	na	na	na																		
91	Carbazole	9.0E-01	9.0E-01	na	na	na	na	na	na	na	9.0E-01	na	na						X									X			
92	4-Chloroaniline	2.7E-03	1.7E-04	5.0E+00	2.7E-03	2.7E-03	na	1.7E-04	1.7E-04	na	na	na	na			X	X					X	X								
93	4-Chloro-3-methylphenol (chlorocresol)	5.0E-01	2.8E-02	8.0E+03	2.2E+01	5.0E-01	na	1.2E+00	2.8E-02	na	na	na	na				X						X								
94	2-Chloronaphthalene (beta-)	5.4E+00	2.8E-01	6.4E+03	3.4E+01	5.4E+00	na	1.8E+00	2.8E-01	na	na	na	na				X						X								
95	2-Chlorophenol	1.8E-01	1.0E-02	4.0E+02	4.7E-01	1.8E-01	na	2.7E-02	1.0E-02	na	na	na	na				X						X								
96	4-Chlorophenyl phenyl ether	na	na	na	na	na	na	na	na	na	na	na	na																		
97	Dibutyl phthalate	2.8E-01	1.5E-02	8.0E+03	5.7E+01	2.8E-01	1.7E+00	3.0E+00	1.5E-02	8.7E-02	3.8E-01	2.0E+02	na				X						X								
98	Dibutyl phenyl phosphate	na	na	na	na	na	na	na	na	na	na	na	na																		
99	1,2-Dichlorobenzene	7.0E+00	4.0E-01	7.2E+03	7.0E+00	7.0E+00	na	4.0E-01	4.0E-01	na	na	na	na			X	X					X	X								
100	1,3-Dichlorobenzene	2.3E-02	1.3E-03	na	na	2.3E-02	na	na	1.3E-03	na	na	na	na				X						X								
101	1,4-Dichlorobenzene	9.8E-01	5.4E-02	1.9E+02	1.2E+00	9.8E-01	na	6.8E-02	5.4E-02	na	na	2.0E+01	na				X						X								
102	3,3'-Dichlorobenzidine	2.1E-04	1.1E-05	2.2E+00	1.3E-02	2.1E-04	na	6.8E-04	1.1E-05	na	na	na	na				X						X								
103	2,4-Dichlorophenol	6.9E-02	4.3E-03	2.4E+02	3.3E-01	6.9E-02	na	2.1E-02	4.3E-03	na	na	na	na				X						X								
104	Di(2-ethylhexyl)adipate	2.9E+02	1.5E+01	8.3E+02	2.9E+02	2.9E+02	na	1.5E+01	1.5E+01	na	na	na	na			X	X					X	X								
105	Diethyl phthalate	1.1E+00	7.4E-02	6.4E+04	7.2E+01	1.1E+00	na	4.7E+00	7.4E-02	na	na	1.0E+02	na				X						X								
106	Dimethyl phthalate	2.8E+00	1.9E-01	na	na	2.8E+00	na	na	1.9E-01	na	na	2.0E+02	na				X						X								
107	2,4-Dimethylphenol	1.2E+00	6.6E-02	1.6E+03	4.4E+00	1.2E+00	na	2.5E-01	6.6E-02	na	na	na	na				X						X								
108	1,2-Dinitrobenzene	1.8E-02	1.0E-03	8.0E+00	1.8E-02	1.8E-02	na	1.0E-03	1.0E-03	na	na	na	na			X	X					X	X								
109	1,3-Dinitrobenzene	1.8E-02	1.0E-03	8.0E+00	1.8E-02	1.8E-02	na	1.0E-03	1.0E-03	na	na	na	na			X	X					X	X								
110	1,4-Dinitrobenzene	1.8E-02	1.0E-03	8.0E+00	1.8E-02	1.8E-02	na	1.0E-03	1.0E-03	na	na	na	na			X	X					X	X								
111	4,6-Dinitro-o-cresol (DNOC)	2.4E-02	1.3E-03	6.4E+00	2.4E-02	2.4E-02	na	1.3E-03	1.3E-03	na	na	na	na			X	X					X	X								
112	2,4-Dinitrophenol	4.0E-02	2.9E-03	1.6E+02	1.3E-01	4.0E-02	na	9.2E-03	2.9E-03	na	na	2.0E+01	na				X						X								
113	2,4-Dinitrotoluene	6.1E-04	3.4E-05	3.2E+00	4.4E-03	6.1E-04	na	2.4E-04	3.4E-05	na	na	na	na				X						X								
114	2,6-Dinitrotoluene	9.2E-04	5.1E-05	6.7E-01	9.2E-04	9.2E-04	na	5.1E-05	5.1E-05	na	na	na	na			X	X					X	X								
115	Di-n-octyl phthalate	3.9E-02	7.8E-03	8.0E+02	4.5E+02	4.5E+02	1.6E-01	2.3E+01	2.3E+01	7.8E-03	3.9E-02	na	na						X									X			
116	1,4-Dioxane	1.8E-03	1.3E-04	1.0E+01	1.8E-03	1.8E-03	na	1.3E-04	1.3E-04	na	na	na	na			X	X					X	X								
117	1,2-Diphenylhydrazine	3.4E-04	1.8E-05	1.3E+00	3.7E-03	3.4E-04	na	2.0E-04	1.8E-05	na	na	na	na				X						X								
118	Hexachlorobenzene	8.0E-06	4.0E-07	6.3E-01	4.4E-01	8.0E-06	4.0E-03	2.2E-02	4.0E-07	2.0E-04	1.0E-03	1.7E+01	na				X						X								
119	Hexachlorobutadiene	2.1E-04	1.1E-05	1.3E+01	1.2E-02	2.1E-04	1.4E-03	6.3E-04	1.1E-05	7.5E-05	3.0E-04	na	na				X						X								
120	Hexachlorocyclopentadiene	3.2E-02	1.7E-03	4.8E+02	1.5E+00	3.2E-02	na	8.1E-02	1.7E-03	na	na	1.0E+01	na				X						X								
121	Hexachloroethane	1.6E-04	9.7E-06	2.5E+01	8.8E-03	1.6E-04	na	5.3E-04	9.7E-06	na	na	na	na				X						X								
122	Isophorone	1.4E-01	9.5E-03	1.1E+03	4.9E-01	1.4E-01	na	3.2E-02	9.5E-03	na	na	na	na				X						X								
123	2-Methoxynaphthalene	na	na	na	na	na	na	na	na	na	na	na	na																		
124	2-Methylphenol (o-cresol)	8.1E+00	4.7E-01	4.0E+03	8.1E+00	8.1E+00	na	4.7E-01	4.7E-01	na	na	na	na			X	X						X	X								
125	3-Methylphenol (m-cresol)	8.0E+00	4.7E-01	4.0E+03	8.0E+00	8.0E+00	na	4.7E-01	4.7E-01	na	na	na	na			X	X						X	X								
126	4-Methylphenol (p-cresol)	2.6E-01	8.5E-02	8.0E+03	1.6E+01	1.6E+01	1.5E+00	9.4E-01	9.4E-01	8.5E-02	2.6E-01	na	na						X									X			
127	2-Nitroaniline	1.0E+00	6.4E-02	8.0E+02	1.0E+00	1.0E+00	na	6.4E-02	6.4E-02	na	na	na	na			X	X						X	X								
128	3-Nitroaniline	na	na	na	na	na	na	na	na	na	na	na	na																		
129	4-Nitroaniline	2.7E-02	1.7E-03	5.0E+01	2.7E-02	2.7E-02	na	1.7E-03	1.7E-03	na	na	na	na			X	X						X	X								
130	Nitrobenzene	6.4E-02	4.1E-03	1.6E+02	1.0E-01	6.4E-02	na	6.5E-03	4.1E-03	na	na	4.0E+01	na				X						X								
131	2-Nitrophenol	na	na	na	na	na	na	na	na	na	na	na	na																		
132	4-Nitrophenol	7.0E+00	7.0E+00	na	na	na	na	na	na	na	na	7.0E+00	na						X											X	
133	n-Nitrosodimethylamine	1.0E-06	7.1E-08	3.7E-03	1.0E-06	1.0E-06	na	7.1E-08	7.1E-08	na	na	na	na			X	X						X	X								
134	n-Nitrosodiphenylamine	3.5E-02	1.8E-03	2.0E+02	1.0E+00	3.5E-02	na	5.2E-02	1.8E-03	na	na	2.0E+01	na				X						X								
135	n-Nitrosodi-n-propylamine	4.2E-05	2.5E-06	1.4E-01	1.2E-04	4.2E-05	na	7.0E-06	2.5E-06	na	na	na	na				X						X								
136	Pentachlorophenol	3.2E-05	1.8E-06	2.5E+00	1.6E-02	3.2E-05	4.9E-01	8.8E-04	1.8E-06	2.7E-02	3.6E-01	3.0E+00	na				X						X								
137	Phenol	1.2E-01	4.7E-02	2.4E+04	3.7E+01	3.1E+01	7.6E-01	2.3E+00	1.9E+00	4.7E-02	1.2E-01	3.0E+01	na						X									X			
138	Pyridine	4.3E-02	2.9E-03	8.0E+01	4.3E-02	4.3E-02	na	2.9E-03	2.9E-03	na	na	na	na			X	X						X	X								
139	2,3,4,5-Tetrachlorophenol	2.0E+01	2.0E+01	na	na	na	na	na	na	na	na	2.0E+01	na						X											X	
140	2,3,4,6-Tetrachlorophenol	4.6E+00	2.7E-01	2.4E+03	4.6E+00	4.6E+00	na	2.7E-01	2.7E-01	na	na	na	na			X	X						X	X								

141	1,2,4-Trichlorobenzene	1.3E-03	7.0E-05	3.4E+01	5.6E-01	1.3E-03	na	2.9E-02	7.0E-05	na	na	2.0E+01	na			X					X							X			
142	2,4,5-Trichlorophenol	4.0E+00	5.7E-01	8.0E+03	5.8E+01	1.1E+01	na	3.0E+00	5.7E-01	na	na	4.0E+00	na						X									X			
143	2,4,6-Trichlorophenol	2.9E-03	1.7E-04	8.0E+01	9.2E-02	2.9E-03	na	5.3E-03	1.7E-04	na	na	1.0E+01	na			X					X							X			
144	***Volatile Organic Compounds***																														
145	Acetone	2.9E+01	2.1E+00	7.2E+04	2.9E+01	2.9E+01	na	2.1E+00	2.1E+00	na	na	na	na		X	X					X	X									
146	Acetaldehyde	na	na	na	na	na	na	na	na	na	na	na	na																		
147	Acrolein	4.0E-03	2.9E-04	4.0E+01	1.6E-02	4.0E-03	na	1.2E-03	2.9E-04	na	na	na	na			X					X										
148	Acrylonitrile	7.9E-05	5.6E-06	1.9E+00	3.4E-04	7.9E-05	na	2.4E-05	5.6E-06	na	na	na	na			X					X										
149	Benzaldehyde	4.6E-02	3.3E-03	2.5E+02	4.6E-02	4.6E-02	na	3.3E-03	3.3E-03	na	na	na	na		X	X					X	X									
150	Benzene	2.4E-03	1.5E-04	1.8E+01	2.7E-02	2.4E-03	na	1.7E-03	1.5E-04	na	na	na	na			X						X									
151	Bromobenzene	5.6E-01	3.3E-02	6.4E+02	5.6E-01	5.6E-01	na	3.3E-02	3.3E-02	na	na	na	na		X	X					X	X									
152	Bromochloromethane	na	na	na	na	na	na	na	na	na	na	na	na																		
153	Bromoethane	na	na	na	na	na	na	na	na	na	na	na	na																		
154	Bromoform	3.0E-02	1.9E-03	1.3E+02	3.6E-01	3.0E-02	na	2.3E-02	1.9E-03	na	na	na	na			X					X										
155	Bromomethane	5.1E-02	3.3E-03	1.1E+02	5.1E-02	5.1E-02	na	3.3E-03	3.3E-03	na	na	na	na		X	X					X	X									
156	2-Butoxyethanol (EGBE)	6.5E+00	4.6E-01	8.0E+03	6.5E+00	6.5E+00	na	4.6E-01	4.6E-01	na	na	na	na		X	X					X	X									
157	n-Butylbenzene	1.4E+01	7.1E-01	4.0E+03	1.4E+01	1.4E+01	na	7.1E-01	7.1E-01	na	na	na	na		X	X					X	X									
158	sec-Butylbenzene	2.5E+01	1.3E+00	8.0E+03	2.5E+01	2.5E+01	na	1.3E+00	1.3E+00	na	na	na	na		X	X					X	X									
159	tert-Butylbenzene	1.9E+01	1.0E+00	8.0E+03	1.9E+01	1.9E+01	na	1.0E+00	1.0E+00	na	na	na	na		X	X					X	X									
160	Carbon disulfide	4.1E+00	2.5E-01	8.0E+03	4.1E+00	4.1E+00	na	2.5E-01	2.5E-01	na	na	na	na		X	X					X	X									
161	Carbon tetrachloride	1.6E-03	8.8E-05	1.4E+01	4.1E-02	1.6E-03	na	2.2E-03	8.8E-05	na	na	na	na			X						X									
162	Chlorobenzene	8.6E-01	5.1E-02	1.6E+03	8.6E-01	8.6E-01	na	5.1E-02	5.1E-02	na	na	4.0E+01	na		X	X					X	X									
163	Chloroethane	na	na	na	na	na	na	na	na	na	na	na	na																		
164	2-Chloroethyl vinyl ether	na	na	na	na	na	na	na	na	na	na	na	na																		
165	Chloroform	7.4E-02	4.8E-03	3.2E+01	7.4E-02	7.4E-02	na	4.8E-03	4.8E-03	na	na	na	na		X	X					X	X									
166	Chloromethane	na	na	na	na	na	na	na	na	na	na	na	na																		
167	3-Chloro-1-propene (allyl chloride)	1.1E-02	6.8E-04	4.8E+01	1.1E-02	1.1E-02	na	6.8E-04	6.8E-04	na	na	na	na		X	X					X	X									
168	2-Chlorotoluene	1.9E+00	1.1E-01	1.6E+03	1.9E+00	1.9E+00	na	1.1E-01	1.1E-01	na	na	na	na		X	X					X	X									
169	4-Chlorotoluene	1.9E+00	1.1E-01	1.6E+03	1.9E+00	1.9E+00	na	1.1E-01	1.1E-01	na	na	na	na		X	X					X	X									
170	Dibromochloromethane	2.8E-03	1.9E-04	1.2E+01	2.4E-02	2.8E-03	na	1.7E-03	1.9E-04	na	na	na	na			X						X									
171	1,2-Dibromo-3-chloropropane	8.9E-04	5.6E-05	2.3E-01	8.9E-04	8.9E-04	na	5.6E-05	5.6E-05	na	na	na	na		X	X					X	X									
172	Dibromomethane	3.6E-01	2.5E-02	8.0E+02	3.6E-01	3.6E-01	na	2.5E-02	2.5E-02	na	na	na	na		X	X					X	X									
173	Dichlorobromomethane	3.4E-03	2.3E-04	1.6E+01	3.3E-02	3.4E-03	na	2.2E-03	2.3E-04	na	na	na	na			X						X									
174	trans-1,4-Dichloro-2-butene	na	na	na	na	na	na	na	na	na	na	na	na																		
175	Dichlorodifluoromethane	3.8E+01	5.3E-01	1.6E+04	3.8E+01	3.8E+01	na	5.3E-01	5.3E-01	na	na	na	na		X	X					X	X									
176	1,1-Dichloroethane	4.1E-02	2.6E-03	1.8E+02	4.1E-02	4.1E-02	na	2.6E-03	2.6E-03	na	na	na	na		X	X					X	X									
177	1,2-Dichloroethane (EDC)	2.3E-02	1.6E-03	1.1E+01	2.3E-02	2.3E-02	na	1.6E-03	1.6E-03	na	na	na	na		X	X					X	X									
178	1,1-Dichloroethylene	4.6E-02	2.5E-03	4.0E+03	4.6E-02	4.6E-02	na	2.5E-03	2.5E-03	na	na	na	na		X	X					X	X									
179	cis-1,2-Dichloroethylene	7.9E-02	5.2E-03	1.6E+02	7.9E-02	7.9E-02	na	5.2E-03	5.2E-03	na	na	na	na		X	X					X	X									
180	trans-1,2-Dichloroethylene	5.2E-01	3.2E-02	1.6E+03	5.2E-01	5.2E-01	na	3.2E-02	3.2E-02	na	na	na	na		X	X					X	X									
181	1,2-Dichloroethylene (mixed isomers)	na	na	na	na	na	na	na	na	na	na	na	na																		
182	1,2-Dichloropropane	3.6E-03	2.4E-04	2.7E+01	2.5E-02	3.6E-03	na	1.7E-03	2.4E-04	na	na	7.0E+02	na			X						X									
183	1,3-Dichloropropane	1.2E-03	7.9E-05	1.6E+03	8.8E-01	1.2E-03	na	5.7E-02	7.9E-05	na	na	na	na			X						X									
184	2,2-Dichloropropane	na	na	na	na	na	na	na	na	na	na	na	na																		
185	1,1-Dichloropropene	na	na	na	na	na	na	na	na	na	na	na	na																		
186	cis-1,3-Dichloropropene	1.0E-03	6.9E-05	1.0E+01	2.0E-03	1.0E-03	na	1.4E-04	6.9E-05	na	na	na	na			X						X									
187	trans-1,3-Dichloropropene	1.0E-03	6.9E-05	1.0E+01	2.0E-03	1.0E-03	na	1.4E-04	6.9E-05	na	na	na	na			X						X									
188	Diisopropyl ether	na	na	na	na	na	na	na	na	na	na	na	na																		
189	Ethane	na	na	na	na	na	na	na	na	na	na	na	na																		
190	Ethylbenzene	1.0E-01	5.9E-03	8.0E+03	5.9E+00	1.0E-01	na	3.4E-01	5.9E-03	na	na	na	na			X						X									
191	Ethylene oxide	1.5E-04	1.1E-05	6.0E-01	1.5E-04	1.5E-04	na	1.1E-05	1.1E-05	na	na	na	na		X	X					X	X									
192	Ethyl ether	6.8E+00	4.7E-01	1.6E+04	6.8E+00	6.8E+00	na	4.7E-01	4.7E-01	na	na	na	na		X	X					X	X									
193	Ethylene dibromide (EDB)	2.7E-04	1.8E-05	5.0E-01	2.7E-04	2.7E-04	na	1.8E-05	1.8E-05	na	na	na	na		X	X					X	X									
194	Formaldehyde	2.2E-03	1.6E-04	8.9E+00	2.2E-03	2.2E-03	na	1.6E-04	1.6E-04	na	na	na	na		X	X					X	X									
195	n-Hexane	7.2E+01	1.8E+00	4.8E+03	7.2E+01	7.2E+01	na	1.8E+00	1.8E+00	na	na	na	na		X	X					X	X									
196	2-Hexanone	1.7E-01	1.2E-02	4.0E+02	1.7E-01	1.7E-01	na	1.2E-02	1.2E-02	na	na	na	na		X	X					X	X									
197	Isopropylbenzene (cumene)	1.5E+01	7.9E-01	8.0E+03	1.5E+01	1.5E+01	na	7.9E-01	7.9E-01	na	na	na	na		X	X					X	X									
198	4-Isopropyltoluene (p-isopropyltoluene)	8.6E-01	4.5E-02	3.2E+02	8.6E-01	8.6E-01	na	4.5E-02	4.5E-02	na	na	na	na		X	X					X	X									
199	Methane	na	na	na	na	na	na	na	na	na	na	na	na																		
200	Methyl ethyl ketone (2-butanone)	2.0E+01	1.4E+00	4.8E+04	2.0E+01	2.0E+01	na	1.4E+00	1.4E+00	na	na	na	na		X	X					X	X									
201	Methyl iodide	na	na	na	na	na	na	na	na	na	na	na	na																		
202	Methyl isobutyl ketone	2.7E+00	1.9E-01	6.4E+03	2.7E+00	2.7E+00	na	1.9E-01	1.9E-01	na	na	na	na		X	X					X	X									
203	Methyl tert-butyl ether (MTBE)	1.0E-01	7.2E-03	5.6E+02	1.0E-01	1.0E-01	na	7.2E-03	7.2E-03	na	na	na	na		X	X					X	X									
204	Methylene chloride	2.2E-02	1.5E-03	9.4E+01	2.2E-02	2.2E-02	na	1.5E-03	1.5E-03	na	na	na	na		X	X					X	X									
205	2-Pentanone	na	na	na	na	na	na	na	na	na	na	na	na																		
206	n-Propylbenzene	1.6E+01	8.8E-01	8.0E+03	1.6E+01	1.6E+01	na	8.8E-01	8.8E-01	na	na	na	na		X	X					X	X									
207	Styrene	2.2E+00	1.2E-01	1.6E+04	2.2E+00	2.2E+00	na	1.2E-01	1.2E-01	na	na	3.0E+02	na		X	X					X	X									
208	1,1,1,2-Tetrachloroethane	9.8E-03	6.3E-04	3.8E+01	9.8E-03	9.8E-03	na	6.3E-04	6.3E-04	na	na	na	na		X	X					X	X									
209	1,1,2,2-Tetrachloroethane	5.6E-04	3.7E-05	5.0E+00	1.2E-03	5.6E-04	na	8.0E-05	3.7E-05	na	na	na	na			X						X									
210	Tetrachloroethylene (PCE)	2.4E-02	1.3E-03	4.8E+02	5.0E-02	2.4E-02	na	2.8E-03	1.3E-03	na	na	na	na			X						X									
211	Tetrahydrofuran	3.0E+01	2.1E+00	7.2E+04	3.0E+01	3.0E+01	na	2.1E+00	2.1E+00	na	na	na	na		X	X					X	X									
212	Toluene	3.7E-01	2.3E-02	6.4E+03	4.5E+00	3.7E-01	na	2.7E-01	2.3E-02	na	na	2.0E+02	na			X						X									
213	1,2,3-Trichlorobenzene	2.0E-01	1.1E-02	6.4E+01	2.0E-01	2.0E-01	na	1.1E-02	1.1E-02	na	na	2.0E+01	na		X	X					X	X									

214	1,1,1-Trichloroethane	1.5E+00	8.4E-02	1.6E+05	1.5E+00	1.5E+00	na	8.4E-02	8.4E-02	na	na	na	na		X	X						X	X				
215	1,1,2-Trichloroethane	1.9E-03	1.3E-04	1.8E+01	1.7E-02	1.9E-03	na	1.1E-03	1.3E-04	na	na	na	na			X							X				
216	Trichloroethylene (TCE)	1.9E-03	1.1E-04	1.2E+01	2.5E-02	1.9E-03	na	1.5E-03	1.1E-04	na	na	na	na			X							X				
217	Trichlorofluoroethane	na	na	na	na	na	na	na	na	na	na	na	na														
218	Trichlorofluoromethane	2.3E+01	7.9E-01	2.4E+04	2.3E+01	2.3E+01	na	7.9E-01	7.9E-01	na	na	na	na		X	X						X	X				
219	1,2,3-Trichloropropane	2.4E-06	1.5E-07	6.3E-03	2.4E-06	2.4E-06	na	1.5E-07	1.5E-07	na	na	na	na		X	X						X	X				
220	Trichlorotrifluoroethane	7.6E+03	1.2E+02	2.4E+06	7.6E+03	7.6E+03	na	1.2E+02	1.2E+02	na	na	na	na		X	X						X	X				
221	1,2,3-Trimethylbenzene	1.3E+00	7.3E-02	8.0E+02	1.3E+00	1.3E+00	na	7.3E-02	7.3E-02	na	na	na	na		X	X						X	X				
222	1,2,4-Trimethylbenzene	1.3E+00	7.2E-02	8.0E+02	1.3E+00	1.3E+00	na	7.2E-02	7.2E-02	na	na	na	na		X	X						X	X				
223	1,3,5-Trimethylbenzene	1.3E+00	7.1E-02	8.0E+02	1.3E+00	1.3E+00	na	7.1E-02	7.1E-02	na	na	na	na		X	X						X	X				
224	Vinyl acetate	3.3E+01	2.3E+00	8.0E+04	3.3E+01	3.3E+01	na	2.3E+00	2.3E+00	na	na	na	na		X	X						X	X				
225	Vinyl chloride	1.2E-04	6.2E-06	6.7E-01	1.7E-03	1.2E-04	na	9.0E-05	6.2E-06	na	na	na	na			X							X				
226	Total xylenes	5.1E-01	3.0E-02	1.6E+04	1.4E+01	5.1E-01	na	8.3E-01	3.0E-02	na	na	na	na			X							X				
227	***PFAS***													***PFAS***													
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	7.39E-02	3.97E-03	1.60E+01	7.39E-02	7.39E-02	na	3.97E-03	3.97E-03	na	na	na	na		X	X						X	X				
229	GenX (HFPO-DA)	1.2E-04	6.9E-06	2.4E-01	1.2E-04	1.2E-04	na	6.9E-06	6.9E-06	na	na	na	na		X	X						X	X				
230	Perfluorobutanoic acid (PFBA)	4.4E-02	2.9E-03	8.0E+01	4.4E-02	4.4E-02	na	2.9E-03	2.9E-03	na	na	na	na		X	X						X	X				
231	Perfluorobutanesulfonic acid (PFBS)	2.5E-02	1.7E-03	2.4E+01	2.5E-02	2.5E-02	na	1.7E-03	1.7E-03	na	na	2.0E+01	na		X	X						X	X				
232	Perfluorodecanoic acid (PFDA)	3.8E-07	2.2E-08	1.6E-04	3.8E-07	3.8E-07	na	2.2E-08	2.2E-08	na	na	1.4E-01	na		X	X						X	X				
233	Perfluorohexanoic acid (PFHxA)	3.5E-02	2.5E-03	4.0E+01	3.5E-02	3.5E-02	na	2.5E-03	2.5E-03	na	na	5.9E+01	na		X	X						X	X				
234	Perfluorohexanesulfonic acid (PFHxS)	4.0E-08	2.6E-09	3.2E-05	4.0E-08	4.0E-08	na	2.6E-09	2.6E-09	na	na	3.5E-02	na		X	X						X	X				
235	Perfluorononanoic acid (PFNA)	8.9E-05	5.3E-06	2.0E-01	8.9E-05	8.9E-05	na	5.3E-06	5.3E-06	na	na	2.1E-01	na		X	X						X	X				
236	Perfluorooctanesulfonic acid (PFOS)	4.6E-05	2.6E-06	8.0E-03	4.6E-05	4.6E-05	5.9E-02	2.6E-06	2.6E-06	3.4E-03	1.1E-02	7.8E-02	na		X	X						X	X				
237	Perfluorooctanoic acid (PFOA)	2.5E-05	1.6E-06	3.4E-05	2.5E-05	2.5E-05	na	1.6E-06	1.6E-06	na	na	4.6E-01	na		X	X						X	X				
238	***Petroleum Hydrocarbons***													***Petroleum Hydrocarbons***													
239	Gasoline range hydrocarbons, fresh	3.0E+01	3.0E+01	1.5E+03	3.0E+01	3.0E+01	na	3.0E+01	3.0E+01	na	na	1.2E+02	na		X	X						X	X				
240	Gasoline range hydrocarbons, weathered	1.0E+02	1.0E+02	1.5E+03	1.0E+02	1.0E+02	na	1.0E+02	1.0E+02	na	na	1.2E+02	na		X	X						X	X				
241	Diesel range hydrocarbons, fresh	2.6E+02	2.6E+02	na	2.0E+03	2.0E+03	na	2.0E+03	2.0E+03	na	3.4E+02	2.6E+02	na					X							X		
242	Diesel range hydrocarbons, weathered	2.6E+02	2.6E+02	na	2.0E+03	2.0E+03	na	2.0E+03	2.0E+03	na	3.4E+02	2.6E+02	na					X							X		
243	Oil range hydrocarbons	2.6E+02	2.6E+02	na	2.0E+03	2.0E+03	na	2.0E+03	2.0E+03	na	3.6E+03	2.6E+02	na					X							X		
244	Total diesel & oil range hydrocarbons	2.6E+02	2.6E+02	na	2.0E+03	2.0E+03	na	2.0E+03	2.0E+03	na	na	2.6E+02	na					X							X		
245	***Pesticides***													***Pesticides***													
246	Aldrin	4.0E-08	2.0E-09	5.9E-02	2.5E-03	4.0E-08	4.0E-04	1.3E-04	2.0E-09	2.0E-05	1.0E-04	1.0E-01	na			X							X				
247	alpha-BHC (alpha-HCH)	1.9E-06	9.8E-08	1.6E-01	5.4E-04	1.9E-06	na	2.8E-05	9.8E-08	na	na	6.0E+00	na			X							X				
248	beta-BHC (beta-HCH)	6.1E-05	3.2E-06	5.6E-01	2.3E-03	6.1E-05	3.1E-02	1.2E-04	3.2E-06	1.6E-03	7.2E-03	6.0E+00	na			X							X				
249	delta-BHC (delta-HCH)	5.8E-05	3.0E-06	4.8E-03	5.8E-05	5.8E-05	na	3.0E-06	3.0E-06	na	na	6.0E+00	na		X	X						X	X				
250	Carbaryl	2.3E-02	1.3E-03	8.0E+03	1.8E+01	2.3E-02	na	1.0E+00	1.3E-03	na	na	na	na			X							X				
251	cis-Chlordane (alpha)	1.0E-04	2.0E-05	4.0E+01	5.4E+00	5.4E+00	4.0E-04	2.7E-01	2.7E-01	2.0E-05	1.0E-04	1.0E+00	na					X						X			
252	trans-Chlordane (gamma)	1.0E-04	2.0E-05	4.0E+01	5.4E+00	5.4E+00	4.0E-04	2.7E-01	2.7E-01	2.0E-05	1.0E-04	1.0E+00	na					X						X			
253	Chlordane	2.3E-05	1.1E-06	2.9E+00	1.3E+00	2.3E-05	3.0E+01	6.4E-02	1.1E-06	1.5E+00	7.4E+00	1.0E+00	na			X							X				
254	Chlorpyrifos	6.1E-03	3.1E-04	8.0E+01	2.4E+00	6.1E-03	4.5E+02	1.2E-01	3.1E-04	2.3E+01	1.1E+02	na	na			X							X				
255	4,4'-DDD	7.3E-06	3.6E-07	4.2E+00	3.4E-01	7.3E-06	4.0E-04	1.7E-02	3.6E-07	2.0E-05	1.0E-04	7.5E-01	na			X							X				
256	4,4'-DDE	1.5E-06	7.6E-08	2.9E+00	2.2E-01	1.5E-06	4.0E-04	1.1E-02	7.6E-08	2.0E-05	1.0E-04	7.5E-01	na			X							X				
257	4,4'-DDT	1.6E-05	8.1E-07	2.9E+00	3.5E+00	1.6E-05	4.0E-04	1.7E-01	8.1E-07	2.0E-05	1.0E-04	7.5E-01	na			X							X				
258	Total DDD	7.3E-06	3.6E-07	4.2E+00	3.4E-01	7.3E-06	1.2E+00	1.7E-02	3.6E-07	6.2E-02	3.1E-01	7.5E-01	na			X							X				
259	Total DDE	1.5E-06	7.6E-08	2.9E+00	2.2E-01	1.5E-06	8.4E-02	1.1E-02	7.6E-08	4.2E-03	2.1E-02	7.5E-01	na			X							X				
260	Total DDT	1.6E-05	8.1E-07	2.9E+00	3.5E+00	1.6E-05	4.0E-01	1.7E-01	8.1E-07	2.0E-02	1.0E-01	7.5E-01	na			X							X				
261	Diazinon	1.1E-02	5.6E-04	5.6E+01	7.2E-01	1.1E-02	3.3E+02	3.7E-02	5.6E-04	1.7E+01	7.8E+01	na	na			X							X				
262	Dieldrin	3.6E-08	1.8E-09	6.3E-02	2.8E-03	3.6E-08	4.0E-04	1.4E-04	1.8E-09	2.0E-05	1.0E-04	7.0E-02	na			X							X				
263	Endosulfan I	7.8E-03	3.9E-04	na	na	7.8E-03	na	na	3.9E-04	na	na	na	na			X							X				
264	Endosulfan II	7.8E-03	3.9E-04	na	na	7.8E-03	na	na	3.9E-04	na	na	na	na			X							X				
265	Endosulfan sulfate	1.8E+00	9.1E-02	4.8E+02	1.9E+01	1.8E+00	na	9.7E-01	9.1E-02	na	na	na	na			X							X				
266	Endrin	4.4E-04	2.2E-05	2.4E+01	4.4E-01	4.4E-04	1.4E+02	2.2E-02	2.2E-05	6.8E+00	3.3E+01	2.0E-01	na			X							X				
267	Endrin aldehyde	2.4E-03	1.2E-04	na	na	2.4E-03	na	na	1.2E-04	na	na	na	na			X							X				
268	Endrin ketone	8.5E-03	8.5E-03	na	na	na	na	na	na	na	8.5E-03	na	na					X							X		
269	Heptachlor	6.6E-08	3.3E-09	2.2E-01	1.9E-02	6.6E-08	4.1E-04	9.5E-04	3.3E-09	2.0E-05	1.0E-04	4.0E-01	na			X							X				
270	Heptachlor epoxide	4.9E-07	2.5E-08	1.1E-01	9.9E-03	4.9E-07	3.5E+00	5.0E-04	2.5E-08	1.8E-01	8.6E-01	4.0E-01	na			X							X				
271	Lindane (gamma-BHC)	2.5E-03	1.3E-04	9.1E-01	6.2E-03	2.5E-03	na	3.3E-04	1.3E-04	na	na	6.0E+00	na			X							X				
272	Malathion	4.6E-04	3.2E-05	1.6E+03	1.5E+00	4.6E-04	na	1.0E-01	3.2E-05	na	na	na	na			X							X				
273	Methoxychlor	3.2E-02	1.6E-03	4.0E+02	6.4E+01	3.2E-02	na	3.2E+00	1.6E-03	na	na	na	na			X							X				
274	Mirex	7.1E-03	3.6E-04	5.6E-02	1.7E-02	7.1E-03	1.7E+00	8.7E-04	3.6E-04	8.7E-02	4.3E-01	na	na			X							X				
275	Nonachlor	na	na	na	na	na	na	na	na	na	na	na	na														
276	Toxaphene	6.1E-05	3.1E-06	9.1E-01	1.5E+00	6.1E-05	4.7E+00	7.6E-02	3.1E-06	2.4E-01	1.2E+00	na	na			X							X				
277	***Herbicides***													***Herbicides***													
278	2,4-Dichlorophenoxyacetic acid (2,4-D)	3.2E-01	2.2E-02	8.0E+02	3.2E-01	3.2E-01	na	2.2E-02	2.2E-02	na	na	na	na		X	X						X	X				
279	4-(2,4-Dichlorophenoxy)butanoic acid 2,4-DB	na	na	na	na	na	na	na	na	na	na	na	na														
280	2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	3.8E-01	2.3E-02	6.4E+02	3.8E-01	3.8E-01	na	2.3E-02	2.3E-02	na	na	na	na		X	X						X	X				
281	2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	9.8E-01	6.3E-02	8.0E+02	9.8E-01	9.8E-01	na	6.3E-02	6.3E-02	na	na	na	na		X	X						X	X				
282	Dalapon	8.1E-01	5.8E-02	2.4E+03	8.1E-01	8.1E-01	na	5.8E-02	5.8E-02	na	na	na	na		X	X						X	X				
283	Dicamba	2.2E+00	1.5E-01	2.4E+03	2.2E+00	2.2E+00	na	1.5E-01	1.5E-01	na	na	na	na		X	X						X	X				
284	Dichloroprop	na	na	na	na	na	na	na	na	na	na	na	na														
285	Dinoseb	6.3E-01	3.2E-02	8.0E+01	6.3E-01	6.3E-01	na	3.2E-02	3.2E-02	na	na	na	na		X	X						X	X				
286	2-Methyl-4-chlorophenoxy acetic acid (MCPA)	3.7E-02	2.5E-03	4.0E+01	3.7E-02	3.7E-02	na	2.5E-03	2.5E-03	na	na	na	na		X	X						X	X				

287	(2-Methyl-4-chlorophenol)2-propionic acid (MCPP)	8.0E-02	5.4E-03	8.0E+01	8.0E-02	8.0E-02	na	5.4E-03	5.4E-03	na	na	na	na

	X	X						X	X				
Number of Chemicals:	2	93	183	1	25	16	19	2	95	187	16	12	13	19

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PCUL Workbook - Groundwater Summary for Freshwater Sites

Sort Order	Chemical (all concentrations in ug/L)	Most Stringent PCUL Potable Water GW #s 1-5	GW-1 Protect Drinking Water PW	GW-2 Protect Surface Water SW-FW	GW-3 Protect Sediment PartitFW	GW-4 Screening Level Protect Indoor Air Industrial VI	TCE Short-Term Action Level for Cardiac Birth Defects Unrestricted VI Guidance	GW-5 Natural Background	Basis - Potable GW: Drinking Water	Surface Water	Sediment	Indoor Air	Nat. Background
1	***PCBs***								***PCBs***				
2	Total PCB Aroclors	7.0E-06	2.2E-01	7.0E-06	3.1E-02	na	na	na		X			
3	Total PCB congeners	7.0E-06	2.2E-01	7.0E-06	9.0E-03	na	na	na		X			
4	Total PCB TEQ	4.4E-09	3.4E-06	4.4E-09	1.8E-06	na	na	na		X			
5	***Dioxins/Furans***								***Dioxins/Furans***				
6	Total dioxin/furan TEQ	5.0E-09	3.4E-06	5.0E-09	4.0E-06	na	na	na		X			
7	2,3,7,8-TCDD	5.0E-09	3.4E-06	5.0E-09	2.3E-05	na	na	na		X			
8	Total chlorinated dioxins	na	na	na	na	na	na	na					
9	Total chlorinated furans	na	na	na	na	na	na	na					
10	***Inorganics***								***Inorganics***				
11	Ammonia	na	na	na	na	na	na	na					
12	Chloride	2.3E+05	2.5E+05	2.3E+05	na	na	na	na					
13	Cyanide, free	1.9E+00	5.0E+00	1.9E+00	na	na	na	na		X			
14	Fluoride	9.6E+02	9.6E+02	9.6E+02	na	na	na	na					
15	Nitrate	1.0E+04	1.0E+04	1.0E+04	na	na	na	na	X	X			
16	Nitrite	1.0E+03	1.0E+03	1.0E+03	na	na	na	na	X	X			
17	Sulfate	2.5E+05	2.5E+05	2.5E+05	na	na	na	na	X	X			
18	Sulfide	na	na	na	na	na	na	na					
19	***Metals***								***Metals***				
20	Aluminum	3.0E+02	1.6E+04	3.0E+02	na	na	na	na		X			
21	Antimony	5.6E+00	6.0E+00	5.6E+00	na	na	na	na		X			
22	Arsenic	8.0E+00	2.7E-02	1.3E-02	3.3E+00	na	na	8.0E+00					X
23	Barium	1.0E+03	2.0E+03	1.0E+03	na	na	na	na		X			
24	Beryllium	4.0E+00	4.0E+00	4.0E+00	na	na	na	na	X	X			
25	Cadmium	4.2E-01	5.0E+00	4.2E-01	1.1E+02	na	na	na		X			
26	Chromium, total	7.2E+01	1.0E+02	1.0E+02	7.2E+01	na	na	na			X		
27	Chromium, trivalent	6.1E+01	2.4E+04	6.1E+01	na	na	na	na		X			
28	Chromium, hexavalent	1.1E+00	1.4E+00	1.1E+00	3.7E+02	na	na	na		X			
29	Cobalt	4.8E+00	4.8E+00	4.8E+00	na	na	na	na	X	X			
30	Copper	1.8E+00	6.4E+02	1.8E+00	1.8E+04	na	na	na		X			
31	Iron	3.0E+02	3.0E+02	3.0E+02	na	na	na	na	X	X			
32	Lead	2.1E+00	1.5E+01	2.5E+00	2.1E+00	na	na	na			X		
33	Manganese	5.0E+01	5.0E+01	5.0E+01	na	na	na	na	X	X			
34	Mercury, inorganic	1.2E-02	2.0E+00	1.2E-02	1.3E+00	7.0E+00	na	na		X			
35	Methylmercury	1.6E+00	1.6E+00	1.6E+00	9.5E+00	na	na	na	X	X			
36	Molybdenum	8.0E+01	8.0E+01	8.0E+01	na	na	na	na	X	X			
37	Nickel	1.1E+01	3.2E+02	1.1E+01	4.0E+02	na	na	na		X			
38	Selenium	1.5E+00	5.0E+01	1.5E+00	1.5E+02	na	na	na		X			
39	Silver	1.7E-01	8.0E+01	1.7E-01	6.6E+01	na	na	na		X			
40	Thallium	6.2E-02	1.6E-01	6.2E-02	na	na	na	na		X			
41	Tin	9.6E+03	9.6E+03	9.6E+03	na	na	na	na	X	X			
42	Vanadium	8.0E+01	8.0E+01	8.0E+01	na	na	na	na	X	X			
43	Zinc	2.4E+01	4.8E+03	2.4E+01	5.1E+04	na	na	na		X			
44	***Metals - Butyltins***								***Metals - Butyltins***				

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45	Monobutyltin	na	na	na	na	na	na	na						
46	Dibutyltin	na	na	na	na	na	na	na						
47	Trybutyl tin	5.2E-02	na	7.2E-02	5.2E-02	na	na	na			X			
48	Tributyltin oxide	1.6E-05	4.8E+00	4.8E+00	1.6E-05	na	na	na			X			
49	Tetrabutyltin	na	na	na	na	na	na	na						
50	***SVOCs - PAHs***								***SVOCs - PAHs***					
51	Acenaphthene	3.0E+01	4.8E+02	3.0E+01	na	na	na	na		X				
52	Acenaphthylene	na	na	na	na	na	na	na						
53	Anthracene	1.0E+02	2.4E+03	1.0E+02	na	na	na	na		X				
54	Benzo(a)anthracene	1.6E-04	na	1.6E-04	5.0E-03	na	na	na		X				
55	Benzo(b)fluoranthene	1.6E-04	na	1.6E-04	3.0E-03	na	na	na		X				
56	Benzo(k)fluoranthene	1.6E-03	na	1.6E-03	3.1E-03	na	na	na		X				
57	Total benzofluoranthenes	na	na	na	na	na	na	na						
58	Benzo(g,h,i)perylene	na	na	na	na	na	na	na						
59	Benzo(a)pyrene	1.6E-05	2.0E-01	1.6E-05	1.9E-03	na	na	na		X				
60	Chrysene	9.8E-03	na	1.6E-02	9.8E-03	na	na	na			X			
61	Dibenz(a,h)anthracene	1.6E-05	na	1.6E-05	1.0E-03	na	na	na		X				
62	Dibenzofuran	4.3E+00	8.0E+00	8.0E+00	4.3E+00	na	na	na			X			
63	Fluoranthene	2.0E-02	6.4E+02	6.0E+00	2.0E-02	na	na	na			X			
64	Fluorene	1.0E+01	3.2E+02	1.0E+01	na	na	na	na		X				
65	Indeno(1,2,3-cd)pyrene	1.6E-04	na	1.6E-04	9.2E-04	na	na	na		X				
66	Methyl isopropyl phenanthrene (retene)	na	na	na	na	na	na	na						
67	1-Methylnaphthalene	8.6E-01	8.6E-01	8.6E-01	na	1.4E+00	na	na	X	X				
68	2-Methylnaphthalene	3.2E+01	3.2E+01	3.2E+01	na	na	na	na	X	X				
69	Naphthalene	4.1E+01	1.6E+02	1.6E+02	na	4.1E+01	na	na				X		
70	Phenanthrene	na	na	na	na	na	na	na						
71	Pyrene	1.5E-02	2.4E+02	8.0E+00	1.5E-02	na	na	na			X			
72	Total LPAHs	na	na	na	na	na	na	na						
73	Total HPAHs	na	na	na	na	na	na	na						
74	Total PAHs	na	na	na	na	na	na	na						
75	Total cPAH TEQ	4.3E-03	2.0E-01	9.7E-03	4.3E-03	na	na	na			X			
76	***Other SVOCs***								***Other SVOCs***					
77	Aniline	1.5E+01	1.5E+01	1.5E+01	na	na	na	na	X	X				
78	Azobenzene	4.0E-01	4.0E-01	4.0E-01	na	na	na	na	X	X				
79	Benzidine	2.0E-05	1.0E-04	2.0E-05	na	na	na	na		X				
80	Benzoic acid	1.0E+04	6.4E+04	6.4E+04	1.0E+04	na	na	na			X			
81	Benzyl alcohol	1.6E+03	1.6E+03	1.6E+03	na	na	na	na	X	X				
82	Bis(2-chloroethoxy)methane	4.8E+01	4.8E+01	4.8E+01	na	na	na	na	X	X				
83	Bis(2-chloroethyl)ether	2.0E-02	4.0E-02	2.0E-02	na	na	na	na		X				
84	Bis(chloromethyl)ether	1.5E-04	2.0E-04	1.5E-04	na	na	na	na		X				
85	Bis(2-chloro-1-methylethyl)ether	6.3E-01	6.3E-01	6.3E-01	na	na	na	na	X	X				
86	2,6-Bis(1,1-dimethylethyl) phenol	na	na	na	na	na	na	na						
87	Bis(2-ethylhexyl) phthalate	4.5E-02	6.0E+00	4.5E-02	9.0E-01	na	na	na		X				
88	4-Bromophenyl phenyl ether	na	na	na	na	na	na	na						
89	Butyl benzyl phthalate	1.3E-02	4.6E+01	1.3E-02	na	na	na	na		X				
90	Butyl diphenyl phosphate	na	na	na	na	na	na	na						
91	Carbazole	na	na	na	na	na	na	na						
92	4-Chloroaniline	4.4E-01	4.4E-01	4.4E-01	na	na	na	na	X	X				
93	4-Chloro-3-methylphenol (chlorocresol)	3.6E+01	1.6E+03	3.6E+01	na	na	na	na		X				
94	2-Chloronaphthalene (beta-)	1.0E+02	6.4E+02	1.0E+02	na	na	na	na		X				
95	2-Chlorophenol	1.5E+01	4.0E+01	1.5E+01	na	na	na	na		X				

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96	4-Chlorophenyl phenyl ether	na	na	na	na	na	na	na						
97	Dibutyl phthalate	8.0E+00	1.6E+03	8.0E+00	4.7E+01	na	na	na		X				
98	Dibutyl phenyl phosphate	na	na	na	na	na	na	na						
99	1,2-Dichlorobenzene	6.0E+02	6.0E+02	6.0E+02	na	2.1E+04	na	na	X	X				
100	1,3-Dichlorobenzene	2.0E+00	na	2.0E+00	na	na	na	na		X				
101	1,4-Dichlorobenzene	2.3E+01	7.5E+01	6.0E+01	na	2.3E+01	na	na					X	
102	3,3'-Dichlorobenzidine	3.1E-03	1.9E-01	3.1E-03	na	na	na	na		X				
103	2,4-Dichlorophenol	1.0E+01	4.8E+01	1.0E+01	na	na	na	na		X				
104	Di(2-ethylhexyl)adipate	4.0E+02	4.0E+02	4.0E+02	na	na	na	na	X	X				
105	Diethyl phthalate	2.0E+02	1.3E+04	2.0E+02	na	na	na	na		X				
106	Dimethyl phthalate	6.0E+02	na	6.0E+02	na	na	na	na		X				
107	2,4-Dimethylphenol	8.5E+01	3.2E+02	8.5E+01	na	na	na	na		X				
108	1,2-Dinitrobenzene	1.6E+00	1.6E+00	1.6E+00	na	na	na	na	X	X				
109	1,3-Dinitrobenzene	1.6E+00	1.6E+00	1.6E+00	na	na	na	na	X	X				
110	1,4-Dinitrobenzene	1.6E+00	1.6E+00	1.6E+00	na	na	na	na	X	X				
111	4,6-Dinitro-o-cresol (DNOC)	1.3E+00	1.3E+00	1.3E+00	na	na	na	na	X	X				
112	2,4-Dinitrophenol	1.0E+01	3.2E+01	1.0E+01	na	na	na	na		X				
113	2,4-Dinitrotoluene	3.9E-02	2.8E-01	3.9E-02	na	na	na	na		X				
114	2,6-Dinitrotoluene	5.8E-02	5.8E-02	5.8E-02	na	na	na	na	X	X				
115	Di-n-octyl phthalate	5.5E-02	1.6E+02	1.6E+02	5.5E-02	na	na	na			X			
116	1,4-Dioxane	4.4E-01	4.4E-01	4.4E-01	na	2.2E+04	na	na	X	X				
117	1,2-Diphenylhydrazine	1.0E-02	1.1E-01	1.0E-02	na	na	na	na		X				
118	Hexachlorobenzene	5.0E-06	2.7E-01	5.0E-06	2.5E-03	1.1E+00	na	na		X				
119	Hexachlorobutadiene	1.0E-02	5.6E-01	1.0E-02	6.6E-02	3.0E+00	na	na		X				
120	Hexachlorocyclopentadiene	1.0E+00	4.8E+01	1.0E+00	na	3.6E+01	na	na		X				
121	Hexachloroethane	2.0E-02	1.1E+00	2.0E-02	na	1.8E+01	na	na		X				
122	Isophorone	2.7E+01	9.2E+01	2.7E+01	na	na	na	na		X				
123	2-Methoxynaphthalene	na	na	na	na	na	na	na						
124	2-Methylphenol (o-cresol)	8.0E+02	8.0E+02	8.0E+02	na	na	na	na	X	X				
125	3-Methylphenol (m-cresol)	8.0E+02	8.0E+02	8.0E+02	na	na	na	na	X	X				
126	4-Methylphenol (p-cresol)	1.5E+02	1.6E+03	1.6E+03	1.5E+02	na	na	na			X			
127	2-Nitroaniline	1.6E+02	1.6E+02	1.6E+02	na	na	na	na	X	X				
128	3-Nitroaniline	na	na	na	na	na	na	na						
129	4-Nitroaniline	4.4E+00	4.4E+00	4.4E+00	na	na	na	na	X	X				
130	Nitrobenzene	1.0E+01	1.6E+01	1.0E+01	na	na	na	na		X				
131	2-Nitrophenol	na	na	na	na	na	na	na						
132	4-Nitrophenol	na	na	na	na	na	na	na						
133	n-Nitrosodimethylamine	2.3E-04	2.3E-04	2.3E-04	na	na	na	na	X	X				
134	n-Nitrosodiphenylamine	6.2E-01	1.8E+01	6.2E-01	na	na	na	na		X				
135	n-Nitrosodi-n-propylamine	4.4E-03	1.3E-02	4.4E-03	na	na	na	na		X				
136	Pentachlorophenol	2.0E-03	1.0E+00	2.0E-03	3.1E+01	na	na	na		X				
137	Phenol	9.8E+01	4.8E+03	4.0E+03	9.8E+01	na	na	na			X			
138	Pyridine	8.0E+00	8.0E+00	8.0E+00	na	na	na	na	X	X				
139	2,3,4,5-Tetrachlorophenol	na	na	na	na	na	na	na						
140	2,3,4,6-Tetrachlorophenol	4.8E+02	4.8E+02	4.8E+02	na	na	na	na	X	X				
141	1,2,4-Trichlorobenzene	3.6E-02	1.5E+01	3.6E-02	na	3.3E+02	na	na		X				
142	2,4,5-Trichlorophenol	3.0E+02	1.6E+03	3.0E+02	na	na	na	na		X				
143	2,4,6-Trichlorophenol	2.5E-01	8.0E+00	2.5E-01	na	na	na	na		X				
144	***Volatile Organic Compounds***								***Volatile Organic Compounds***					
145	Acetone	7.2E+03	7.2E+03	7.2E+03	na	na	na	na	X	X				
146	Acetaldehyde	2.9E+03	na	na	na	2.9E+03	na	na					X	

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147	Acrolein	1.0E+00	4.0E+00	1.0E+00	na	2.5E+01	na	na		X				
148	Acrylonitrile	1.9E-02	8.1E-02	1.9E-02	na	5.4E+01	na	na		X				
149	Benzaldehyde	1.1E+01	1.1E+01	1.1E+01	na	na	na	na	X	X				
150	Benzene	4.4E-01	5.0E+00	4.4E-01	na	1.1E+01	na	na		X				
151	Bromobenzene	6.4E+01	6.4E+01	6.4E+01	na	5.4E+03	na	na	X	X				
152	Bromochloromethane	na	na	na	na	na	na	na						
153	Bromoethane	na	na	na	na	na	na	na						
154	Bromoform	4.6E+00	5.5E+01	4.6E+00	na	1.0E+03	na	na		X				
155	Bromomethane	1.1E+01	1.1E+01	1.1E+01	na	9.3E+01	na	na	X	X				
156	2-Butoxyethanol (EGBE)	1.6E+03	1.6E+03	1.6E+03	na	na	na	na	X	X				
157	n-Butylbenzene	4.0E+02	4.0E+02	4.0E+02	na	na	na	na	X	X				
158	sec-Butylbenzene	8.0E+02	8.0E+02	8.0E+02	na	na	na	na	X	X				
159	tert-Butylbenzene	8.0E+02	8.0E+02	8.0E+02	na	na	na	na	X	X				
160	Carbon disulfide	8.0E+02	8.0E+02	8.0E+02	na	7.1E+03	na	na	X	X				
161	Carbon tetrachloride	2.0E-01	5.0E+00	2.0E-01	na	2.9E+00	na	na		X				
162	Chlorobenzene	1.0E+02	1.0E+02	1.0E+02	na	2.9E+03	na	na	X	X				
163	Chloroethane	1.2E+05	na	na	na	1.2E+05	na	na				X		
164	2-Chloroethyl vinyl ether	na	na	na	na	na	na	na						
165	Chloroform	5.5E+00	1.4E+01	1.4E+01	na	5.5E+00	na	na				X		
166	Chloromethane	1.3E+03	na	na	na	1.3E+03	na	na				X		
167	3-Chloro-1-propene (allyl chloride)	2.1E+00	2.1E+00	2.1E+00	na	7.0E+00	na	na	X	X				
168	2-Chlorotoluene	1.6E+02	1.6E+02	1.6E+02	na	na	na	na	X	X				
169	4-Chlorotoluene	1.6E+02	1.6E+02	1.6E+02	na	na	na	na	X	X				
170	Dibromochloromethane	6.0E-01	5.2E+00	6.0E-01	na	na	na	na		X				
171	1,2-Dibromo-3-chloropropane	1.4E-01	1.4E-01	1.4E-01	na	7.5E-01	na	na	X	X				
172	Dibromomethane	8.0E+01	8.0E+01	8.0E+01	na	8.2E+02	na	na	X	X				
173	Dichlorobromomethane	7.3E-01	7.1E+00	7.3E-01	na	6.4E+00	na	na		X				
174	trans-1,4-Dichloro-2-butene	na	na	na	na	na	na	na						
175	Dichlorodifluoromethane	3.6E+01	1.6E+03	1.6E+03	na	3.6E+01	na	na				X		
176	1,1-Dichloroethane	7.7E+00	7.7E+00	7.7E+00	na	5.2E+01	na	na	X	X				
177	1,2-Dichloroethane (EDC)	4.8E+00	4.8E+00	4.8E+00	na	1.6E+01	na	na	X	X				
178	1,1-Dichloroethylene	7.0E+00	7.0E+00	7.0E+00	na	1.1E+03	na	na	X	X				
179	cis-1,2-Dichloroethylene	1.6E+01	1.6E+01	1.6E+01	na	1.6E+03	na	na	X	X				
180	trans-1,2-Dichloroethylene	1.0E+02	1.0E+02	1.0E+02	na	6.5E+02	na	na	X	X				
181	1,2-Dichloroethylene (mixed isomers)	na	na	na	na	na	na	na						
182	1,2-Dichloropropane	7.1E-01	5.0E+00	7.1E-01	na	4.8E+01	na	na		X				
183	1,3-Dichloropropane	2.2E-01	1.6E+02	2.2E-01	na	na	na	na		X				
184	2,2-Dichloropropane	na	na	na	na	na	na	na						
185	1,1-Dichloropropene	na	na	na	na	na	na	na						
186	cis-1,3-Dichloropropene	2.2E-01	4.4E-01	2.2E-01	na	3.7E+01	na	na		X				
187	trans-1,3-Dichloropropene	2.2E-01	4.4E-01	2.2E-01	na	3.7E+01	na	na		X				
188	Diisopropyl ether	na	na	na	na	na	na	na						
189	Ethane	na	na	na	na	na	na	na						
190	Ethylbenzene	1.2E+01	7.0E+02	1.2E+01	na	2.4E+04	na	na		X				
191	Ethylene oxide	3.7E-02	3.7E-02	3.7E-02	na	9.5E-01	na	na	X	X				
192	Ethyl ether	1.6E+03	1.6E+03	1.6E+03	na	na	na	na	X	X				
193	Ethylene dibromide (EDB)	5.0E-02	5.0E-02	5.0E-02	na	1.4E+00	na	na	X	X				
194	Formaldehyde	5.5E-01	5.5E-01	5.5E-01	na	na	na	na	X	X				
195	n-Hexane	6.1E+01	4.8E+02	4.8E+02	na	6.1E+01	na	na				X		
196	2-Hexanone	4.0E+01	4.0E+01	4.0E+01	na	6.2E+04	na	na	X	X				
197	Isopropylbenzene (cumene)	8.0E+02	8.0E+02	8.0E+02	na	7.8E+03	na	na	X	X				

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198	4-Isopropyltoluene (p-isopropyltoluene)	3.2E+01	3.2E+01	3.2E+01	na	7.5E+02	na	na	X	X			
199	Methane	na	na	na	na	na	na	na					
200	Methyl ethyl ketone (2-butanone)	4.8E+03	4.8E+03	4.8E+03	na	1.5E+07	na	na	X	X			
201	Methyl iodide	na	na	na	na	na	na	na					
202	Methyl isobutyl ketone	6.4E+02	6.4E+02	6.4E+02	na	4.0E+06	na	na	X	X			
203	Methyl tert-butyl ether (MTBE)	2.4E+01	2.4E+01	2.4E+01	na	4.0E+03	na	na	X	X			
204	Methylene chloride	5.0E+00	5.0E+00	5.0E+00	na	1.4E+04	na	na	X	X			
205	2-Pentanone	na	na	na	na	na	na	na					
206	n-Propylbenzene	8.0E+02	8.0E+02	8.0E+02	na	1.9E+04	na	na	X	X			
207	Styrene	1.0E+02	1.0E+02	1.0E+02	na	7.3E+04	na	na	X	X			
208	1,1,1,2-Tetrachloroethane	1.7E+00	1.7E+00	1.7E+00	na	3.3E+01	na	na	X	X			
209	1,1,2,2-Tetrachloroethane	1.0E-01	2.2E-01	1.0E-01	na	2.7E+01	na	na		X			
210	Tetrachloroethylene (PCE)	2.4E+00	5.0E+00	2.4E+00	na	1.2E+02	na	na		X			
211	Tetrahydrofuran	7.2E+03	7.2E+03	7.2E+03	na	4.5E+06	na	na	X	X			
212	Toluene	5.3E+01	6.4E+02	5.3E+01	na	1.3E+05	na	na		X			
213	1,2,3-Trichlorobenzene	6.4E+00	6.4E+00	6.4E+00	na	na	na	na	X	X			
214	1,1,1-Trichloroethane	2.0E+02	2.0E+02	2.0E+02	na	4.6E+04	na	na	X	X			
215	1,1,2-Trichloroethane	3.5E-01	3.0E+00	3.5E-01	na	4.1E+01	na	na		X			
216	Trichloroethylene (TCE)	3.0E-01	4.0E+00	3.0E-01	na	1.2E+01	3.1E+01	na		X			
217	Trichlorofluoroethane	na	na	na	na	na	na	na					
218	Trichlorofluoromethane	1.0E+03	2.4E+03	2.4E+03	na	1.0E+03	na	na				X	
219	1,2,3-Trichloropropane	3.8E-04	3.8E-04	3.8E-04	na	1.7E+02	na	na	X	X			
220	Trichlorotrifluoroethane	1.4E+03	2.4E+05	2.4E+05	na	1.4E+03	na	na				X	
221	1,2,3-Trimethylbenzene	8.0E+01	8.0E+01	8.0E+01	na	3.5E+03	na	na	X	X			
222	1,2,4-Trimethylbenzene	8.0E+01	8.0E+01	8.0E+01	na	2.0E+03	na	na	X	X			
223	1,3,5-Trimethylbenzene	8.0E+01	8.0E+01	8.0E+01	na	1.4E+03	na	na	X	X			
224	Vinyl acetate	8.0E+03	8.0E+03	8.0E+03	na	6.9E+04	na	na	X	X			
225	Vinyl chloride	2.0E-02	2.9E-01	2.0E-02	na	1.6E+00	na	na		X			
226	Total xylenes	5.7E+01	1.6E+03	5.7E+01	na	2.8E+03	na	na		X			
227	***PFAS***								***PFAS***				
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	3.20E+00	3.20E+00	3.20E+00	na	na	na	na	X	X			
229	GenX (HFPO-DA)	1.0E-02	1.0E-02	1.0E-02	na	na	na	na	X	X			
230	Perfluorobutanoic acid (PFBA)	8.0E+00	8.0E+00	8.0E+00	na	na	na	na	X	X			
231	Perfluorobutanesulfonic acid (PFBS)	4.8E+00	4.8E+00	4.8E+00	na	na	na	na	X	X			
232	Perfluorodecanoic acid (PFDA)	3.2E-05	3.2E-05	3.2E-05	na	na	na	na	X	X			
233	Perfluorohexanoic acid (PFHxA)	8.0E+00	8.0E+00	8.0E+00	na	na	na	na	X	X			
234	Perfluorohexanesulfonic acid (PFHxS)	6.4E-06	6.4E-06	6.4E-06	na	na	na	na	X	X			
235	Perfluorononanoic acid (PFNA)	1.0E-02	1.0E-02	1.0E-02	na	na	na	na	X	X			
236	Perfluorooctanesulfonic acid (PFOS)	4.0E-03	4.0E-03	4.0E-03	5.2E+00	na	na	na	X	X			
237	Perfluorooctanoic acid (PFOA)	4.0E-03	4.0E-03	4.0E-03	na	na	na	na	X	X			
238	***Petroleum Hydrocarbons***								***Petroleum Hydrocarbons***				
239	Gasoline range hydrocarbons, fresh	8.0E+02	8.0E+02	8.0E+02	na	na	na	na	X	X			
240	Gasoline range hydrocarbons, weathered	1.0E+03	1.0E+03	1.0E+03	na	na	na	na	X	X			
241	Diesel range hydrocarbons, fresh	1.5E+02	5.0E+02	1.5E+02	na	na	na	na		X			
242	Diesel range hydrocarbons, weathered	5.0E+02	5.0E+02	5.0E+02	na	na	na	na	X	X			
243	Oil range hydrocarbons	5.0E+02	5.0E+02	5.0E+02	na	na	na	na	X	X			
244	Total diesel & oil range hydrocarbons	5.0E+02	5.0E+02	5.0E+02	na	na	na	na	X	X			
245	***Pesticides***								***Pesticides***				
246	Aldrin	4.1E-08	2.6E-03	4.1E-08	4.1E-04	na	na	na		X			
247	alpha-BHC (alpha-HCH)	4.8E-05	1.4E-02	4.8E-05	na	na	na	na		X			
248	beta-BHC (beta-HCH)	1.3E-03	4.9E-02	1.3E-03	6.6E-01	na	na	na		X			

249	delta-BHC (delta-HCH)	9.6E-04	9.6E-04	9.6E-04	na	na	na	na		X	X			
250	Carbaryl	2.1E+00	1.6E+03	2.1E+00	na	na	na	na			X			
251	cis-Chlordane (alpha)	3.0E-04	4.0E+00	4.0E+00	3.0E-04	na	na	na				X		
252	trans-Chlordane (gamma)	3.0E-04	4.0E+00	4.0E+00	3.0E-04	na	na	na				X		
253	Chlordane	2.2E-05	1.3E+00	2.2E-05	2.9E+01	na	na	na			X			
254	Chlorpyrifos	4.1E-02	1.6E+01	4.1E-02	3.0E+03	na	na	na			X			
255	4,4'-DDD	7.9E-06	3.6E-01	7.9E-06	4.4E-04	na	na	na			X			
256	4,4'-DDE	8.8E-07	1.3E-01	8.8E-07	2.3E-04	na	na	na			X			
257	4,4'-DDT	1.2E-06	2.6E-01	1.2E-06	2.9E-05	na	na	na			X			
258	Total DDD	7.9E-06	3.6E-01	7.9E-06	1.4E+00	na	na	na			X			
259	Total DDE	8.8E-07	1.3E-01	8.8E-07	4.9E-02	na	na	na			X			
260	Total DDT	1.2E-06	2.6E-01	1.2E-06	2.9E-02	na	na	na			X			
261	Diazinon	1.7E-01	1.1E+01	1.7E-01	5.1E+03	na	na	na			X			
262	Dieldrin	7.0E-08	5.5E-03	7.0E-08	7.8E-04	na	na	na			X			
263	Endosulfan I	5.6E-02	na	5.6E-02	na	na	na	na			X			
264	Endosulfan II	5.6E-02	na	5.6E-02	na	na	na	na			X			
265	Endosulfan sulfate	9.0E+00	9.6E+01	9.0E+00	na	na	na	na			X			
266	Endrin	2.0E-03	2.0E+00	2.0E-03	6.2E+02	na	na	na			X			
267	Endrin aldehyde	3.4E-02	na	3.4E-02	na	na	na	na			X			
268	Endrin ketone	na	na	na	na	na	na	na						
269	Heptachlor	3.4E-07	9.7E-02	3.4E-07	2.1E-03	2.4E+00	na	na			X			
270	Heptachlor epoxide	2.4E-06	4.8E-02	2.4E-06	1.7E+01	na	na	na			X			
271	Lindane (gamma-BHC)	8.0E-02	2.0E-01	8.0E-02	na	na	na	na			X			
272	Malathion	1.0E-01	3.2E+02	1.0E-01	na	na	na	na			X			
273	Methoxychlor	2.0E-02	4.0E+01	2.0E-02	na	na	na	na			X			
274	Mirex	1.0E-03	2.4E-03	1.0E-03	2.4E-01	6.9E-02	na	na			X			
275	Nonachlor	na	na	na	na	na	na	na						
276	Toxaphene	3.2E-05	8.0E-01	3.2E-05	2.5E+00	na	na	na			X			
277	***Herbicides***									***Herbicides***				
278	2,4-Dichlorophenoxyacetic acid (2,4-D)	7.0E+01	7.0E+01	7.0E+01	na	na	na	na		X	X			
279	4-(2,4-Dichlorophenoxy)butanoic acid 2,4-DB	na	na	na	na	na	na	na						
280	2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	5.0E+01	5.0E+01	5.0E+01	na	na	na	na		X	X			
281	2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	1.6E+02	1.6E+02	1.6E+02	na	na	na	na		X	X			
282	Dalapon	2.0E+02	2.0E+02	2.0E+02	na	na	na	na		X	X			
283	Dicamba	4.8E+02	4.8E+02	4.8E+02	na	na	na	na		X	X			
284	Dichloroprop	na	na	na	na	na	na	na						
285	Dinoseb	7.0E+00	7.0E+00	7.0E+00	na	na	na	na		X	X			
286	2-Methyl-4-chlorophenoxy acetic acid (MCPA)	8.0E+00	8.0E+00	8.0E+00	na	na	na	na		X	X			
287	(2-Methyl-4-chlorophenol)2-propionic acid (MCPP)	1.6E+01	1.6E+01	1.6E+01	na	na	na	na		X	X			
								Number of Chemicals:		100	204	15	10	1

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PCUL Workbook - Sediment Summary for Freshwater Sites

Sort Order	Chemical (all concentrations in mg/kg dry weight)	Contact & Bioaccum. for Sed Data Eval SWAC Sed #s 1, 2	Benthic Criterion for Sed Data Eval Point by Point Sed # 3	Min. Sediment PCUL for Partition Calcs Sed #s 1-3	Bioaccum-ulative SedDetFW	SD-1 SMS Lower Tier Beach Play Dir. Contact SCO SWAC SedDetFW	SD-2 SMS Lower Tier Seafood Consumption SCO SWAC SedDetFW	SD-3 SMS Lower Tier Freshwater Benthic SCO Point by Point SedDetFW	SD-4 Freshwater Natural Background Param	SD-5 PQL SedDetFW	Basis-Partitioning: Natural Bknd.	PQL	Benthic	Direct Contact
1	***PCBs***													
2	Total PCB Aroclors	1.2E-02	1.1E-01	1.2E-02	YES	4.9E-01	1.2E-02	1.1E-01	na	1.2E-02		X		
3	Total PCB congeners	3.5E-03	na	3.5E-03	YES	4.9E-01	3.5E-03	na	3.5E-03	na	X			
4	Total PCB TEQ	7.0E-07	na	7.0E-07	YES	2.9E-05	7.0E-07	na	2.0E-07	7.0E-07		X		
5	***Dioxins/Furans***													
6	Total dioxin/furan TEQ	5.0E-06	na	5.0E-06	YES	2.9E-05	5.0E-06	na	4.0E-06	5.0E-06		X		
7	2,3,7,8-TCDD	2.9E-05	na	2.9E-05	YES	2.9E-05	PQL	na	na	na				X
8	Total chlorinated dioxins	na	na	na	YES	na	PQL	na	na	na				
9	Total chlorinated furans	na	na	na	YES	na	PQL	na	na	na				
10	***Inorganics***													
11	Ammonia	na	na	na	no	na	na	na	na	na				
12	Chloride	na	na	na	no	na	na	na	na	na				
13	Cyanide, free	na	na	na	no	na	na	na	na	na				
14	Fluoride	na	na	na	no	na	na	na	na	na				
15	Nitrate	na	na	na	no	na	na	na	na	na				
16	Nitrite	na	na	na	no	na	na	na	na	na				
17	Sulfate	na	na	na	no	na	na	na	na	na				
18	Sulfide	na	3.9E+01	3.9E+01	no	na	na	3.9E+01	na	na			X	
19	***Metals***													
20	Aluminum	na	na	na	no	na	na	na	3.3E+04	na				
21	Antimony	na	na	na	no	na	na	na	5.2E+00	5.0E-01				
22	Arsenic	7.3E+00	1.4E+01	9.8E-02	YES	9.8E-02	7.3E+00	1.4E+01	7.3E+00	3.0E-01				X
23	Barium	na	na	na	no	na	na	na	2.5E+02	na				
24	Beryllium	na	na	na	no	na	na	na	6.1E-01	na				
25	Cadmium	7.7E-01	2.1E+00	7.7E-01	YES	2.2E+02	7.7E-01	2.1E+00	7.7E-01	7.0E-02	X			
26	Chromium, total	na	7.2E+01	7.2E+01	no	na	na	7.2E+01	4.8E+01	2.0E-01			X	
27	Chromium, trivalent	na	na	na	no	na	na	na	na	na				
28	Chromium, hexavalent	7.2E+00	na	7.2E+00	YES	7.2E+00	PQL	na	na	na				X
29	Cobalt	na	na	na	no	na	na	na	1.1E+01	na				
30	Copper	na	4.0E+02	4.0E+02	no	na	na	4.0E+02	3.6E+01	1.0E-01			X	
31	Iron	na	na	na	no	na	na	na	3.6E+04	na				
32	Lead	2.1E+01	3.6E+02	2.1E+01	YES	na	2.1E+01	3.6E+02	2.1E+01	1.0E-01	X			
33	Manganese	na	na	na	no	na	na	na	1.1E+03	na				
34	Mercury, inorganic	7.0E-02	6.6E-01	7.0E-02	YES	na	7.0E-02	6.6E-01	7.0E-02	2.0E-02	X			
35	Methylmercury	6.7E+01	na	6.7E+01	YES	6.7E+01	PQL	na	na	na				X
36	Molybdenum	na	na	na	no	na	na	na	na	na				
37	Nickel	na	2.6E+01	2.6E+01	no	na	na	2.6E+01	4.8E+01	2.0E-01			X	
38	Selenium	7.8E-01	1.1E+01	7.8E-01	YES	3.3E+03	7.8E-01	1.1E+01	7.8E-01	1.0E-01	X			
39	Silver	na	5.7E-01	5.7E-01	no	na	na	5.7E-01	2.4E-01	1.0E-01			X	
40	Thallium	na	na	na	no	na	na	na	na	na				
41	Tin	na	na	na	no	na	na	na	na	na				
42	Vanadium	na	na	na	no	na	na	na	4.5E+01	na				
43	Zinc	na	3.2E+03	3.2E+03	no	na	na	3.2E+03	8.5E+01	1.0E+00			X	
44	***Metals - Butyltins***													
45	Monobutyltin	na	5.4E-01	5.4E-01	no	na	na	5.4E-01	na	na			X	
46	Dibutyltin	na	9.1E-01	9.1E-01	no	na	na	9.1E-01	na	na			X	
47	Trybutyl tin	na	4.7E-02	4.7E-02	no	na	na	4.7E-02	na	na			X	
48	Tributyltin oxide	2.1E-03	na	2.1E-03	YES	3.3E+01	2.1E-03	na	na	2.1E-03		X		
49	Tetrabutyltin	na	9.7E-02	9.7E-02	no	na	na	9.7E-02	na	na			X	
50	***SVOCs - PAHs***													
51	Acenaphthene	na	na	na	no	na	na	na	na	5.0E-03				
52	Acenaphthylene	na	na	na	no	na	na	na	na	5.0E-03				
53	Anthracene	na	na	na	no	na	na	na	na	5.0E-03				
54	Benzo(a)anthracene	9.0E-03	na	9.0E-03	YES	na	9.0E-03	na	na	9.0E-03		X		
55	Benzo(b)fluoranthene	9.0E-03	na	9.0E-03	YES	na	9.0E-03	na	na	9.0E-03		X		
56	Benzo(k)fluoranthene	9.0E-03	na	9.0E-03	YES	na	9.0E-03	na	na	9.0E-03		X		
57	Total benzofluoranthenes	1.2E-02	na	1.2E-02	YES	na	1.2E-02	na	na	1.2E-02		X		

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58	Benzo(g,h,i)perylene	5.0E-03	na	5.0E-03	YES	na	5.0E-03	na	na	5.0E-03		X		
59	Benzo(a)pyrene	9.0E-03	na	9.0E-03	YES	1.7E-01	9.0E-03	na	na	9.0E-03		X		
60	Chrysene	9.0E-03	na	9.0E-03	YES	na	9.0E-03	na	na	9.0E-03		X		
61	Dibenz(a,h)anthracene	9.0E-03	na	9.0E-03	YES	na	9.0E-03	na	na	9.0E-03		X		
62	Dibenzofuran	na	2.0E-01	2.0E-01	no	na	na	2.0E-01	na	6.8E-02			X	
63	Fluoranthene	5.0E-03	na	5.0E-03	YES	3.6E+03	5.0E-03	na	na	5.0E-03		X		
64	Fluorene	na	na	na	no	na	na	na	na	5.0E-03				
65	Indeno(1,2,3-cd)pyrene	9.0E-03	na	9.0E-03	YES	na	9.0E-03	na	na	9.0E-03		X		
66	Methyl isopropyl phenanthrene (retene)	na	na	na	no	na	na	na	na	na				
67	1-Methylnaphthalene	na	na	na	no	na	na	na	na	na				
68	2-Methylnaphthalene	na	na	na	no	na	na	na	na	7.0E-03				
69	Naphthalene	na	na	na	no	na	na	na	na	6.0E-03				
70	Phenanthrene	na	na	na	no	na	na	na	na	5.0E-03				
71	Pyrene	5.0E-03	na	5.0E-03	YES	2.7E+03	5.0E-03	na	na	5.0E-03		X		
72	Total LPAHs	na	na	na	no	na	na	na	na	na				
73	Total HPAHs	na	na	na	no	na	na	na	na	na				
74	Total PAHs	na	1.7E+01	1.7E+01	no	na	na	1.7E+01	na	na			X	
75	Total cPAH TEQ	2.1E-02	na	2.1E-02	YES	1.7E-01	2.1E-02	na	2.1E-02	9.0E-03	X			
76	***Other SVOCs***										***Other SVOCs***			
77	Aniline	na	na	na	no	na	na	na	na	na				
78	Azobenzene	na	na	na	no	na	na	na	na	na				
79	Benzidine	na	na	na	no	na	na	na	na	na				
80	Benzoic acid	na	2.9E+00	2.9E+00	no	na	na	2.9E+00	na	5.0E-01			X	
81	Benzyl alcohol	na	na	na	no	na	na	na	na	1.4E-01				
82	Bis(2-chloroethoxy)methane	na	na	na	no	na	na	na	na	na				
83	Bis(2-chloroethyl)ether	na	na	na	no	na	na	na	na	na				
84	Bis(chloromethyl)ether	na	na	na	no	na	na	na	na	na				
85	Bis(2-chloro-1-methylethyl)ether	na	na	na	no	na	na	na	na	na				
86	2,6-Bis(1,1-dimethylethyl) phenol	na	na	na	no	na	na	na	na	na				
87	Bis(2-ethylhexyl) phthalate	na	5.0E-01	5.0E-01	no	na	na	5.0E-01	na	1.2E-01			X	
88	4-Bromophenyl phenyl ether	na	na	na	no	na	na	na	na	na				
89	Butyl benzyl phthalate	na	na	na	no	na	na	na	na	8.1E-02				
90	Butyl diphenyl phosphate	na	na	na	no	na	na	na	na	na				
91	Carbazole	na	9.0E-01	9.0E-01	no	na	na	9.0E-01	na	na			X	
92	4-Chloroaniline	na	na	na	no	na	na	na	na	na				
93	4-Chloro-3-methylphenol (chlorocresol)	na	na	na	no	na	na	na	na	na				
94	2-Chloronaphthalene (beta-)	na	na	na	no	na	na	na	na	na				
95	2-Chlorophenol	na	na	na	no	na	na	na	na	na				
96	4-Chlorophenyl phenyl ether	na	na	na	no	na	na	na	na	na				
97	Dibutyl phthalate	na	3.8E-01	3.8E-01	no	na	na	3.8E-01	na	7.6E-02			X	
98	Dibutyl phenyl phosphate	na	na	na	no	na	na	na	na	na				
99	1,2-Dichlorobenzene	na	na	na	no	na	na	na	na	6.8E-02				
100	1,3-Dichlorobenzene	na	na	na	no	na	na	na	na	6.8E-02				
101	1,4-Dichlorobenzene	na	na	na	no	na	na	na	na	6.8E-02				
102	3,3'-Dichlorobenzidine	na	na	na	no	na	na	na	na	na				
103	2,4-Dichlorophenol	na	na	na	no	na	na	na	na	na				
104	Di(2-ethylhexyl)adipate	na	na	na	no	na	na	na	na	na				
105	Diethyl phthalate	na	na	na	no	na	na	na	na	9.3E-02				
106	Dimethyl phthalate	na	na	na	no	na	na	na	na	6.6E-02				
107	2,4-Dimethylphenol	na	na	na	no	na	na	na	na	2.1E-01				
108	1,2-Dinitrobenzene	na	na	na	no	na	na	na	na	na				
109	1,3-Dinitrobenzene	na	na	na	no	na	na	na	na	na				
110	1,4-Dinitrobenzene	na	na	na	no	na	na	na	na	na				
111	4,6-Dinitro-o-cresol (DNOC)	na	na	na	no	na	na	na	na	na				
112	2,4-Dinitrophenol	na	na	na	no	na	na	na	na	na				
113	2,4-Dinitrotoluene	na	na	na	no	na	na	na	na	na				
114	2,6-Dinitrotoluene	na	na	na	no	na	na	na	na	na				
115	Di-n-octyl phthalate	na	3.9E-02	3.9E-02	no	na	na	3.9E-02	na	1.4E-01			X	
116	1,4-Dioxane	na	na	na	no	na	na	na	na	na				
117	1,2-Diphenylhydrazine	na	na	na	no	na	na	na	na	na				
118	Hexachlorobenzene	1.0E-03	na	1.0E-03	YES	4.9E+00	1.0E-03	na	na	1.0E-03		X		
119	Hexachlorobutadiene	3.0E-04	na	3.0E-04	YES	1.0E+02	3.0E-04	na	na	3.0E-04		X		
120	Hexachlorocyclopentadiene	na	na	na	no	na	na	na	na	na				
121	Hexachloroethane	na	na	na	no	na	na	na	na	1.0E-03				

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122	Isophorone	na	na	na	no	na	na	na	na	na				
123	2-Methoxynaphthalene	na	na	na	no	na	na	na	na	na				
124	2-Methylphenol (o-cresol)	na	na	na	no	na	na	na	na	6.9E-02				
125	3-Methylphenol (m-cresol)	na	na	na	no	na	na	na	na	1.8E-01				
126	4-Methylphenol (p-cresol)	na	2.6E-01	2.6E-01	no	na	na	2.6E-01	na	1.5E-02			X	
127	2-Nitroaniline	na	na	na	no	na	na	na	na	na				
128	3-Nitroaniline	na	na	na	no	na	na	na	na	na				
129	4-Nitroaniline	na	na	na	no	na	na	na	na	na				
130	Nitrobenzene	na	na	na	no	na	na	na	na	na				
131	2-Nitrophenol	na	na	na	no	na	na	na	na	na				
132	4-Nitrophenol	na	na	na	no	na	na	na	na	na				
133	n-Nitrosodimethylamine	na	na	na	no	na	na	na	na	na				
134	n-Nitrosodiphenylamine	na	na	na	no	na	na	na	na	6.8E-02				
135	n-Nitrosodi-n-propylamine	na	na	na	no	na	na	na	na	na				
136	Pentachlorophenol	3.6E-01	1.2E+00	3.6E-01	YES	1.4E+00	3.6E-01	1.2E+00	na	3.6E-01		X		
137	Phenol	na	1.2E-01	1.2E-01	no	na	na	1.2E-01	na	7.2E-02			X	
138	Pyridine	na	na	na	no	na	na	na	na	na				
139	2,3,4,5-Tetrachlorophenol	na	na	na	no	na	na	na	na	na				
140	2,3,4,6-Tetrachlorophenol	na	na	na	no	na	na	na	na	na				
141	1,2,4-Trichlorobenzene	na	na	na	no	na	na	na	na	6.8E-02				
142	2,4,5-Trichlorophenol	na	na	na	no	na	na	na	na	na				
143	2,4,6-Trichlorophenol	na	na	na	no	na	na	na	na	na				
144	***Volatile Organic Compounds***										***Volatile Organic Compou***			
145	Acetone	na	na	na	no	na	na	na	na	na				
146	Acetaldehyde	na	na	na	no	na	na	na	na	na				
147	Acrolein	na	na	na	no	na	na	na	na	na				
148	Acrylonitrile	na	na	na	no	na	na	na	na	na				
149	Benzaldehyde	na	na	na	no	na	na	na	na	na				
150	Benzene	na	na	na	no	na	na	na	na	4.1E-03				
151	Bromobenzene	na	na	na	no	na	na	na	na	na				
152	Bromochloromethane	na	na	na	no	na	na	na	na	na				
153	Bromoethane	na	na	na	no	na	na	na	na	na				
154	Bromoform	na	na	na	no	na	na	na	na	na				
155	Bromomethane	na	na	na	no	na	na	na	na	na				
156	2-Butoxyethanol (EGBE)	na	na	na	no	na	na	na	na	na				
157	n-Butylbenzene	na	na	na	no	na	na	na	na	na				
158	sec-Butylbenzene	na	na	na	no	na	na	na	na	na				
159	tert-Butylbenzene	na	na	na	no	na	na	na	na	na				
160	Carbon disulfide	na	na	na	no	na	na	na	na	na				
161	Carbon tetrachloride	na	na	na	no	na	na	na	na	na				
162	Chlorobenzene	na	na	na	no	na	na	na	na	na				
163	Chloroethane	na	na	na	no	na	na	na	na	na				
164	2-Chloroethyl vinyl ether	na	na	na	no	na	na	na	na	na				
165	Chloroform	na	na	na	no	na	na	na	na	na				
166	Chloromethane	na	na	na	no	na	na	na	na	na				
167	3-Chloro-1-propene (allyl chloride)	na	na	na	no	na	na	na	na	na				
168	2-Chlorotoluene	na	na	na	no	na	na	na	na	na				
169	4-Chlorotoluene	na	na	na	no	na	na	na	na	na				
170	Dibromochloromethane	na	na	na	no	na	na	na	na	na				
171	1,2-Dibromo-3-chloropropane	na	na	na	no	na	na	na	na	na				
172	Dibromomethane	na	na	na	no	na	na	na	na	na				
173	Dichlorobromomethane	na	na	na	no	na	na	na	na	na				
174	trans-1,4-Dichloro-2-butene	na	na	na	no	na	na	na	na	na				
175	Dichlorodifluoromethane	na	na	na	no	na	na	na	na	na				
176	1,1-Dichloroethane	na	na	na	no	na	na	na	na	na				
177	1,2-Dichloroethane (EDC)	na	na	na	no	na	na	na	na	na				
178	1,1-Dichloroethylene	na	na	na	no	na	na	na	na	na				
179	cis-1,2-Dichloroethylene	na	na	na	no	na	na	na	na	na				
180	trans-1,2-Dichloroethylene	na	na	na	no	na	na	na	na	na				
181	1,2-Dichloroethylene (mixed isomers)	na	na	na	no	na	na	na	na	na				
182	1,2-Dichloropropane	na	na	na	no	na	na	na	na	na				
183	1,3-Dichloropropane	na	na	na	no	na	na	na	na	na				
184	2,2-Dichloropropane	na	na	na	no	na	na	na	na	na				
185	1,1-Dichloropropene	na	na	na	no	na	na	na	na	na				

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186	cis-1,3-Dichloropropene	na	na	na	no	na	na	na	na	na				
187	trans-1,3-Dichloropropene	na	na	na	no	na	na	na	na	na				
188	Diisopropyl ether	na	na	na	no	na	na	na	na	na				
189	Ethane	na	na	na	no	na	na	na	na	na				
190	Ethylbenzene	na	na	na	no	na	na	na	na	6.6E-03				
191	Ethylene oxide	na	na	na	no	na	na	na	na	na				
192	Ethyl ether	na	na	na	no	na	na	na	na	na				
193	Ethylene dibromide (EDB)	na	na	na	no	na	na	na	na	na				
194	Formaldehyde	na	na	na	no	na	na	na	na	na				
195	n-Hexane	na	na	na	no	na	na	na	na	na				
196	2-Hexanone	na	na	na	no	na	na	na	na	na				
197	Isopropylbenzene (cumene)	na	na	na	no	na	na	na	na	na				
198	4-Isopropyltoluene (p-isopropyltoluene)	na	na	na	no	na	na	na	na	na				
199	Methane	na	na	na	no	na	na	na	na	na				
200	Methyl ethyl ketone (2-butanone)	na	na	na	no	na	na	na	na	na				
201	Methyl iodide	na	na	na	no	na	na	na	na	na				
202	Methyl isobutyl ketone	na	na	na	no	na	na	na	na	na				
203	Methyl tert-butyl ether (MTBE)	na	na	na	no	na	na	na	na	na				
204	Methylene chloride	na	na	na	no	na	na	na	na	na				
205	2-Pentanone	na	na	na	no	na	na	na	na	na				
206	n-Propylbenzene	na	na	na	no	na	na	na	na	na				
207	Styrene	na	na	na	no	na	na	na	na	na				
208	1,1,1,2-Tetrachloroethane	na	na	na	no	na	na	na	na	na				
209	1,1,2,2-Tetrachloroethane	na	na	na	no	na	na	na	na	na				
210	Tetrachloroethylene (PCE)	na	na	na	no	na	na	na	na	6.6E-03				
211	Tetrahydrofuran	na	na	na	no	na	na	na	na	1.0E+00				
212	Toluene	na	na	na	no	na	na	na	na	na				
213	1,2,3-Trichlorobenzene	na	na	na	no	na	na	na	na	na				
214	1,1,1-Trichloroethane	na	na	na	no	na	na	na	na	na				
215	1,1,2-Trichloroethane	na	na	na	no	na	na	na	na	na				
216	Trichloroethylene (TCE)	na	na	na	no	na	na	na	na	6.6E-03				
217	Trichlorofluoroethane	na	na	na	no	na	na	na	na	na				
218	Trichlorofluoromethane	na	na	na	no	na	na	na	na	na				
219	1,2,3-Trichloropropane	na	na	na	no	na	na	na	na	na				
220	Trichlorotrifluoroethane	na	na	na	no	na	na	na	na	na				
221	1,2,3-Trimethylbenzene	na	na	na	no	na	na	na	na	na				
222	1,2,4-Trimethylbenzene	na	na	na	no	na	na	na	na	na				
223	1,3,5-Trimethylbenzene	na	na	na	no	na	na	na	na	na				
224	Vinyl acetate	na	na	na	no	na	na	na	na	na				
225	Vinyl chloride	na	na	na	no	na	na	na	na	na				
226	Total xylenes	na	na	na	no	na	na	na	na	na				
227	***PFAS***										***PFAS***			
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	na	na	na	no	na	na	na	na	na				
229	GenX (HFPO-DA)	na	na	na	no	na	na	na	na	na				
230	Perfluorobutanoic acid (PFBA)	na	na	na	no	na	na	na	na	na				
231	Perfluorobutanesulfonic acid (PFBS)	na	na	na	no	na	na	na	na	na				
232	Perfluorodecanoic acid (PFDA)	na	na	na	no	na	na	na	na	na				
233	Perfluorohexanoic acid (PFHxA)	na	na	na	no	na	na	na	na	na				
234	Perfluorohexanesulfonic acid (PFHxS)	na	na	na	no	na	na	na	na	na				
235	Perfluorononanoic acid (PFNA)	na	na	na	no	na	na	na	na	na				
236	Perfluorooctanesulfonic acid (PFOS)	1.1E-02	na	1.1E-02	YES	1.1E-02	PQL	na	na	na				X
237	Perfluorooctanoic acid (PFOA)	na	na	na	no	na	na	na	na	na				
238	***Petroleum Hydrocarbons***										***Petroleum Hydrocarbons***			
239	Gasoline range hydrocarbons, fresh	na	na	na	no	na	na	na	na	na				
240	Gasoline range hydrocarbons, weathered	na	na	na	no	na	na	na	na	na				
241	Diesel range hydrocarbons, fresh	na	3.4E+02	3.4E+02	no	na	na	3.4E+02	na	1.8E+01			X	
242	Diesel range hydrocarbons, weathered	na	3.4E+02	3.4E+02	no	na	na	3.4E+02	na	1.8E+01			X	
243	Oil range hydrocarbons	na	3.6E+03	3.6E+03	no	na	na	3.6E+03	na	3.8E+01			X	
244	Total diesel & oil range hydrocarbons	na	na	na	no	na	na	na	na	3.8E+01				
245	***Pesticides***										***Pesticides***			
246	Aldrin	1.0E-04	na	1.0E-04	YES	4.6E-01	1.0E-04	na	na	1.0E-04		X		
247	alpha-BHC (alpha-HCH)	na	na	na	no	na	na	na	na	na				
248	beta-BHC (beta-HCH)	na	7.2E-03	7.2E-03	no	na	na	7.2E-03	na	na			X	
249	delta-BHC (delta-HCH)	na	na	na	no	na	na	na	na	na				

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250	Carbaryl	na	na	na	no	na	na	na	na	na				
251	cis-Chlordane (alpha)	1.0E-04	na	1.0E-04	YES	1.1E+02	1.0E-04	na	na	1.0E-04		X		
252	trans-Chlordane (gamma)	1.0E-04	na	1.0E-04	YES	1.1E+02	1.0E-04	na	na	1.0E-04		X		
253	Chlordane	7.4E+00	na	7.4E+00	YES	7.4E+00	PQL	na	na	na				X
254	Chlorpyrifos	1.1E+02	na	1.1E+02	YES	1.1E+02	PQL	na	na	na				X
255	4,4'-DDD	1.0E-04	na	1.0E-04	YES	5.4E+00	1.0E-04	na	na	1.0E-04		X		
256	4,4'-DDE	1.0E-04	na	1.0E-04	YES	2.3E+01	1.0E-04	na	na	1.0E-04		X		
257	4,4'-DDT	1.0E-04	na	1.0E-04	YES	9.2E+00	1.0E-04	na	na	1.0E-04		X		
258	Total DDD	5.4E+00	3.1E-01	3.1E-01	YES	5.4E+00	PQL	3.1E-01	na	na			X	
259	Total DDE	2.3E+01	2.1E-02	2.1E-02	YES	2.3E+01	PQL	2.1E-02	na	na			X	
260	Total DDT	9.2E+00	1.0E-01	1.0E-01	YES	9.2E+00	PQL	1.0E-01	na	na			X	
261	Diazinon	7.8E+01	na	7.8E+01	YES	7.8E+01	PQL	na	na	na				X
262	Dieldrin	1.0E-04	4.9E-03	1.0E-04	YES	8.1E-02	1.0E-04	4.9E-03	na	1.0E-04		X		
263	Endosulfan I	na	na	na	YES	na	PQL	na	na	na				
264	Endosulfan II	na	na	na	YES	na	PQL	na	na	na				
265	Endosulfan sulfate	na	na	na	no	na	na	na	na	na				
266	Endrin	3.3E+01	na	3.3E+01	YES	3.3E+01	PQL	na	na	na				X
267	Endrin aldehyde	na	na	na	no	na	na	na	na	na				
268	Endrin ketone	na	8.5E-03	8.5E-03	no	na	na	8.5E-03	na	na			X	
269	Heptachlor	1.0E-04	na	1.0E-04	YES	1.7E+00	1.0E-04	na	na	1.0E-04		X		
270	Heptachlor epoxide	8.6E-01	na	8.6E-01	YES	8.6E-01	PQL	na	na	na				X
271	Lindane (gamma-BHC)	na	na	na	no	na	na	na	na	na				
272	Malathion	na	na	na	no	na	na	na	na	na				
273	Methoxychlor	na	na	na	no	na	na	na	na	na				
274	Mirex	4.3E-01	na	4.3E-01	YES	4.3E-01	PQL	na	na	na				X
275	Nonachlor	na	na	na	no	na	na	na	na	1.0E-04				
276	Toxaphene	1.2E+00	na	1.2E+00	YES	1.2E+00	PQL	na	na	na				X
277	***Herbicides***										***Herbicides***			
278	2,4-Dichlorophenoxyacetic acid (2,4-D)	na	na	na	no	na	na	na	na	na				
279	4-(2,4-Dichlorophenoxy)butanoic acid 2,4-DB	na	na	na	no	na	na	na	na	na				
280	2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	na	na	na	no	na	na	na	na	na				
281	2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	na	na	na	no	na	na	na	na	na				
282	Dalapon	na	na	na	no	na	na	na	na	na				
283	Dicamba	na	na	na	no	na	na	na	na	na				
284	Dichloroprop	na	na	na	no	na	na	na	na	na				
285	Dinoseb	na	na	na	no	na	na	na	na	na				
286	2-Methyl-4-chlorophenoxy acetic acid (MCPA)	na	na	na	no	na	na	na	na	na				
287	(2-Methyl-4-chlorophenol)2-propionic acid (MCPP)	na	na	na	no	na	na	na	na	na				
											6	26		12

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PCUL Workbook - Soil Vapor and Air Summary

Chemical (all concentrations in ug/m^3)	AR-1 Air PCUL Industrial Air-Det	TCE Short-Term Air Action Level for Cardiac Birth Defects Industrial VI Guidance	SG-1 Soil Gas Screening Level Protect Indoor Air Industrial Air-Det
PCBs			
Total PCB Aroclors	4.4E-02	na	na
Total PCB congeners	4.4E-02	na	na
Total PCB TEQ	6.6E-07	na	na
Dioxins/Furans			
Total dioxin/furan TEQ	6.6E-07	na	na
2,3,7,8-TCDD	6.6E-07	na	na
Total chlorinated dioxins	na	na	na
Total chlorinated furans	na	na	na
Inorganics			
Ammonia	5.00E+02	na	na
Chloride	na	na	na
Cyanide, free	8.0E-01	na	na
Fluoride	1.3E+01	na	na
Nitrate	na	na	na
Nitrite	na	na	na
Sulfate	na	na	na
Sulfide	na	na	na
Metals			
Aluminum	5.0E+00	na	na
Antimony	3.0E-01	na	na
Arsenic	5.8E-03	na	na
Barium	5.0E-01	na	na
Beryllium	1.0E-02	na	na
Cadmium	1.0E-02	na	na
Chromium, total	na	na	na
Chromium, trivalent	na	na	na
Chromium, hexavalent	2.3E-03	na	na
Cobalt	2.8E-03	na	na
Copper	na	na	na
Iron	na	na	na
Lead	na	na	na
Manganese	5.0E-02	na	na
Mercury, inorganic	3.0E-01	na	1.0E+01
Methylmercury	na	na	na
Molybdenum	2.0E+00	na	na
Nickel	1.4E-02	na	na
Selenium	2.0E+01	na	na
Silver	na	na	na
Thallium	na	na	na
Tin	na	na	na
Vanadium	1.0E-01	na	na
Zinc	na	na	na
Metals - Butyltins			

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PCUL Workbook - Soil Vapor and Air Summary

Chemical (all concentrations in ug/m^3)	AR-1 Air PCUL Industrial Air-Det	TCE Short-Term Air Action Level for Cardiac Birth Defects Industrial VI Guidance	SG-1 Soil Gas Screening Level Protect Indoor Air Industrial Air-Det
Monobutyltin	na	na	na
Dibutyltin	na	na	na
Trybutyl tin	na	na	na
Tributyltin oxide	na	na	na
Tetrabutyltin	na	na	na
SVOCs - PAHs			
Acenaphthene	na	na	na
Acenaphthylene	na	na	na
Anthracene	na	na	na
Benzo(a)anthracene	na	na	na
Benzo(b)fluoranthene	na	na	na
Benzo(k)fluoranthene	na	na	na
Total benzofluoranthenes	na	na	na
Benzo(g,h,i)perylene	na	na	na
Benzo(a)pyrene	2.0E-03	na	na
Chrysene	na	na	na
Dibenz(a,h)anthracene	na	na	na
Dibenzofuran	na	na	na
Fluoranthene	na	na	na
Fluorene	na	na	na
Indeno(1,2,3-cd)pyrene	na	na	na
Methyl isopropyl phenanthrene (retene)	na	na	na
1-Methylnaphthalene	3.0E-03	na	1.0E-01
2-Methylnaphthalene	na	na	na
Naphthalene	7.4E-01	na	2.5E+01
Phenanthrene	na	na	na
Pyrene	na	na	na
Total LPAHs	na	na	na
Total HPAHs	na	na	na
Total PAHs	na	na	na
Total cPAH TEQ	4.2E-02	na	na
Other SVOCs			
Aniline	1.0E+00	na	na
Azobenzene	8.1E-01	na	na
Benzidine	3.7E-04	na	na
Benzoic acid	na	na	na
Benzyl alcohol	na	na	na
Bis(2-chloroethoxy)methane	na	na	na
Bis(2-chloroethyl)ether	7.6E-02	na	na
Bis(chloromethyl)ether	4.0E-04	na	na
Bis(2-chloro-1-methylethyl)ether	2.5E+00	na	na
2,6-Bis(1,1-dimethylethyl) phenol	na	na	na
Bis(2-ethylhexyl) phthalate	1.0E+01	na	na
4-Bromophenyl phenyl ether	na	na	na

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PCUL Workbook - Soil Vapor and Air Summary

Chemical (all concentrations in ug/m^3)	AR-1 Air PCUL Industrial Air-Det	TCE Short-Term Air Action Level for Cardiac Birth Defects Industrial VI Guidance	SG-1 Soil Gas Screening Level Protect Indoor Air Industrial Air-Det
Butyl benzyl phthalate	na	na	na
Butyl diphenyl phosphate	na	na	na
Carbazole	na	na	na
4-Chloroaniline	na	na	na
4-Chloro-3-methylphenol (chlorocresol)	na	na	na
2-Chloronaphthalene (beta-)	na	na	na
2-Chlorophenol	na	na	na
4-Chlorophenyl phenyl ether	na	na	na
Dibutyl phthalate	na	na	na
Dibutyl phenyl phosphate	na	na	na
1,2-Dichlorobenzene	2.0E+02	na	6.7E+03
1,3-Dichlorobenzene	na	na	na
1,4-Dichlorobenzene	2.3E+00	na	7.6E+01
3,3'-Dichlorobenzidine	7.4E-02	na	na
2,4-Dichlorophenol	na	na	na
Di(2-ethylhexyl)adipate	na	na	na
Diethyl phthalate	na	na	na
Dimethyl phthalate	na	na	na
2,4-Dimethylphenol	na	na	na
1,2-Dinitrobenzene	na	na	na
1,3-Dinitrobenzene	na	na	na
1,4-Dinitrobenzene	na	na	na
4,6-Dinitro-o-cresol (DNOC)	na	na	na
2,4-Dinitrophenol	na	na	na
2,4-Dinitrotoluene	2.8E-01	na	na
2,6-Dinitrotoluene	na	na	na
Di-n-octyl phthalate	na	na	na
1,4-Dioxane	5.0E+00	na	1.7E+02
1,2-Diphenylhydrazine	1.1E-01	na	na
Hexachlorobenzene	5.4E-02	na	1.8E+00
Hexachlorobutadiene	1.1E+00	na	3.8E+01
Hexachlorocyclopentadiene	2.0E-01	na	6.7E+00
Hexachloroethane	2.3E+00	na	7.6E+01
Isophorone	2.0E+03	na	na
2-Methoxynaphthalene	na	na	na
2-Methylphenol (o-cresol)	6.0E+02	na	na
3-Methylphenol (m-cresol)	6.0E+02	na	na
4-Methylphenol (p-cresol)	6.0E+02	na	na
2-Nitroaniline	5.0E-02	na	na
3-Nitroaniline	na	na	na
4-Nitroaniline	6.0E+00	na	na
Nitrobenzene	6.3E-01	na	na
2-Nitrophenol	na	na	na
4-Nitrophenol	na	na	na

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PCUL Workbook - Soil Vapor and Air Summary

Chemical (all concentrations in ug/m^3)	AR-1 Air PCUL Industrial Air-Det	TCE Short-Term Air Action Level for Cardiac Birth Defects Industrial VI Guidance	SG-1 Soil Gas Screening Level Protect Indoor Air Industrial Air-Det
n-Nitrosodimethylamine	1.8E-03	na	na
n-Nitrosodiphenylamine	9.6E+00	na	na
n-Nitrosodi-n-propylamine	1.3E-02	na	na
Pentachlorophenol	4.9E+00	na	na
Phenol	2.0E+02	na	na
Pyridine	na	na	na
2,3,4,5-Tetrachlorophenol	na	na	na
2,3,4,6-Tetrachlorophenol	na	na	na
1,2,4-Trichlorobenzene	2.0E+00	na	6.7E+01
2,4,5-Trichlorophenol	na	na	na
2,4,6-Trichlorophenol	8.1E+00	na	na
Volatile Organic Compounds			
Acetone	na	na	na
Acetaldehyde	9.0E+00	na	3.0E+02
Acrolein	2.0E-02	na	6.7E-01
Acrylonitrile	3.7E-01	na	1.2E+01
Benzaldehyde	na	na	na
Benzene	3.2E+00	na	1.1E+02
Bromobenzene	6.0E+01	na	2.0E+03
Bromochloromethane	4.0E+01	na	na
Bromoethane	na	na	na
Bromoform	2.3E+01	na	7.6E+02
Bromomethane	5.0E+00	na	1.7E+02
2-Butoxyethanol (EGBE)	1.6E+03	na	na
n-Butylbenzene	na	na	na
sec-Butylbenzene	na	na	na
tert-Butylbenzene	na	na	na
Carbon disulfide	7.0E+02	na	2.3E+04
Carbon tetrachloride	4.2E+00	na	1.4E+02
Chlorobenzene	5.0E+01	na	1.7E+03
Chloroethane	1.0E+04	na	3.3E+05
2-Chloroethyl vinyl ether	na	na	na
Chloroform	1.1E+00	na	3.6E+01
Chloromethane	9.0E+01	na	3.0E+03
3-Chloro-1-propene (allyl chloride)	1.0E+00	na	3.3E+01
2-Chlorotoluene	na	na	na
4-Chlorotoluene	na	na	na
Dibromochloromethane	na	na	na
1,2-Dibromo-3-chloropropane	4.2E-03	na	1.4E-01
Dibromomethane	4.0E+00	na	1.3E+02
Dichlorobromomethane	6.8E-01	na	2.3E+01
trans-1,4-Dichloro-2-butene	6.0E-03	na	na
Dichlorodifluoromethane	1.0E+02	na	3.3E+03
1,1-Dichloroethane	1.6E+01	na	5.2E+02

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PCUL Workbook - Soil Vapor and Air Summary

Chemical (all concentrations in ug/m^3)	AR-1 Air PCUL Industrial Air-Det	TCE Short-Term Air Action Level for Cardiac Birth Defects Industrial VI Guidance	SG-1 Soil Gas Screening Level Protect Indoor Air Industrial Air-Det
1,2-Dichloroethane (EDC)	9.6E-01	na	3.2E+01
1,1-Dichloroethylene	2.0E+02	na	6.7E+03
cis-1,2-Dichloroethylene	4.0E+01	na	1.3E+03
trans-1,2-Dichloroethylene	4.0E+01	na	1.3E+03
1,2-Dichloroethylene (mixed isomers)	na	na	na
1,2-Dichloropropane	4.0E+00	na	1.3E+02
1,3-Dichloropropane	na	na	na
2,2-Dichloropropane	na	na	na
1,1-Dichloropropene	na	na	na
cis-1,3-Dichloropropene	6.3E+00	na	2.1E+02
trans-1,3-Dichloropropene	6.3E+00	na	2.1E+02
Diisopropyl ether	7.0E+02	na	na
Ethane	na	na	na
Ethylbenzene	1.0E+03	na	3.3E+04
Ethylene oxide	8.3E-03	na	2.8E-01
Ethyl ether	na	na	na
Ethylene dibromide (EDB)	4.2E-02	na	1.4E+00
Formaldehyde	3.4E+00	na	na
n-Hexane	7.0E+02	na	2.3E+04
2-Hexanone	3.0E+01	na	1.0E+03
Isopropylbenzene (cumene)	4.0E+02	na	1.3E+04
4-Isopropyltoluene (p-isopropyltoluene)	4.0E+01	na	1.3E+03
Methane	6.6E+04	na	na
Methyl ethyl ketone (2-butanone)	5.0E+03	na	1.7E+05
Methyl iodide	na	na	na
Methyl isobutyl ketone	3.0E+03	na	1.0E+05
Methyl tert-butyl ether (MTBE)	9.6E+01	na	3.2E+03
Methylene chloride	6.0E+02	na	2.0E+04
2-Pentanone	na	na	na
n-Propylbenzene	1.0E+03	na	3.3E+04
Styrene	1.0E+03	na	3.3E+04
1,1,1,2-Tetrachloroethane	3.4E+00	na	1.1E+02
1,1,2,2-Tetrachloroethane	4.3E-01	na	1.4E+01
Tetrachloroethylene (PCE)	4.0E+01	na	1.3E+03
Tetrahydrofuran	2.0E+03	na	6.7E+04
Toluene	5.0E+03	na	1.7E+05
1,2,3-Trichlorobenzene	na	na	na
1,1,1-Trichloroethane	5.0E+03	na	1.7E+05
1,1,2-Trichloroethane	2.0E-01	na	6.7E+00
Trichloroethylene (TCE)	2.0E+00	7.5E+00	6.7E+01
Trichlorofluoroethane	na	na	na
Trichlorofluoromethane	7.0E+02	na	2.3E+04
1,2,3-Trichloropropane	3.0E-01	na	1.0E+01
Trichlorotrifluoroethane	5.0E+03	na	1.7E+05

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PCUL Workbook - Soil Vapor and Air Summary

Chemical (all concentrations in ug/m^3)	AR-1 Air PCUL Industrial Air-Det	TCE Short-Term Air Action Level for Cardiac Birth Defects Industrial VI Guidance	SG-1 Soil Gas Screening Level Protect Indoor Air Industrial Air-Det
1,2,3-Trimethylbenzene	6.0E+01	na	2.0E+03
1,2,4-Trimethylbenzene	6.0E+01	na	2.0E+03
1,3,5-Trimethylbenzene	6.0E+01	na	2.0E+03
Vinyl acetate	2.0E+02	na	6.7E+03
Vinyl chloride	2.8E+00	na	9.5E+01
Total xylenes	1.0E+02	na	3.3E+03
PFAS			
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	na	na	na
GenX (HFPO-DA)	na	na	na
Perfluorobutanoic acid (PFBA)	na	na	na
Perfluorobutanesulfonic acid (PFBS)	na	na	na
Perfluorodecanoic acid (PFDA)	na	na	na
Perfluorohexanoic acid (PFHxA)	na	na	na
Perfluorohexanesulfonic acid (PFHxS)	na	na	na
Perfluorononanoic acid (PFNA)	na	na	na
Perfluorooctanesulfonic acid (PFOS)	na	na	na
Perfluorooctanoic acid (PFOA)	na	na	na
Petroleum Hydrocarbons			
Gasoline range hydrocarbons, fresh	1.5E+03	na	1.5E+03
Gasoline range hydrocarbons, weathered	1.5E+03	na	1.5E+03
Diesel range hydrocarbons, fresh	1.5E+03	na	1.5E+03
Diesel range hydrocarbons, weathered	1.5E+03	na	1.5E+03
Oil range hydrocarbons	na	na	na
Total diesel & oil range hydrocarbons	na	na	na
Pesticides			
Aldrin	5.1E-03	na	na
alpha-BHC (alpha-HCH)	1.4E-02	na	na
beta-BHC (beta-HCH)	4.7E-02	na	na
delta-BHC (delta-HCH)	na	na	na
Carbaryl	na	na	na
cis-Chlordane (alpha)	na	na	na
trans-Chlordane (gamma)	na	na	na
Chlordane	2.5E-01	na	na
Chlorpyrifos	na	na	na
4,4'-DDD	3.6E-01	na	na
4,4'-DDE	2.6E-01	na	na
4,4'-DDT	2.6E-01	na	na
Total DDD	3.6E-01	na	na
Total DDE	2.6E-01	na	na
Total DDT	2.6E-01	na	na
Diazinon	na	na	na
Dieldrin	5.4E-03	na	na
Endosulfan I	na	na	na
Endosulfan II	na	na	na

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PCUL Workbook - Soil Vapor and Air Summary

Chemical (all concentrations in ug/m^3)	AR-1 Air PCUL Industrial Air-Det	TCE Short-Term Air Action Level for Cardiac Birth Defects Industrial VI Guidance	SG-1 Soil Gas Screening Level Protect Indoor Air Industrial Air-Det
Endosulfan sulfate	na	na	na
Endrin	na	na	na
Endrin aldehyde	na	na	na
Endrin ketone	na	na	na
Heptachlor	1.9E-02	na	6.4E-01
Heptachlor epoxide	9.6E-03	na	na
Lindane (gamma-BHC)	8.1E-02	na	na
Malathion	na	na	na
Methoxychlor	na	na	na
Mirex	4.9E-03	na	1.6E-01
Nonachlor	na	na	na
Toxaphene	7.8E-02	na	na

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PCUL Workbook - Chemicals of Interest, CAS Numbers, and Synonyms

Sort Order	Chemical	CAS No.	Chemical Name in CLARC	Alternate CAS No.	Abbreviation	Synonyms
1	***PCBs***					
2	Total PCB Aroclors	1336-36-3	polychlorinated biphenyls (PCBs)			
3	Total PCB congeners	na	Not in CLARC			
4	Total PCB TEQ	na	Not in CLARC			
5	***Dioxins/Furans***					
6	Total dioxin/furan TEQ	na	Not in CLARC			
7	2,3,7,8-TCDD	1746-01-6	TCDD;2,3,7,8 (DIOXIN)			
8	Total chlorinated dioxins	na	Not in CLARC			Dioxin
9	Total chlorinated furans	na	Not in CLARC			
10	***Inorganics***					
11	Ammonia	7664-41-7	ammonia			
12	Chloride	16887-00-6	chloride			
13	Cyanide, free	57-12-5	cyanide			
14	Fluoride	16984-48-8	fluoride			
15	Nitrate	14797-55-8	nitrate (measured as nitrogen)			
16	Nitrite	14797-65-0	nitrite (measured as nitrogen)			
17	Sulfate	14808-79-8	sulfate			
18	Sulfide	na	Not in CLARC			
19	***Metals***					
20	Aluminum	7429-90-5	aluminum		Al	
21	Antimony	7440-36-0	antimony		Sb	
22	Arsenic	7440-38-2	arsenic, inorganic		As	
23	Barium	7440-39-3	barium and compounds		Ba	
24	Beryllium	7440-41-7	beryllium		Be	
25	Cadmium	7440-43-9	cadmium (potable groundwater and surface water) and cadmium (soil and nonpotable surface water)	7440-43-9a	Cd	
26	Chromium, total	7440-47-3	chromium (total)		Cr	
27	Chromium, trivalent	16065-83-1	CHROMIUM (III)		Cr+3, Cr III	Trivalent chromium
28	Chromium, hexavalent	18540-29-9	CHROMIUM (VI)		Cr+6, Cr VI	Hexavalent chromium
29	Cobalt	7440-48-4	cobalt		Co	
30	Copper	7440-50-8	copper		Cu	
31	Iron	7439-89-6	iron		Fe	
32	Lead	7439-92-1	lead		Pb	
33	Manganese	7439-96-5	MANGANESE (Diet - e.g., fish consumption) and MANGANESE (Non-Diet - e.g., drinking water or soil)		Mn	
34	Mercury, inorganic	7439-97-6	mercury		Hg	
35	Methylmercury	16056-34-1	methyl mercury	22967-92-6		Mercury, organic
36	Molybdenum	7439-98-7	molybdenum		Mo	
37	Nickel	7440-02-0	nickel soluble salts		Ni	
38	Selenium	7782-49-2	selenium and compounds		Se	
39	Silver	7440-22-4	silver		Ag	
40	Thallium	7440-28-0	thallium, soluble salts		Tl	
41	Tin	7440-31-5	tin		Sn	
42	Vanadium	7440-62-2	vanadium		V	
43	Zinc	7440-66-6	zinc		Zn	
44	***Metals - Butyltins***					
45	Monobutyltin	78763-54-9	Not in CLARC			Butyl tin ion
46	Dibutyltin	1002-53-5	Not in CLARC			
47	Trybutyl tin	688-73-3	tributyltin			
48	Tributyltin oxide	36643-28-4	tributyltin oxide			Tributyl tin ion
49	Tetrabutyltin	1461-25-2	Not in CLARC			Tetrabutylstannane
50	***SVOCs - PAHs***					
51	Acenaphthene	83-32-9	acenaphthene			
52	Acenaphthylene	208-96-8	Not in CLARC			
53	Anthracene	120-12-7	anthracene			
54	Benzo(a)anthracene	56-55-3	benzo[a]anthracene			
55	Benzo(b)fluoranthene	205-99-2	benzo[b]fluoranthene			
56	Benzo(k)fluoranthene	207-08-9	benzo[k]fluoranthene			
57	Total benzofluoranthenes	na	Not in CLARC			
58	Benzo(g,h,i)perylene	191-24-2	Not in CLARC			
59	Benzo(a)pyrene	50-32-8	benzo[a]pyrene		BaP	
60	Chrysene	218-01-9	chrysene			Benzo(a)phenanthrene
61	Dibenz(a,h)anthracene	53-70-3	DIBENZ[a,h]ANTHRACENE			
62	Dibenzofuran	132-64-9	dibenzofuran			
63	Fluoranthene	206-44-0	fluoranthene			
64	Fluorene	86-73-7	fluorene			
65	Indeno(1,2,3-cd)pyrene	193-39-5	INDENO[1,2,3-cd]PYRENE			
66	Methyl isopropyl phenanthrene (retene)	483-65-8	Not in CLARC			Methyl isopropyl phenanthrene
67	1-Methylnaphthalene	90-12-0	methyl naphthalene;1-			
68	2-Methylnaphthalene	91-57-6	methyl naphthalene;2-			
69	Naphthalene	91-20-3	naphthalene			
70	Phenanthrene	85-01-8	Not in CLARC			
71	Pyrene	129-00-0	pyrene			
72	Total LPAHs	na	Not in CLARC			
73	Total HPAHs	na	Not in CLARC			
74	Total PAHs	na	Not in CLARC			
75	Total cPAH TEQ	na	Not in CLARC			
76	***Other SVOCs***					
77	Aniline	62-53-3	aniline			Benzenamine
78	Azobenzene	103-33-3	azobenzene			Diphenyldiazene
79	Benzidine	92-87-5	benzidine			
80	Benzoic acid	65-85-0	benzoic acid			
81	Benzyl alcohol	100-51-6	benzyl alcohol			
82	Bis(2-chloroethoxy)methane	111-91-1	bis(2-chloroethoxy)methane			

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Sort Order	Chemical	CAS No.	Chemical Name in CLARC	Alternate CAS No.	Abbreviation	Synonyms
83	Bis(2-chloroethyl)ether	111-44-4	bis(2-chloroethyl)ether			
84	Bis(chloromethyl)ether	542-88-1	bis(chloromethyl)ether			
85	Bis(2-chloro-1-methylethyl)ether	108-60-1	bis(2-chloro-1-methyl-ethyl)ether			2,2'-Oxybis(1-chloropropane), bis(2-chloroisopropyl)ether
86	2,6-Bis(1,1-dimethylethyl) phenol	128-39-2	Not in CLARC			2,6-Di-tert-butylphenol
87	Bis(2-ethylhexyl) phthalate	117-81-7	bis(2-ethylhexyl) phthalate (DEHP)		BEHP, DEHP	Di(2-ethylhexyl) phthalate; 1,2-benzenedicarboxylic acid; 1,2-bis(2-ethylhexyl) ester
88	4-Bromophenyl phenyl ether	101-55-3	Not in CLARC			
89	Butyl benzyl phthalate	85-68-7	butyl benzyl phthalate (BBP)		BBP	1,2-Benzenedicarboxylic acid; 1-butyl 2-(phenylmethyl) ester; phthalic acid; benzyl butyl ester
90	Butyl diphenyl phosphate	2752-95-6	Not in CLARC			
91	Carbazole	86-74-8	Not in CLARC			
92	4-Chloroaniline	106-47-8	chloroaniline;p-			p-Chloroaniline; 4-chlorobenzenamine
93	4-Chloro-3-methylphenol (chlorocresol)	59-50-7	chlorocresol			p-Chloro-m-cresol
94	2-Chloronaphthalene (beta-)	91-58-7	beta-chloronaphthalene			PCN-002
95	2-Chlorophenol	95-57-8	chlorophenol;2-			
96	4-Chlorophenyl phenyl ether	7005-72-3	Not in CLARC			
97	Dibutyl phthalate	84-74-2	di-butyl phthalate (DBP)		DBP	Di-n-butyl phthalate; 1,2-benzenedicarboxylic acid; 1,2-dibutyl ester
98	Dibutyl phenyl phosphate	2528-36-1	Not in CLARC			
99	1,2-Dichlorobenzene	95-50-1	dichlorobenzene;1,2-			o-Dichlorobenzene
100	1,3-Dichlorobenzene	541-73-1	dichlorobenzene;1,3-			m-Dichlorobenzene
101	1,4-Dichlorobenzene	106-46-7	dichlorobenzene;1,4-			p-Dichlorobenzene
102	3,3'-Dichlorobenzidine	91-94-1	dichlorobenzidine;3,3'-			
103	2,4-Dichlorophenol	120-83-2	dichlorophenol;2,4-			
104	Di(2-ethylhexyl)adipate	103-23-1	di(2-ethylhexyl)adipate			bis(2-Ethylhexyl) ester; hexanedioic acid
105	Diethyl phthalate	84-66-2	diethyl phthalate		DEP	1,2-Benzenedicarboxylic acid 1,2-diethyl ester; diethyl 1,2-benzenedicarboxylate
106	Dimethyl phthalate	131-11-3	dimethyl phthalate			1,2-Benzenedicarboxylic acid dimethyl ester; 1,2-benzenedicarboxylate
107	2,4-Dimethylphenol	105-67-9	dimethylphenol;2,4-			
108	1,2-Dinitrobenzene	528-29-0	dinitrobenzene;o-			
109	1,3-Dinitrobenzene	99-65-0	dinitrobenzene;m-			1,3-DNB
110	1,4-Dinitrobenzene	100-25-4	dinitrobenzene;p-			
111	4,6-Dinitro-o-cresol (DNOC)	534-52-1	DNOC			2-Methyl-4,6-dinitrophenol; 4,5-dinitro-o-cresol, Elgetol 30, Sinox; 4,6-dinitro-2-methylphenol
112	2,4-Dinitrophenol	51-28-5	dinitrophenol;2,4-			
113	2,4-Dinitrotoluene	121-14-2	dinitrotoluene;2,4-			2,4-DNT
114	2,6-Dinitrotoluene	606-20-2	dinitrotoluene;2,6-			2,6-DNT
115	Di-n-octyl phthalate	117-84-0	di-n-octyl phthalate (DNoP)			1,2-Benzenedicarboxylic acid; 1,2-dioxtyl ester; DnOP, phthalic acid dioxtyl ester
116	1,4-Dioxane	123-91-1	dioxane;1,4-			p-Dioxane; 1,4-diethyleneoxide
117	1,2-Diphenylhydrazine	122-66-7	diphenylhydrazine;1,2-			
118	Hexachlorobenzene	118-74-1	hexachlorobenzene		HCB	Perchlorobenzene; 1,2,3,4,5,6-hexachlorobenzene
119	Hexachlorobutadiene	87-68-3	hexachlorobutadiene			1,1,2,3,4,4-Hexachloro-1,3-butadiene; Hexachloro-1,3-butadiene
120	Hexachlorocyclopentadiene	77-47-4	hexachlorocyclopentadiene			
121	Hexachloroethane	67-72-1	hexachloroethane			
122	Isophorone	78-59-1	isophorone			
123	2-Methoxynaphthalene	93-04-9	Not in CLARC			
124	2-Methylphenol (o-cresol)	95-48-7	cresol;o-			o-Hydroxytoluene
125	3-Methylphenol (m-cresol)	108-39-4	cresol;m-			1-Hydroxy-3-methylbenzene; 3-methylphenol
126	4-Methylphenol (p-cresol)	106-44-5	cresol;p-			4-Hydroxytoluene
127	2-Nitroaniline	88-74-4	nitroaniline, 2-			o-Nitroaniline
128	3-Nitroaniline	99-09-2	Not in CLARC			
129	4-Nitroaniline	100-01-6	nitroaniline, 4-			p-Nitroaniline
130	Nitrobenzene	98-95-3	nitrobenzene			NB
131	2-Nitrophenol	88-75-5	Not in CLARC			
132	4-Nitrophenol	100-02-7	Not in CLARC			
133	n-Nitrosodimethylamine	62-75-9	nitrosodimethylamine;N-			n-Methyl-n-nitrosomethanamine; NDMA
134	n-Nitrosodiphenylamine	86-30-6	nitrosodiphenylamine;N-			
135	n-Nitrosodi-n-propylamine	621-64-7	nitroso-di-n-propylamine;N-			Di-n-propylnitrosamine; n-nitrosodipropylamine
136	Pentachlorophenol	87-86-5	pentachlorophenol			Dowicide 7, PCP
137	Phenol	108-95-2	phenol			Hydroxybenzene; carbolic acid
138	Pyridine	110-86-1	pyridine			
139	2,3,4,5-Tetrachlorophenol	4901-51-3	Not in CLARC			
140	2,3,4,6-Tetrachlorophenol	58-90-2	TETRACHLOROPHENOL;2,3,4,6-			
141	1,2,4-Trichlorobenzene	120-82-1	trichlorobenzene;1,2,4-			
142	2,4,5-Trichlorophenol	95-95-4	trichlorophenol;2,4,5-			
143	2,4,6-Trichlorophenol	88-06-2	trichlorophenol;2,4,6-			
144	***Volatile Organic Compounds***					
145	Acetone	67-64-1	acetone			2-Propanone; methyl ketone
146	Acetaldehyde	75-07-0	acetaldehyde			
147	Acrolein	107-02-8	acrolein			2-Propenal
148	Acrylonitrile	107-13-1	acrylonitrile			2-Propenenitrile
149	Benzaldehyde	100-52-7	benzaldehyde			
150	Benzene	71-43-2	benzene			
151	Bromobenzene	108-86-1	bromobenzene			
152	Bromochloromethane	74-97-5	bromochloromethane			
153	Bromoethane	74-96-4	Not in CLARC			
154	Bromoform	75-25-2	bromoform			Tribromomethane
155	Bromomethane	74-83-9	bromomethane			Methyl bromide
156	2-Butoxyethanol (EGBE)	111-76-2	ethylene glycol monobutyl ether (EGBE)		EGBE	
157	n-Butylbenzene	104-51-8	butylbenzene; n-			Butylbenzene
158	sec-Butylbenzene	135-98-8	butylbenzene; sec-			1-Methylpropylbenzene
159	tert-Butylbenzene	98-06-6	butylbenzene; tert-			
160	Carbon disulfide	75-15-0	carbon disulfide			
161	Carbon tetrachloride	56-23-5	carbon tetrachloride			
162	Chlorobenzene	108-90-7	chlorobenzene			Monochlorobenzene

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Sort Order	Chemical	CAS No.	Chemical Name in CLARC	Alternate CAS No.	Abbreviation	Synonyms
163	Chloroethane	75-00-3	ethyl chloride			
164	2-Chloroethyl vinyl ether	110-75-8	Not in CLARC			
165	Chloroform	67-66-3	chloroform			Trichloromethane; methyl trichloride
166	Chloromethane	74-87-3	chloromethane			Methyl chloride
167	3-Chloro-1-propene (allyl chloride)	107-05-1	allyl chloride			3-Chloropropene
168	2-Chlorotoluene	95-49-8	chlorotoluene;o-			
169	4-Chlorotoluene	106-43-4	chlorotoluene;p-			
170	Dibromochloromethane	124-48-1	dibromochloromethane			Chlorodibromomethane
171	1,2-Dibromo-3-chloropropane	96-12-8	dibromo-3-chloropropane;1,2-		DBCP	
172	Dibromomethane	74-95-3	methylene bromide			
173	Dichlorobromomethane	75-27-4	bromodichloromethane			
174	trans-1,4-Dichloro-2-butene	110-57-6	dichloro-2-butene;trans-1,4-			
175	Dichlorodifluoromethane	75-71-8	dichlorodifluoromethane		CFC-12	Freon 12
176	1,1-Dichloroethane	75-34-3	dichloroethane;1,1-		1,1-DCA	
177	1,2-Dichloroethane (EDC)	107-06-2	dichloroethane;1,2- (EDC)		EDC	Ethylene dichloride; 1,2-DCA
178	1,1-Dichloroethylene	75-35-4	dichloroethylene;1,1-		1,1-DCE	1,1-Dichloroethene; vinylidene chloride
179	cis-1,2-Dichloroethylene	156-59-2	dichloroethylene;cis-1,2-		1,2-DCE	cis-1,2-Dichloroethene
180	trans-1,2-Dichloroethylene	156-60-5	dichloroethylene;trans-1,2-		1,2-DCE	trans-1,2-Dichloroethene
181	1,2-Dichloroethylene (mixed isomers)	540-59-0	Not in CLARC		1,2-DCE	
182	1,2-Dichloropropane	78-87-5	dichloropropane;1,2-			
183	1,3-Dichloropropane	142-28-9	dichloropropane;1,3-			
184	2,2-Dichloropropane	594-20-7	Not in CLARC			
185	1,1-Dichloropropene	563-58-6	Not in CLARC			
186	cis-1,3-Dichloropropene	10061-01-5	dichloropropene;1,3-			
187	trans-1,3-Dichloropropene	10061-02-6	dichloropropene;1,3-			
188	Diisopropyl ether	108-20-3	diisopropyl ether			
189	Ethane	74-84-0	Not in CLARC			
190	Ethylbenzene	100-41-4	ethylbenzene			
191	Ethylene oxide	74-85-1	ethylene oxide			
192	Ethyl ether	60-29-7	ethyl ether			Diethyl ether
193	Ethylene dibromide (EDB)	106-93-4	ethylene dibromide (EDB)		EDB	1,2-Dibromoethane
194	Formaldehyde	50-00-0	formaldehyde			Methanal; methyl aldehyde
195	n-Hexane	110-54-3	hexane;n-			
196	2-Hexanone	591-78-6	hexanone;2-		MBK	Methyl butyl ketone
197	Isopropylbenzene (cumene)	98-82-8	cumene			(1-Methylethyl)-benzene
198	4-Isopropyltoluene (p-isopropyltoluene)	99-87-6	Isopropyltoluene; p-			p-Isopropyltoluene
199	Methane	74-82-8	Not in CLARC			
200	Methyl ethyl ketone (2-butanone)	78-93-3	methyl ethyl ketone		MEK	2-Butanone
201	Methyl iodide	74-88-4	Not in CLARC			
202	Methyl isobutyl ketone	108-10-1	methyl isobutyl ketone		MIBK	4-Methyl-2-pentanone; hexone
203	Methyl tert-butyl ether (MTBE)	1634-04-4	methyl tert-butyl ether (MTBE)		MTBE	Methyl tertiary-butyl ether; 2-Methoxy-2-methylpropane
204	Methylene chloride	75-09-2	methylene chloride		DCM	Dichloromethane
205	2-Pentanone	107-87-9	Not in CLARC			
206	n-Propylbenzene	103-65-1	propylbenzene;n-			
207	Styrene	100-42-5	styrene			Ethenylbenzene
208	1,1,1,2-Tetrachloroethane	630-20-6	tetrachloroethane;1,1,1,2-			
209	1,1,2,2-Tetrachloroethane	79-34-5	tetrachloroethane;1,1,2,2-			1,1,2,2-PCA
210	Tetrachloroethylene (PCE)	127-18-4	tetrachloroethylene (PCE)		PCE	Tetrachloroethene; perchlorotehylene; perc; 1,1,2,2-tetrachloroethene
211	Tetrahydrofuran	109-99-9	tetrahydrofuran			
212	Toluene	108-88-3	toluene			Methylbenzene
213	1,2,3-Trichlorobenzene	87-61-6	trichlorobenzene;1,2,3-			
214	1,1,1-Trichloroethane	71-55-6	trichloroethane;1,1,1-		1,1,1-TCA	
215	1,1,2-Trichloroethane	79-00-5	trichloroethane;1,1,2-		1,1,2-TCA	
216	Trichloroethylene (TCE)	79-01-6	trichloroethylene (TCE)		TCE	Trichloroethene
217	Trichlorofluoroethane	27154-33-2	Not in CLARC			
218	Trichlorofluoromethane	75-69-4	trichlorofluoromethane		CFC-11	Freon 11
219	1,2,3-Trichloropropane	96-18-4	trichloropropane;1,2,3-			
220	Trichlorotrifluoroethane	76-13-1	trichloro-1,2,2-trifluoroethane;1,1,2-		CFC-113	1,1,2-Trichloro-1,2,2-trifluoroethane; Freon 113
221	1,2,3-Trimethylbenzene	526-73-8	trimethylbenzene;1,2,3-			
222	1,2,4-Trimethylbenzene	95-63-6	trimethylbenzene;1,2,4-			
223	1,3,5-Trimethylbenzene	108-67-8	trimethylbenzene;1,3,5-			
224	Vinyl acetate	108-05-4	vinyl acetate			
225	Vinyl chloride	75-01-4	vinyl chloride			Chloroethene; chloroethylene
226	Total xylenes	1330-20-7	xylenes			Dimethylbenzenes
227	***PFAS***					
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	27619-97-2	FLUOROTELOMER SULFONIC ACID;6:2 (6:2 FTS)		6:2 FTS	
229	GenX (HFPO-DA)	13252-13-6	HEXAFLUOROPROPYLENE OXIDE DIMER ACID (HFPO-DA; GenX)		HFPO-DA	
230	Perfluorobutanoic acid (PFBA)	375-22-4	PERFLUOROBUTANOIC ACID (PFBA)		PFBA	
231	Perfluorobutanesulfonic acid (PFBS)	375-73-5	PERFLUOROBUTANESULFONIC ACID (PFBS)		PFBS	
232	Perfluorodecanoic acid (PFDA)	335-76-2	PERFLUORODECANOIC ACID (PFDA)		PFDA	
233	Perfluorohexanoic acid (PFHxA)	307-24-4	PERFLUOROHEXANOIC ACID (PFHxA)		PFHxA	
234	Perfluorohexanesulfonic acid (PFHxS)	355-46-4	PERFLUOROHEXANESULFONIC ACID (PFHxS)		PFHxS	
235	Perfluorononanoic acid (PFNA)	375-95-1	PERFLUORONONANOIC ACID (PFNA)		PFNA	
236	Perfluorooctanesulfonic acid (PFOS)	1763-23-1	PERFLUOROOCTANESULFONIC ACID (PFOS)		PFOS	
237	Perfluorooctanoic acid (PFOA)	335-67-1	PERFLUOROOCTANOIC ACID (PFOA)		PFOA	
238	***Petroleum Hydrocarbons***					
239	Gasoline range hydrocarbons, fresh	na	tph;gasoline range organics, benzene present		TPH-G, GRO	
240	Gasoline range hydrocarbons, weathered	na	tph: gasoline range organics, no detectable benzene			
241	Diesel range hydrocarbons, fresh	na	tph, diesel range organics		TPH-D, DRO	
242	Diesel range hydrocarbons, weathered	na				
243	Oil range hydrocarbons	na	tph, heavy oils		TPH-O, ORO	
244	Total diesel & oil range hydrocarbons	na	--		TPH-D+O	
245	***Pesticides***					

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Sort Order	Chemical	CAS No.	Chemical Name in CLARC	Alternate CAS No.	Abbreviation	Synonyms
246	Aldrin	309-00-2	aldrin			
247	alpha-BHC (alpha-HCH)	319-84-6	hexachlorocyclohexane;alpha			alpha-Hexachlorocyclohexane; alpha-HCH; alpha-benzene hexachloride; alpha-lindane
248	beta-BHC (beta-HCH)	319-85-7	hexachlorocyclohexane;beta-			beta-Hexachlorocyclohexane; beta-benzene hexachloride; beta-HCH; beta-lindane
249	delta-BHC (delta-HCH)	319-86-8	hexachlorocyclohexane; delta-			delta-Hexachlorocyclohexane; delta-benzene hexachloride; delta-HCH; delta-lindane
250	Carbaryl	63-25-2	carbaryl			1-naphthyl methylcarbamate
251	cis-Chlordane (alpha)	5103-71-9	chlordane (alpha)			alpha-Chlordane
252	trans-Chlordane (gamma)	5103-74-2	chlordane (gamma)			beta-Chlordate
253	Chlordane	57-74-9	chlordane	12789-03-6		Chlordan
254	Chlorpyrifos	2921-88-2	chlorpyrifos			Dursban
255	4,4'-DDD	72-54-8	ddd			p,p'-Dichlorodiphenyl dichloroethane
256	4,4'-DDE	72-55-9	dde			p,p'-Dichlorodiphenyl dichloroethylene
257	4,4'-DDT	50-29-3	ddt			p,p'-Dichlorodiphenyltrichloroethane; Clofenotane; chlorophenothane
258	Total DDD	na	Not in CLARC			Dichlorodiphenyl dichloroethanes
259	Total DDE	na	Not in CLARC			Dichlorodiphenyl dichloroethylenes
260	Total DDT	na	Not in CLARC			Dichlorodiphenyltrichloroethanes
261	Diazinon	333-41-5	diazinon			Dimpylate
262	Dieldrin	60-57-1	dieldrin			HEOD
263	Endosulfan I	959-98-8	endosulfan;alpha	115-29-7		
264	Endosulfan II	33213-65-9	endosulfan;beta			
265	Endosulfan sulfate	1031-07-8	endosulfan sulfate			Endosulfan III; endosulfate
266	Endrin	72-20-8	endrin			
267	Endrin aldehyde	7421-93-4	endrin aldehyde			
268	Endrin ketone	53494-70-5	Not in CLARC			delta-Keto 153
269	Heptachlor	76-44-8	heptachlor			
270	Heptachlor epoxide	1024-57-3	heptachlor epoxide			
271	Lindane (gamma-BHC)	58-89-9	lindane			gamma-BHC; gamma-HCH
272	Malathion	121-75-5	malathion			
273	Methoxychlor	72-43-5	methoxychlor			
274	Mirex	2385-85-5	mirex			
275	Nonachlor	3734-49-4	Not in CLARC			
276	Toxaphene	8001-35-2	toxaphene			Camphechlor
277	***Herbicides***					
278	2,4-Dichlorophenoxyacetic acid (2,4-D)	94-75-7	dichlorophenoxyacetic acid;2,4-		2,4-D	2,4-D Acid; Acetic acid, (2,4-dichlorophenoxy)-
279	4-(2,4-Dichlorophenoxy)butanoic acid 2,4-DB	94-82-6	Not in CLARC		2,4-DB	Butanoic acid, 4-(2,4-dichlorophenoxy)-; Butoxone; 2,4-DB acid
280	2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	93-72-1	tp;2,4,5-		2,4,5-TP	fenoprop; Silvex
281	2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	93-76-5	trichlorophenoxyacetic acid;2,4,5-		2,4,5-T	Acetic acid, (2,4,5-trichlorophenoxy)-
282	Dalapon	75-99-0	dalapon, sodium salt		DPA	Dalapon; Dalapon; Propanoic acid, 2,2-dichloro-
283	Dicamba	1918-00-9	dicamba			Dicamba; Banvel; Benzoic acid, 3,6-dichloro-2-methoxy-
284	Dichloroprop	120-36-5	Not in CLARC			
285	Dinoseb	88-85-7	dinoseb		DNBP	
286	2-Methyl-4-chlorophenoxy acetic acid (MCPA)	94-74-6	methyl-4-chlorophenoxy-acetic acid;2-		MCPA	Acetic acid, (4-chloro-2-methylphenoxy)-; MCPA acid
287	(2-Methyl-4-chlorophenol)2-propionic acid (MCPP)	93-65-2	propionic acid;(2-methyl-4-chlorophenoxy)2-		MCPP	Mecoprop; Propanoic acid, 2-(4-chloro-2-methylphenoxy)-

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PCUL Workbook - Chemical-Specific Parameters Soil foc: 0.1% Sediment foc: 0.5% Chemicals highlighted yellow in column B are mutagenic

Sort Order	Chemical	Koc (L/kg) CLARC	Kd Inorganics Soil pH=6.8 (L/kg) CLARC	Kd Organics at Soil F_{oc} (L/kg) MTCA Eq. 747-2	Selected Soil Kd (L/kg)	Kd Inorganics pH=8.0 (L/kg) 1995 SSG	Kd Organics at Sed. F_{oc} (L/kg) MTCA Eq. 747-2	Selected Sediment Kd (L/kg)	Hcc at 13°C (unitless) CLARC	Hcc at 25°C (unitless) CLARC	Selected Hcc (unitless) CLARC	BCF (L/kg) CLARC	RfDo (mg/kg-day) CLARC	RfDo Source CLARC	GI-MTCA (Gastrointest. Absorption) (unitless) CLARC	RfDi-MTCA (mg/kg-day) SCUM	GI/GIABS-SMS (Gastrointestinal Convers. Factor (unitless) SCUM Eq. A-1	RfDd=SMS (mg/kg-day) SCUM Eq. 9-4	RfC (mg/m3) CLARC	RfC Source CLARC	RfDi (mg/kg-day) RfC x 70 kg / 20 m3/day * 70 kg	CPFo (risk per mg/kg-day) CLARC	CPFo Source CLARC	CPFd-MTCA (risk per mg/kg-day) SCUM	CPFd-SMS (risk per mg/kg-day) SCUM Eq. 9-5	IUR (risk per ug/m3) CLARC	IUR Source CLARC	CPFi (risk per mg/kg-day IUR x 70 kg x 1E3 ug/mg / 20 m3/day	Noted as Mutagen in CLARC	INH (unitless) CLARC	ABS-MTCA Dermal Absorption (unitless) CLARC	AB1 Relative Bioavailability (unitless) CLARC	ABS-SMS Dermal Absorption (unitless) SCUM Eq. A-1	Listed on CLARC WTM Page	PBT List WAC 173-333-310	DMMP List 1 or 2	LDW COC for Human Consumption of Seafood RI Table B.7-1	Exceeded NOAEL for LDW Higher Trophic Level RI Table A.9-1	Considered Bioaccumulative for Calculating LDW Sediment PCULs	Natural Background Soil Puget Sound Basin (mg/kg) Ecology 1994	Natural Background Marine Sediment (mg/kg DW) SCUM Table 10-1	Natural Background LDW Sediment (mg/kg DW) RDG Table 19	Natural Background Freshwater Sediment (mg/kg DW) Mire et Burt 5	Regional Background Port Gardner Bay Sediment (mg/kg DW) SCUM Table 10-2	Regional Background Bellingham Bay Sediment (mg/kg DW) SCUM Table 10-2	Regional Background Lake Washington Sediment (mg/kg DW) SCUM Table 10-2
1	***PCBs***																																							
2	Total PCB Aroclors	7.81E+04	na	7.81E+01	7.81E+01	na	3.91E+02	3.91E+02	na	1.70E-02	1.70E-02	1.70E-02	3.12E+04	na	na	0.800	na	1	na	na	na	na	2.00E+00	IRIS	2.50E+00	2.00E+00	5.70E-04	IRIS	2.00E+00	no	2	0.14	1.00	0.14	no	YES	YES	YES	YES	YES	na	na	2.00E-03	na	na	na	na
3	Total PCB congeners	7.81E+04	na	7.81E+01	7.81E+01	na	3.91E+02	3.91E+02	na	1.70E-02	1.70E-02	1.70E-02	3.12E+04	na	na	0.800	na	1	na	na	na	na	2.00E+00	IRIS	2.50E+00	2.00E+00	5.70E-04	IRIS	2.00E+00	no	2	0.14	1.00	0.14	no	YES	no	YES	YES	YES	na	3.50E-03	na	3.50E-03	na	na	na
4	Total PCB TEQ	7.81E+04	na	7.81E+01	7.81E+01	na	3.91E+02	3.91E+02	na	1.70E-02	1.70E-02	1.70E-02	3.12E+04	7.00E-10	IRIS	0.500	3.50E-10	1	7.00E-10	4.00E-08	Cal EPA	1.14E-08	1.30E+05	IRIS	2.60E+05	1.30E+05	3.80E+01	CalEPA	1.33E+05	no	2	0.03	0.60	0.03	no	YES	YES	YES	no	YES	5.20E-06	4.00E-06	2.00E-06	4.00E-06	3.90E-05	1.50E-05	na
5	***Dioxins/Furans***																																								
6	Total dioxin/furan TEQ	2.49E+05	na	2.49E+02	2.49E+02	na	1.25E+03	1.25E+03	na	2.04E-03	2.04E-03	5.00E-03	7.00E-10	IRIS	0.500	3.50E-10	1	7.00E-10	4.00E-08	Cal EPA	1.14E-08	1.30E+05	IRIS	2.60E+05	1.30E+05	3.80E+01	CalEPA	1.33E+05	no	2	0.03	0.60	0.03	no	YES	YES	YES	no	YES	5.20E-06	4.00E-06	2.00E-06	4.00E-06	3.90E-05	1.50E-05	na
7	2,3,7,8-TCDD	2.49E+05	na	2.49E+02	2.49E+02	na	1.25E+03	1.25E+03	na	2.04E-03	2.04E-03	5.00E-03	na	na	0.500	3.50E-10	1	7.00E-10	4.00E-08	Cal EPA	1.14E-08	1.30E+05	IRIS	2.60E+05	1.30E+05	3.80E+01	CalEPA	1.33E+05	no	2	0.03	0.60	0.03	no	YES	YES	YES	no	YES	na	na	na	na	na	na	na
8	Total chlorinated dioxins	2.49E+05	na	2.49E+02	2.49E+02	na	1.25E+03	1.25E+03	na	2.04E-03	2.04E-03	5.00E-03	na	na	0.500	na	1	na	na	na	na	na	na	na	na	na	na	na	no	2	0.03	0.60	0.03	no	YES	na	na	na	na	na	na	na	na	na	na	na
9	Total chlorinated furans	2.49E+05	na	2.49E+02	2.49E+02	na	1.25E+03	1.25E+03	na	2.04E-03	2.04E-03	5.00E-03	na	na	0.500	na	1	na	na	na	na	na	na	na	na	na	na	na	no	2	0.03	0.60	0.03	no	YES	na	na	na	na	na	na	na	na	na	na	na
10	***Inorganics***																																								
11	Ammonia	na	na	na	na	na	na	na	4.81E-04	6.58E-04	4.81E-04	na	na	na	0.200	na	1	na	5.00E-01	IRIS	1.43E-01	na	na	na	na	na	na	na	no	2	0.01	1.00	0.00	no	no	no	no	no	no	3.30E+04	na	na	3.30E+04	na	na	na
12	Chloride	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	0.200	na	na	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	na	no	no	no	na	na	no	5.20E+00	na	na	5.20E+00	na	na	na
13	Cyanide, free	na	9.90E+00	na	9.90E+00	na	na	9.90E+00	na	4.15E-03	4.15E-03	1.00E+00	6.30E-04	IRIS	0.200	1.26E-04	1	6.30E-04	9.00E-04	Cr	2.25E-04	na	na	na	na	na	na	na	no	2	0.01	1.00	0.00	no	no	no	no	no	no	na	na	na	na	na	na	na
14	Fluoride	na	1.50E+02	na	1.50E+02	na	na	1.50E+02	na	na	0.00E+00	na	6.00E-02	IRIS	0.200	1.20E-02	1	6.00E-02	1.30E-02	Cal EPA	3.71E-03	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	na	no	na	na	na	na	na	na	na
15	Nitrate	na	na	na	na	na	na	na	na	na	0.00E+00	na	1.60E+00	IRIS	0.200	3.20E-01	1	1.60E+00	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	na	no	na	na	na	na	na	na	na
16	Nitrite	na	na	na	na	na	na	na	na	na	0.00E+00	na	1.00E-01	IRIS	0.200	2.00E-02	1	1.00E-01	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	na	no	na	na	na	na	na	na	na
17	Sulfate	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	0.200	na	1	na	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	na	no	na	na	na	na	na	na	na
18	Sulfide	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	1.000	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	na	0.00	no	no	no	no	na	no	na	na	na	na	na	na	na
19	***Metals***																																								
20	Aluminum	na	1.50E+03	na	1.50E+03	na	na	1.50E+03	0.00E+00	0.00E+00	0.00E+00	na	1.00E+00	PPRTV	0.200	2.00E-01	1	1.00E+00	5.00E-03	PPRTV	1.43E-03	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	no	no	3.30E+04	na	na	3.30E+04	na	na	na
21	Antimony	na	4.50E+01	na	4.50E+01	na	na	4.50E+01	0.00E+00	0.00E+00	0.00E+00	na	4.00E-04	IRIS	0.150	6.00E-05	0.15	6.00E-05	3.00E-04	ATSDR	8.57E-05	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	no	no	5.20E+00	na	na	5.20E+00	na	na	na
22	Arsenic	na	2.90E+01	na	2.90E+01	3.10E+01	na	2.90E+01	0.00E+00	0.00E+00	0.00E+00	4.40E+01	8.00E-05	IRIS	0.950	5.70E-05	1	6.00E-05	1.50E-05	Cal EPA	4.29E-06	3.20E+01	IRIS	9.37E+01	3.20E+01	4.30E-03	IRIS	1.51E+01	no	1	0.03	1.00	0.03	no	no	YES	YES	YES	7.30E+00	1.10E+01	7.00E+00	7.30E+00	1.20E+01	na	na
23	Barium	na	4.10E+01	na	4.10E+01	5.20E+01	na	4.10E+01	0.00E+00	0.00E+00	0.00E+00	na	2.00E-01	IRIS	0.070	1.40E-02	0.07	1.40E-02	5.00E-04	HEAST	1.43E-04	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	no	no	2.50E+02	na	na	2.50E+02	na	na	na
24	Beryllium	na	7.90E+02	na	7.90E+02	3.00E+05	na	7.90E+02	0.00E+00	0.00E+00	0.00E+00	na	2.00E-03	IRIS	0.007	1.40E-05	0.007	1.40E-05	2.00E-05	IRIS	5.71E-06	na	na	na	na	2.40E-03	IRIS	8.45E+00	no	1	0.01	1.00	0.00	no	no	no	no	no	no	6.13E-01	na	na	6.13E-01	na	na	na
25	Cadmium	na	6.70E+00	na	6.70E+00	4.30E+03	na	6.70E+00	0.00E+00	0.00E+00	0.00E+00	6.40E+01	1.00E-03	IRIS	0.025	2.50E-05	0.025	2.50E-05	1.00E-05	ATSDR	2.86E-06	na	na	na	na	1.80E-03	IRIS	6.30E+00	no	1	0.001	1.00	0.00	no	YES	no	no	no	no	7.70E-01	8.00E-01	na	7.70E-01	5.20E-01	na	na
26	Chromium, total	na	1.00E+03	na	1.00E+03	na	na	1.00E+03	na	na	0.00E+00	na	na	na	0.013	na	0.013	na	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	no	no	4.80E+01	na	na	4.80E+01	na	na	na
27	Chromium, trivalent	na	1.00E+03	na	1.00E+03	4.30E+06	na	1.00E+03	0.00E+00	0.00E+00	0.00E+00	1.60E+01	1.50E+00	IRIS	0.013	1.95E-02	0.013	1.95E-02	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	no	no	na	na	na	na	na	na	na
28	Chromium, hexavalent	na	1.90E+01	na	1.90E+01	1.40E+01	na	1.90E+01	0.00E+00	0.00E+00	0.00E+00	1.60E+01	9.00E-04	IRIS	0.025	2.25E-05	0.025	2.25E-05	3.00E-05	IRIS	8.57E-06	1.60E-01	IRIS	6.40E+00	6.40E+00	1.10E-02	IRIS	3.85E+01	YES	1	0.01	1.00	0.00	no	no	YES	no	no	no	na	na	na	na	na	na	na
29	eCoal	na	4.50E+01	na	4.50E+01	na	na	4.50E+01	0.00E+00	0.00E+00	0.00E+00	na	3.00E-04	PPRTV	0.200	6.00E-05	1	3.00E-04	6.00E-06	PPRTV	1.71E-06	na	na	na	na	9.00E-03	PPRTV	3.15E+01	no	1	0.01	1.00	0.00	no	no	no	no	no	no	1.10E+01	na	na	1.10E+01	na	na	na
30	Copper	na	2.20E+01	na	2.20E+01	2.85E+04	na	2.20E+01	0.00E+00	0.00E+00	0.00E+00	3.60E+01	4.00E-02	HEAST	0.200	8.00E-03	1	4.00E-02	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	no	no	3.60E+01	4.50E+01	na	3.60E+01	na	na	na
31	Iron	na	2.50E+01	na	2.50E+01	na	na	2.50E+01	0.00E+00	0.00E+00	0.00E+00	na	7.00E-01	PPRTV	0.200	1.40E-01	1	7.00E-01	na	na	na	na	na	na	na	na	na	na	no	no	no	no	0.00	no	no	no	no	no	no	3.60E+04	na	na	3.60E+04	na	na	na
32	Lead	na	1.00E+04	na	1.00E+04	2.30E+04	na	1.00E+04	0.00E+00	0.00E+00	0.00E+00	1	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	YES	YES	no	no	no	no	2.40E+01	2.10E+01	na	2.10E+01	na	1.60E+01	na
33	Manganese	na	6.50E+01	na	6.50E+01	na	na	6.50E+01	0.00E+00	0.00E+00	0.00E+00	na	4.67E-02	IRIS	0.040	1.87E-03	0.04	1.87E-03	5.00E-05	IRIS	1.43E-05	na	na	na	na	na	na	na	no	no	no	no	no	no	no	no	no	no	no	1.10E+03	na	na	1.10E+03	na	na	na
34	Mercury, inorganic	na	5.20E+01	na	5.20E+01	2.00E+02	na	5.20E+01	1.66E-01	4.70E-01	1.66E-01	na	na	na	0.300	na	0.07	na	3.00E-04	IRIS	8.57E-05	na	na	na	na	na	na	na	YES	2	0.01	1.00	0.00	YES	YES	YES	no	no	YES	7.00E-02	2.00E-01	na	7.00E-02	1.40E-01	na	na
35	Methylmercury	na	7.00E+03	na	7.00E+03	na	na	7.00E+03	na	na	0.00E+00	na	1.00E-04	IRIS	0.300	3.00E-05	1	1.00E-04	na	na	na	na	na	na	na	na	na	na	no	YES	YES	no	no	no	no	no	no	no	na	na	na	na	na	na	na
36	Molybdenum	na	2.00E+01	na	2.00E+01	na	na	2.00E+01	0.00E+00	0.00E+00	0.00E+00	na	5.00E-03	IRIS	0.200	1.00E-03	1	5.00E-03	2.00E-03	Cal EPA	5.71E-04	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	no	no	na	na	na	na	na	na	na
37	Nickel	na	6.50E+01	na	6.50E+01	1.90E+03	na	6.50E+01	0.00E+00	0.00E+00	0.00E+00	4.70E+01	2.00E-02	IRIS	0.040	8.00E-04	0.04	8.00E-04	1.40E-05	ATSDR	4.00E-06	na	na	na	na	2.60E-04	CalEPA	9.10E-01	no	1	0.01	1.00	0.00	no	no	no	no	no	no	4.80E+01	5.00E+01	na	4.80E+01	na	na	na
38	Selenium	na	5.00E+00	na	5.00E+00	2.20E+00	na	5.00E+00	0.00E+00	0.00E+00	0.00E+00	4.80E+00	5.00E-03	IRIS	0.300	1.50E-03	1	5.00E-03	2.00E-02	Cal EPA	5.71E-03	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	YES	no	no	no	7.80E-01	na	na	7.80E-01	na	na	na
39	Silver	na	8.30E+00	na	8.30E+00	1.10E+02	na	8.30E+00	0.00E+00	0.00E+00	0.00E+00	5.00E-01	5.00E-03	IRIS	0.040	2.00E-04	0.04	2.00E-04	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	no	no	6.10E-01	2.40E-01	na	6.10E-01	na	na	na
40	Thallium	na	7.10E+01	na	7.10E+01	9.60E+01	na	7.10E+01	0.00E+00	0.00E+00	0.00E+00	1.60E+01	1.00E-05	PPRTV-APP	1.000	1.00E-05	1	1.00E-05	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	no	no	na	na	na	na	na	na	na
41	Tin	na	2.50E+02	na	2.50E+02	na	na	2.50E+02	0.00E+00	0.00E+00	0.00E+00	na	6.00E-01	HEAST	0.200	1.20E-01	1	6.00E-01	na	na	na	na	na	na	na	na	na	na	no	1	0.01	1.00	0.00	no	no	no	no	no	no	na	na	na	na	na	na	na
42	Vanadium	na	1.00E+03	na	1.00E+03	na	na	1.00E+03	0.00E+00	0.00E+00	0.00E+00	na	5.00E-03	IRIS	0.026	1.30E-04	0.026	1.30E-04	1.00E-04	PPRTV	2.86E-05	na	na	na	na	na	na	na	no	no	no	no	no	YES	no	no	no	no	no	4.50E+01	na	na	4.50E+01	na	1.60E+01	na
43	Zinc	na	6.20E+01	na	6.20E+01	5.30E+02	na	6.20E+01	0.00E+00	0.00E+00	0.00E+00	4.70E+01	3.00E-01	IRIS	1	3.00E-01	1	3.00E-01	na	na	na	na	na	na	na	na	na	na	no	YES	YES	no	no	no	no	no	no	no	8.50E+01	9.30E+01	na	8.50E+01	na	na	na
44	***Metals - Butyltins***																																								
45	Monobutyltin	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	1.000	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	na	0.10	no	no	no	no	no	no	na	na	na	na	na	na	na
46	Dibutyltin	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	1.000	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	na	0.10	no	no	no	no	no	no	na	na	na	na	na	na	na
47	Tributyl tin	8.09E+03	na	8.09E+00	8.09E+00	na	4.05E+01	4.05E+01	3.65E+01	6.21E+01	3.65E+01	na	na	na	0.800	na	1	na	na	na	na	na	na	na	na	na	na	na	no	2	0.03	1.00	0.10	no	no	no	no	no	no	na	na	na	na	na	na	na
48	Tributyltin oxide	2.59E+04	na	2.59E+04	2.59E+04	na	1.30E+05	1.30E+05	na	1.23E-05	na	1.23E-05	na	na	0.500	1.50E-04	1	3.00E-04	na	na	na	na	na	na	na	na	na	na	no	no	no	no	0.10	no	YES	YES	no	no	YES	na	na	na	na	na	na	na
49	Tetrabutyltin	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	1.000	na	1	na	na	na	na	na	na	na	na	na	na	na	no	1	0.10	1.00	0.10	no	no	no	no	no	no	na	na	na	na	na	na	na
50	***SVOCs - PAHs***																																								
51	Acenaphthene	4.90E+03	na	4.90E+00	4.90E+00	na	2.45E+01	2.45E+01	2.50E-03	7.52E-03	2.50E-03	2.42E+02	6.00E-02	IRIS	0.890	5.34E-02	1	6.00E-02	na	na	na	na	na	na	na	na	na	na	no	2	0.13	1.00	0.13	no	no	no	no	no	no	na	na	na	na	na	na	na
52	Acenaphthylene	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	1.000	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	na	0.13	no	no	no	no	no	no	na	na	na	na	na	na	na
53	Anthracene	2.35E+04	na	2.35E+01	2.35E+01	na	1.18E+02	1.18E+02	6.51E-04	1.21E-03	6.51E-04	3.00E-01	3.00E-01	IRIS	0.890	2.67E-01	1	3.00E-01	na	na	na	na	na	na	na	na	na	na	no	2	0.13	1.00	0.13	no	no	no	no	no	no	na	na	na	na	na	na	na
54	Benzo(a)anthracene	3.58E+05	na	3.58E+02	3.58E+02	na	1.79E+03	1.79E+03	9.60E-05	4.91E-04	9.60E-05	3.00E-01	na	na	0.890	na	1	na	na	na	na	na	na	na	na	na	na	na	no	1	0.13	1.00	0.13	no	YES	no	no	no	no	na	na	na	na	na	na	na
55	Benzo(b)fluoranthene	5.99E+05	na	5.99E+02	5.99E+02	na	3.00E+03	3.00E+03	6.04E-06	2.69E-05	6.04E-06	3.00E-01	na	na	0.890	na	1	na	na	na	na	na	na	na	na	na	na	na	no	1	0.13	1.00	0.13	no	YES	no	no	no	no	na	na	na	na	na	na	na
56	Benzo(k)fluoranthene	5.87E+05	na	5.87E+02	5.87E+02	na	2.94E+03	2.94E+03	4.28E-06	2.39E-05	4.28E-06	3.00E-01	na	na	0.890	na	1	na	na	na	na	na	na	na	na	na	na	na	no	1	0.13	1.00	0.13	no	YES	no	no	no	no	na	na	na	na	na	na	na
57	Total benzofluoranthenes	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	0.890	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	na	0.13	no	YES	no	no	no	no	na	na	na	na	na	na	na
58	Benzo(g,h,i)perylene	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	1.000	na	1	na	na	na	na	na	na	na	na	na	na	na	no	YES	na	na	0.13	no	YES	no	no	no	no	na	na	na	na	na	na	na
59	Benzo(a)pyrene	9.69E+05	na	9.69E+02	9.69E+02	na	4.84E+03	4.84E+03	3.61E-06	1.87E-05	3.61E-06	3.00E-01	3.00E-04	IRIS	0.890	2.67E-04	1	3.00E-04	2.00E-06	IRIS	5.71E-07	3.00E-04	IRIS	8.38E+01	5.10E+01	1.40E-02	IRIS	4.90E+01	YES	1	0.13	1.00	0.13	no	YES	no	no	no	no	1.70E+00	na	na	1.70E+00	na	na	na
60	Chrysene	1.83E+05	na	1.83E+02	1.83E+02	na	9.15E+02	9.15E+02	3.87E-05	2.14E-04	3.87E-05	3.00E-01	na	na	0.890	na	1	na	na	na	na	na	na	na	na	na	na	na	no	1	0.13	1.00	0.13	no	YES	no	no	no	no	na	na	na	na	na	na	na
61	Dibenz(a,h)anthracene	1.79E+06	na	1.79E+03	1.79E+03	na	8.95E+03	8.95E+03	7.45E-07	5.76E-06	7.45E-07	3.00E-01	na	na	0.890	na	1	na	na	na	na	na	na	na	na	na	na	na	no	1	0.13	1.00	0.13	no	YES	no	no	no	no	na	na	na	na	na	na	na
62	Dibenzofuran	9.16E+03	na	9.16E+00	9.16E+00	na	4.58E+01	4.58E+01	1.84E-05	8.71E-05	1.84E-05	3.00E-01	4.00E-03	PPRTV-APP	0.890	5.06E-04	1	1.00E-03	na	na	na	na	na	na	na	na	na	na	no	2	0.03	1.00	0.10	no	no	no	no	no	no	na	na	na	na	na	na	na
63	Fluoranthene	4.91E+04	na	4.91E+01	4.91E+01	na	2.46E+02	2.46E+02	9.14E-05	3.62E-04	9.14E-05	1.15E+03	4.00E-02	IRIS	0.890	3.56E-02	1	4.00E-02	na	na	na	na	na	na	na	na	na	na	no	1	0.13	1.00	0.13	no	YES	YES	no	no	no	na	na	na	na	na	na	na
64	Fluorene	7.17E+04	na	7.17E+01	7.17E+01	na	3.58E+01	3.58E+01	2.39E-04	1.45E-03	2.39E-04	3.00E-01	4.00E-02	na	0.890	3.56E-02	1	4.00E-02	na	na	na	na	na	na	na	na	na	na	no	1	0.13	1.00	0.13	no	YES	no	no	no	no	na	na	na	na	na	na	na
65	Indeno(1,2,3-cd)pyrene	1.95E+06	na	1.95E+03	1.95E+03	na	9.75E+03	9.75E+03	2.09E-06	1.42E-05	2.09E-06	3.00E-01	na	na	0.890	na	1	na	na	na	na	na	na	na	na	na	na	na	no	1	0.13	1.00	0.13	no	YES	no	no	no	no	na	na	na	na	na	na	na
66	Methylisopropylphenanthrene (retene)	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	1.000	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	na	0.13	no	no	no	no	no	no	na	na	na	na	na	na	na
67	1-Methylnaphthalene	2.53E+03	na	2.53E+00	2.53E+00	na	1.27E+01	1.27E+01	8.16E-03	2.10E-02	8.16E-03	na	7.00E-02	ATSDR	0.890	6.23E-02	1	7.00E-02	3.00E-06	PPRTV	8.57E-07	5.10E-02	PPRTV-APP	5.73E-02	5.10E-02	na	na	na	na	no	2	0.13	1.00	0.13	YES	no	no	no	no	no	na	na	na	na	na	na	na
68	2-Methylnaphthalene	2.48E+03	na	2.48E+00	2.48E+00	na	1.24E+01	1.24E+01	7.00E-03	2.12E-02	7.00E-03	na	4.00E-03	IRIS	0.890	3.56E-03	1	4.00E-03	na	na	na	na	na	na	na	na	na	na	no	2	0.13	1.00	0.13	no	no	no	no	no	no	na	na	na	na	na	na	na
69	Naphthalene	1.19E+03	na	1.19E+00	1.19E+00	na	5.95E+00	5.95E+00	8.32E-03	1.98E-02	8.32E-03	1.05E+01	2.00E-02	IRIS	0.890	1.78E-02	1	2.00E-02	3.00E-03	IRIS	8.57E-04	na	na	na	na	3.40E-05	CalEPA	1.19E-01	no	2	0.13	1.00	0.13	YES	no	no	no	no	no	no	na	na	na	na	na	na	na
70	Phenanthrene	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	1.000	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	na	0.13	no	no	no	no	no	no	na	na	na	na	na	na	na
71	Pyrene	6.80E+04	na	6.80E+01	6.80E+01	na	3.40E+02	3.40E+02	1.15E-04	4.87E-04	1.15E-04	3.00E-01	3.00E-02	IRIS	0.890	2.67E-02	1	3.00E-02	na	na	na	na	na	na	na	na	na	na	no	2	0.13	1.00	0.13	no	YES	no	no	no	no	na	na	na	na	na	na	na
72	Total LPAHs	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	0.890	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	na	0.13	no	no	no	no	no	no	na	na	na	na	na	na	na
73	Total HPAHs	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	0.890	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	na	0.13	no	no	no	no	no	no	na	na	na	na	na	na	na
74	Total PAHs	na	na	na	na	na	na	na	na	na	0.00E+00	na	na	na	0.890	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	na	0.13	no	no	no	no	no	no	na	na	na	na	na	na	na
75	Total cPAH TEQ	9.69E+05	na	9.69E+02	9.69E+02	na	4.84E+03	4.84E+03	3.61E-06	na	3.61E-06	3.00E-01	na	na	0.890	na	1	na	na	na	na	1.00E+00	IRIS	1.12E+00	1.00E+00	6.00E-04	IRIS	2.10E+00	YES	1	0.13	1.00	0.13	no	YES	no	YES	no	no	2.10E-02	2.10E-02	2.10E-02	2.10E-02	5.60E-02	8.60E-02	2.10E-01
76	***Other SVOCs***																																								
77	Aniline	7.02E+01	na	7.02E-02	7.02E-02	na	3.51E-01	3.51E-01	3.60E-05	8.26E-05	3.60E-05	na	7.00E-03	PPRTV	0.500	3.50E-03	1	7.00E-03	1.00E-03	IRIS	2.86E-04	5.70E-03	IRIS	1.14E-02	5.70E-03	1.60E-06	CalEPA	5.60E-03	no	1	0.10	1.00	0.10	no	no	no	no	no	no	na	na	na	na	na	na	na
78	Azobenzene	3.76E+02	na	3.76E+00	3.76E+00	na	1.88E+01	1.88E+01	1.91E-04	5.33E-04	1.91E-04	na	3.00E-02	IRIS	0.800	2.40E-02	1	3.00E-02	na	na	na	na	na	na	na	na	na	na	no	1	0.10	1.00	0.10	no	no	no	no	no	no	na	na	na	na	na	na	na
79	Benzidine	1.19E+03	na	1.19E+00	1.19E+00	na	5.95E+00	5.95E+00	4.89E-10	2.11E-09	4.89E

PCUL Workbook - Chemical-Specific Parameters — Soil foc: 0.1% — Sediment foc: 0.5% — Chemicals highlighted yellow in column B are mutagenic

Sort Order	Chemical	Koc (L/kg) CLARC	Kd Inorganics Soil pH=6.5 (L/kg) CLARC	Kd Organics at Soil F_{oc} (L/kg) MTCA Eq. 747-2	Selected Soil Kd (L/kg)	Kd Inorganics at pH=8.0 (L/kg) 1998 SSG	Kd Organics at Sed. F_{oc} (L/kg) MTCA Eq. 747-2	Selected Sediment Kd (L/kg)	Hcc at 13°C (unitless) CLARC	Hcc at 25°C (unitless) CLARC	Selected Hcc (unitless) CLARC	BCF (L/kg) CLARC	RfDo (mg/kg-day) CLARC	RfDo Source CLARC	GI-MTCA (Gastrointest. Absorption) (unitless) CLARC	RfDs-MTCA (mg/kg-day) SCUM Eq. 9-4	GI/GIABS-SMS (Gastrointestinal Convers. Factor (unitless) SCUM Eq. A-	RfDs-SMS (mg/kg-day) SCUM Eq. 9-5	RfC (mg/m3) CLARC	RfC Source CLARC	RfDi (mg/kg-day) RfC x 20 m3/day / 70 kg CLARC	CPFo (risk per mg/kg-day) SCUM Eq. 9-5	CPFo Source CLARC	CPFd-MTCA (risk per mg/kg-day) SCUM Eq. 9-5	CPFd-SMS (risk per mg/kg-day) SCUM Eq. 9-6	IUR (risk per ug/m3) CLARC	IUR Source CLARC	CPFi (risk per mg/kg-day) IUR x 70 kg x 1E3 ug/mg / 20 m3/day CLARC	Noted as Mutagen in CLARC	INH (unitless) CLARC	ABS-MTCA Dermal Absorption (unitless) CLARC	AB1 Relative Bioavailability (unitless) CLARC	ABS-SMS Dermal Absorption (unitless) SCUM Eq. 9-	Listed on CLARC W Page	PBT List WAC 173-333-310	DMMP List 1 or 2	LDW COC for Human Consumption of Seafood RI Table B.7-1	Exceeded NOAEL for LDW Higher Trophic Level RI Table A.9-9	Considered Bioaccumulative for Calculating LDW Sediment PCULs	Natural Background Soil Puget Sound Basin (mg/kg) Ecology 1994	Natural Background Marine Sediment (mg/kg DW) SCUM Table 10-1	Natural Background LDW Sediment (mg/kg DW) ROD Table 19	Natural Background Freshwater Sediment (mg/kg DW)	Regional Background Port Gardner Bay Sediment (mg/kg DW) Mix of Soil & Marine Sediment	Regional Background Bellingham Bay Sediment (mg/kg DW) SCUM Table 10-2	Regional Background Lake Washington Sediment (mg/kg DW) SCUM Table 10-2
157	n-Butylbenzene	1.48E+03	na	1.48E+00	1.48E+00	na	7.40E+00	7.40E+00	2.93E-01	6.50E-01	2.93E-01	na	8.00E-02	PPRTV	0.800	8.00E-02	1	1.00E+00	8.00E-02	na	na	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
158	sec-Butylbenzene	1.33E+03	na	1.33E+00	1.33E+00	na	6.65E+00	6.65E+00	2.75E-01	7.20E-01	2.75E-01	na	1.00E-01	PPRTV-APP	0.800	8.00E-02	1	1.00E-01	na	na	na	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
159	tert-Butylbenzene	1.00E+03	na	1.00E+00	1.00E+00	na	5.00E+00	5.00E+00	2.06E-01	5.40E-01	2.06E-01	na	1.00E-01	PPRTV-APP	0.800	8.00E-02	1	1.00E-01	na	na	na	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
160	Carbon disulfide	2.17E+01	na	2.17E-02	2.17E-02	na	1.09E-01	1.09E-01	3.83E-01	5.89E-01	3.83E-01	na	1.00E-01	IRIS	0.800	8.00E-02	1	1.00E-01	7.00E-01	IRIS	2.00E-01	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
161	Carbon tetrachloride	1.52E+02	na	1.52E-01	1.52E-01	na	7.60E-01	7.60E-01	6.79E-01	1.13E+00	6.79E-01	1.88E+01	4.00E-03	IRIS	0.800	3.20E-03	1	4.00E-03	1.00E-01	IRIS	2.86E-02	7.00E-02	IRIS	8.75E-02	7.00E-02	6.00E-06	IRIS	2.10E+02	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
162	Chlorobenzene	2.24E+02	na	2.24E-01	2.24E-01	na	1.12E+00	1.12E+00	6.63E-02	1.27E-01	6.63E-02	1.03E+01	2.00E-02	IRIS	0.800	1.60E-02	1	2.00E-02	5.00E-02	PPRTV	1.43E-02	na	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
163	Chloroethane	2.17E+01	na	2.17E-02	2.17E-02	na	1.09E-01	1.09E-01	3.12E-01	4.54E-01	3.12E-01	na	na	na	0.800	na	1	na	1.00E+01	IRIS	2.86E+00	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
164	2-Chloroethyl vinyl ether	na	na	na	na	na	na	na	na	5.00E+00	na	na	na	na	0.800	na	1	na	na	na	na	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
165	Chloroform	5.30E+01	na	5.30E-02	5.30E-02	na	2.65E-01	2.65E-01	9.17E-02	1.50E-01	9.17E-02	3.75E+00	1.00E-02	IRIS	0.800	8.00E-03	1	1.00E-02	2.00E-03	ATSDR	5.71E-04	3.10E-02	CalEPA	3.88E-02	3.10E-02	2.30E-05	IRIS	8.05E-02	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
166	Chloromethane	6.00E+01	na	6.00E-02	6.00E-02	na	3.00E-01	3.00E-01	2.66E-01	3.61E-01	2.66E-01	3.75E+00	na	na	na	na	1	na	9.00E-02	IRIS	2.57E-02	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
167	3-Chloro-1-propene (allyl chloride)	3.96E+01	na	3.96E-02	3.96E-02	na	1.98E-01	1.98E-01	2.79E-01	4.50E-01	2.79E-01	na	na	na	0.800	na	1	na	1.00E-03	IRIS	2.86E-04	2.10E-02	CalEPA	2.63E-02	2.10E-02	6.00E-06	CalEPA	2.10E+02	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
168	2-Chlorotoluene	3.83E+02	na	3.83E-01	3.83E-01	na	1.92E+00	1.92E+00	7.08E-02	1.46E-01	7.08E-02	na	2.00E-02	IRIS	0.800	1.60E-02	1	2.00E-02	na	na	na	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
169	4-Chlorotoluene	3.75E+02	na	3.75E-01	3.75E-01	na	1.88E+00	1.88E+00	8.07E-02	1.79E-01	8.07E-02	na	2.00E-02	PPRTV-APP	0.800	1.60E-02	1	2.00E-02	na	na	na	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
170	Dibromochloromethane	3.18E+01	na	3.18E-02	3.18E-02	na	1.59E-01	1.59E-01	2.10E-02	3.20E-02	2.10E-02	3.75E+00	2.00E-02	IRIS	0.800	1.60E-02	1	2.00E-02	na	na	na	8.40E-02	IRIS	1.05E-01	8.40E-02	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
171	1,2-Dibromo-3-chloropropane	1.16E+02	na	1.16E-01	1.16E-01	na	5.80E-01	5.80E-01	2.60E-03	6.01E-03	2.60E-03	na	2.00E-04	PPRTV	0.800	1.60E-04	1	2.00E-04	2.00E-04	IRIS	5.71E-05	8.00E-01	PPRTV	1.00E+00	8.00E-01	6.00E-03	PPRTV	2.10E+01	YES	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
172	Dibromomethane	2.17E+01	na	2.17E-02	2.17E-02	na	1.09E-01	1.09E-01	1.89E-02	3.36E-02	1.89E-02	na	1.00E-02	HEAST	0.800	8.00E-03	1	1.00E-02	4.00E-03	PPRTV-APP	1.14E-03	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
173	Dichlorobromomethane	3.18E+01	na	3.18E-02	3.18E-02	na	1.59E-01	1.59E-01	4.90E-02	8.67E-02	4.90E-02	3.75E+00	2.00E-02	IRIS	0.800	1.60E-02	1	2.00E-02	na	na	na	6.20E-02	IRIS	7.75E-02	6.20E-02	3.70E-05	CalEPA	1.30E-01	no	2	0.0300	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
174	trans-1,4-Dichloro-2-butene	1.32E+02	na	1.32E-01	1.32E-01	na	6.60E-01	6.60E-01	1.30E-02	2.71E-02	1.30E-02	na	na	na	0.800	na	1	na	na	na	na	na	na	na	na	4.20E-03	PPRTV	1.47E+01	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
175	Dichlorodifluoromethane	4.36E+01	na	4.36E-02	4.36E-02	na	2.18E-01	2.18E-01	1.06E-01	1.40E-01	1.06E-01	na	2.00E-01	IRIS	0.800	1.60E-01	1	2.00E-01	1.00E-01	PPRTV-APP	2.86E-02	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
176	1,1-Dichloroethane	5.30E+01	na	5.30E-02	5.30E-02	na	2.65E-01	2.65E-01	1.42E-01	2.30E-01	1.42E-01	na	2.00E-01	PPRTV	0.800	1.60E-01	1	2.00E-01	na	na	na	5.70E-03	CalEPA	7.13E-03	5.70E-03	1.60E-06	CalEPA	5.60E-03	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
177	1,2-Dichloroethane (EDC)	3.80E+01	na	3.80E-02	3.80E-02	na	1.90E-01	1.90E-01	2.76E-02	4.82E-02	2.76E-02	1.20E+00	6.00E-03	PPRTV-APP	0.800	4.80E-03	1	6.00E-03	7.00E-03	PPRTV	2.00E-03	9.10E-02	IRIS	1.14E-01	9.10E-02	2.60E-05	IRIS	9.10E-02	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
178	1,1-Dichloroethylene	6.50E+01	na	6.50E-02	6.50E-02	na	3.25E-01	3.25E-01	7.03E-01	1.07E+00	7.03E-01	5.60E+00	5.00E-02	IRIS	0.800	4.00E-02	1	5.00E-02	2.00E-01	IRIS	5.71E-02	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
179	cis-1,2-Dichloroethylene	3.96E+01	na	3.96E-02	3.96E-02	na	1.98E-01	1.98E-01	1.00E-01	1.67E-01	1.00E-01	na	2.00E-03	IRIS	0.800	1.60E-03	1	2.00E-03	4.00E-02	na	1.14E-02	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
180	trans-1,2-Dichloroethylene	3.80E+01	na	3.80E-02	3.80E-02	na	1.90E-01	1.90E-01	2.38E-01	3.93E-01	2.38E-01	1.56E+00	2.00E-02	IRIS	0.800	1.60E-02	1	2.00E-02	4.00E-02	PPRTV-APP	1.14E-02	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
181	1,2-Dichloroethylene (mixed isomers)	3.55E+01	na	3.55E-02	3.55E-02	na	1.78E-01	1.78E-01	na	na	0.000E+00	na	na	na	0.800	na	1	na	na	na	na	na	na	na	na	na	na	na	no	na	na	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
182	1,2-Dichloropropane	4.70E+01	na	4.70E-02	4.70E-02	na	2.35E-01	2.35E-01	6.54E-02	1.15E-01	6.54E-02	4.11E+00	4.00E-02	PPRTV	0.800	3.20E-02	1	4.00E-02	4.00E-03	IRIS	1.14E-03	3.70E-02	PPRTV	4.63E-02	3.70E-02	3.70E-06	PPRTV	1.30E-02	no	2	0.0300	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
183	1,3-Dichloropropane	7.22E+01	na	7.22E-02	7.22E-02	na	3.61E-01	3.61E-01	2.09E-02	3.39E-02	2.09E-02	na	2.00E-02	na	0.800	1.60E-02	1	2.00E-02	na	na	na	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
184	2,2-Dichloropropane	na	na	na	na	na	na	na	na	na	0.000E+00	na	na	na	0.800	na	1	na	na	na	na	na	na	na	na	na	na	na	na	no	na	na	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
185	1,1-Dichloropropene	na	na	na	na	na	na	na	na	na	0.000E+00	na	na	na	0.800	na	1	na	na	na	na	na	na	na	na	na	na	na	na	no	na	na	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
186	cis-1,3-Dichloropropene	2.70E+01	na	2.70E-02	2.70E-02	na	1.35E-01	1.35E-01	7.86E-02	1.45E-01	7.86E-02	1.91E+00	3.00E-02	IRIS	0.800	2.40E-02	1	3.00E-02	2.00E-02	IRIS	5.71E-03	1.00E-01	IRIS	1.25E-01	1.00E-01	4.00E-06	IRIS	1.40E-02	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
187	trans-1,3-Dichloropropene	2.70E+01	na	2.70E-02	2.70E-02	na	1.35E-01	1.35E-01	7.86E-02	1.45E-01	7.86E-02	1.91E+00	3.00E-02	IRIS	0.800	2.40E-02	1	3.00E-02	2.00E-02	IRIS	5.71E-03	1.00E-01	IRIS	1.25E-01	1.00E-01	4.00E-06	IRIS	1.40E-02	no	2	0.0300	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
188	Dibromoacetonitrile	2.28E+01	na	2.28E-02	2.28E-02	na	1.14E-01	1.14E-01	6.27E-02	1.25E-01	6.27E-02	na	2.00E-02	IRIS	0.800	1.60E-02	1	2.00E-02	2.00E-02	PPRTV	2.00E-03	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
189	Ethanol	na	na	na	na	na	na	na	na	na	0.000E+00	na	na	na	0.800	na	1	na	na	na	na	na	na	na	na	na	na	na	na	no	na	na	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
190	Ethylbenzene	2.04E+02	na	2.04E-01	2.04E-01	na	1.02E+00	1.02E+00	1.64E-01	3.23E-01	1.64E-01	3.75E+01	1.00E-01	IRIS	0.920	9.20E-02	na	1.00E-01	1.00E+00	IRIS	2.85E-01	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
191	Ethylene oxide	3.24E+00	na	3.24E-03	3.24E-03	na	1.62E-02	1.62E-02	4.15E-01	9.00E-03	4.10E-03	na	na	na	0.800	na	1	na	3.00E-02	EPA	8.57E-03	3.88E-01	IRIS	3.10E-01	YES	3.00E-02	2.40E-05	IRIS	9.60E-02	no	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
192	Ethyl ether	9.70E+00	na	9.70E-03	9.70E-03	na	4.85E-02	4.85E-02	3.27E-02	5.03E-02	3.27E-02	na	2.00E-01	IRIS	0.800	1.60E-01	1	2.00E-01	na	na	na	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
193	Ethylene dibromide (EDB)	6.60E+01	na	6.60E-02	6.60E-02	na	3.30E-01	3.30E-01	1.41E-02	2.66E-02	1.41E-02	na	9.00E-03	IRIS	0.800	7.20E-03	1	9.00E-03	9.00E-03	IRIS	2.57E-03	2.00E+00	IRIS	2.50E+00	2.00E+00	6.00E-04	IRIS	2.10E+00	no	2	0.0300	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
194	Formaldehyde	1.00E+03	na	1.00E-01	1.00E-01	na	5.00E-01	5.00E-01	9.79E-06	1.58E-05	9.79E-06	na	2.00E-01	IRIS	0.800	1.60E-01	1	2.00E-01	7.00E-01	IRIS	2.57E-01	2.10E-02	CalEPA	2.63E-02	2.10E-02	7.40E-06	IRIS	2.60E-02	no	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
195	n-Hexane	3.41E+03	na	3.41E+00	3.41E+00	na	1.71E+01	1.71E+01	4.47E-01	7.40E-01	4.47E-01	na	6.00E-02	HEAST	0.800	4.80E-02	1	6.00E-02	7.00E-01	IRIS	2.00E-01	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
196	2-Hexanone	1.50E+01	na	1.50E-02	1.50E-02	na	7.50E-02	7.50E-02	1.91E-02	3.31E-02	1.89E-02	na	5.00E-03	IRIS	0.800	4.00E-03	1	5.00E-03	1.00E-02	IRIS	2.57E-03	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
197	Isopropylbenzene (cumene)	6.98E+02	na	6.98E-01	6.98E-01	na	3.49E+00	3.49E+00	2.01E-01	4.70E-01	2.01E-01	na	1.00E-01	IRIS	0.800	8.00E-02	1	1.00E-01	4.00E-01	IRIS	1.14E-01	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
198	4-Isopropyltoluene (p-Isopropyltoluene)	1.12E+03	na	1.12E+00	1.12E+00	na	5.60E+00	5.60E+00	2.07E-01	4.50E-01	2.07E-01	na	4.00E-03	PPRTV SL	0.800	3.20E-03	1	4.00E-03	4.00E-02	PPRTV SL	1.14E-02	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
199	Methane	na	na	na	na	na	na	na	na	na	0.000E+00	na	na	na	0.800	na	1	na	na	na	na	na	na	na	na	na	na	na	na	no	na	na	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
200	Methyl ethyl ketone (2-butanone)	4.51E+00	na	4.51E-03	4.51E-03	na	2.26E-02	2.26E-02	1.34E-03	2.33E-03	1.34E-03	na	6.00E-01	IRIS	0.800	4.80E-01	1	6.00E-01	6.00E+00	IRIS	1.43E+00	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
201	Methyl iodide	na	na	na	na	na	na	na	na	na	0.000E+00	na	na	na	0.800	na	1	na	na	na	na	na	na	na	na	na	na	na	na	no	na	na	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
202	Methyl isobutyl ketone	1.26E+01	na	1.26E-02	1.26E-02	na	6.30E-02	6.30E-02	2.94E-03	5.04E-03	2.94E-03	na	8.00E-02	CLARC	0.800	6.40E-02	1	8.00E-02	3.00E+00	CLARC	na	8.57E-01	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
203	Methyl tert-butyl ether (MTBE)	1.09E+01	na	1.09E-02	1.09E-02	na	5.45E-02	5.45E-02	1.12E-02	1.80E-02	1.12E-02	na	na	na	0.800	na	1	na	3.50E+00	IRIS	8.57E-01	1.80E-03	CalEPA	2.25E-03	1.80E-03	2.60E-07	CalEPA	9.10E-04	no	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
204	Methylene chloride	1.00E+01	na	1.00E-02	1.00E-02	na	5.00E-02	5.00E-02	8.43E-02	1.33E-01	8.43E-02	9.00E-01	6.00E-03	IRIS	0.800	4.80E-03	1	6.00E-03	6.00E-01	IRIS	1.71E-01	2.00E-03	IRIS	2.50E-03	2.00E-03	1.00E-08	IRIS	3.50E-05	YES	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
205	2-Pentanone	na	na	na	na	na	na	na	na	na	0.000E+00	na	na	na	0.800	na	1	na	na	na	na	4.50E+00	IRIS	5.63E+00	4.50E+00	1.30E-05	IRIS	4.55E+00	no	2	0.0300	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
206	n-Propylbenzene	8.13E+02	na	8.13E-01	8.13E-01	na	4.07E+00	4.07E+00	2.02E-01	4.29E-01	2.02E-01	na	1.00E-01	PPRTV-APP	0.800	8.00E-02	1	1.00E-01	1.00E+00	PPRTV-APP	2.86E-01	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
207	Styrene	9.12E+01	na	9.12E-02	9.12E-02	na	4.56E+00	4.56E+00	1.72E-01	3.50E-01	1.72E-01	1.30E+02	2.00E-01	IRIS	0.800	1.60E-01	1	2.00E-01	1.00E+00	IRIS	2.86E-01	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
208	1,1,1,2-Tetrachloroethane	8.60E+01	na	8.60E-02	8.60E-02	na	4.30E-01	4.30E-01	4.75E-02	1.02E-01	4.75E-02	na	3.00E-02	IRIS	0.800	2.40E-02	1	3.00E-02	na	na	na	2.60E-02	IRIS	3.25E-02	2.60E-02	7.40E-06	IRIS	2.60E-02	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
209	1,1,2,2-Tetrachloroethane	7.90E+01	na	7.90E-02	7.90E-02	na	3.95E-01	3.95E-01	7.35E-03	1.50E-02	7.35E-03	5.00E+00	2.00E-02	IRIS	0.800	1.60E-02	1	2.00E-02	na	na	na	2.00E-01	IRIS	2.50E-01	2.00E-01	5.80E-05	CalEPA	2.03E-01	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
210	Tetrachloroethene (PCE)	2.66E+02	na	2.66E-01	2.66E-01	na	1.33E+00	1.33E+00	3.84E-01	7.24E-01	3.84E-01	1.30E+02	1.00E-02	IRIS	0.800	4.80E-03	1	6.00E-03	2.00E-02	IRIS	1.14E-02	2.63E-03	CalEPA	2.63E-03	2.63E-03	2.60E-07	IRIS	9.10E-04	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
211	Tetrahydrofuran	1.08E+01	na	1.08E-02	1.08E-02	na	5.40E-02	5.40E-02	1.74E-03	2.88E-03	1.74E-03	na	9.00E-01	IRIS	0.800	7.20E-01	1	9.00E-01	2.00E+00	IRIS	5.71E-01	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
212	Toluene	1.40E+02	na	1.40E-01	1.40E-01	na	7.00E-01	7.00E-01	1.49E-01	2.72E-01	1.49E-01	1.07E+01	8.00E-02	IRIS	1.000	8.00E-02	1	8.00E-02	5.00E+00	IRIS	1.43E+00	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
213	1,2,3-Trichlorobenzene	1.38E+03	na	1.38E+00	1.38E+00	na	6.90E+00	6.90E+00	1.72E-02	3.51E-02	1.72E-02	na	2.00E-02	PPRTV	0.800	1.60E-02	1	2.00E-02	na	na	na	na	na	na	na	na	na	na	na	no	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
214	1,1,1-Trichloroethane	1.35E+02	na	1.35E-01	1.35E-01	na	6.75E-01	6.75E-01	4.25E-01	7.03E-01	4.20E-01	5.00E+00	2.00E+00	IRIS	0.800	1.60E+00	1	2.00E+00	5.00E+00	IRIS	1.43E+00	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
215	1,1,2-Trichloroethane	7.50E+01	na	7.50E-02	7.50E-02	na	3.75E-01	3.75E-01	1.37E-02	2.67E-02	1.37E-02	na	4.00E-03	IRIS	0.800	3.20E-03	1	4.00E-03	2.00E-02	PPRTV-APP	5.71E-03	5.70E-02	IRIS	7.13E-02	5.70E-02	1.60E-05	IRIS	5.60E-02	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
216	Trichloroethene (TCE)	9.40E+01	na	9.40E-02	9.40E-02	na	4.70E-01	4.70E-01	2.32E-01	4.03E-01	2.32E-01	1.10E+01	5.00E-04	IRIS	0.800	4.00E-04	1	5.00E-04	2.00E-03	IRIS	5.71E-04	4.60E-02	IRIS	5.75E-02	4.60E-02	4.10E-06	IRIS	1.44E-02	YES	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
217	Trichlorofluoromethane	na	na	na	na	na	na	na	na	na	0.000E+00	na	na	na	0.800	na	1	na	na	na	na	na	na	na	na	na	na	na	na	no	na	na	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
218	Trichloropropane	4.36E+01	na	4.36E-02	4.36E-02	na	2.25E-01	2.25E-01	2.68E-03	3.97E-03	2.68E-03	na	3.00E-04	IRIS	0.800	2.40E-04	1	3.00E-04	7.00E-04	HEAST	2.00E-04	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
219	1,2,3-Trichloropropane	1.16E+02	na	1.16E-01	1.16E-01	na	5.80E-01	5.80E-01	6.86E-03	1.40E-02	6.86E-03	na	4.00E-03	IRIS	0.800	3.20E-03	1	4.00E-03	3.00E-04	IRIS	8.57E-05	3.00E+01	IRIS	3.75E+01	3.00E+01	na	na	na	YES	2	0.0300	1.00	0.00	no	no	no	no	no	no	no	na	na	na	na	na	na
220	Trichlorotrifluoroethane	1.97E+02	na	1.97E-01	1.97E-01	na	9.85E-01	9.85E-01	1.37E-01	2.15E+01	1.37E+01	na	3.00E+01	IRIS	0.800	2.40E+01	1	3.00E+01	5.00E+00	PPRTV	1.43E+00	na	na	na	na	na	na	na	na	no	2	0.0005	1.00	0.00	YES	no	no	no	no	no	no	na	na	na	na	na	na
221	1,2,3-Trimethylbenzene	6.27E+02	na	6.27E-01	6.27E-01	na	3.13E+00	3.14E+00	6.62E-02	1.79E-01	6.62E-02	na	1.00E-02	IRIS	0.800	8.00E-03	1	1.00E-02	6.00E-02	IRIS	1.71E-02	na	na	na	na	na	na	na	na	no	2	0.0300	1.00

PCUL Workbook - Equations

To make changes to this page, you must unprotect it. On the 'Review' ribbon, select 'Unprotect Sheet'. The password is 'LDW'.

Aqua highlighting indicates parameter values that are specific to the LDW site.
Yellow highlighting indicates parameter values that are set to default but could be made site-specific.
Green indicates default values not currently being used

MTCA Equation 720-1 (Method B ground water cleanup level, noncancer, potable water)

$$CUL{-}GW{-}N = \frac{RfDo\ x\ ABW\ x\ UCF\ x\ HQ\ x\ AT}{DWIR\ x\ INH\ x\ DWF\ x\ ED}$$

IDWIFn = ABW x UCF x HQ x AT / (DWIR x DWF x ED)
CUL-GW-NC = IDWIFn x RfDo / INH

CUL-GW-N	Ground water cleanup level, noncancer	ug/L	Calculated - see Sheet '720-1'
RfDo	Oral reference dose	mg/kg-day	See Sheet 'Param'
ABW	Average body weight over exposure duration, default	kg	16
UCF	Unit conversion factor, default	ug/mg	1E+03
HQ	Acceptable hazard quotient, default	unitless	1
AT	Averaging time, default	years	6
DWIR	Drinking water ingestion rate, default	L/day	1
INH	Inhalation correction factor	unitless	See Sheet 'Param'
DWF	Drinking water fraction, default	unitless	1
ED	Exposure duration, default	years	6
IDWIFn	Intermediate drinking water intake factor, noncancer	kg-ug-day/mg-L	1.60E+04

MTCA Equation 720-2 (Method B ground water cleanup level, cancer, potable water)

$$CUL{-}GW{-}C = \frac{Risk\ x\ ABW\ x\ UCF\ x\ AT}{CPFo\ x\ DWIR\ x\ INH\ x\ DWF\ x\ ED}$$

IDWIFc = Risk x ABW x UCF x AT / (DWIR x DWF x ED)
CUL-GW-C = IDWIFc / (CPFo x INH)

CUL-GW-C	Ground water cleanup level, cancer	ug/L	Calculated - see Sheet '720-2'
Risk	Acceptable cancer risk level, default	unitless	1E-06
ABW	Average body weight over exposure duration, default	kg	70
UCF	Unit conversion factor, default	ug/mg	1E+03
AT	Averaging time, default	years	75
CPFo	Oral cancer potency factor	kg-day/mg	See Sheet 'Param'
DWIR	Drinking water ingestion rate, default	L/day	2
INH	Inhalation correction factor	unitless	See Sheet 'Param'
DWF	Drinking water fraction, default	unitless	1
ED	Exposure duration, default	years	30
IDWIFc	Intermediate drinking water intake factor, cancer	kg-ug-day/mg-L	8.75E-02

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PCUL Workbook - Equations

MTCA Equation 730-1 (Method B surface water cleanup level, noncancer)

$$CUL{-}SW{-}N = \frac{RfDo\ x\ ABW\ x\ UCF1\ x\ UCF2\ x\ HQ\ x\ AT}{BCF\ x\ FCR\ x\ FDF\ x\ ED}$$

ISWIFn = ABW x UCF1 x UCF2 x HQ x AT / (FCR x FDF x ED)
CUL-SW-NC = RfDo x ISWIFn / BCF

CUL-SW-N	Surface water cleanup level, noncancer	ug/L	Calculated - see Sheet '730-1'	
RfD	Oral reference dose	mg/kg-day	See Sheet 'Param'	
ABW	Average body weight, default	kg	70	
UCF1	Unit conversion factor 1, default	ug/mg	1E+03	
UCF2	Unit conversion factor 2, default	g/kg	1E+03	
HQ	Acceptable hazard quotient, default	unitless	1	
AT	Averaging time, default	years	30	
BCF	Bioconcentration factor	L/kg	See Sheet 'Param'	Default
FCR	Fish consumption rate, LDW	g/day	97.5	54
FDF	Fish diet fraction, LDW	unitless	1	0.5
ED	Exposure duration, default	years	30	
ISWIFn	Intermediate surface water intake factor, noncancer	ug-day/mg	7.18E+05	

If you use any values other than the L
to the surface water CULs for mutage

MTCA Equation 730-2 (Method B surface water cleanup level, cancer)

$$CUL{-}SW{-}C = \frac{Risk\ x\ ABW\ x\ UCF1\ x\ UCF2\ x\ AT}{CPFo\ x\ BCF\ x\ FCR\ x\ FDF\ x\ ED}$$

ISWIFc = Risk x ABW x UCF1 x UCF2 x AT / (FCR x FDF x ED)
CUL-SW-C = ISWIFc / (CPFo x BCF)

CUL-SW-C	Surface water cleanup level, cancer	ug/L	Calculated - see Sheet '730-2'
Risk	Acceptable cancer risk level, default	unitless	1.00E-06
ABW	Average body weight, default	kg	70
UCF1	Unit conversion factor 1, default	ug/mg	1E+03
UCF2	Unit conversion factor 2, default	g/kg	1E+03
AT	Averaging time, default	years	75
CPF	Cancer potency factor	kg-day/mg	See Sheet 'Param'
BCF	Bioconcentration factor	L/kg	See Sheet 'Param'
FCR	Fish consumption rate, LDW	g/day	97.5
FDF	Fish diet fraction, LDW	unitless	1
ED	Exposure duration, default	years	30
ISWIFc	Intermediate surface water intake factor, cancer	ug-day/mg	1.79E+00

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PCUL Workbook - Equations

MTCA Equation 740-1 (Method B soil cleanup level, noncancer)

$$CUL{-}S{-}RN = \frac{RfDo\ x\ ABW\ x\ UCF\ x\ HQ\ x\ AT}{SIR\ x\ AB1\ x\ EF\ x\ ED}$$

ISIFrn = ABW x UCF x HQ x AT / (SIR x EF x ED)
CUL-S-RNC = ISIFrn x RfDo / AB1

CUL-S-N	Soil cleanup level, noncancer	mg/kg	Calculated - see Sheet '740-1'
RfDo	Oral reference dose	mg/kg-day	See Sheet 'Param'
ABW	Average body weight over exposure duration, default	kg	16
UCF	Unit conversion factor, default	mg/kg	1E+06
HQ	Hazard quotient, default	unitless	1
AT	Averaging time, default	years	6
SIR	Soil ingestion rate, default	mg/day	200
AB1	Gastrointestinal absorption fraction, default	unitless	Chemical-specific
EF	Exposure frequency, default	unitless	1
ED	Exposure duration, default	years	6
ISIFrn	Intermediate soil intake factor, residential noncancer	1/day	8.00E+04

MTCA Equation 740-2 (Method B soil cleanup level, cancer)

$$CUL{-}S{-}\mathrm{RC} = \frac{Risk\ x\ ABW\ x\ UCF\ x\ AT}{CPFo\ x\ SIR\ x\ AB1\ x\ EF\ x\ ED}$$

ISIFrc = Risk x ABW x UCF x AT / (SIR x EF x ED)
CUL-S-RC = ISIFrc / (CPFo x AB1)

CUL-S-C	Soil cleanup level, cancer	mg/kg	Calculated - see Sheet '740-2'
Risk	Acceptable cancer risk level, default	unitless	1E-06
ABW	Average body weight over exposure duration, default	kg	16
AT	Averaging time, default	years	75
UCF	Unit conversion factor, default	mg/kg	1E+06
CPFo	Oral cancer potency factor	kg-day/mg	See Sheet 'Param'
SIR	Soil ingestion rate, default	mg/day	200
AB1	Gastrointestinal absorption fraction, default	unitless	Chemical-specific
EF	Exposure frequency, default	unitless	1
ED	Exposure duration, default	years	6
ISIFrc	Intermediate soil intake factor, residential cancer	1/day	1.00E+00

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PCUL Workbook - Equations

MTCA Equation 745-1 (Method C soil cleanup level, noncancer)

$$CUL{-}S{-}IN = \frac{RfDo\ x\ ABW\ x\ UCF\ x\ HQ\ x\ AT}{SIR\ x\ AB1\ x\ EF\ x\ ED}$$

ISIFin = ABW x UCF x HQ x AT / (SIR x EF x ED)
CUL-S-INC = RfDo x ISIFin / AB1

CUL-S-N	Soil cleanup level, noncancer	mg/kg	Calculated - see Sheet '745-1'
RfDo	Oral reference dose	mg/kg-day	See Sheet 'Param'
ABW	Average body weight over exposure duration, default	kg	70
UCF	Unit conversion factor, default	mg/kg	1E+06
HQ	Hazard quotient, default	unitless	1
AT	Averaging time, default	years	20
SIR	Soil ingestion rate, default	mg/day	50
AB1	Gastrointestinal absorption fraction, default	unitless	Chemical-specific
EF	Exposure frequency, default	unitless	0.4
ED	Exposure duration, default	years	20
ISIFin	Intermediate soil intake factor, industrial noncancer	1/day	3.50E+06

MTCA Equation 745-2 (Method C soil cleanup level, cancer)

$$CUL{-}S{-}IC = \frac{Risk\ x\ ABW\ x\ UCF\ x\ AT}{CPFo\ x\ SIR\ x\ AB1\ x\ EF\ x\ ED}$$

ISIFic = Risk x ABW x UCF x AT / (SIR x EF x ED)
CUL-S-IC = ISIFic / (CPFo x AB1)

CUL-S-C	Soil cleanup level, cancer	mg/kg	Calculated - see Sheet '745-2'
Risk	Acceptable cancer risk level, default	unitless	1.00E-05
ABW	Average body weight over exposure duration, default	kg	70
AT	Averaging time, default	years	75
UCF	Unit conversion factor, default	mg/kg	1E+06
CPFo	Oral cancer potency factor	kg-day/mg	See Sheet 'Param'
SIR	Soil ingestion rate, default	mg/day	50
AB1	Gastrointestinal absorption fraction, default	unitless	Chemical-specific
EF	Exposure frequency, default	unitless	0.4
ED	Exposure duration, default	years	20
ISIFic	Intermediate soil intake factor, industiral cancer	1/day	1.31E+02

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PCUL Workbook - Equations

MTCA Equation 747-1 (Soil cleanup level for ground water protection)

$$CUL{-}S{-}GW = CUL{-}GW \; x \; UCF \; x \; DF \; x \left[K_d + \frac{\theta_w + \theta_a H_{cc}}{\rho_b} \right]$$

ILF1 = UCF x DF
ILF2 = θw / ρb
ILF3 = θa / ρb
CUL-S-FW = GUL-GW x ILF1 (Kd + ILF2 + ILF3 x Hcc)

CUL-S-GW	Soil cleanup level, ground water protection	mg/kg	Calculated - see Sheet '747-1'
CUL-GW	Selected groundwater CUL	ug/L	Calculated - see Sheet 'GW-Detail'
UCF	Unit conversion factor, default	mg/ug	1E-03
DF	Dilution factor, default		
	Vadose	unitless	20
	Saturated	unitless	1
K_d	Distribution coefficient	L/kg	See Sheet 'Param'
θ_w	Water-filled soil porosity, default		
	Vadose	ml water/ml soil	0.3
	Saturated	ml water/ml soil	0.43
θ_a	Air-filled soil porosity, default		
	Vadose	ml air/ml soil	0.13
	Saturated	ml air/ml soil	0
H_{cc}	Henry's law constant at 13 degrees C	unitless	See Sheet 'Param'
ρ_b	Dry soil bulk density, default	kg/L	1.5
ILF1v	Intermediate leaching factor 1, vadose zone	mg/ug	2.00E-02
ILF2v	Intermediate leaching factor 2, vadose zone	L/kg	2.00E-01
ILF3v	Intermediate leaching factor 3, vadose zone	L/kg	8.67E-02
ILF1s	Intermediate leaching factor 1, saturated zone	mg/ug	1.00E-03
ILF2s	Intermediate leaching factor 2, saturated zone	L/kg	2.87E-01
	There is no ILF3 for the saturated zone		

MTCA Equation 747-2 (Kd, distribution coefficient) (not used for metals)

$$K_d = Koc \; x \; Foc$$

K_d	Distribution coefficient	L/kg	See Sheet 'Param'	
K_{oc}	Soil organic carbon-water partitioning coefficient	ml/g	See Sheet 'Param'	
F_{oc}	Organic carbon fraction			Default
	Soil	g/g	0.001	0.001
	Sediment	g/g	0.005	0.005

Default value taken from low end of

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PCUL Workbook - Equations

Modified MTCA Equation 747-1 (ground water concentration for protection of sediment; from Ecology [2016], Appendix A)

$$CUL{-}GW{-}SED = \frac{RBC{-}SED}{UCF\ x\ DF\ x\ \left[K_d + \frac{\theta_w}{\rho_b}\right]}$$

IPF1 = UCF x DF
IPF2 = θw / ρb
CUL-GW-SED = RBC-SED / [IPF1 (Kd + IPF2)]

CUL-GW-SED	Groundwater cleanup level, sediment protection	ug/L	Calculated - see Sheet 'Mod. 747-1'	
RBC-SED	Sediment risk-based concentration (Lower Tier Sediment PCUL)	mg/kg	Calculated - see Sheet 'SD-Detail'	
UCF	Unit conversion factor, default	mg/ug	1E-03	
DF	Dilution factor, default (saturated)	unitless	1	
K_d	Distribution coefficient in sediment	L/kg	See Sheet 'Param'	Default
θ_w	Water-filled soil porosity, LDW average	ml water/ml soil	0.43	0.43
ρ_b	Dry soil bulk density, from Ecology (2016)	kg/L	1.5	1.5
IPF1	Intermediate partitioning factor 1	mg/ug	1.00E-03	
IPF2	Intermediate partitioning factor 2	L/kg	2.87E-01	

MTCA Equation 750-1 (Method B air cleanup level, noncancer)

$$CUL{-}\mathrm{A}{-}RN = \frac{RfD_i\ x\ ABW\ x\ UCF\ x\ HQ\ x\ AT}{BR\ x\ ABS\ x\ EF\ x\ ED}$$

IAIFrn = ABW x UCF x HQ x AT / (BR x EF x ED)
CUL-A-RN = RfDi x IAIFrn / ABS

CUL-A-RN	Air cleanup level, noncancer	ug/m3	Calculated - see Sheet '750-1'
RfDi	Inhalation reference dose	mg/kg-day	See Sheet 'Param'
ABW	Average body weight over exposure duration, default	kg	16
UCF	Unit conversion factor, default	ug/mg	1E+03
HQ	Hazard quotient, default	unitless	1
AT	Averaging time, default	years	6
BR	Breathing rate	m3/day	10
ABS	Inhalation absorption fraction, default	unitless	1
EF	Exposure frequency, default	unitless	1
ED	Exposure duration	years	6
IAIFrn	Intermediate air intake factor, noncancer	kg-ug-day/mg-m3	1.60E+03

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PCUL Workbook - Equations

MTCA Equation 750-2 (Method B air cleanup level, cancer)

$$CUL{-}\mathrm{A}{-}\mathrm{RC} = \frac{Risk\ x\ ABW\ x\ UCF\ x\ AT}{CPF_i\ x\ BR\ x\ ABS\ x\ EF\ x\ ED}$$

IAIFrc = Risk x ABW x UCF x AT / (BR x EF x ED)
CUL-A-RC = IAIFrc / (CPFi x ABS)

CUL-S-RC	Air cleanup level, cancer	ug/m3	Calculated - see Sheet '750-2'
Risk	Acceptable cancer risk level, default	unitless	1E-06
ABW	Average body weight over exposure duration, default	kg	70
AT	Averaging time, default	years	75
UCF	Unit conversion factor, default	ug/mg	1E+03
CPFi	Inhalation cancer potency factor	kg-day/mg	See Sheet 'Param'
BR	Breathing rate	m3/day	20
ABS	Inhalation absorption fraction, default	unitless	1
EF	Exposure frequency, default	unitless	1
ED	Exposure duration, default	years	30
IAIFrc	Intermediate air intake factor, cancer	kg-ug-day/mg-m3	8.75E-03

MTCA Equation 750-1 (Method C air cleanup level, noncancer)

$$CUL{-}\mathrm{A}{-}IN = \frac{RfD_i\ x\ ABW\ x\ UCF\ x\ HQ\ x\ AT}{BR\ x\ ABS\ x\ EF\ x\ ED}$$

IAIFin = ABW x UCF x HQ x AT / (BR x EF x ED)
CUL-A-IN = RfDi x IAIFin / ABS

CUL-A-N	Air cleanup level, noncancer	ug/m3	Calculated - see Sheet '750-1'
RfDi	Inhalation reference dose	mg/kg-day	See Sheet 'Param'
ABW	Average body weight over exposure duration, default	kg	70
UCF	Unit conversion factor, default	ug/mg	1E+03
HQ	Hazard quotient, default	unitless	1
AT	Averaging time, default	years	6
BR	Breathing rate	m3/day	20
ABS	Inhalation absorption fraction, default	unitless	1
EF	Exposure frequency, default	unitless	1
ED	Exposure duration	years	6
IAIFin	Intermediate air intake factor, industrial noncancer	kg-ug-day/mg-m3	3.50E+03

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PCUL Workbook - Equations

MTCA Equation 750-2 (Method C air cleanup level, cancer)

$$CUL{-}\mathrm{A}{-}\mathrm{IC} = \frac{Risk\ x\ ABW\ x\ UCF\ x\ AT}{CPF_i\ x\ BR\ x\ ABS\ x\ EF\ x\ ED}$$

IAIFic = Risk x ABW x UCF x AT / (BR x EF x Ed)
CUL-A-IC = IAIFic / (CPFi x ABS)

CUL-S-C	Air cleanup level, cancer	ug/m3	Calculated - see Sheet '750-2'
Risk	Acceptable cancer risk level, default	unitless	1E-05
ABW	Average body weight over exposure duration, default	kg	70
AT	Averaging time, default	years	75
UCF	Unit conversion factor, default	ug/mg	1E+03
CPFi	Inhalation cancer potency factor	kg-day/mg	See Sheet 'Param'
BR	Breathing rate	m3/day	20
ABS	Inhalation absorption fraction, default	unitless	1
EF	Exposure frequency, default	unitless	1
ED	Exposure duration, default	years	30
IAIFic	Intermediate air intake factor, industrial cancer	kg-ug-day/mg-m3	8.75E-02

MTCA Equation 750-1 (commercial air screening level, noncancer)

$$CUL{-}\mathrm{A}{-}IN = \frac{RfD_i\ x\ ABW\ x\ UCF\ x\ HQ\ x\ AT}{BR\ x\ ABS\ x\ EF\ x\ ED}$$

IAIFin = ABW x UCF x HQ x AT / (BR x EF x ED)
CUL-A-IN = RfDi x IAIFin / ABS

CUL-A-N	Air cleanup level, noncancer	ug/m3	Calculated - see Sheet '750-1'
RfDi	Inhalation reference dose	mg/kg-day	See Sheet 'Param'
ABW	Average body weight over exposure duration, default	kg	70
UCF	Unit conversion factor, default	ug/mg	1E+03
HQ	Hazard quotient, default	unitless	1
AT	Averaging time, default	years	25
BR	Breathing rate	m3/day	20
ABS	Inhalation absorption fraction, default	unitless	1
EF	Exposure frequency (9 hr/day, 250 dy/yr)	unitless	0.256849315
ED	Exposure duration	years	25
IAIFin	Intermediate air intake factor, industrial noncancer	kg-ug-day/mg-m3	1.36E+04

MTCA Equation 750-2 (commercial air screening level, cancer)

$$CUL{-}\mathrm{A}{-}\mathrm{IC} = \frac{Risk\ x\ ABW\ x\ UCF\ x\ AT}{CPF_i\ x\ BR\ x\ ABS\ x\ EF\ x\ ED}$$

IAIFic = Risk x ABW x UCF x AT / (BR x EF x Ed)
CUL-A-IC = IAIFic / (CPFi x ABS)

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PCUL Workbook - Equations

CUL-S-C	Air cleanup level, cancer	ug/m3	Calculated - see Sheet '750-2'
Risk	Acceptable cancer risk level, default	unitless	1E-06
ABW	Average body weight over exposure duration, default	kg	70
AT	Averaging time, default	years	75
UCF	Unit conversion factor, default	ug/mg	1E+03
CPFi	Inhalation cancer potency factor	kg-day/mg	See Sheet 'Param'
BR	Breathing rate	m3/day	20
ABS	Inhalation absorption fraction, default	unitless	1
EF	Exposure frequency (9 hr/day, 250 dy/yr)	unitless	0.256849315
ED	Exposure duration, default	years	25
IAIFic	Intermediate air intake factor, industrial cancer	kg-ug-day/mg-m3	4.09E-02

Equation 1 (Vapor Intrusion Guidance 2009, rev. Feb 2016, page 3-6)

$$SL-GW-VI = \frac{SL_{IA}}{VAF\ x\ UCF\ x\ Hcc}$$

SL-GW-VI	Screening level in groundwater protective of indoor air	ug/L	Calculated -see Sheet 'Eq. 1 (VI)'
SL_{IA}	Indoor air screening level	ug/m3	Calculated - see Sheet '750-1' & '750-2'
VAF	Vapor attenuation factor; default	unitless	1E-03
Hcc	Henry's Law Constant at 13 degrees C	unitless	See Sheet 'Param'
UCF	Unit conversion factor	L/m3	1E+03
IVEF	Intermediate vapor exposure factor	m3/L	1

Equation 2 (Vapor Intrusion Guidance 2009, rev. Feb 2016, page 3-10)

$$SL-SG = \frac{SL_{IA}}{VAF}$$

SL-SG	Screening level in soil gas protective of indoor air	ug/m3	Calculated
VAF	Vapor attenuation factor		
	Shallow soil gas/sub-slab	unitless	0.03
	Deep soil gas	unitless	0.01

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PCUL Workbook - Equations

SMS SCUM II, Equation 9-1 (sediment ingestion / direct contact, cancer)

$$RBC{-}SED{-}C = \frac{ACR\ x\ BW\ x\ ATc}{EF\ x\ ED\ x\ \left[\left(\frac{IR\ x\ AB\ x\ CPFo}{UCF}\right) + \left(\frac{SA\ x\ AF\ x\ ABS\ x\ CPFd}{UCF}\right)\right]}$$

ISDIF1c = BW x ATc x UCF / (EF x ED)
ISDIF2 = SA x AF
RBC-SED-C = ACR x ISDIF1c / (IR x AB x CPFo + ISDIF2 x ABS x CPFd)

General Parameters					
RBC-SED-C	Risk-based concentration, sediment, cancer	mg/kg	Calculated - see Sheet 'Sed-Eq'		
ACR	Acceptable cancer risk level	unitless	1E-06 (Lower Tier SCO) 1E-05 (Upper Tier CSL)		
AB	Gastrointestinal absorption fraction	unitless	See Sheet 'Param'		
CPFo	Oral cancer potency factor	$(mg/kg\text{-}day)^{-1}$	See Sheet 'Param'		
UCF	Unit conversion factor	mg/kg	1E+06		
ABS	Dermal absorption factor	unitless	From SCUM II Appendix E See Sheet 'Param'		
CPFd	Dermal cancer potency factor	$(mg/kg\text{-}day)^{-1}$	Calculated; see Equation 9-3 below		
			Site-Specific Assumptions from LDW ROD		
Scenario-Specific Parameters			Beach Play (Child)	Subsistence Clam Digging (Adult)	Subsistence Net Fishing (Adult)
BW	Average body weight over exposure duration	kg	15	75	75
ATc	Averaging time (cancer)	days	25,550	25,550	25,550
EF	Exposure frequency	days/year	41	120	119
ED	Exposure duration	years	6	70	70
IR	Sediment ingestion rate	mg/day	200	100	50
SA	Skin surface area	cm^2/day	3,835	11,813	5,590
AF	Sediment-to-skin adherence factor	$mg/cm^2\text{-}day$	2.6	0.24	0.19
Intermediate Calculations			Beach Play (Child)	Subsistence Clam Digging (Adult)	Subsistence Net Fishing (Adult)
ISDIF1c	Intermediate sediment intake factor 1, cancer	mg	1.56E+09	2.28E+08	2.30E+08
ISDIF2	Intermediate sediment intake factor 2	mg/day	9.97E+03	2.84E+03	1.06E+03

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PCUL Workbook - Equations

SMS SCUM II, Equation 9-2 (sediment ingestion / direct contact, noncancer)

$$RBC{-}SED{-}N = \frac{HQ\ x\ BW\ x\ ATn}{EF\ x\ ED\ x\ \left[\left(\frac{IR\ x\ AB}{RfDo\ x\ UCF}\right) + \left(\frac{SA\ x\ AF\ x\ ABS}{RfDd\ x\ UCF}\right)\right]}$$

ISDIF1n = HQ x BW x ATn x UCF / (EF x ED)
ISDIF2 = SA x AF
RBC-SED-N = ISDIF1n / (IR x AB/RfDo + ISDIF2 x ABS/RfDd)

General Parameters			
RBC-SED-N	Risk-based concentration, sediment, noncancer	mg/kg	Calculated - see Sheet 'Sed-Eq'
HQ	Hazard quotient	unitless	1
AB	Gastrointestinal absorption fraction	unitless	Chemical-specific
RfDo	Oral reference dose	mg/kg-day	See Sheet 'Param'
UCF	Unit conversion factor	mg/kg	1E+06
ABS	Dermal absorption factor	unitless	From SCUM II Appendix E See Sheet 'Param'
RfDd	Dermal reference dose	mg/kg-day	Calculated; see Equation 9-4 below

			Site-Specific Assumptions from LDW ROD		
Scenario-Specific Parameters			Beach Play (Child)	Subsistence Clam Digging (Adult)	Subsistence Net Fishing (Adult)
BW	Average body weight over exposure duration	kg	15	75	75
ATn	Averaging time (noncancer)	days	2,190	25,550	25,550
EF	Exposure frequency	days/year	41	120	119
ED	Exposure duration	years	6	70	70
IR	Sediment ingestion rate	mg/day	200	100	50
SA	Skin surface area	cm^2/day	3,835	11,813	5,590
AF	Sediment-to-skin adherence factor	mg/cm^2-day	2.6	0.24	0.19
Intermediate Calculations			Beach Play (Child)	Subsistence Clam Digging (Adult)	Subsistence Net Fishing (Adult)
ISDIF1n	Intermediate sediment intake factor 1, noncancer	mg	1.34E+08	2.28E+08	2.30E+08
ISDIF2	Intermediate sediment intake factor 2	mg/day	9.97E+03	2.84E+03	1.06E+03

SMS SCUM II, Equation 9-3 (CPFd)

$$CPFd = \frac{CPFo}{GI}$$

CPFd	Cancer potency factor, dermal	$(mg/kg\text{-}day)^{-1}$	Calculated; See Sheet 'Param'
CPFo	Cancer potency factor, oral	$(mg/kg\text{-}day)^{-1}$	From CLARC; See Sheet 'Param'
GI	Gastrointestinal absorption conversion factor	unitless	Chemical-specific

SMS SCUM II, Equation 9-4 (RFDd)

$$RfDd = RfDo\ x\ GI$$

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PCUL Workbook - Equations

RfDd	Reference dose, dermal	(mg/kg-day)	Calculated; See Sheet 'Param'
RfDo	Reference dose, oral	(mg/kg-day)	From CLARC; See Sheet 'Param'
GI	Gastrointestinal absorption conversion factor	unitless	Chemical-specific

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Sort Order	Chemical (all concentrations in mg/kg)	MTCA-B Soil Direct Contact Noncancer SL-Eq	MTCA-B Soil Direct Contact Cancer SL-Eq	SL-1 MTCA-B Soil Direct Contact Minimum	Site-Specific TEE Eco. Indic. Soil Conc. Plants MTCA Table 749-3	Site-Specific TEE Eco. Indic. Soil Conc. Soil Biota MTCA Table 749-3	Site-Specific TEE Eco. Indic. Soil Conc. Wildlife MTCA Table 749-3	SL-9 Site-Specific TEE Eco. Indic. Soil Conc. Unrestricted Land Use	Site-Specific TEE Eco. Indic. Soil Conc. Industrial or Commercial Land Use	Simplified TEE Unrestricted Land Use MTCA Table 749-2	Simplified TEE Industrial or Commercial Land Use MTCA Table 749-2	MTCA-C Soil Direct Contact Noncancer SL-Eq	MTCA-C Soil Direct Contact Cancer SL-Eq	MTCA-C Soil Direct Contact Minimum	Federal TSCA Unrestricted Access 40 CFR 761.61	Federal TSCA Restricted Access 40 CFR 761.62
1	***PCBs***															
2	Total PCB Aroclors	na	5.00E-01	1.00E+00	4.00E+01	na	6.50E-01	6.50E-01	6.50E-01	2.00E+00	2.00E+00	na	6.56E+01	1.00E+01	1.00E+00	1.00E+01
3	Total PCB congeners	na	5.00E-01	1.00E+00	4.00E+01	na	6.50E-01	6.50E-01	6.50E-01	2.00E+00	2.00E+00	na	6.56E+01	1.00E+01	1.00E+00	1.00E+01
4	Total PCB TEQ	9.33E-05	1.28E-05	1.28E-05	na	na	na	na	na	na	na	4.08E-03	1.68E-03	1.68E-03	na	na
5	***Dioxins/Furans***															
6	Total dioxin/furan TEQ	9.33E-05	1.28E-05	1.28E-05	na	na	na	na	na	na	na	4.08E-03	1.68E-03	1.68E-03	na	na
7	2,3,7,8-TCDD	9.33E-05	1.28E-05	1.28E-05	na	na	na	na	na	na	na	4.08E-03	1.68E-03	1.68E-03	na	na
8	Total chlorinated dioxins	na	na	na	na	na	2.00E-06	2.00E-06	2.00E-06	5.00E-06	5.00E-06	na	na	na	na	na
9	Total chlorinated furans	na	na	na	na	na	2.00E-06	2.00E-06	2.00E-06	3.00E-06	3.00E-06	na	na	na	na	na
10	***Inorganics***															
11	Ammonia	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
12	Chloride	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
13	Cyanide, free	5.04E+01	na	5.04E+01	na	na	na	na	na	na	na	2.21E+03	na	2.21E+03	na	na
14	Fluoride	4.80E+03	na	4.80E+03	na	na	na	na	na	na	na	2.10E+05	na	2.10E+05	na	na
15	Nitrate	1.28E+05	na	1.28E+05	na	na	na	na	na	na	na	5.60E+06	na	5.60E+06	na	na
16	Nitrite	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
17	Sulfate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
18	Sulfide	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
19	***Metals***															
20	Aluminum	8.00E+04	na	8.00E+04	5.00E+01	na	na	5.00E+01	na	na	na	3.50E+06	na	3.50E+06	na	na
21	Antimony	3.20E+01	na	3.20E+01	5.00E+00	na	na	5.00E+00	na	na	na	1.40E+03	na	1.40E+03	na	na
22	Arsenic	4.80E+00	3.13E-02	3.13E-02	1.00E+01	6.00E+01	1.32E+02	1.00E+01	1.32E+02	2.00E+01	2.00E+01	2.10E+02	4.10E+00	4.10E+00	na	na
23	Barium	1.60E+04	na	1.60E+04	5.00E+02	na	1.02E+02	1.02E+02	1.02E+02	1.25E+03	1.32E+03	7.00E+05	na	7.00E+05	na	na
24	Beryllium	1.60E+02	na	1.60E+02	1.00E+01	na	na	1.00E+01	na	2.50E+01	na	7.00E+03	na	7.00E+03	na	na
25	Cadmium	8.00E+01	na	8.00E+01	4.00E+00	2.00E+01	1.40E+01	4.00E+00	1.40E+01	2.50E+01	3.60E+01	3.50E+03	na	3.50E+03	na	na
26	Chromium, total	na	na	na	4.20E+01	4.20E+01	6.70E+01	4.20E+01	6.70E+01	4.20E+01	1.35E+02	na	na	na	na	na
27	Chromium, trivalent	1.20E+05	na	1.20E+05	na	na	na	na	na	na	na	5.25E+06	na	5.25E+06	na	na
28	Chromium, hexavalent	7.20E+01	1.20E+00	1.20E+00	na	na	na	na	na	na	na	3.15E+03	8.20E+02	8.20E+02	na	na
29	Cobalt	2.40E+01	na	2.40E+01	2.00E+01	na	na	2.00E+01	na	na	na	1.05E+03	na	1.05E+03	na	na
30	Copper	3.20E+03	na	3.20E+03	1.00E+02	5.00E+01	2.17E+02	5.00E+01	2.17E+02	1.00E+02	5.50E+02	1.40E+05	na	1.40E+05	na	na
31	Iron	5.60E+04	na	5.60E+04	na	na	na	na	na	na	na	2.45E+06	na	2.45E+06	na	na
32	Lead	na	na	2.50E+02	5.00E+01	5.00E+02	1.18E+02	5.00E+01	1.18E+02	2.20E+02	2.20E+02	na	na	1.00E+03	na	na
33	Manganese	3.74E+03	na	3.74E+03	1.10E+03	na	1.50E+03	1.10E+03	1.50E+03	na	2.35E+04	1.63E+05	na	1.63E+05	na	na
34	Mercury, inorganic	na	na	na	3.00E-01	1.00E-01	5.50E+00	1.00E-01	5.50E+00	9.00E+00	9.00E+00	na	na	na	na	na
35	Methylmercury	8.00E+00	na	8.00E+00	na	na	4.00E-01	4.00E-01	4.00E-01	7.00E-01	7.00E-01	3.50E+02	na	3.50E+02	na	na
36	Molybdenum	4.00E+02	na	4.00E+02	2.00E+00	na	7.00E+00	2.00E+00	7.00E+00	na	7.10E+01	1.75E+04	na	1.75E+04	na	na
37	Nickel	1.60E+03	na	1.60E+03	3.00E+01	2.00E+02	9.80E+02	3.00E+01	9.80E+02	1.00E+02	1.85E+03	7.00E+04	na	7.00E+04	na	na
38	Selenium	4.00E+02	na	4.00E+02	1.00E+00	7.00E+01	3.00E-01	3.00E-01	3.00E-01	8.00E-01	8.00E-01	1.75E+04	na	1.75E+04	na	na
39	Silver	4.00E+02	na	4.00E+02	2.00E+00	na	na	2.00E+00	na	na	na	1.75E+04	na	1.75E+04	na	na
40	Thallium	8.00E-01	na	8.00E-01	1.00E+00	na	na	1.00E+00	na	na	na	3.50E+01	na	3.50E+01	na	na
41	Tin	4.80E+04	na	4.80E+04	5.00E+01	na	na	5.00E+01	na	2.75E+02	na	2.10E+06	na	2.10E+06	na	na
42	Vanadium	4.00E+02	na	4.00E+02	2.00E+00	na	na	2.00E+00	na	2.60E+01	na	1.75E+04	na	1.75E+04	na	na
43	Zinc	2.40E+04	na	2.40E+04	8.60E+01	2.00E+02	3.60E+02	8.60E+01	3.60E+02	2.70E+02	5.70E+02	1.05E+06	na	1.05E+06	na	na
44	***Metals - Butyltins***															
45	Monobutyltin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
46	Dibutyltin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
47	Trybutyl tin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
48	Tributyltin oxide	2.40E+01	na	2.40E+01	na	na	na	na	na	na	na	1.05E+03	na	1.05E+03	na	na
49	Tetrabutyltin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
50	***SVOCs - PAHs***															
51	Acenaphthene	4.80E+03	na	4.80E+03	2.00E+01	na	na	2.00E+01	na	na	na	2.10E+05	na	2.10E+05	na	na
52	Acenaphthylene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
53	Anthracene	2.40E+04	na	2.40E+04	na	na	na	na	na	na	na	1.05E+06	na	1.05E+06	na	na
54	Benzo(a)anthracene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
55	Benzo(b)fluoranthene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
56	Benzo(k)fluoranthene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
57	Total benzofluoranthenes	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
58	Benzo(g,h,i)perylene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
59	Benzo(a)pyrene	2.40E+01	1.88E-01	1.88E-01	na	na	1.20E+01	1.20E+01	1.20E+01	3.00E+01	3.00E+02	1.05E+03	1.31E+02	1.31E+02	na	na
60	Chrysene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
61	Dibenz(a,h)anthracene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
62	Dibenzofuran	8.00E+01	na	8.00E+01	na	na	na	na	na	na	na	3.50E+03	na	3.50E+03	na	na
63	Fluoranthene	3.20E+03	na	3.20E+03	na	na	na	na	na	na	na	1.40E+05	na	1.40E+05	na	na
64	Fluorene	3.20E+03	na	3.20E+03	na	3.00E+01	na	3.00E+01	na	na	na	1.40E+05	na	1.40E+05	na	na
65	Indeno(1,2,3-cd)pyrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
66	Methyl isopropyl phenanthrene (retene)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
67	1-Methylnaphthalene	5.60E+03	1.96E+01	1.96E+01	na	na	na	na	na	na	na	2.45E+05	2.57E+03	2.57E+03	na	na
68	2-Methylnaphthalene	3.20E+02	na	3.20E+02	na	na	na	na	na	na	na	1.40E+04	na	1.40E+04	na	na
69	Naphthalene	1.60E+03	na	1.60E+03	na	na	na	na	na	na	na	7.00E+04	na	7.00E+04	na	na
70	Phenanthrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
71	Pyrene	2.40E+03	na	2.40E+03	na	na	na	na	na	na	na	1.05E+05	na	1.05E+05	na	na
72	Total LPAHs	na	na	na	na	2.90E+01	1.00E+02	2.90E+01	1.00E+02	na	na	na	na	na	na	na

Sort Order	Chemical (all concentrations in mg/kg)	MTCA-B Soil Direct Contact Noncancer SL-Eq	MTCA-B Soil Direct Contact Cancer SL-Eq	SL-1 MTCA-B Soil Direct Contact Minimum	Site-Specific TEE Eco. Indic. Soil Conc. Plants MTCA Table 749-3	Site-Specific TEE Eco. Indic. Soil Conc. Soil Biota MTCA Table 749-3	Site-Specific TEE Eco. Indic. Soil Conc. Wildlife MTCA Table 749-3	SL-9 Site-Specific TEE Eco. Indic. Soil Conc. Unrestricted Land Use	Site-Specific TEE Eco. Indic. Soil Conc. Industrial or Commercial Land Use	Simplified TEE Unrestricted Land Use MTCA Table 749-2	Simplified TEE Industrial or Commercial Land Use MTCA Table 749-2	MTCA-C Soil Direct Contact Noncancer SL-Eq	MTCA-C Soil Direct Contact Cancer SL-Eq	MTCA-C Soil Direct Contact Minimum	Federal TSCA Unrestricted Access 40 CFR 761.61	Federal TSCA Restricted Access 40 CFR 761.62
73	Total HPAHs	na	na	na	na	1.80E+01	1.10E+00	1.10E+00	1.10E+00	na	na	na	na	na	na	na
74	Total PAHs	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
75	Total cPAH TEQ	na	1.88E-01	1.88E-01	na	na	na	na	na	na	na	na	1.31E+02	1.31E+02	na	na
76	***Other SVOCs***															
77	Aniline	5.60E+02	1.75E+02	1.75E+02	na	na	na	na	na	na	na	2.45E+04	2.30E+04	2.30E+04	na	na
78	Azobenzene	na	9.09E+00	9.09E+00	na	na	na	na	na	na	na	na	1.19E+03	1.19E+03	na	na
79	Benzidine	2.40E+02	8.20E-04	8.20E-04	na	na	na	na	na	na	na	1.05E+04	5.71E-01	5.71E-01	na	na
80	Benzoic acid	3.20E+05	na	3.20E+05	na	na	na	na	na	na	na	1.40E+07	na	1.40E+07	na	na
81	Benzyl alcohol	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
82	Bis(2-chloroethoxy)methane	2.40E+02	na	2.40E+02	na	na	na	na	na	na	na	1.05E+04	na	1.05E+04	na	na
83	Bis(2-chloroethyl)ether	na	9.09E-01	9.09E-01	na	na	na	na	na	na	na	na	1.19E+02	1.19E+02	na	na
84	Bis(chloromethyl)ether	na	4.55E-03	4.55E-03	na	na	na	na	na	na	na	na	5.97E-01	5.97E-01	na	na
85	Bis(2-chloro-1-methylethyl)ether	3.20E+03	1.43E+01	1.43E+01	na	na	na	na	na	na	na	1.40E+05	1.88E+03	1.88E+03	na	na
86	2,6-Bis(1,1-dimethylethyl) phenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
87	Bis(2-ethylhexyl) phthalate	1.60E+03	7.14E+01	7.14E+01	na	na	na	na	na	na	na	7.00E+04	9.38E+03	9.38E+03	na	na
88	4-Bromophenyl phenyl ether	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
89	Butyl benzyl phthalate	1.60E+04	5.26E+02	5.26E+02	na	na	na	na	na	na	na	7.00E+05	6.91E+04	6.91E+04	na	na
90	Butyl diphenyl phosphate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
91	Carbazole	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
92	4-Chloroaniline	3.20E+02	5.00E+00	5.00E+00	na	na	na	na	na	na	na	1.40E+04	6.56E+02	6.56E+02	na	na
93	4-Chloro-3-methylphenol (chlorocresol)	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
94	2-Chloronaphthalene (beta-)	6.40E+03	na	6.40E+03	na	na	na	na	na	na	na	2.80E+05	na	2.80E+05	na	na
95	2-Chlorophenol	4.00E+02	na	4.00E+02	na	na	na	na	na	na	na	1.75E+04	na	1.75E+04	na	na
96	4-Chlorophenyl phenyl ether	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
97	Dibutyl phthalate	8.00E+03	na	8.00E+03	2.00E+02	na	na	2.00E+02	na	2.00E+02	na	3.50E+05	na	3.50E+05	na	na
98	Dibutyl phenyl phosphate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
99	1,2-Dichlorobenzene	7.20E+03	na	7.20E+03	na	na	na	na	na	na	na	3.15E+05	na	3.15E+05	na	na
100	1,3-Dichlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
101	1,4-Dichlorobenzene	5.60E+03	1.85E+02	1.85E+02	na	2.00E+01	na	2.00E+01	na	na	na	2.45E+05	2.43E+04	2.43E+04	na	na
102	3,3'-Dichlorobenzidine	na	2.22E+00	2.22E+00	na	na	na	na	na	na	na	na	2.92E+02	2.92E+02	na	na
103	2,4-Dichlorophenol	2.40E+02	na	2.40E+02	na	na	na	na	na	na	na	1.05E+04	na	1.05E+04	na	na
104	Di(2-ethylhexyl)adipate	4.80E+04	8.33E+02	8.33E+02	na	na	na	na	na	na	na	2.10E+06	1.09E+05	1.09E+05	na	na
105	Diethyl phthalate	6.40E+04	na	6.40E+04	1.00E+02	na	na	1.00E+02	na	na	na	2.80E+06	na	2.80E+06	na	na
106	Dimethyl phthalate	na	na	na	na	2.00E+02	na	2.00E+02	na	na	na	na	na	na	na	na
107	2,4-Dimethylphenol	1.60E+03	na	1.60E+03	na	na	na	na	na	na	na	7.00E+04	na	7.00E+04	na	na
108	1,2-Dinitrobenzene	8.00E+00	na	8.00E+00	na	na	na	na	na	na	na	3.50E+02	na	3.50E+02	na	na
109	1,3-Dinitrobenzene	8.00E+00	na	8.00E+00	na	na	na	na	na	na	na	3.50E+02	na	3.50E+02	na	na
110	1,4-Dinitrobenzene	8.00E+00	na	8.00E+00	na	na	na	na	na	na	na	3.50E+02	na	3.50E+02	na	na
111	4,6-Dinitro-o-cresol (DNOC)	6.40E+00	na	6.40E+00	na	na	na	na	na	na	na	2.80E+02	na	2.80E+02	na	na
112	2,4-Dinitrophenol	1.60E+02	na	1.60E+02	2.00E+01	na	na	2.00E+01	na	na	na	7.00E+03	na	7.00E+03	na	na
113	2,4-Dinitrotoluene	1.60E+02	3.23E+00	3.23E+00	na	na	na	na	na	na	na	7.00E+03	4.23E+02	4.23E+02	na	na
114	2,6-Dinitrotoluene	2.40E+01	6.67E-01	6.67E-01	na	na	na	na	na	na	na	1.05E+03	8.75E+01	8.75E+01	na	na
115	Di-n-octyl phthalate	8.00E+02	na	8.00E+02	na	na	na	na	na	na	na	3.50E+04	na	3.50E+04	na	na
116	1,4-Dioxane	2.40E+03	1.00E+01	1.00E+01	na	na	na	na	na	na	na	1.05E+05	1.31E+03	1.31E+03	na	na
117	1,2-Diphenylhydrazine	na	1.25E+00	1.25E+00	na	na	na	na	na	na	na	na	1.64E+02	1.64E+02	na	na
118	Hexachlorobenzene	6.40E+01	6.25E-01	6.25E-01	na	na	1.70E+01	1.70E+01	1.70E+01	3.10E+01	3.10E+01	2.80E+03	8.20E+01	8.20E+01	na	na
119	Hexachlorobutadiene	8.00E+01	1.28E+01	1.28E+01	na	na	na	na	na	na	na	3.50E+03	1.68E+03	1.68E+03	na	na
120	Hexachlorocyclopentadiene	4.80E+02	na	4.80E+02	1.00E+01	na	na	1.00E+01	na	na	na	2.10E+04	na	2.10E+04	na	na
121	Hexachloroethane	5.60E+01	2.50E+01	2.50E+01	na	na	na	na	na	na	na	2.45E+03	3.28E+03	2.45E+03	na	na
122	Isophorone	1.60E+04	1.05E+03	1.05E+03	na	na	na	na	na	na	na	7.00E+05	1.38E+05	1.38E+05	na	na
123	2-Methoxynaphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
124	2-Methylphenol (o-cresol)	4.00E+03	na	4.00E+03	na	na	na	na	na	na	na	1.75E+05	na	1.75E+05	na	na
125	3-Methylphenol (m-cresol)	4.00E+03	na	4.00E+03	na	na	na	na	na	na	na	1.75E+05	na	1.75E+05	na	na
126	4-Methylphenol (p-cresol)	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
127	2-Nitroaniline	8.00E+02	na	8.00E+02	na	na	na	na	na	na	na	3.50E+04	na	3.50E+04	na	na
128	3-Nitroaniline	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
129	4-Nitroaniline	3.20E+02	5.00E+01	5.00E+01	na	na	na	na	na	na	na	1.40E+04	6.56E+03	6.56E+03	na	na
130	Nitrobenzene	1.60E+02	na	1.60E+02	na	4.00E+01	na	4.00E+01	na	na	na	7.00E+03	na	7.00E+03	na	na
131	2-Nitrophenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
132	4-Nitrophenol	na	na	na	na	7.00E+00	na	7.00E+00	na	na	na	na	na	na	na	na
133	n-Nitrosodimethylamine	6.40E-01	3.70E-03	3.70E-03	na	na	na	na	na	na	na	2.80E+01	2.57E+00	2.57E+00	na	na
134	n-Nitrosodiphenylamine	na	2.04E+02	2.04E+02	na	2.00E+01	na	2.00E+01	na	na	na	na	2.68E+04	2.68E+04	na	na
135	n-Nitrosodi-n-propylamine	na	1.43E-01	1.43E-01	na	na	na	na	na	na	na	na	1.88E+01	1.88E+01	na	na
136	Pentachlorophenol	4.00E+02	2.50E+00	2.50E+00	3.00E+00	6.00E+00	4.50E+00	3.00E+00	4.50E+00	1.10E+01	1.10E+01	1.75E+04	3.28E+02	3.28E+02	na	na
137	Phenol	2.40E+04	na	2.40E+04	7.00E+01	3.00E+01	na	3.00E+01	na	na	na	1.05E+06	na	1.05E+06	na	na
138	Pyridine	8.00E+01	na	8.00E+01	na	na	na	na	na	na	na	3.50E+03	na	3.50E+03	na	na
139	2,3,4,5-Tetrachlorophenol	na	na	na	na	2.00E+01	na	2.00E+01	na	na	na	na	na	na	na	na
140	2,3,4,6-Tetrachlorophenol	2.40E+03	na	2.40E+03	na	na	na	na	na	na	na	1.05E+05	na	1.05E+05	na	na
141	1,2,4-Trichlorobenzene	8.00E+02	3.45E+01	3.45E+01	na	2.00E+01	na	2.00E+01	na	na	na	3.50E+04	4.53E+03	4.53E+03	na	na
142	2,4,5-Trichlorophenol	8.00E+03	na	8.00E+03	4.00E+00	9.00E+00	na	4.00E+00	na	na	na	3.50E+05	na	3.50E+05	na	na
143	2,4,6-Trichlorophenol	8.00E+01	9.09E+01	8.00E+01	na	1.00E+01	na	1.00E+01	na	na	na	3.50E+03	1.19E+04	3.50E+03	na	na
144	***Volatile Organic Compounds***															

Sort Order	Chemical (all concentrations in mg/kg)	MTCA-B Soil Direct Contact Noncancer SL-Eq	MTCA-B Soil Direct Contact Cancer SL-Eq	SL-1 MTCA-B Soil Direct Contact Minimum	Site-Specific TEE Eco. Indic. Soil Conc. Plants MTCA Table 749-3	Site-Specific TEE Eco. Indic. Soil Conc. Soil Biota MTCA Table 749-3	Site-Specific TEE Eco. Indic. Soil Conc. Wildlife MTCA Table 749-3	SL-9 Site-Specific TEE Eco. Indic. Soil Conc. Unrestricted Land Use	Site-Specific TEE Eco. Indic. Soil Conc. Industrial or Commercial Land Use	Simplified TEE Unrestricted Land Use MTCA Table 749-2	Simplified TEE Industrial or Commercial Land Use MTCA Table 749-2	MTCA-C Soil Direct Contact Noncancer SL-Eq	MTCA-C Soil Direct Contact Cancer SL-Eq	MTCA-C Soil Direct Contact Minimum	Federal TSCA Unrestricted Access 40 CFR 761.61	Federal TSCA Restricted Access 40 CFR 761.62
145	Acetone	7.20E+04	na	7.20E+04	na	na	na	na	na	na	na	3.15E+06	na	3.15E+06	na	na
146	Acetaldehyde	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
147	Acrolein	4.00E+01	na	4.00E+01	na	na	na	na	na	na	na	1.75E+03	na	1.75E+03	na	na
148	Acrylonitrile	8.00E+01	1.85E+00	1.85E+00	na	na	na	na	na	na	na	3.50E+03	2.43E+02	2.43E+02	na	na
149	Benzaldehyde	8.00E+03	2.50E+02	2.50E+02	na	na	na	na	na	na	na	3.50E+05	3.28E+04	3.28E+04	na	na
150	Benzene	3.20E+02	1.82E+01	1.82E+01	na	na	na	na	na	na	na	1.40E+04	2.39E+03	2.39E+03	na	na
151	Bromobenzene	6.40E+02	na	6.40E+02	na	na	na	na	na	na	na	2.80E+04	na	2.80E+04	na	na
152	Bromochloromethane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
153	Bromoethane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
154	Bromoform	1.60E+03	1.27E+02	1.27E+02	na	na	na	na	na	na	na	7.00E+04	1.66E+04	1.66E+04	na	na
155	Bromomethane	1.12E+02	na	1.12E+02	na	na	na	na	na	na	na	4.90E+03	na	4.90E+03	na	na
156	2-Butoxyethanol (EGBE)	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
157	n-Butylbenzene	4.00E+03	na	4.00E+03	na	na	na	na	na	na	na	1.75E+05	na	1.75E+05	na	na
158	sec-Butylbenzene	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
159	tert-Butylbenzene	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
160	Carbon disulfide	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
161	Carbon tetrachloride	3.20E+02	1.43E+01	1.43E+01	na	na	na	na	na	na	na	1.40E+04	1.88E+03	1.88E+03	na	na
162	Chlorobenzene	1.60E+03	na	1.60E+03	na	4.00E+01	na	4.00E+01	na	na	na	7.00E+04	na	7.00E+04	na	na
163	Chloroethane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
164	2-Chloroethyl vinyl ether	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
165	Chloroform	8.00E+02	3.23E+01	3.23E+01	na	na	na	na	na	na	na	3.50E+04	4.23E+03	4.23E+03	na	na
166	Chloromethane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
167	3-Chloro-1-propene (allyl chloride)	na	4.76E+01	4.76E+01	na	na	na	na	na	na	na	na	6.25E+03	6.25E+03	na	na
168	2-Chlorotoluene	1.60E+03	na	1.60E+03	na	na	na	na	na	na	na	7.00E+04	na	7.00E+04	na	na
169	4-Chlorotoluene	1.60E+03	na	1.60E+03	na	na	na	na	na	na	na	7.00E+04	na	7.00E+04	na	na
170	Dibromochloromethane	1.60E+03	1.19E+01	1.19E+01	na	na	na	na	na	na	na	7.00E+04	1.56E+03	1.56E+03	na	na
171	1,2-Dibromo-3-chloropropane	1.60E+01	2.30E-01	2.30E-01	na	na	na	na	na	na	na	7.00E+02	1.64E+02	1.64E+02	na	na
172	Dibromomethane	8.00E+02	na	8.00E+02	na	na	na	na	na	na	na	3.50E+04	na	3.50E+04	na	na
173	Dichlorobromomethane	1.60E+03	1.61E+01	1.61E+01	na	na	na	na	na	na	na	7.00E+04	2.12E+03	2.12E+03	na	na
174	trans-1,4-Dichloro-2-butene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
175	Dichlorodifluoromethane	1.60E+04	na	1.60E+04	na	na	na	na	na	na	na	7.00E+05	na	7.00E+05	na	na
176	1,1-Dichloroethane	1.60E+04	1.75E+02	1.75E+02	na	na	na	na	na	na	na	7.00E+05	2.30E+04	2.30E+04	na	na
177	1,2-Dichloroethane (EDC)	4.80E+02	1.10E+01	1.10E+01	na	na	na	na	na	na	na	2.10E+04	1.44E+03	1.44E+03	na	na
178	1,1-Dichloroethylene	4.00E+03	na	4.00E+03	na	na	na	na	na	na	na	1.75E+05	na	1.75E+05	na	na
179	cis-1,2-Dichloroethylene	1.60E+02	na	1.60E+02	na	na	na	na	na	na	na	7.00E+03	na	7.00E+03	na	na
180	trans-1,2-Dichloroethylene	1.60E+03	na	1.60E+03	na	na	na	na	na	na	na	7.00E+04	na	7.00E+04	na	na
181	1,2-Dichloroethylene (mixed isomers)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
182	1,2-Dichloropropane	3.20E+03	2.70E+01	2.70E+01	na	7.00E+02	na	7.00E+02	na	na	na	1.40E+05	3.55E+03	3.55E+03	na	na
183	1,3-Dichloropropane	1.60E+03	na	1.60E+03	na	na	na	na	na	na	na	7.00E+04	na	7.00E+04	na	na
184	2,2-Dichloropropane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
185	1,1-Dichloropropene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
186	cis-1,3-Dichloropropene	2.40E+03	1.00E+01	1.00E+01	na	na	na	na	na	na	na	1.05E+05	1.31E+03	1.31E+03	na	na
187	trans-1,3-Dichloropropene	2.40E+03	1.00E+01	1.00E+01	na	na	na	na	na	na	na	1.05E+05	1.31E+03	1.31E+03	na	na
188	Diisopropyl ether	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
189	Ethane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
190	Ethylbenzene	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
191	Ethylene oxide	na	6.00E-01	6.00E-01	na	na	na	na	na	na	na	na	4.23E+02	4.23E+02	na	na
192	Ethyl ether	1.60E+04	na	1.60E+04	na	na	na	na	na	na	na	7.00E+05	na	7.00E+05	na	na
193	Ethylene dibromide (EDB)	7.20E+02	5.00E-01	5.00E-01	na	na	na	na	na	na	na	3.15E+04	6.56E+01	6.56E+01	na	na
194	Formaldehyde	1.60E+04	8.90E+00	8.90E+00	na	na	na	na	na	na	na	7.00E+05	6.25E+03	6.25E+03	na	na
195	n-Hexane	4.80E+03	na	4.80E+03	na	na	na	na	na	na	na	2.10E+05	na	2.10E+05	na	na
196	2-Hexanone	4.00E+02	na	4.00E+02	na	na	na	na	na	na	na	1.75E+04	na	1.75E+04	na	na
197	Isopropylbenzene (cumene)	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
198	4-Isopropyltoluene (p-isopropyltoluene)	3.20E+02	na	3.20E+02	na	na	na	na	na	na	na	1.40E+04	na	1.40E+04	na	na
199	Methane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
200	Methyl ethyl ketone (2-butanone)	4.80E+04	na	4.80E+04	na	na	na	na	na	na	na	2.10E+06	na	2.10E+06	na	na
201	Methyl iodide	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
202	Methyl isobutyl ketone	6.40E+03	na	6.40E+03	na	na	na	na	na	na	na	2.80E+05	na	2.80E+05	na	na
203	Methyl tert-butyl ether (MTBE)	na	5.56E+02	5.56E+02	na	na	na	na	na	na	na	na	7.29E+04	7.29E+04	na	na
204	Methylene chloride	4.80E+02	9.40E+01	9.40E+01	na	na	na	na	na	na	na	2.10E+04	6.56E+04	2.10E+04	na	na
205	2-Pentanone	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
206	n-Propylbenzene	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
207	Styrene	1.60E+04	na	1.60E+04	3.00E+02	na	na	3.00E+02	na	na	na	7.00E+05	na	7.00E+05	na	na
208	1,1,1,2-Tetrachloroethane	2.40E+03	3.85E+01	3.85E+01	na	na	na	na	na	na	na	1.05E+05	5.05E+03	5.05E+03	na	na
209	1,1,2,2-Tetrachloroethane	1.60E+03	5.00E+00	5.00E+00	na	na	na	na	na	na	na	7.00E+04	6.56E+02	6.56E+02	na	na
210	Tetrachloroethylene (PCE)	4.80E+02	4.76E+02	4.76E+02	na	na	na	na	na	na	na	2.10E+04	6.25E+04	2.10E+04	na	na
211	Tetrahydrofuran	7.20E+04	na	7.20E+04	na	na	na	na	na	na	na	3.15E+06	na	3.15E+06	na	na
212	Toluene	6.40E+03	na	6.40E+03	2.00E+02	na	na	2.00E+02	na	na	na	2.80E+05	na	2.80E+05	na	na
213	1,2,3-Trichlorobenzene	6.40E+01	na	6.40E+01	na	2.00E+01	na	2.00E+01	na	na	na	2.80E+03	na	2.80E+03	na	na
214	1,1,1-Trichloroethane	1.60E+05	na	1.60E+05	na	na	na	na	na	na	na	7.00E+06	na	7.00E+06	na	na
215	1,1,2-Trichloroethane	3.20E+02	1.75E+01	1.75E+01	na	na	na	na	na	na	na	1.40E+04	2.30E+03	2.30E+03	na	na
216	Trichloroethylene (TCE)	4.00E+01	1.20E+01	1.20E+01	na	na	na	na	na	na	na	1.80E+03	2.90E+03	1.80E+03	na	na

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Sort Order	Chemical (all concentrations in mg/kg)	MTCA-B Soil Direct Contact Noncancer SL-Eq	MTCA-B Soil Direct Contact Cancer SL-Eq	SL-1 MTCA-B Soil Direct Contact Minimum	Site-Specific TEE Eco. Indic. Soil Conc. Plants MTCA Table 749-3	Site-Specific TEE Eco. Indic. Soil Conc. Soil Biota MTCA Table 749-3	Site-Specific TEE Eco. Indic. Soil Conc. Wildlife MTCA Table 749-3	SL-9 Site-Specific TEE Eco. Indic. Soil Conc. Unrestricted Land Use	Site-Specific TEE Eco. Indic. Soil Conc. Industrial or Commercial Land Use	Simplified TEE Unrestricted Land Use MTCA Table 749-2	Simplified TEE Industrial or Commercial Land Use MTCA Table 749-2	MTCA-C Soil Direct Contact Noncancer SL-Eq	MTCA-C Soil Direct Contact Cancer SL-Eq	MTCA-C Soil Direct Contact Minimum	Federal TSCA Unrestricted Access 40 CFR 761.61	Federal TSCA Restricted Access 40 CFR 761.62
217	Trichlorofluoroethane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
218	Trichlorofluoromethane	2.40E+04	na	2.40E+04	na	na	na	na	na	na	na	1.05E+06	na	1.05E+06	na	na
219	1,2,3-Trichloropropane	3.20E+02	6.30E-03	6.30E-03	na	na	na	na	na	na	na	1.40E+04	4.38E+00	4.38E+00	na	na
220	Trichlorotrifluoroethane	2.40E+06	na	2.40E+06	na	na	na	na	na	na	na	1.05E+08	na	1.05E+08	na	na
221	1,2,3-Trimethylbenzene	8.00E+02	na	8.00E+02	na	na	na	na	na	na	na	3.50E+04	na	3.50E+04	na	na
222	1,2,4-Trimethylbenzene	8.00E+02	na	8.00E+02	na	na	na	na	na	na	na	3.50E+04	na	3.50E+04	na	na
223	1,3,5-Trimethylbenzene	8.00E+02	na	8.00E+02	na	na	na	na	na	na	na	3.50E+04	na	3.50E+04	na	na
224	Vinyl acetate	8.00E+04	na	8.00E+04	na	na	na	na	na	na	na	3.50E+06	na	3.50E+06	na	na
225	Vinyl chloride	2.40E+02	6.67E-01	6.67E-01	na	na	na	na	na	na	na	1.05E+04	8.75E+01	8.75E+01	na	na
226	Total xylenes	1.60E+04	na	1.60E+04	na	na	na	na	na	na	na	7.00E+05	na	7.00E+05	na	na
227	***PFAS***															
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	1.60E+01	na	1.60E+01	na	na	na	na	na	na	na	7.00E+02	na	7.00E+02	na	na
229	GenX (HFPO-DA)	2.40E-01	na	2.40E-01	na	na	na	na	na	na	na	1.05E+01	na	1.05E+01	na	na
230	Perfluorobutanoic acid (PFBA)	8.00E+01	na	8.00E+01	na	na	na	na	na	na	na	3.50E+03	na	3.50E+03	na	na
231	Perfluorobutanesulfonic acid (PFBS)	2.40E+01	na	2.40E+01	na	na	2.02E+01	2.02E+01	2.02E+01	na	na	1.05E+03	na	1.05E+03	na	na
232	Perfluorodecanoic acid (PFDA)	1.60E-04	na	1.60E-04	na	na	1.37E-01	1.37E-01	1.37E-01	na	na	7.00E-03	na	7.00E-03	na	na
233	Perfluorohexanoic acid (PFHxA)	4.00E+01	na	4.00E+01	na	na	5.92E+01	5.92E+01	5.92E+01	na	na	1.75E+03	na	1.75E+03	na	na
234	Perfluorohexanesulfonic acid (PFHxS)	3.20E-05	na	3.20E-05	na	na	3.49E-02	3.49E-02	3.49E-02	na	na	1.40E-03	na	1.40E-03	na	na
235	Perfluorononanoic acid (PFNA)	2.00E-01	na	2.00E-01	na	na	2.06E-01	2.06E-01	2.06E-01	na	na	8.75E+00	na	8.75E+00	na	na
236	Perfluorooctanesulfonic acid (PFOS)	8.00E-03	2.53E-02	8.00E-03	na	1.00E+02	7.84E-02	7.84E-02	7.84E-02	na	na	3.50E-01	3.32E+00	3.50E-01	na	na
237	Perfluorooctanoic acid (PFOA)	2.40E-03	3.41E-05	3.41E-05	5.00E+01	2.50E+01	4.60E-01	4.60E-01	4.60E-01	na	na	1.05E-01	4.48E-03	4.48E-03	na	na
238	***Petroleum Hydrocarbons***															
239	Gasoline range hydrocarbons, fresh	1.50E+03	na	1.50E+03	1.20E+02	1.20E+02	5.00E+03	1.20E+02	5.00E+03	2.00E+02	1.20E+04	2.90E+04	na	2.90E+04	na	na
240	Gasoline range hydrocarbons, weathered	1.50E+03	na	1.50E+03	1.20E+02	1.20E+02	5.00E+03	1.20E+02	5.00E+03	2.00E+02	1.20E+04	2.90E+04	na	2.90E+04	na	na
241	Diesel range hydrocarbons, fresh	na	na	na	1.60E+03	2.60E+02	6.00E+03	2.60E+02	6.00E+03	4.60E+02	1.50E+04	2.90E+04	na	2.90E+04	na	na
242	Diesel range hydrocarbons, weathered	na	na	na	1.60E+03	2.60E+02	6.00E+03	2.60E+02	6.00E+03	4.60E+02	1.50E+04	2.90E+04	na	2.90E+04	na	na
243	Oil range hydrocarbons	na	na	na	1.60E+03	2.60E+02	6.00E+03	2.60E+02	6.00E+03	na	na	2.90E+04	na	2.90E+04	na	na
244	Total diesel & oil range hydrocarbons	na	na	na	1.60E+03	2.60E+02	6.00E+03	2.60E+02	6.00E+03	4.60E+02	1.50E+04	2.90E+04	na	2.90E+04	na	na
245	***Pesticides***															
246	Aldrin	2.40E+00	5.88E-02	5.88E-02	na	na	1.00E-01	1.00E-01	1.00E-01	1.70E-01	1.70E-01	1.05E+02	7.72E+00	7.72E+00	na	na
247	alpha-BHC (alpha-HCH)	7.20E+01	1.59E-01	1.59E-01	na	na	6.00E+00	6.00E+00	6.00E+00	1.00E+01	1.00E+01	3.15E+03	2.08E+01	2.08E+01	na	na
248	beta-BHC (beta-HCH)	na	5.56E-01	5.56E-01	na	na	6.00E+00	6.00E+00	6.00E+00	1.00E+01	1.00E+01	na	7.29E+01	7.29E+01	na	na
249	delta-BHC (delta-HCH)	4.80E-03	na	4.80E-03	na	na	6.00E+00	6.00E+00	6.00E+00	1.00E+01	1.00E+01	2.10E-01	na	2.10E-01	na	na
250	Carbaryl	8.00E+03	na	8.00E+03	na	na	na	na	na	na	na	3.50E+05	na	3.50E+05	na	na
251	cis-Chlordane (alpha)	4.00E+01	na	4.00E+01	na	1.00E+00	2.70E+00	1.00E+00	2.70E+00	1.00E+00	7.00E+00	1.75E+03	na	1.75E+03	na	na
252	trans-Chlordane (gamma)	4.00E+01	na	4.00E+01	na	1.00E+00	2.70E+00	1.00E+00	2.70E+00	1.00E+00	7.00E+00	1.75E+03	na	1.75E+03	na	na
253	Chlordane	4.00E+01	2.86E+00	2.86E+00	na	1.00E+00	2.70E+00	1.00E+00	2.70E+00	1.00E+00	7.00E+00	1.75E+03	3.75E+02	3.75E+02	na	na
254	Chlorpyrifos	8.00E+01	na	8.00E+01	na	na	na	na	na	na	na	3.50E+03	na	3.50E+03	na	na
255	4,4'-DDD	4.00E+01	4.17E+00	4.17E+00	na	na	7.50E-01	7.50E-01	7.50E-01	1.00E+00	1.00E+00	1.75E+03	5.47E+02	5.47E+02	na	na
256	4,4'-DDE	4.00E+01	2.94E+00	2.94E+00	na	na	7.50E-01	7.50E-01	7.50E-01	1.00E+00	1.00E+00	1.75E+03	3.86E+02	3.86E+02	na	na
257	4,4'-DDT	4.00E+01	2.94E+00	2.94E+00	na	na	7.50E-01	7.50E-01	7.50E-01	1.00E+00	1.00E+00	1.75E+03	3.86E+02	3.86E+02	na	na
258	Total DDD	4.00E+01	4.17E+00	4.17E+00	na	na	7.50E-01	7.50E-01	7.50E-01	1.00E+00	1.00E+00	1.75E+03	5.47E+02	5.47E+02	na	na
259	Total DDE	4.00E+01	2.94E+00	2.94E+00	na	na	7.50E-01	7.50E-01	7.50E-01	1.00E+00	1.00E+00	1.75E+03	3.86E+02	3.86E+02	na	na
260	Total DDT	4.00E+01	2.94E+00	2.94E+00	na	na	7.50E-01	7.50E-01	7.50E-01	1.00E+00	1.00E+00	1.75E+03	3.86E+02	3.86E+02	na	na
261	Diazinon	5.60E+01	na	5.60E+01	na	na	na	na	na	na	na	2.45E+03	na	2.45E+03	na	na
262	Dieldrin	4.00E+00	6.25E-02	6.25E-02	na	na	7.00E-02	7.00E-02	7.00E-02	1.70E-01	1.70E-01	1.75E+02	8.20E+00	8.20E+00	na	na
263	Endosulfan I	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
264	Endosulfan II	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
265	Endosulfan sulfate	4.80E+02	na	4.80E+02	na	na	na	na	na	na	na	2.10E+04	na	2.10E+04	na	na
266	Endrin	2.40E+01	na	2.40E+01	na	na	2.00E-01	2.00E-01	2.00E-01	4.00E-01	4.00E-01	1.05E+03	na	1.05E+03	na	na
267	Endrin aldehyde	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
268	Endrin ketone	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
269	Heptachlor	4.00E+01	2.22E-01	2.22E-01	na	na	4.00E-01	4.00E-01	4.00E-01	6.00E-01	6.00E-01	1.75E+03	2.92E+01	2.92E+01	na	na
270	Heptachlor epoxide	1.04E+00	1.10E-01	1.10E-01	na	na	4.00E-01	4.00E-01	4.00E-01	6.00E-01	6.00E-01	4.55E+01	1.44E+01	1.44E+01	na	na
271	Lindane (gamma-BHC)	2.40E+01	9.09E-01	9.09E-01	na	na	6.00E+00	6.00E+00	6.00E+00	1.00E+01	1.00E+01	1.05E+03	1.19E+02	1.19E+02	na	na
272	Malathion	1.60E+03	na	1.60E+03	na	na	na	na	na	na	na	7.00E+04	na	7.00E+04	na	na
273	Methoxychlor	4.00E+02	na	4.00E+02	na	na	na	na	na	na	na	1.75E+04	na	1.75E+04	na	na
274	Mirex	1.60E+01	5.56E-02	5.56E-02	na	na	na	na	na	na	na	7.00E+02	7.29E+00	7.29E+00	na	na
275	Nonachlor	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
276	Toxaphene	7.20E+00	9.09E-01	9.09E-01	na	na	na	na	na	na	na	3.15E+02	1.19E+02	1.19E+02	na	na

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PCBs							
Total PCB Aroclors	na	2.00E+00	1.0	na	5.00E-01	na	6.56E+01
Total PCB congeners	na	2.00E+00	1.0	na	5.00E-01	na	6.56E+01
Total PCB TEQ	7.00E-10	1.30E+05	0.6	9.33E-05	1.28E-05	4.08E-03	1.68E-03
Dioxins/Furans							
Total dioxin/furan TEQ	7.00E-10	1.30E+05	0.6	9.33E-05	1.28E-05	4.08E-03	1.68E-03
2,3,7,8-TCDD	7.00E-10	1.30E+05	0.6	9.33E-05	1.28E-05	4.08E-03	1.68E-03
Total chlorinated dioxins	na	na	0.6	na	na	na	na
Total chlorinated furans	na	na	0.6	na	na	na	na
Inorganics							
Ammonia	na	na	1.0	na	na	na	na
Chloride	na	na	1.0	na	na	na	na
Cyanide, free	6.30E-04	na	1.0	5.04E+01	na	2.21E+03	na
Fluoride	6.00E-02	na	1.0	4.80E+03	na	2.10E+05	na
Nitrate	1.60E+00	na	1.0	1.28E+05	na	5.60E+06	na
Nitrite	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
Sulfate	na	na	1.0	na	na	na	na
Sulfide	na	na	na	na	na	na	na
Metals							
Aluminum	1.00E+00	na	1.0	8.00E+04	na	3.50E+06	na
Antimony	4.00E-04	na	1.0	3.20E+01	na	1.40E+03	na
Arsenic	6.00E-05	3.20E+01	1.0	4.80E+00	3.13E-02	2.10E+02	4.10E+00
Barium	2.00E-01	na	1.0	1.60E+04	na	7.00E+05	na
Beryllium	2.00E-03	na	1.0	1.60E+02	na	7.00E+03	na
Cadmium	1.00E-03	na	1.0	8.00E+01	na	3.50E+03	na
Chromium, total	na	na	1.0	na	na	na	na
Chromium, trivalent	1.50E+00	na	1.0	1.20E+05	na	5.25E+06	na
Chromium, hexavalent	9.00E-04	1.60E-01	1.0	7.20E+01	1.20E+00	3.15E+03	8.20E+02
Cobalt	3.00E-04	na	1.0	2.40E+01	na	1.05E+03	na
Copper	4.00E-02	na	1.0	3.20E+03	na	1.40E+05	na
Iron	7.00E-01	na	1.0	5.60E+04	na	2.45E+06	na
Lead	na	na	1.0	na	na	na	na
Manganese	4.67E-02	na	1.0	3.74E+03	na	1.63E+05	na
Mercury, inorganic	na	na	1.0	na	na	na	na
Methylmercury	1.00E-04	na	1.0	8.00E+00	na	3.50E+02	na
Molybdenum	5.00E-03	na	1.0	4.00E+02	na	1.75E+04	na
Nickel	2.00E-02	na	1.0	1.60E+03	na	7.00E+04	na
Selenium	5.00E-03	na	1.0	4.00E+02	na	1.75E+04	na
Silver	5.00E-03	na	1.0	4.00E+02	na	1.75E+04	na
Thallium	1.00E-05	na	1.0	8.00E-01	na	3.50E+01	na
Tin	6.00E-01	na	1.0	4.80E+04	na	2.10E+06	na
Vanadium	5.00E-03	na	1.0	4.00E+02	na	1.75E+04	na

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Zinc	3.00E-01	na	1.0	2.40E+04	na	1.05E+06	na
Metals - Butyltins							
Monobutyltin	na	na	na	na	na	na	na
Dibutyltin	na	na	na	na	na	na	na
Trybutyl tin	na	na	1.0	na	na	na	na
Tributyltin oxide	3.00E-04	na	1.0	2.40E+01	na	1.05E+03	na
Tetrabutyltin	na	na	1.0	na	na	na	na
SVOCs - PAHs							
Acenaphthene	6.00E-02	na	1.0	4.80E+03	na	2.10E+05	na
Acenaphthylene	na	na	na	na	na	na	na
Anthracene	3.00E-01	na	1.0	2.40E+04	na	1.05E+06	na
Benzo(a)anthracene	na	na	1.0	na	na	na	na
Benzo(b)fluoranthene	na	na	1.0	na	na	na	na
Benzo(k)fluoranthene	na	na	1.0	na	na	na	na
Total benzofluoranthenes	na	na	na	na	na	na	na
Benzo(g,h,i)perylene	na	na	na	na	na	na	na
Benzo(a)pyrene	3.00E-04	1.00E+00	1.0	2.40E+01	1.88E-01	1.05E+03	1.31E+02
Chrysene	na	na	1.0	na	na	na	na
Dibenz(a,h)anthracene	na	na	1.0	na	na	na	na
Dibenzofuran	1.00E-03	na	1.0	8.00E+01	na	3.50E+03	na
Fluoranthene	4.00E-02	na	1.0	3.20E+03	na	1.40E+05	na
Fluorene	4.00E-02	na	1.0	3.20E+03	na	1.40E+05	na
Indeno(1,2,3-cd)pyrene	na	na	1.0	na	na	na	na
Methyl isopropyl phenanthrene (retene)	na	na	na	na	na	na	na
1-Methylnaphthalene	7.00E-02	5.10E-02	1.0	5.60E+03	1.96E+01	2.45E+05	2.57E+03
2-Methylnaphthalene	4.00E-03	na	1.0	3.20E+02	na	1.40E+04	na
Naphthalene	2.00E-02	na	1.0	1.60E+03	na	7.00E+04	na
Phenanthrene	na	na	na	na	na	na	na
Pyrene	3.00E-02	na	1.0	2.40E+03	na	1.05E+05	na
Total LPAHs	na	na	na	na	na	na	na
Total HPAHs	na	na	na	na	na	na	na
Total PAHs	na	na	na	na	na	na	na
Total cPAH TEQ	na	1.00E+00	1.0	na	1.88E-01	na	1.31E+02
Other SVOCs							
Aniline	7.00E-03	5.70E-03	1.0	5.60E+02	1.75E+02	2.45E+04	2.30E+04
Azobenzene	na	1.10E-01	1.0	na	9.09E+00	na	1.19E+03
Benzidine	3.00E-03	2.30E+02	1.0	2.40E+02	8.20E-04	1.05E+04	5.71E-01
Benzoic acid	4.00E+00	na	1.0	3.20E+05	na	1.40E+07	na
Benzyl alcohol	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
Bis(2-chloroethoxy)methane	3.00E-03	na	1.0	2.40E+02	na	1.05E+04	na
Bis(2-chloroethyl)ether	na	1.10E+00	1.0	na	9.09E-01	na	1.19E+02
Bis(chloromethyl)ether	na	2.20E+02	1.0	na	4.55E-03	na	5.97E-01

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Bis(2-chloro-1-methylethyl)ether	4.00E-02	7.00E-02	1.0	3.20E+03	1.43E+01	1.40E+05	1.88E+03
2,6-Bis(1,1-dimethylethyl) phenol	na	na	na	na	na	na	na
Bis(2-ethylhexyl) phthalate	2.00E-02	1.40E-02	1.0	1.60E+03	7.14E+01	7.00E+04	9.38E+03
4-Bromophenyl phenyl ether	na	na	na	na	na	na	na
Butyl benzyl phthalate	2.00E-01	1.90E-03	1.0	1.60E+04	5.26E+02	7.00E+05	6.91E+04
Butyl diphenyl phosphate	na	na	na	na	na	na	na
Carbazole	na	na	na	na	na	na	na
4-Chloroaniline	4.00E-03	2.00E-01	1.0	3.20E+02	5.00E+00	1.40E+04	6.56E+02
4-Chloro-3-methylphenol (chlorocresol)	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
2-Chloronaphthalene (beta-)	8.00E-02	na	1.0	6.40E+03	na	2.80E+05	na
2-Chlorophenol	5.00E-03	na	1.0	4.00E+02	na	1.75E+04	na
4-Chlorophenyl phenyl ether	na	na	na	na	na	na	na
Dibutyl phthalate	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
Dibutyl phenyl phosphate	na	na	na	na	na	na	na
1,2-Dichlorobenzene	9.00E-02	na	1.0	7.20E+03	na	3.15E+05	na
1,3-Dichlorobenzene	na	na	1.0	na	na	na	na
1,4-Dichlorobenzene	7.00E-02	5.40E-03	1.0	5.60E+03	1.85E+02	2.45E+05	2.43E+04
3,3'-Dichlorobenzidine	na	4.50E-01	1.0	na	2.22E+00	na	2.92E+02
2,4-Dichlorophenol	3.00E-03	na	1.0	2.40E+02	na	1.05E+04	na
Di(2-ethylhexyl)adipate	6.00E-01	1.20E-03	1.0	4.80E+04	8.33E+02	2.10E+06	1.09E+05
Diethyl phthalate	8.00E-01	na	1.0	6.40E+04	na	2.80E+06	na
Dimethyl phthalate	na	na	1.0	na	na	na	na
2,4-Dimethylphenol	2.00E-02	na	1.0	1.60E+03	na	7.00E+04	na
1,2-Dinitrobenzene	1.00E-04	na	1.0	8.00E+00	na	3.50E+02	na
1,3-Dinitrobenzene	1.00E-04	na	1.0	8.00E+00	na	3.50E+02	na
1,4-Dinitrobenzene	1.00E-04	na	1.0	8.00E+00	na	3.50E+02	na
4,6-Dinitro-o-cresol (DNOC)	8.00E-05	na	1.0	6.40E+00	na	2.80E+02	na
2,4-Dinitrophenol	2.00E-03	na	1.0	1.60E+02	na	7.00E+03	na
2,4-Dinitrotoluene	2.00E-03	3.10E-01	1.0	1.60E+02	3.23E+00	7.00E+03	4.23E+02
2,6-Dinitrotoluene	3.00E-04	1.50E+00	1.0	2.40E+01	6.67E-01	1.05E+03	8.75E+01
Di-n-octyl phthalate	1.00E-02	na	1.0	8.00E+02	na	3.50E+04	na
1,4-Dioxane	3.00E-02	1.00E-01	1.0	2.40E+03	1.00E+01	1.05E+05	1.31E+03
1,2-Diphenylhydrazine	na	8.00E-01	1.0	na	1.25E+00	na	1.64E+02
Hexachlorobenzene	8.00E-04	1.60E+00	1.0	6.40E+01	6.25E-01	2.80E+03	8.20E+01
Hexachlorobutadiene	1.00E-03	7.80E-02	1.0	8.00E+01	1.28E+01	3.50E+03	1.68E+03
Hexachlorocyclopentadiene	6.00E-03	na	1.0	4.80E+02	na	2.10E+04	na
Hexachloroethane	7.00E-04	4.00E-02	1.0	5.60E+01	2.50E+01	2.45E+03	3.28E+03
Isophorone	2.00E-01	9.50E-04	1.0	1.60E+04	1.05E+03	7.00E+05	1.38E+05
2-Methoxynaphthalene	na	na	na	na	na	na	na
2-Methylphenol (o-cresol)	5.00E-02	na	1.0	4.00E+03	na	1.75E+05	na
3-Methylphenol (m-cresol)	5.00E-02	na	1.0	4.00E+03	na	1.75E+05	na
4-Methylphenol (p-cresol)	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na

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PCUL Workbook - Soil Direct Contact Equations Chemicals highlighted yellow are mutagenic.

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2-Nitroaniline	1.00E-02	na	1.0	8.00E+02	na	3.50E+04	na
3-Nitroaniline	na	na	na	na	na	na	na
4-Nitroaniline	4.00E-03	2.00E-02	1.0	3.20E+02	5.00E+01	1.40E+04	6.56E+03
Nitrobenzene	2.00E-03	na	1.0	1.60E+02	na	7.00E+03	na
2-Nitrophenol	na	na	na	na	na	na	na
4-Nitrophenol	na	na	na	na	na	na	na
n-Nitrosodimethylamine	8.00E-06	5.10E+01	1.0	6.40E-01	3.70E-03	2.80E+01	2.57E+00
n-Nitrosodiphenylamine	na	4.90E-03	1.0	na	2.04E+02	na	2.68E+04
n-Nitrosodi-n-propylamine	na	7.00E+00	1.0	na	1.43E-01	na	1.88E+01
Pentachlorophenol	5.00E-03	4.00E-01	1.0	4.00E+02	2.50E+00	1.75E+04	3.28E+02
Phenol	3.00E-01	na	1.0	2.40E+04	na	1.05E+06	na
Pyridine	1.00E-03	na	1.0	8.00E+01	na	3.50E+03	na
2,3,4,5-Tetrachlorophenol	na	na	na	na	na	na	na
2,3,4,6-Tetrachlorophenol	3.00E-02	na	1.0	2.40E+03	na	1.05E+05	na
1,2,4-Trichlorobenzene	1.00E-02	2.90E-02	1.0	8.00E+02	3.45E+01	3.50E+04	4.53E+03
2,4,5-Trichlorophenol	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
2,4,6-Trichlorophenol	1.00E-03	1.10E-02	1.0	8.00E+01	9.09E+01	3.50E+03	1.19E+04
Volatile Organic Compounds							
Acetone	9.00E-01	na	1.0	7.20E+04	na	3.15E+06	na
Acetaldehyde	na	na	1.0	na	na	na	na
Acrolein	5.00E-04	na	1.0	4.00E+01	na	1.75E+03	na
Acrylonitrile	1.00E-03	5.40E-01	1.0	8.00E+01	1.85E+00	3.50E+03	2.43E+02
Benzaldehyde	1.00E-01	4.00E-03	1.0	8.00E+03	2.50E+02	3.50E+05	3.28E+04
Benzene	4.00E-03	5.50E-02	1.0	3.20E+02	1.82E+01	1.40E+04	2.39E+03
Bromobenzene	8.00E-03	na	1.0	6.40E+02	na	2.80E+04	na
Bromochloromethane	na	na	1.0	na	na	na	na
Bromoethane	na	na	na	na	na	na	na
Bromoform	2.00E-02	7.90E-03	1.0	1.60E+03	1.27E+02	7.00E+04	1.66E+04
Bromomethane	1.40E-03	na	1.0	1.12E+02	na	4.90E+03	na
2-Butoxyethanol (EGBE)	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
n-Butylbenzene	5.00E-02	na	1.0	4.00E+03	na	1.75E+05	na
sec-Butylbenzene	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
tert-Butylbenzene	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
Carbon disulfide	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
Carbon tetrachloride	4.00E-03	7.00E-02	1.0	3.20E+02	1.43E+01	1.40E+04	1.88E+03
Chlorobenzene	2.00E-02	na	1.0	1.60E+03	na	7.00E+04	na
Chloroethane	na	na	1.0	na	na	na	na
2-Chloroethyl vinyl ether	na	na	na	na	na	na	na
Chloroform	1.00E-02	3.10E-02	1.0	8.00E+02	3.23E+01	3.50E+04	4.23E+03
Chloromethane	na	na	1.0	na	na	na	na
3-Chloro-1-propene (allyl chloride)	na	2.10E-02	1.0	na	4.76E+01	na	6.25E+03
2-Chlorotoluene	2.00E-02	na	1.0	1.60E+03	na	7.00E+04	na

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4-Chlorotoluene	2.00E-02	na	1.0	1.60E+03	na	7.00E+04	na
Dibromochloromethane	2.00E-02	8.40E-02	1.0	1.60E+03	1.19E+01	7.00E+04	1.56E+03
1,2-Dibromo-3-chloropropane	2.00E-04	8.00E-01	1.0	1.60E+01	2.30E-01	7.00E+02	1.64E+02
Dibromomethane	1.00E-02	na	1.0	8.00E+02	na	3.50E+04	na
Dichlorobromomethane	2.00E-02	6.20E-02	1.0	1.60E+03	1.61E+01	7.00E+04	2.12E+03
trans-1,4-Dichloro-2-butene	na	na	1.0	na	na	na	na
Dichlorodifluoromethane	2.00E-01	na	1.0	1.60E+04	na	7.00E+05	na
1,1-Dichloroethane	2.00E-01	5.70E-03	1.0	1.60E+04	1.75E+02	7.00E+05	2.30E+04
1,2-Dichloroethane (EDC)	6.00E-03	9.10E-02	1.0	4.80E+02	1.10E+01	2.10E+04	1.44E+03
1,1-Dichloroethylene	5.00E-02	na	1.0	4.00E+03	na	1.75E+05	na
cis-1,2-Dichloroethylene	2.00E-03	na	1.0	1.60E+02	na	7.00E+03	na
trans-1,2-Dichloroethylene	2.00E-02	na	1.0	1.60E+03	na	7.00E+04	na
1,2-Dichloroethylene (mixed isomers)	na	na	na	na	na	na	na
1,2-Dichloropropane	4.00E-02	3.70E-02	1.0	3.20E+03	2.70E+01	1.40E+05	3.55E+03
1,3-Dichloropropane	2.00E-02	na	1.0	1.60E+03	na	7.00E+04	na
2,2-Dichloropropane	na	na	na	na	na	na	na
1,1-Dichloropropene	na	na	na	na	na	na	na
cis-1,3-Dichloropropene	3.00E-02	1.00E-01	1.0	2.40E+03	1.00E+01	1.05E+05	1.31E+03
trans-1,3-Dichloropropene	3.00E-02	1.00E-01	1.0	2.40E+03	1.00E+01	1.05E+05	1.31E+03
Diisopropyl ether	na	na	1.0	na	na	na	na
Ethane	na	na	na	na	na	na	na
Ethylbenzene	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
Ethylene oxide	na	3.10E-01	1.0	na	6.00E-01	na	4.23E+02
Ethyl ether	2.00E-01	na	1.0	1.60E+04	na	7.00E+05	na
Ethylene dibromide (EDB)	9.00E-03	2.00E+00	1.0	7.20E+02	5.00E-01	3.15E+04	6.56E+01
Formaldehyde	2.00E-01	2.10E-02	1.0	1.60E+04	8.90E+00	7.00E+05	6.25E+03
n-Hexane	6.00E-02	na	1.0	4.80E+03	na	2.10E+05	na
2-Hexanone	5.00E-03	na	1.0	4.00E+02	na	1.75E+04	na
Isopropylbenzene (cumene)	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
4-Isopropyltoluene (p-isopropyltoluene)	4.00E-03	na	1.0	3.20E+02	na	1.40E+04	na
Methane	na	na	na	na	na	na	na
Methyl ethyl ketone (2-butanone)	6.00E-01	na	1.0	4.80E+04	na	2.10E+06	na
Methyl iodide	na	na	na	na	na	na	na
Methyl isobutyl ketone	8.00E-02	na	1.0	6.40E+03	na	2.80E+05	na
Methyl tert-butyl ether (MTBE)	na	1.80E-03	1.0	na	5.56E+02	na	7.29E+04
Methylene chloride	6.00E-03	2.00E-03	1.0	4.80E+02	9.40E+01	2.10E+04	6.56E+04
2-Pentanone	na	na	na	na	na	na	na
n-Propylbenzene	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
Styrene	2.00E-01	na	1.0	1.60E+04	na	7.00E+05	na
1,1,1,2-Tetrachloroethane	3.00E-02	2.60E-02	1.0	2.40E+03	3.85E+01	1.05E+05	5.05E+03
1,1,2,2-Tetrachloroethane	2.00E-02	2.00E-01	1.0	1.60E+03	5.00E+00	7.00E+04	6.56E+02
Tetrachloroethylene (PCE)	6.00E-03	2.10E-03	1.0	4.80E+02	4.76E+02	2.10E+04	6.25E+04

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PCUL Workbook - Soil Direct Contact Equations Chemicals highlighted yellow are mutagenic.

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Tetrahydrofuran	9.00E-01	na	1.0	7.20E+04	na	3.15E+06	na
Toluene	8.00E-02	na	1.0	6.40E+03	na	2.80E+05	na
1,2,3-Trichlorobenzene	8.00E-04	na	1.0	6.40E+01	na	2.80E+03	na
1,1,1-Trichloroethane	2.00E+00	na	1.0	1.60E+05	na	7.00E+06	na
1,1,2-Trichloroethane	4.00E-03	5.70E-02	1.0	3.20E+02	1.75E+01	1.40E+04	2.30E+03
Trichloroethylene (TCE)	5.00E-04	4.60E-02	1.0	4.00E+01	1.20E+01	1.80E+03	2.90E+03
Trichlorofluoroethane	na	na	na	na	na	na	na
Trichlorofluoromethane	3.00E-01	na	1.0	2.40E+04	na	1.05E+06	na
1,2,3-Trichloropropane	4.00E-03	3.00E+01	1.0	3.20E+02	6.30E-03	1.40E+04	4.38E+00
Trichlorotrifluoroethane	3.00E+01	na	1.0	2.40E+06	na	1.05E+08	na
1,2,3-Trimethylbenzene	1.00E-02	na	1.0	8.00E+02	na	3.50E+04	na
1,2,4-Trimethylbenzene	1.00E-02	na	1.0	8.00E+02	na	3.50E+04	na
1,3,5-Trimethylbenzene	1.00E-02	na	1.0	8.00E+02	na	3.50E+04	na
Vinyl acetate	1.00E+00	na	1.0	8.00E+04	na	3.50E+06	na
Vinyl chloride	3.00E-03	1.50E+00	1.0	2.40E+02	6.67E-01	1.05E+04	8.75E+01
Total xylenes	2.00E-01	na	1.0	1.60E+04	na	7.00E+05	na
PFAS							
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	2.00E-04	na	1.0	1.60E+01	na	7.00E+02	na
GenX (HFPO-DA)	3.00E-06	na	1.0	2.40E-01	na	1.05E+01	na
Perfluorobutanoic acid (PFBA)	1.00E-03	na	1.0	8.00E+01	na	3.50E+03	na
Perfluorobutanesulfonic acid (PFBS)	3.00E-04	na	1.0	2.40E+01	na	1.05E+03	na
Perfluorodecanoic acid (PFDA)	2.00E-09	na	1.0	1.60E-04	na	7.00E-03	na
Perfluorohexanoic acid (PFHxA)	5.00E-04	na	1.0	4.00E+01	na	1.75E+03	na
Perfluorohexanesulfonic acid (PFHxS)	4.00E-10	na	1.0	3.20E-05	na	1.40E-03	na
Perfluorononanoic acid (PFNA)	2.50E-06	na	1.0	2.00E-01	na	8.75E+00	na
Perfluorooctanesulfonic acid (PFOS)	1.00E-07	3.95E+01	1.0	8.00E-03	2.53E-02	3.50E-01	3.32E+00
Perfluorooctanoic acid (PFOA)	3.00E-08	2.93E+04	1.0	2.40E-03	3.41E-05	1.05E-01	4.48E-03
Petroleum Hydrocarbons							
Gasoline range hydrocarbons, fresh	na	na	1.0	1.50E+03	na	2.90E+04	na
Gasoline range hydrocarbons, weathered	na	na	1.0	1.50E+03	na	2.90E+04	na
Diesel range hydrocarbons, fresh	na	na	1.0	na	na	2.90E+04	na
Diesel range hydrocarbons, weathered	na	na	1.0	na	na	2.90E+04	na
Oil range hydrocarbons	na	na	1.0	na	na	2.90E+04	na
Total diesel & oil range hydrocarbons	na	na	na	na	na	2.90E+04	na
Pesticides							
Aldrin	3.00E-05	1.70E+01	1.0	2.40E+00	5.88E-02	1.05E+02	7.72E+00
alpha-BHC (alpha-HCH)	9.00E-04	6.30E+00	1.0	7.20E+01	1.59E-01	3.15E+03	2.08E+01
beta-BHC (beta-HCH)	na	1.80E+00	1.0	na	5.56E-01	na	7.29E+01
delta-BHC (delta-HCH)	6.00E-08	na	1.0	4.80E-03	na	2.10E-01	na
Carbaryl	1.00E-01	na	1.0	8.00E+03	na	3.50E+05	na
cis-Chlordane (alpha)	5.00E-04	na	1.0	4.00E+01	na	1.75E+03	na
trans-Chlordane (gamma)	5.00E-04	na	1.0	4.00E+01	na	1.75E+03	na

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Chlordane	5.00E-04	3.50E-01	1.0	4.00E+01	2.86E+00	1.75E+03	3.75E+02
Chlorpyrifos	1.00E-03	na	1.0	8.00E+01	na	3.50E+03	na
4,4'-DDD	5.00E-04	2.40E-01	1.0	4.00E+01	4.17E+00	1.75E+03	5.47E+02
4,4'-DDE	5.00E-04	3.40E-01	1.0	4.00E+01	2.94E+00	1.75E+03	3.86E+02
4,4'-DDT	5.00E-04	3.40E-01	1.0	4.00E+01	2.94E+00	1.75E+03	3.86E+02
Total DDD	5.00E-04	2.40E-01	1.0	4.00E+01	4.17E+00	1.75E+03	5.47E+02
Total DDE	5.00E-04	3.40E-01	1.0	4.00E+01	2.94E+00	1.75E+03	3.86E+02
Total DDT	5.00E-04	3.40E-01	1.0	4.00E+01	2.94E+00	1.75E+03	3.86E+02
Diazinon	7.00E-04	na	1.0	5.60E+01	na	2.45E+03	na
Dieldrin	5.00E-05	1.60E+01	1.0	4.00E+00	6.25E-02	1.75E+02	8.20E+00
Endosulfan I	na	na	1.0	na	na	na	na
Endosulfan II	na	na	1.0	na	na	na	na
Endosulfan sulfate	6.00E-03	na	1.0	4.80E+02	na	2.10E+04	na
Endrin	3.00E-04	na	1.0	2.40E+01	na	1.05E+03	na
Endrin aldehyde	na	na	1.0	na	na	na	na
Endrin ketone	na	na	na	na	na	na	na
Heptachlor	5.00E-04	4.50E+00	1.0	4.00E+01	2.22E-01	1.75E+03	2.92E+01
Heptachlor epoxide	1.30E-05	9.10E+00	1.0	1.04E+00	1.10E-01	4.55E+01	1.44E+01
Lindane (gamma-BHC)	3.00E-04	1.10E+00	1.0	2.40E+01	9.09E-01	1.05E+03	1.19E+02
Malathion	2.00E-02	na	1.0	1.60E+03	na	7.00E+04	na
Methoxychlor	5.00E-03	na	1.0	4.00E+02	na	1.75E+04	na
Mirex	2.00E-04	1.80E+01	1.0	1.60E+01	5.56E-02	7.00E+02	7.29E+00
Nonachlor	na	na	na	na	na	na	na
Toxaphene	9.00E-05	1.10E+00	1.0	7.20E+00	9.09E-01	3.15E+02	1.19E+02

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PCUL Workbook - MTCA Equation 747-1 at Freshwater Sites (Soil for Protection of Groundwater)

Sort Order	Chemical (all concentrations in mg/kg)	Soil Kd (pH 6.8, Foc = 0.1%) (L/kg) Param	Hcc at 13°C (unitless) Param	GW-1 GW PCUL Protect Drinking Water (ug/L) PW	SL-2 Soil Protect Drinking Water Vadose Zone (mg/kg) Eq. 747-1	SL-5 Soil Protect Drinking Water Saturated Zone (mg/kg) Eq. 747-1	GW-2 GW PCUL Protect Surface Water via GW (ug/L) SW-FW	SL-3 Soil Protect Surface Water Vadose Zone (mg/kg) Eq. 747-1	SL-6 Soil Protect Surface Water Saturated Zone (mg/kg) Eq. 747-1	GW-3 GW PCUL Protect Sediment via GW (ug/L) PartitFW	SL-4 Protect Sediment Vadose Zone (mg/kg) Eq. 747-1	SL-7 Protect Sediment Saturated Zone (mg/kg) Eq. 747-1	User-Defined Ground Water PCUL (ug/L) Specify Source	Soil Protect GW at User-Defined GW PCUL Vadose Zone (mg/kg) Eq. 747-1	Soil Protect GW at User-Defined GW PCUL Saturated Zone (mg/kg) Eq. 747-1
1	***PCBs***														
2	Total PCB Aroclors	7.81E+01	1.70E-02	2.19E-01	3.43E-01	1.71E-02	7.00E-06	1.10E-05	5.49E-07	3.07E-02	4.81E-02	2.41E-03		0.00E+00	0.00E+00
3	Total PCB congeners	7.81E+01	1.70E-02	2.19E-01	3.43E-01	1.71E-02	7.00E-06	1.10E-05	5.49E-07	8.96E-03	1.40E-02	7.02E-04		0.00E+00	0.00E+00
4	Total PCB TEQ	7.81E+01	1.70E-02	3.37E-06	5.27E-06	2.64E-07	4.43E-09	6.93E-09	3.47E-10	1.79E-06	2.81E-06	1.40E-07		0.00E+00	0.00E+00
5	***Dioxins/Furans***														
6	Total dioxin/furan TEQ	2.49E+02	2.04E-03	3.37E-06	1.68E-05	8.39E-07	5.00E-09	2.49E-08	1.25E-09	4.01E-06	2.00E-05	1.00E-06		0.00E+00	0.00E+00
7	2,3,7,8-TCDD	2.49E+02	2.04E-03	3.37E-06	1.68E-05	8.39E-07	5.00E-09	2.49E-08	1.25E-09	2.30E-05	1.14E-04	5.72E-06		0.00E+00	0.00E+00
8	Total chlorinated dioxins	2.49E+02	2.04E-03	na	na	na	na	na	na	na	na	na		0.00E+00	0.00E+00
9	Total chlorinated furans	2.49E+02	2.04E-03	na	na	na	na	na	na	na	na	na		0.00E+00	0.00E+00
10	***Inorganics***														
11	Ammonia	na	4.81E-04	na	na	na	na	na	na	na	na	na		na	na
12	Chloride	na	0.00E+00	2.50E+05	na	na	2.30E+05	na	na	na	na	na		na	na
13	Cyanide, free	9.90E+00	4.15E-03	5.04E+00	1.02E+00	5.13E-02	1.90E+00	3.84E-01	1.94E-02	na	na	na		0.00E+00	0.00E+00
14	Fluoride	1.50E+02	0.00E+00	9.60E+02	2.88E+03	1.44E+02	9.60E+02	2.88E+03	1.44E+02	na	na	na		0.00E+00	0.00E+00
15	Nitrate	na	0.00E+00	1.00E+04	na	na	1.00E+04	na	na	na	na	na		na	na
16	Nitrite	na	0.00E+00	1.00E+03	na	na	1.00E+03	na	na	na	na	na		na	na
17	Sulfate	na	0.00E+00	2.50E+05	na	na	2.50E+05	na	na	na	na	na		na	na
18	Sulfide	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
19	***Metals***														
20	Aluminum	1.50E+03	0.00E+00	1.60E+04	4.80E+05	2.40E+04	3.02E+02	9.06E+03	4.53E+02	na	na	na		0.00E+00	0.00E+00
21	Antimony	4.50E+01	0.00E+00	6.00E+00	5.42E+00	2.72E-01	5.60E+00	5.06E+00	2.54E-01	na	na	na		0.00E+00	0.00E+00
22	Arsenic	2.90E+01	0.00E+00	2.73E-02	1.60E-02	8.01E-04	1.27E-02	7.44E-03	3.73E-04	3.33E+00	1.95E+00	9.75E-02	8.00E+00	4.67E+00	2.34E-01
23	Barium	4.10E+01	0.00E+00	2.00E+03	1.65E+03	8.26E+01	1.00E+03	8.24E+02	4.13E+01	na	na	na		0.00E+00	0.00E+00
24	Beryllium	7.90E+02	0.00E+00	4.00E+00	6.32E+01	3.16E+00	4.00E+00	6.32E+01	3.16E+00	na	na	na		0.00E+00	0.00E+00
25	Cadmium	6.70E+00	0.00E+00	5.00E+00	6.90E-01	3.49E-02	4.20E-01	5.80E-02	2.93E-03	1.10E+02	1.52E+01	7.70E-01		0.00E+00	0.00E+00
26	Chromium, total	1.00E+03	0.00E+00	1.00E+02	2.00E+03	1.00E+02	1.00E+02	2.00E+03	1.00E+02	7.20E+01	1.44E+03	7.20E+01		0.00E+00	0.00E+00
27	Chromium, trivalent	1.00E+03	0.00E+00	2.40E+04	4.80E+05	2.40E+04	6.10E+01	1.22E+03	6.10E+01	na	na	na		0.00E+00	0.00E+00
28	Chromium, hexavalent	1.90E+01	0.00E+00	1.40E+00	5.38E-01	2.70E-02	1.14E+00	4.36E-01	2.19E-02	3.73E+02	1.43E+02	7.20E+00		0.00E+00	0.00E+00
29	Cobalt	4.50E+01	0.00E+00	4.80E+00	4.34E+00	2.17E-01	4.80E+00	4.34E+00	2.17E-01	na	na	na		0.00E+00	0.00E+00
30	Copper	2.20E+01	0.00E+00	6.40E+02	2.84E+02	1.43E+01	1.80E+00	7.99E-01	4.01E-02	1.79E+04	7.97E+03	4.00E+02		0.00E+00	0.00E+00
31	Iron	2.50E+01	0.00E+00	3.00E+02	1.51E+02	7.59E+00	3.00E+02	1.51E+02	7.59E+00	na	na	na		0.00E+00	0.00E+00
32	Lead	1.00E+04	0.00E+00	1.50E+01	3.00E+03	1.50E+02	2.50E+00	5.00E+02	2.50E+01	2.10E+00	4.20E+02	2.10E+01		0.00E+00	0.00E+00
33	Manganese	6.50E+01	0.00E+00	5.00E+01	6.52E+01	3.26E+00	5.00E+01	6.52E+01	3.26E+00	na	na	na		0.00E+00	0.00E+00
34	Mercury, inorganic	5.20E+01	1.66E-01	2.00E+00	2.09E+00	1.05E-01	1.20E-02	1.25E-02	6.27E-04	1.34E+00	1.40E+00	7.00E-02		0.00E+00	0.00E+00
35	Methylmercury	7.00E+03	0.00E+00	1.60E+00	2.24E+02	1.12E+01	1.60E+00	2.24E+02	1.12E+01	9.54E+00	1.34E+03	6.68E+01		0.00E+00	0.00E+00
36	Molybdenum	2.00E+01	0.00E+00	8.00E+01	3.23E+01	1.62E+00	8.00E+01	3.23E+01	1.62E+00	na	na	na		0.00E+00	0.00E+00
37	Nickel	6.50E+01	0.00E+00	3.20E+02	4.17E+02	2.09E+01	1.10E+01	1.43E+01	7.18E-01	3.98E+02	5.19E+02	2.60E+01		0.00E+00	0.00E+00
38	Selenium	5.00E+00	0.00E+00	5.00E+01	5.20E+00	2.64E-01	1.50E+00	1.56E-01	7.93E-03	1.48E+02	1.53E+01	7.80E-01		0.00E+00	0.00E+00
39	Silver	8.30E+00	0.00E+00	8.00E+01	1.36E+01	6.87E-01	1.70E-01	2.89E-02	1.46E-03	6.64E+01	1.13E+01	5.70E-01		0.00E+00	0.00E+00
40	Thallium	7.10E+01	0.00E+00	1.60E-01	2.28E-01	1.14E-02	6.19E-02	8.81E-02	4.41E-03	na	na	na		0.00E+00	0.00E+00
41	Tin	2.50E+02	0.00E+00	9.60E+03	4.80E+04	2.40E+03	9.60E+03	4.80E+04	2.40E+03	na	na	na		0.00E+00	0.00E+00
42	Vanadium	1.00E+03	0.00E+00	8.00E+01	1.60E+03	8.00E+01	8.00E+01	1.60E+03	8.00E+01	na	na	na		0.00E+00	0.00E+00
43	Zinc	6.20E+01	0.00E+00	4.80E+03	5.97E+03	2.99E+02	2.40E+01	2.99E+01	1.49E+00	5.14E+04	6.39E+04	3.20E+03		0.00E+00	0.00E+00
44	***Metals - Butyltins***														
45	Monobutyltin	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
46	Dibutyltin	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
47	Trybutyl tin	8.09E+00	3.65E+01	na	na	na	7.20E-02	1.65E-02	6.03E-04	5.16E-02	1.18E-02	4.32E-04		0.00E+00	0.00E+00
48	Tributyltin oxide	2.59E+04	1.23E-05	4.80E+00	2.49E+03	1.24E+02	4.80E+00	2.49E+03	1.24E+02	1.62E-05	8.40E-03	4.20E-04		0.00E+00	0.00E+00
49	Tetrabutyltin	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
50	***SVOCs - PAHs***														
51	Acenaphthene	4.90E+00	2.50E-03	4.80E+02	4.90E+01	2.49E+00	3.00E+01	3.06E+00	1.56E-01	na	na	na		0.00E+00	0.00E+00
52	Acenaphthylene	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
53	Anthracene	2.35E+01	6.51E-04	2.40E+03	1.14E+03	5.71E+01	1.00E+02	4.74E+01	2.38E+00	na	na	na		0.00E+00	0.00E+00

54	Benzo(a)anthracene	3.58E+02	9.60E-05	na	na	na	1.60E-04	1.14E-03	5.73E-05	5.03E-03	3.60E-02	1.80E-03		0.00E+00	0.00E+00
55	Benzo(b)fluoranthene	5.99E+02	6.04E-06	na	na	na	1.60E-04	1.92E-03	9.59E-05	3.00E-03	3.60E-02	1.80E-03		0.00E+00	0.00E+00
56	Benzo(k)fluoranthene	5.87E+02	4.28E-06	na	na	na	1.60E-03	1.88E-02	9.40E-04	3.07E-03	3.60E-02	1.80E-03		0.00E+00	0.00E+00
57	Total benzofluoranthenes	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
58	Benzo(g,h,i)perylene	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
59	Benzo(a)pyrene	9.69E+02	3.61E-06	2.00E-01	3.88E+00	1.94E-01	1.60E-05	3.10E-04	1.55E-05	1.86E-03	3.60E-02	1.80E-03		0.00E+00	0.00E+00
60	Chrysene	1.83E+02	3.87E-05	na	na	na	1.60E-02	5.86E-02	2.93E-03	9.83E-03	3.60E-02	1.80E-03		0.00E+00	0.00E+00
61	Dibenz(a,h)anthracene	1.79E+03	7.45E-07	na	na	na	1.60E-05	5.73E-04	2.86E-05	1.01E-03	3.60E-02	1.80E-03		0.00E+00	0.00E+00
62	Dibenzofuran	9.16E+00	1.84E-05	8.00E+00	1.50E+00	7.56E-02	8.00E+00	1.50E+00	7.56E-02	4.34E+00	8.12E-01	4.10E-02		0.00E+00	0.00E+00
63	Fluoranthene	4.91E+01	9.14E-05	6.40E+02	6.31E+02	3.16E+01	6.00E+00	5.92E+00	2.96E-01	2.03E-02	2.01E-02	1.00E-03		0.00E+00	0.00E+00
64	Fluorene	7.71E+00	1.23E-03	3.20E+02	5.06E+01	2.56E+00	1.00E+01	1.58E+00	8.00E-02	na	na	na		0.00E+00	0.00E+00
65	Indeno(1,2,3-cd)pyrene	1.95E+03	2.09E-06	na	na	na	1.60E-04	6.24E-03	3.12E-04	9.23E-04	3.60E-02	1.80E-03		0.00E+00	0.00E+00
66	Methyl isopropyl phenanthrene (retene)	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
67	1-Methylnaphthalene	2.53E+00	8.16E-03	8.58E-01	4.69E-02	2.42E-03	8.58E-01	4.69E-02	2.42E-03	na	na	na		0.00E+00	0.00E+00
68	2-Methylnaphthalene	2.48E+00	7.00E-03	3.20E+01	1.72E+00	8.85E-02	3.20E+01	1.72E+00	8.85E-02	na	na	na		0.00E+00	0.00E+00
69	Naphthalene	1.19E+00	8.32E-03	1.60E+02	4.45E+00	2.36E-01	1.60E+02	4.45E+00	2.36E-01	na	na	na		0.00E+00	0.00E+00
70	Phenanthrene	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
71	Pyrene	6.80E+01	1.15E-04	2.40E+02	3.27E+02	1.64E+01	8.00E+00	1.09E+01	5.46E-01	1.47E-02	2.00E-02	1.00E-03		0.00E+00	0.00E+00
72	Total LPAHs	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
73	Total HPAHs	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
74	Total PAHs	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
75	Total cPAH TEQ	9.69E+02	3.61E-06	2.00E-01	3.88E+00	1.94E-01	9.69E-03	1.88E-01	9.39E-03	4.34E-03	8.40E-02	4.20E-03		0.00E+00	0.00E+00
76	***Other SVOCs***														
77	Aniline	7.02E-02	3.60E-05	1.54E+01	8.30E-02	5.48E-03	1.54E+01	8.30E-02	5.48E-03	na	na	na		0.00E+00	0.00E+00
78	Azobenzene	3.76E+00	1.91E-04	3.98E-01	3.15E-02	1.61E-03	3.98E-01	3.15E-02	1.61E-03	na	na	na		0.00E+00	0.00E+00
79	Benzidine	1.19E+00	4.89E-10	1.00E-04	2.78E-06	1.48E-07	2.00E-05	5.56E-07	2.95E-08	na	na	na		0.00E+00	0.00E+00
80	Benzoic acid	6.00E-04	5.20E-07	6.40E+04	2.57E+02	1.84E+01	6.40E+04	2.57E+02	1.84E+01	1.00E+04	4.02E+01	2.88E+00		0.00E+00	0.00E+00
81	Benzyl alcohol	2.15E-02	4.92E-06	1.60E+03	7.09E+00	4.93E-01	1.60E+03	7.09E+00	4.93E-01	na	na	na		0.00E+00	0.00E+00
82	Bis(2-chloroethoxy)methane	1.44E-02	6.56E-05	4.80E+01	2.06E-01	1.45E-02	4.80E+01	2.06E-01	1.45E-02	na	na	na		0.00E+00	0.00E+00
83	Bis(2-chloroethyl)ether	7.60E-02	2.79E-04	3.98E-02	2.20E-04	1.44E-05	2.00E-02	1.10E-04	7.25E-06	na	na	na		0.00E+00	0.00E+00
84	Bis(chloromethyl)ether	9.70E-03	9.41E-02	1.99E-04	8.66E-07	5.89E-08	1.50E-04	6.54E-07	4.45E-08	na	na	na		0.00E+00	0.00E+00
85	Bis(2-chloro-1-methylethyl)ether	8.29E-02	1.35E-03	6.25E-01	3.54E-03	2.31E-04	6.25E-01	3.54E-03	2.31E-04	na	na	na		0.00E+00	0.00E+00
86	2,6-Bis(1,1-dimethylethyl) phenol	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
87	Bis(2-ethylhexyl) phthalate	1.11E+02	2.34E-06	6.00E+00	1.33E+01	6.68E-01	4.50E-02	1.00E-01	5.01E-03	9.00E-01	2.00E+00	1.00E-01		0.00E+00	0.00E+00
88	4-Bromophenyl phenyl ether	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
89	Butyl benzyl phthalate	1.37E+01	1.47E-05	4.61E+01	1.28E+01	6.44E-01	1.30E-02	3.61E-03	1.82E-04	na	na	na		0.00E+00	0.00E+00
90	Butyl diphenyl phosphate	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
91	Carbazole	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
92	4-Chloroaniline	1.13E-01	1.73E-05	4.38E-01	2.74E-03	1.75E-04	4.38E-01	2.74E-03	1.75E-04	na	na	na		0.00E+00	0.00E+00
93	4-Chloro-3-methylphenol (chlorocresol)	4.92E-01	4.00E-05	1.60E+03	2.21E+01	1.25E+00	3.60E+01	4.98E-01	2.80E-02	na	na	na		0.00E+00	0.00E+00
94	2-Chloronaphthalene (beta-)	2.48E+00	4.84E-03	6.40E+02	3.43E+01	1.77E+00	1.00E+02	5.36E+00	2.77E-01	na	na	na		0.00E+00	0.00E+00
95	2-Chlorophenol	3.88E-01	2.08E-04	4.00E+01	4.70E-01	2.70E-02	1.50E+01	1.76E-01	1.01E-02	na	na	na		0.00E+00	0.00E+00
96	4-Chlorophenyl phenyl ether	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
97	Dibutyl phthalate	1.57E+00	1.00E-05	1.60E+03	5.66E+01	2.97E+00	8.00E+00	2.83E-01	1.49E-02	4.67E+01	1.65E+00	8.67E-02		0.00E+00	0.00E+00
98	Dibutyl phenyl phosphate	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
99	1,2-Dichlorobenzene	3.79E-01	3.65E-02	6.00E+02	6.99E+00	3.99E-01	6.00E+02	6.99E+00	3.99E-01	na	na	na		0.00E+00	0.00E+00
100	1,3-Dichlorobenzene	3.75E-01	5.09E-02	na	na	na	2.00E+00	2.32E-02	1.32E-03	na	na	na		0.00E+00	0.00E+00
101	1,4-Dichlorobenzene	6.16E-01	4.58E-02	7.50E+01	1.23E+00	6.77E-02	5.98E+01	9.80E-01	5.40E-02	na	na	na		0.00E+00	0.00E+00
102	3,3'-Dichlorobenzidine	3.19E+00	1.16E-09	1.94E-01	1.32E-02	6.76E-04	3.10E-03	2.10E-04	1.08E-05	na	na	na		0.00E+00	0.00E+00
103	2,4-Dichlorophenol	1.47E-01	7.46E-05	4.80E+01	3.33E-01	2.08E-02	1.00E+01	6.94E-02	4.34E-03	na	na	na		0.00E+00	0.00E+00
104	Di(2-ethylhexyl)adipate	3.60E+01	3.63E-06	4.00E+02	2.90E+02	1.45E+01	4.00E+02	2.90E+02	1.45E+01	na	na	na		0.00E+00	0.00E+00
105	Diethyl phthalate	8.20E-02	6.52E-06	1.28E+04	7.22E+01	4.72E+00	2.00E+02	1.13E+00	7.37E-02	na	na	na		0.00E+00	0.00E+00
106	Dimethyl phthalate	3.16E-02	2.29E-06	na	na	na	6.00E+02	2.78E+00	1.91E-01	na	na	na		0.00E+00	0.00E+00
107	2,4-Dimethylphenol	4.92E-01	1.41E-05	3.20E+02	4.43E+00	2.49E-01	8.50E+01	1.18E+00	6.62E-02	na	na	na		0.00E+00	0.00E+00
108	1,2-Dinitrobenzene	3.59E-01	5.00E-07	1.60E+00	1.79E-02	1.03E-03	1.60E+00	1.79E-02	1.03E-03	na	na	na		0.00E+00	0.00E+00
109	1,3-Dinitrobenzene	3.52E-01	5.06E-07	1.60E+00	1.77E-02	1.02E-03	1.60E+00	1.77E-02	1.02E-03	na	na	na		0.00E+00	0.00E+00
110	1,4-Dinitrobenzene	3.52E-01	8.42E-07	1.60E+00	1.77E-02	1.02E-03	1.60E+00	1.77E-02	1.02E-03	na	na	na		0.00E+00	0.00E+00
111	4,6-Dinitro-o-cresol (DNOC)	7.54E-01	5.72E-05	1.28E+00	2.44E-02	1.33E-03	1.28E+00	2.44E-02	1.33E-03	na	na	na		0.00E+00	0.00E+00
112	2,4-Dinitrophenol	1.00E-05	3.52E-06	3.20E+01	1.28E-01	9.17E-03	1.00E+01	4.00E-02	2.87E-03	na	na	na		0.00E+00	0.00E+00
113	2,4-Dinitrotoluene	5.76E-01	4.83E-07	2.82E-01	4.38E-03	2.43E-04	3.90E-02	6.05E-04	3.36E-05	na	na	na		0.00E+00	0.00E+00

114	2,6-Dinitrotoluene	5.87E-01	7.26E-06	5.83E-02	9.18E-04	5.10E-05	5.83E-02	9.18E-04	5.10E-05	na	na	na		0.00E+00	0.00E+00
115	Di-n-octyl phthalate	1.41E+02	1.49E-05	1.60E+02	4.52E+02	2.26E+01	1.60E+02	4.52E+02	2.26E+01	5.53E-02	1.56E-01	7.81E-03		0.00E+00	0.00E+00
116	1,4-Dioxane	2.63E-03	1.06E-04	4.38E-01	1.77E-03	1.27E-04	4.38E-01	1.77E-03	1.27E-04	na	na	na		0.00E+00	0.00E+00
117	1,2-Diphenylhydrazine	1.51E+00	5.90E-06	1.09E-01	3.74E-03	1.97E-04	1.00E-02	3.42E-04	1.80E-05	na	na	na		0.00E+00	0.00E+00
118	Hexachlorobenzene	8.00E+01	2.22E-02	2.73E-01	4.39E-01	2.20E-02	5.00E-06	8.02E-06	4.01E-07	2.50E-03	4.01E-03	2.01E-04		0.00E+00	0.00E+00
119	Hexachlorobutadiene	8.45E-01	1.78E-01	5.61E-01	1.19E-02	6.35E-04	1.00E-02	2.12E-04	1.13E-05	6.65E-02	1.41E-03	7.52E-05		0.00E+00	0.00E+00
120	Hexachlorocyclopentadiene	1.40E+00	2.17E-02	4.80E+01	1.54E+00	8.10E-02	1.00E+00	3.20E-02	1.69E-03	na	na	na		0.00E+00	0.00E+00
121	Hexachloroethane	1.97E-01	5.91E-02	1.09E+00	8.80E-03	5.29E-04	2.00E-02	1.61E-04	9.67E-06	na	na	na		0.00E+00	0.00E+00
122	Isophorone	6.52E-02	1.13E-04	9.21E+01	4.89E-01	3.24E-02	2.70E+01	1.43E-01	9.50E-03	na	na	na		0.00E+00	0.00E+00
123	2-Methoxynaphthalene	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
124	2-Methylphenol (o-cresol)	3.07E-01	1.98E-05	8.00E+02	8.11E+00	4.75E-01	8.00E+02	8.11E+00	4.75E-01	na	na	na		0.00E+00	0.00E+00
125	3-Methylphenol (m-cresol)	3.00E-01	1.33E-05	8.00E+02	8.00E+00	4.69E-01	8.00E+02	8.00E+00	4.69E-01	na	na	na		0.00E+00	0.00E+00
126	4-Methylphenol (p-cresol)	3.00E-01	1.55E-05	1.60E+03	1.60E+01	9.39E-01	1.60E+03	1.60E+01	9.39E-01	1.46E+02	1.46E+00	8.54E-02		0.00E+00	0.00E+00
127	2-Nitroaniline	1.11E-01	6.10E-07	1.60E+02	9.95E-01	6.36E-02	1.60E+02	9.95E-01	6.36E-02	na	na	na		0.00E+00	0.00E+00
128	3-Nitroaniline	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
129	4-Nitroaniline	1.09E-01	1.08E-08	4.38E+00	2.71E-02	1.73E-03	4.38E+00	2.71E-02	1.73E-03	na	na	na		0.00E+00	0.00E+00
130	Nitrobenzene	1.19E-01	3.97E-04	1.60E+01	1.02E-01	6.49E-03	1.00E+01	6.38E-02	4.06E-03	na	na	na		0.00E+00	0.00E+00
131	2-Nitrophenol	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
132	4-Nitrophenol	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
133	n-Nitrosodimethylamine	2.28E-02	3.65E-05	2.30E-04	1.02E-06	7.12E-08	2.30E-04	1.02E-06	7.12E-08	na	na	na		0.00E+00	0.00E+00
134	n-Nitrosodiphenylamine	2.63E+00	4.95E-05	1.79E+01	1.01E+00	5.21E-02	6.20E-01	3.51E-02	1.81E-03	na	na	na		0.00E+00	0.00E+00
135	n-Nitrosodi-n-propylamine	2.75E-01	2.20E-04	1.25E-02	1.19E-04	7.02E-06	4.40E-03	4.18E-05	2.47E-06	na	na	na		0.00E+00	0.00E+00
136	Pentachlorophenol	5.92E-01	1.00E-06	1.00E+00	1.58E-02	8.79E-04	2.00E-03	3.17E-05	1.76E-06	3.08E+01	4.88E-01	2.70E-02		0.00E+00	0.00E+00
137	Phenol	1.87E-01	5.53E-06	4.80E+03	3.72E+01	2.27E+00	4.00E+03	3.10E+01	1.89E+00	9.82E+01	7.60E-01	4.65E-02		0.00E+00	0.00E+00
138	Pyridine	7.17E-02	2.39E-04	8.00E+00	4.35E-02	2.87E-03	8.00E+00	4.35E-02	2.87E-03	na	na	na		0.00E+00	0.00E+00
139	2,3,4,5-Tetrachlorophenol	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na

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140	2,3,4,6-Tetrachlorophenol	2.80E-01	3.61E-04	4.80E+02	4.61E+00	2.72E-01	4.80E+02	4.61E+00	2.72E-01	na	na	na		0.00E+00	0.00E+00
141	1,2,4-Trichlorobenzene	1.66E+00	2.37E-02	1.51E+01	5.62E-01	2.94E-02	3.60E-02	1.34E-03	7.01E-05	na	na	na		0.00E+00	0.00E+00
142	2,4,5-Trichlorophenol	1.60E+00	2.57E-05	1.60E+03	5.75E+01	3.01E+00	3.00E+02	1.08E+01	5.65E-01	na	na	na		0.00E+00	0.00E+00
143	2,4,6-Trichlorophenol	3.81E-01	4.13E-05	7.95E+00	9.24E-02	5.31E-03	2.50E-01	2.91E-03	1.67E-04	na	na	na		0.00E+00	0.00E+00
144	***Volatile Organic Compounds***														
145	Acetone	2.36E-03	8.75E-04	7.20E+03	2.92E+01	2.08E+00	7.20E+03	2.92E+01	2.08E+00	na	na	na		0.00E+00	0.00E+00
146	Acetaldehyde	1.00E-03	1.83E-03	na	na	na	na	na	na	na	na	na		0.00E+00	0.00E+00
147	Acrolein	1.00E-03	3.11E-03	4.00E+00	1.61E-02	1.15E-03	1.00E+00	4.03E-03	2.88E-04	na	na	na		0.00E+00	0.00E+00
148	Acrylonitrile	8.51E-03	3.18E-03	8.10E-02	3.38E-04	2.39E-05	1.90E-02	7.93E-05	5.61E-06	na	na	na		0.00E+00	0.00E+00
149	Benzaldehyde	1.11E-02	4.76E-04	1.09E+01	4.62E-02	3.26E-03	1.09E+01	4.62E-02	3.26E-03	na	na	na		0.00E+00	0.00E+00
150	Benzene	6.20E-02	1.34E-01	5.00E+00	2.74E-02	1.74E-03	4.40E-01	2.41E-03	1.53E-04	na	na	na		0.00E+00	0.00E+00
151	Bromobenzene	2.34E-01	4.32E-02	6.40E+01	5.60E-01	3.33E-02	6.40E+01	5.60E-01	3.33E-02	na	na	na		0.00E+00	0.00E+00
152	Bromochloromethane	2.17E-02	3.59E-02	na	na	na	na	na	na	na	na	na		0.00E+00	0.00E+00
153	Bromoethane	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
154	Bromoform	1.26E-01	1.05E-02	5.54E+01	3.62E-01	2.29E-02	4.60E+00	3.01E-02	1.90E-03	na	na	na		0.00E+00	0.00E+00
155	Bromomethane	9.00E-03	2.10E-01	1.12E+01	5.09E-02	3.31E-03	1.12E+01	5.09E-02	3.31E-03	na	na	na		0.00E+00	0.00E+00
156	2-Butoxyethanol (EGBE)	2.82E-03	2.53E-05	1.60E+03	6.49E+00	4.63E-01	1.60E+03	6.49E+00	4.63E-01	na	na	na		0.00E+00	0.00E+00
157	n-Butylbenzene	1.48E+00	2.93E-01	4.00E+02	1.36E+01	7.07E-01	4.00E+02	1.36E+01	7.07E-01	na	na	na		0.00E+00	0.00E+00
158	sec-Butylbenzene	1.33E+00	2.75E-01	8.00E+02	2.49E+01	1.29E+00	8.00E+02	2.49E+01	1.29E+00	na	na	na		0.00E+00	0.00E+00
159	tert-Butylbenzene	1.00E+00	2.06E-01	8.00E+02	1.95E+01	1.03E+00	8.00E+02	1.95E+01	1.03E+00	na	na	na		0.00E+00	0.00E+00
160	Carbon disulfide	2.17E-02	3.83E-01	8.00E+02	4.08E+00	2.47E-01	8.00E+02	4.08E+00	2.47E-01	na	na	na		0.00E+00	0.00E+00
161	Carbon tetrachloride	1.52E-01	6.75E-01	5.00E+00	4.11E-02	2.19E-03	2.00E-01	1.64E-03	8.77E-05	na	na	na		0.00E+00	0.00E+00
162	Chlorobenzene	2.24E-01	6.63E-02	1.00E+02	8.59E-01	5.11E-02	1.00E+02	8.59E-01	5.11E-02	na	na	na		0.00E+00	0.00E+00
163	Chloroethane	2.17E-02	3.12E-01	na	na	na	na	na	na	na	na	na		0.00E+00	0.00E+00
164	2-Chloroethyl vinyl ether	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
165	Chloroform	5.30E-02	9.17E-02	1.41E+01	7.37E-02	4.79E-03	1.41E+01	7.37E-02	4.79E-03	na	na	na		0.00E+00	0.00E+00
166	Chloromethane	6.00E-03	2.69E-01	na	na	na	na	na	na	na	na	na		0.00E+00	0.00E+00
167	3-Chloro-1-propene (allyl chloride)	3.96E-02	2.79E-01	2.08E+00	1.10E-02	6.80E-04	2.08E+00	1.10E-02	6.80E-04	na	na	na		0.00E+00	0.00E+00
168	2-Chlorotoluene	3.83E-01	7.08E-02	1.60E+02	1.89E+00	1.07E-01	1.60E+02	1.89E+00	1.07E-01	na	na	na		0.00E+00	0.00E+00
169	4-Chlorotoluene	3.75E-01	8.07E-02	1.60E+02	1.86E+00	1.06E-01	1.60E+02	1.86E+00	1.06E-01	na	na	na		0.00E+00	0.00E+00
170	Dibromochloromethane	3.18E-02	2.10E-02	5.21E+00	2.43E-02	1.66E-03	6.00E-01	2.80E-03	1.91E-04	na	na	na		0.00E+00	0.00E+00
171	1,2-Dibromo-3-chloropropane	1.16E-01	2.60E-03	1.40E-01	8.85E-04	5.64E-05	1.40E-01	8.85E-04	5.64E-05	na	na	na		0.00E+00	0.00E+00
172	Dibromomethane	2.17E-02	1.89E-02	8.00E+01	3.57E-01	2.47E-02	8.00E+01	3.57E-01	2.47E-02	na	na	na		0.00E+00	0.00E+00
173	Dichlorobromomethane	3.18E-02	4.90E-02	7.06E+00	3.33E-02	2.25E-03	7.30E-01	3.45E-03	2.32E-04	na	na	na		0.00E+00	0.00E+00
174	trans-1,4-Dichloro-2-butene	1.32E-01	1.30E-02	na	na	na	na	na	na	na	na	na		0.00E+00	0.00E+00
175	Dichlorodifluoromethane	4.39E-02	1.08E+01	1.60E+03	3.78E+01	5.29E-01	1.60E+03	3.78E+01	5.29E-01	na	na	na		0.00E+00	0.00E+00
176	1,1-Dichloroethane	5.30E-02	1.42E-01	7.68E+00	4.07E-02	2.61E-03	7.68E+00	4.07E-02	2.61E-03	na	na	na		0.00E+00	0.00E+00
177	1,2-Dichloroethane (EDC)	3.80E-02	2.76E-02	4.81E+00	2.31E-02	1.56E-03	4.81E+00	2.31E-02	1.56E-03	na	na	na		0.00E+00	0.00E+00
178	1,1-Dichloroethylene	6.50E-02	7.03E-01	7.00E+00	4.56E-02	2.46E-03	7.00E+00	4.56E-02	2.46E-03	na	na	na		0.00E+00	0.00E+00
179	cis-1,2-Dichloroethylene	3.96E-02	1.00E-01	1.60E+01	7.95E-02	5.22E-03	1.60E+01	7.95E-02	5.22E-03	na	na	na		0.00E+00	0.00E+00
180	trans-1,2-Dichloroethylene	3.80E-02	2.38E-01	1.00E+02	5.17E-01	3.25E-02	1.00E+02	5.17E-01	3.25E-02	na	na	na		0.00E+00	0.00E+00
181	1,2-Dichloroethylene (mixed isomers)	3.55E-02	0.00E+00	na	na	na	na	na	na	na	na	na		0.00E+00	0.00E+00
182	1,2-Dichloropropane	4.70E-02	6.54E-02	5.00E+00	2.53E-02	1.67E-03	7.10E-01	3.59E-03	2.37E-04	na	na	na		0.00E+00	0.00E+00
183	1,3-Dichloropropane	7.22E-02	2.09E-02	1.60E+02	8.77E-01	5.74E-02	2.20E-01	1.21E-03	7.90E-05	na	na	na		0.00E+00	0.00E+00
184	2,2-Dichloropropane	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
185	1,1-Dichloropropene	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
186	cis-1,3-Dichloropropene	2.70E-02	7.86E-02	4.38E-01	2.05E-03	1.37E-04	2.20E-01	1.03E-03	6.90E-05	na	na	na		0.00E+00	0.00E+00
187	trans-1,3-Dichloropropene	2.70E-02	7.86E-02	4.38E-01	2.05E-03	1.37E-04	2.20E-01	1.03E-03	6.90E-05	na	na	na		0.00E+00	0.00E+00
188	Diisopropyl ether	2.28E-02	6.27E-02	na	na	na	na	na	na	na	na	na		0.00E+00	0.00E+00
189	Ethane	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
190	Ethylbenzene	2.04E-01	1.64E-01	7.00E+02	5.86E+00	3.43E-01	1.20E+01	1.00E-01	5.89E-03	na	na	na		0.00E+00	0.00E+00
191	Ethylene oxide	3.24E-03	4.10E-03	3.70E-02	1.51E-04	1.07E-05	3.70E-02	1.51E-04	1.07E-05	na	na	na		0.00E+00	0.00E+00
192	Ethyl ether	9.70E-03	3.27E-02	1.60E+03	6.80E+00	4.74E-01	1.60E+03	6.80E+00	4.74E-01	na	na	na		0.00E+00	0.00E+00
193	Ethylene dibromide (EDB)	6.60E-02	1.41E-02	5.00E-02	2.67E-04	1.76E-05	5.00E-02	2.67E-04	1.76E-05	na	na	na		0.00E+00	0.00E+00
194	Formaldehyde	1.00E-03	9.75E-06	5.50E-01	2.21E-03	1.58E-04	5.50E-01	2.21E-03	1.58E-04	na	na	na		0.00E+00	0.00E+00
195	n-Hexane	3.41E+00	4.47E+01	4.80E+02	7.18E+01	1.77E+00	4.80E+02	7.18E+01	1.77E+00	na	na	na		0.00E+00	0.00E+00
196	2-Hexanone	1.50E-02	1.89E-03	4.00E+01	1.72E-01	1.21E-02	4.00E+01	1.72E-01	1.21E-02	na	na	na		0.00E+00	0.00E+00
197	Isopropylbenzene (cumene)	6.98E-01	2.01E-01	8.00E+02	1.46E+01	7.88E-01	8.00E+02	1.46E+01	7.88E-01	na	na	na		0.00E+00	0.00E+00
198	4-Isopropyltoluene (p-isopropyltoluene)	1.12E+00	2.07E-01	3.20E+01	8.56E-01	4.50E-02	3.20E+01	8.56E-01	4.50E-02	na	na	na		0.00E+00	0.00E+00
199	Methane	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na

200	Methyl ethyl ketone (2-butanone)	4.51E-03	1.34E-03	4.80E+03	1.96E+01	1.40E+00	4.80E+03	1.96E+01	1.40E+00	na	na	na		0.00E+00	0.00E+00
201	Methyl iodide	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
202	Methyl isobutyl ketone	1.26E-02	2.94E-03	6.40E+02	2.72E+00	1.92E-01	6.40E+02	2.72E+00	1.92E-01	na	na	na		0.00E+00	0.00E+00
203	Methyl tert-butyl ether (MTBE)	1.09E-02	1.12E-02	2.43E+01	1.03E-01	7.23E-03	2.43E+01	1.03E-01	7.23E-03	na	na	na		0.00E+00	0.00E+00
204	Methylene chloride	1.00E-02	8.43E-02	5.00E+00	2.17E-02	1.48E-03	5.00E+00	2.17E-02	1.48E-03	na	na	na		0.00E+00	0.00E+00
205	2-Pentanone	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
206	n-Propylbenzene	8.13E-01	2.02E-01	8.00E+02	1.65E+01	8.80E-01	8.00E+02	1.65E+01	8.80E-01	na	na	na		0.00E+00	0.00E+00
207	Styrene	9.12E-01	5.36E-02	1.00E+02	2.23E+00	1.20E-01	1.00E+02	2.23E+00	1.20E-01	na	na	na		0.00E+00	0.00E+00
208	1,1,1,2-Tetrachloroethane	8.60E-02	4.75E-02	1.68E+00	9.76E-03	6.27E-04	1.68E+00	9.76E-03	6.27E-04	na	na	na		0.00E+00	0.00E+00
209	1,1,2,2-Tetrachloroethane	7.90E-02	7.35E-03	2.19E-01	1.22E-03	8.00E-05	1.00E-01	5.59E-04	3.66E-05	na	na	na		0.00E+00	0.00E+00
210	Tetrachloroethylene (PCE)	2.65E-01	3.84E-01	5.00E+00	4.98E-02	2.76E-03	2.40E+00	2.39E-02	1.32E-03	na	na	na		0.00E+00	0.00E+00
211	Tetrahydrofuran	1.08E-02	1.74E-03	7.20E+03	3.04E+01	2.14E+00	7.20E+03	3.04E+01	2.14E+00	na	na	na		0.00E+00	0.00E+00
212	Toluene	1.40E-01	1.49E-01	6.40E+02	4.52E+00	2.73E-01	5.30E+01	3.74E-01	2.26E-02	na	na	na		0.00E+00	0.00E+00
213	1,2,3-Trichlorobenzene	1.38E+00	1.72E-02	6.40E+00	2.02E-01	1.07E-02	6.40E+00	2.02E-01	1.07E-02	na	na	na		0.00E+00	0.00E+00
214	1,1,1-Trichloroethane	1.35E-01	4.20E-01	2.00E+02	1.49E+00	8.43E-02	2.00E+02	1.49E+00	8.43E-02	na	na	na		0.00E+00	0.00E+00
215	1,1,2-Trichloroethane	7.50E-02	1.78E-02	3.00E+00	1.66E-02	1.09E-03	3.50E-01	1.94E-03	1.27E-04	na	na	na		0.00E+00	0.00E+00
216	Trichloroethylene (TCE)	9.40E-02	2.32E-01	4.00E+00	2.51E-02	1.52E-03	3.00E-01	1.88E-03	1.14E-04	na	na	na		0.00E+00	0.00E+00
217	Trichlorofluoroethane	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
218	Trichlorofluoromethane	4.39E-02	2.68E+00	2.40E+03	2.28E+01	7.93E-01	2.40E+03	2.28E+01	7.93E-01	na	na	na		0.00E+00	0.00E+00
219	1,2,3-Trichloropropane	1.16E-01	6.86E-03	3.80E-04	2.41E-06	1.53E-07	3.80E-04	2.41E-06	1.53E-07	na	na	na		0.00E+00	0.00E+00
220	Trichlorotrifluoroethane	1.97E-01	1.37E+01	2.40E+05	7.61E+03	1.16E+02	2.40E+05	7.61E+03	1.16E+02	na	na	na		0.00E+00	0.00E+00
221	1,2,3-Trimethylbenzene	6.27E-01	6.62E-02	8.00E+01	1.33E+00	7.31E-02	8.00E+01	1.33E+00	7.31E-02	na	na	na		0.00E+00	0.00E+00
222	1,2,4-Trimethylbenzene	6.14E-01	1.15E-01	8.00E+01	1.32E+00	7.21E-02	8.00E+01	1.32E+00	7.21E-02	na	na	na		0.00E+00	0.00E+00
223	1,3,5-Trimethylbenzene	6.02E-01	1.64E-01	8.00E+01	1.31E+00	7.11E-02	8.00E+01	1.31E+00	7.11E-02	na	na	na		0.00E+00	0.00E+00
224	Vinyl acetate	5.58E-03	1.13E-02	8.00E+03	3.30E+01	2.34E+00	8.00E+03	3.30E+01	2.34E+00	na	na	na		0.00E+00	0.00E+00
225	Vinyl chloride	2.17E-02	8.50E-01	2.92E-01	1.72E-03	8.99E-05	2.00E-02	1.18E-04	6.17E-06	na	na	na		0.00E+00	0.00E+00
226	Total xylenes	2.33E-01	1.41E-01	1.60E+03	1.42E+01	8.31E-01	5.70E+01	5.08E-01	2.96E-02	na	na	na		0.00E+00	0.00E+00
227	***PFAS***														
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	9.55E-01	7.44E-09	3.20E+00	7.39E-02	3.97E-03	3.20E+00	7.39E-02	3.97E-03	na	na	na		0.00E+00	0.00E+00
229	GenX (HFPO-DA)	4.07E-01	1.02E-02	1.00E-02	1.22E-04	6.94E-06	1.00E-02	1.22E-04	6.94E-06	na	na	na		0.00E+00	0.00E+00
230	Perfluorobutanoic acid (PFBA)	7.59E-02	2.05E-03	8.00E+00	4.42E-02	2.90E-03	8.00E+00	4.42E-02	2.90E-03	na	na	na		0.00E+00	0.00E+00
231	Perfluorobutanesulfonic acid (PFBS)	6.17E-02	1.21E-08	4.80E+00	2.51E-02	1.67E-03	4.80E+00	2.51E-02	1.67E-03	na	na	na		0.00E+00	0.00E+00
232	Perfluorodecanoic acid (PFDA)	3.98E-01	2.16E-09	3.20E-05	3.83E-07	2.19E-08	3.20E-05	3.83E-07	2.19E-08	na	na	na		0.00E+00	0.00E+00
233	Perfluorohexanoic acid (PFHxA)	2.04E-02	9.61E-09	8.00E+00	3.53E-02	2.46E-03	8.00E+00	3.53E-02	2.46E-03	na	na	na		0.00E+00	0.00E+00
234	Perfluorohexanesulfonic acid (PFHxS)	1.12E-01	0.00E+00	6.40E-06	3.99E-08	2.55E-09	6.40E-06	3.99E-08	2.55E-09	na	na	na		0.00E+00	0.00E+00
235	Perfluorononanoic acid (PFNA)	2.46E-01	0.00E+00	1.00E-02	8.92E-05	5.33E-06	1.00E-02	8.92E-05	5.33E-06	na	na	na		0.00E+00	0.00E+00
236	Perfluorooctanesulfonic acid (PFOS)	3.72E-01	1.77E-05	4.00E-03	4.58E-05	2.63E-06	4.00E-03	4.58E-05	2.63E-06	5.20E+00	5.94E-02	3.42E-03		0.00E+00	0.00E+00
237	Perfluorooctanoic acid (PFOA)	1.15E-01	1.46E-04	4.00E-03	2.52E-05	1.61E-06	4.00E-03	2.52E-05	1.61E-06	na	na	na		0.00E+00	0.00E+00
238	***Petroleum Hydrocarbons***														
239	Gasoline range hydrocarbons, fresh	na	0.00E+00	8.00E+02	3.00E+01	3.00E+01	8.00E+02	3.00E+01	3.00E+01	na	na	na		na	na
240	Gasoline range hydrocarbons, weathered	na	0.00E+00	1.00E+03	1.00E+02	1.00E+02	1.00E+03	1.00E+02	1.00E+02	na	na	na		na	na
241	Diesel range hydrocarbons, fresh	na	0.00E+00	5.00E+02	2.00E+03	2.00E+03	1.50E+02	2.00E+03	2.00E+03	na	na	na		na	na
242	Diesel range hydrocarbons, weathered	na	0.00E+00	5.00E+02	2.00E+03	2.00E+03	5.00E+02	2.00E+03	2.00E+03	na	na	na		na	na
243	Oil range hydrocarbons	na	0.00E+00	5.00E+02	2.00E+03	2.00E+03	5.00E+02	2.00E+03	2.00E+03	na	na	na		na	na
244	Total diesel & oil range hydrocarbons	na	0.00E+00	5.00E+02	2.00E+03	2.00E+03	5.00E+02	2.00E+03	2.00E+03	na	na	na		na	na
245	***Pesticides***														
246	Aldrin	4.87E+01	8.08E-05	2.57E-03	2.52E-03	1.26E-04	4.10E-08	4.01E-08	2.01E-09	4.10E-04	4.01E-04	2.01E-05		0.00E+00	0.00E+00
247	alpha-BHC (alpha-HCH)	1.76E+00	2.74E-04	1.39E-02	5.44E-04	2.84E-05	4.80E-05	1.88E-06	9.82E-08	na	na	na		0.00E+00	0.00E+00
248	beta-BHC (beta-HCH)	2.14E+00	1.80E-05	4.86E-02	2.28E-03	1.18E-04	1.30E-03	6.08E-05	3.15E-06	6.55E-01	3.07E-02	1.59E-03		0.00E+00	0.00E+00
249	delta-BHC (delta-HCH)	2.81E+00	2.10E-04	9.60E-04	5.78E-05	2.97E-06	9.60E-04	5.78E-05	2.97E-06	na	na	na		0.00E+00	0.00E+00
250	Carbaryl	3.55E-01	1.34E-07	1.60E+03	1.78E+01	1.03E+00	2.10E+00	2.33E-02	1.35E-03	na	na	na		0.00E+00	0.00E+00
251	cis-Chlordane (alpha)	6.75E+01	1.99E-03	4.00E+00	5.42E+00	2.71E-01	4.00E+00	5.42E+00	2.71E-01	2.96E-04	4.01E-04	2.01E-05		0.00E+00	0.00E+00
252	trans-Chlordane (gamma)	6.75E+01	1.99E-03	4.00E+00	5.42E+00	2.71E-01	4.00E+00	5.42E+00	2.71E-01	2.96E-04	4.01E-04	2.01E-05		0.00E+00	0.00E+00
253	Chlordane	5.13E+01	2.01E-04	1.25E+00	1.29E+00	6.45E-02	2.20E-05	2.27E-05	1.13E-06	2.89E+01	2.98E+01	1.49E+00		0.00E+00	0.00E+00
254	Chlorpyrifos	7.28E+00	1.20E-04	1.60E+01	2.39E+00	1.21E-01	4.10E-02	6.13E-03	3.10E-04	3.04E+03	4.55E+02	2.30E+01		0.00E+00	0.00E+00
255	4,4'-DDD	4.58E+01	2.70E-04	3.65E-01	3.35E-01	1.68E-02	7.90E-06	7.27E-06	3.64E-07	4.36E-04	4.01E-04	2.01E-05		0.00E+00	0.00E+00
256	4,4'-DDE	8.64E+01	4.39E-04	1.29E-01	2.23E-01	1.12E-02	8.80E-07	1.52E-06	7.63E-08	2.31E-04	4.01E-04	2.01E-05		0.00E+00	0.00E+00
257	4,4'-DDT	6.78E+02	1.28E-04	2.57E-01	3.49E+00	1.75E-01	1.20E-06	1.63E-05	8.14E-07	2.95E-05	4.00E-04	2.00E-05		0.00E+00	0.00E+00
258	Total DDD	4.58E+01	2.70E-04	3.65E-01	3.35E-01	1.68E-02	7.90E-06	7.27E-06	3.64E-07	1.35E+00	1.24E+00	6.23E-02		0.00E+00	0.00E+00
259	Total DDE	8.64E+01	4.39E-04	1.29E-01	2.23E-01	1.12E-02	8.80E-07	1.52E-06	7.63E-08	4.86E-02	8.41E-02	4.21E-03		0.00E+00	0.00E+00

260	Total DDT	6.78E+02	1.28E-04	2.57E-01	3.49E+00	1.75E-01	1.20E-06	1.63E-05	8.14E-07	2.95E-02	4.00E-01	2.00E-02		0.00E+00	0.00E+00
261	Diazinon	3.03E+00	4.62E-06	1.12E+01	7.24E-01	3.71E-02	1.70E-01	1.10E-02	5.64E-04	5.06E+03	3.27E+02	1.68E+01		0.00E+00	0.00E+00
262	Dieldrin	2.55E+01	8.78E-05	5.47E-03	2.81E-03	1.41E-04	7.00E-08	3.60E-08	1.81E-09	7.83E-04	4.02E-04	2.02E-05		0.00E+00	0.00E+00
263	Endosulfan I	6.76E+00	2.90E-04	na	na	na	5.60E-02	7.80E-03	3.95E-04	na	na	na		0.00E+00	0.00E+00
264	Endosulfan II	6.76E+00	1.60E-05	na	na	na	5.60E-02	7.80E-03	3.95E-04	na	na	na		0.00E+00	0.00E+00
265	Endosulfan sulfate	9.85E+00	1.33E-05	9.60E+01	1.93E+01	9.73E-01	9.00E+00	1.81E+00	9.12E-02	na	na	na		0.00E+00	0.00E+00
266	Endrin	1.08E+01	2.60E-04	2.00E+00	4.40E-01	2.22E-02	2.00E-03	4.40E-04	2.22E-05	6.16E+02	1.36E+02	6.83E+00		0.00E+00	0.00E+00
267	Endrin aldehyde	3.27E+00	1.71E-04	na	na	na	3.40E-02	2.36E-03	1.21E-04	na	na	na		0.00E+00	0.00E+00
268	Endrin ketone	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
269	Heptachlor	9.53E+00	3.77E-03	9.72E-02	1.89E-02	9.54E-04	3.40E-07	6.62E-08	3.34E-09	2.09E-03	4.06E-04	2.05E-05		0.00E+00	0.00E+00
270	Heptachlor epoxide	1.01E+01	2.01E-04	4.81E-02	9.90E-03	4.99E-04	2.40E-06	4.94E-07	2.49E-08	1.69E+01	3.47E+00	1.75E-01		0.00E+00	0.00E+00
271	Lindane (gamma-BHC)	1.35E+00	2.10E-04	2.00E-01	6.20E-03	3.27E-04	8.00E-02	2.48E-03	1.31E-04	na	na	na		0.00E+00	0.00E+00
272	Malathion	3.13E-02	2.00E-07	3.20E+02	1.48E+00	1.02E-01	1.00E-01	4.63E-04	3.18E-05	na	na	na		0.00E+00	0.00E+00
273	Methoxychlor	8.00E+01	8.30E-06	4.00E+01	6.42E+01	3.21E+00	2.00E-02	3.21E-02	1.61E-03	na	na	na		0.00E+00	0.00E+00
274	Mirex	3.57E+02	3.32E-02	2.43E-03	1.74E-02	8.68E-04	1.00E-03	7.14E-03	3.57E-04	2.42E-01	1.73E+00	8.66E-02		0.00E+00	0.00E+00
275	Nonachlor	na	0.00E+00	na	na	na	na	na	na	na	na	na		na	na
276	Toxaphene	9.58E+01	2.45E-04	7.95E-01	1.53E+00	7.64E-02	3.20E-05	6.14E-05	3.07E-06	2.47E+00	4.74E+00	2.37E-01		0.00E+00	0.00E+00

DRAFT

PCUL Workbook - Groundwater Detail for Protection of Potable (Drinking) Water

Chemical (all concentrations in ug/L)	Federal MCLs 40 CFR 141	Federal MCLGs 40 CFR 141	WA State MCLs WAC 246-290	Most Stringent ARAR	MTCA-B Ground Water Noncancer Eq. 720-1 GW-Eq	ARAR Evaluation Column F / Column G	Does ARAR need adjustment for noncancer health effects?	Protection of Drinking Water Noncancer	MTCA-B Ground Water Cancer Eq. 720-2 GW-Eq	ARAR Evaluation Column F / Column K	Does ARAR need adjustment for cancer health effects?	Protection of Drinking Water Cancer	GW-1 Ground Water PCUL Protect Potable Water minimum	GW-4 Ground Water Screening Level Protect Indoor Air VI	MTCA-C GW Protect Indoor Air VI
PCBs															
Total PCB Aroclors	5.00E-01	na	5.00E-01	5.00E-01	na	na	na	5.00E-01	2.19E-02	2.29E+01	YES	2.19E-01	2.19E-01	na	na
Total PCB congeners	5.00E-01	na	5.00E-01	5.00E-01	na	na	na	5.00E-01	2.19E-02	2.29E+01	YES	2.19E-01	2.19E-01	na	na
Total PCB TEQ	3.00E-05	na	3.00E-05	3.00E-05	5.60E-06	5.36E+00	YES	5.60E-06	3.37E-07	8.91E+01	YES	3.37E-06	3.37E-06	na	na
Dioxins/Furans															
Total dioxin/furan TEQ	3.00E-05	na	3.00E-05	3.00E-05	5.60E-06	5.36E+00	YES	5.60E-06	3.37E-07	8.91E+01	YES	3.37E-06	3.37E-06	na	na
2,3,7,8-TCDD	3.00E-05	na	3.00E-05	3.00E-05	5.60E-06	5.36E+00	YES	5.60E-06	3.37E-07	8.91E+01	YES	3.37E-06	3.37E-06	na	na
Total chlorinated dioxins	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Total chlorinated furans	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Inorganics															
Ammonia	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Chloride	na	na	2.50E+05	2.50E+05	na	na	na	2.50E+05	na	na	na	na	2.50E+05	na	na
Cyanide, free	2.00E+02	2.00E+02	2.00E+02	2.00E+02	5.04E+00	3.97E+01	YES	5.04E+00	na	na	na	na	5.04E+00	na	na
Fluoride	4.00E+03	4.00E+03	4.00E+03	4.00E+03	9.60E+02	4.17E+00	YES	9.60E+02	na	na	na	na	9.60E+02	na	na
Nitrate	1.00E+04	1.00E+04	1.00E+04	1.00E+04	2.56E+04	3.91E-01	no	1.00E+04	na	na	na	na	1.00E+04	na	na
Nitrite	1.00E+03	1.00E+03	1.00E+03	1.00E+03	1.60E+03	6.25E-01	no	1.00E+03	na	na	na	na	1.00E+03	na	na
Sulfate	na	na	2.50E+05	2.50E+05	na	na	na	2.50E+05	na	na	na	na	2.50E+05	na	na
Sulfide	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Metals															
Aluminum	na	na	na	na	1.60E+04	na	na	1.60E+04	na	na	na	na	1.60E+04	na	na
Antimony	6.00E+00	6.00E+00	6.00E+00	6.00E+00	6.40E+00	9.38E-01	no	6.00E+00	na	na	na	na	6.00E+00	na	na
Arsenic	1.00E+01	na	1.00E+01	1.00E+01	9.60E-01	1.04E+01	YES	9.60E-01	2.73E-03	3.66E+03	YES	2.73E-02	2.73E-02	na	na
Barium	2.00E+03	2.00E+03	2.00E+03	2.00E+03	3.20E+03	6.25E-01	no	2.00E+03	na	na	na	na	2.00E+03	na	na
Beryllium	4.00E+00	4.00E+00	4.00E+00	4.00E+00	3.20E+01	1.25E-01	no	4.00E+00	na	na	na	na	4.00E+00	na	na
Cadmium	5.00E+00	5.00E+00	5.00E+00	5.00E+00	8.00E+00	6.25E-01	no	5.00E+00	na	na	na	na	5.00E+00	na	na
Chromium, total	1.00E+02	1.00E+02	1.00E+02	1.00E+02	na	na	na	1.00E+02	na	na	na	na	1.00E+02	na	na
Chromium, trivalent	na	na	na	na	2.40E+04	na	na	2.40E+04	na	na	na	na	2.40E+04	na	na
Chromium, hexavalent	na	na	na	na	1.44E+01	na	na	1.44E+01	1.40E-01	na	na	1.40E+00	1.40E+00	na	na
Cobalt	na	na	na	na	4.80E+00	na	na	4.80E+00	na	na	na	na	4.80E+00	na	na
Copper	1.30E+03	1.30E+03	1.30E+03	1.30E+03	6.40E+02	2.03E+00	YES	6.40E+02	na	na	na	na	6.40E+02	na	na
Iron	na	na	3.00E+02	3.00E+02	1.12E+04	2.68E-02	no	3.00E+02	na	na	na	na	3.00E+02	na	na
Lead	1.50E+01	na	1.50E+01	1.50E+01	na	na	na	1.50E+01	na	na	na	na	1.50E+01	na	na
Manganese	na	na	5.00E+01	5.00E+01	7.47E+02	6.69E-02	no	5.00E+01	na	na	na	na	5.00E+01	na	na
Mercury, inorganic	2.00E+00	2.00E+00	2.00E+00	2.00E+00	na	na	na	2.00E+00	na	na	na	na	2.00E+00	8.27E-01	1.81E+00
Methylmercury	na	na	na	na	1.60E+00	na	na	1.60E+00	na	na	na	na	1.60E+00	na	na
Molybdenum	na	na	na	na	8.00E+01	na	na	8.00E+01	na	na	na	na	8.00E+01	na	na
Nickel	na	na	na	na	3.20E+02	na	na	3.20E+02	na	na	na	na	3.20E+02	na	na
Selenium	5.00E+01	5.00E+01	5.00E+01	5.00E+01	8.00E+01	6.25E-01	no	5.00E+01	na	na	na	na	5.00E+01	na	na
Silver	na	na	1.00E+02	1.00E+02	8.00E+01	1.25E+00	YES	8.00E+01	na	na	na	na	8.00E+01	na	na
Thallium	2.00E+00	5.00E-01	2.00E+00	5.00E-01	1.60E-01	3.13E+00	YES	1.60E-01	na	na	na	na	1.60E-01	na	na
Tin	na	na	na	na	9.60E+03	na	na	9.60E+03	na	na	na	na	9.60E+03	na	na
Vanadium	na	na	na	na	8.00E+01	na	na	8.00E+01	na	na	na	na	8.00E+01	na	na
Zinc	na	na	5.00E+03	5.00E+03	4.80E+03	1.04E+00	YES	4.80E+03	na	na	na	na	4.80E+03	na	na
Metals - Butyltins															
Monobutyltin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Dibutyltin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Trybutyl tin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Tributyltin oxide	na	na	na	na	4.80E+00	na	na	4.80E+00	na	na	na	na	4.80E+00	na	na
Tetrabutyltin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
SVOCs - PAHs															
Acenaphthene	na	na	na	na	4.80E+02	na	na	4.80E+02	na	na	na	na	4.80E+02	na	na
Acenaphthylene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Anthracene	na	na	na	na	2.40E+03	na	na	2.40E+03	na	na	na	na	2.40E+03	na	na
Benzo(a)anthracene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Benzo(b)fluoranthene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Benzo(k)fluoranthene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Total benzofluoranthenes	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Benzo(g,h,i)perylene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Benzo(a)pyrene	2.00E-01	na	2.00E-01	2.00E-01	4.80E+00	4.17E-02	no	2.00E-01	2.30E-02	8.70E+00	no	2.00E-01	2.00E-01	na	na
Chrysene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Dibenz(a,h)anthracene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Dibenzofuran	na	na	na	na	8.00E+00	na	na	8.00E+00	na	na	na	na	8.00E+00	na	na
Fluoranthene	na	na	na	na	6.40E+02	na	na	6.40E+02	na	na	na	na	6.40E+02	na	na
Fluorene	na	na	na	na	3.20E+02	na	na	3.20E+02	na	na	na	na	3.20E+02	na	na
Indeno(1,2,3-cd)pyrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
Methyl isopropyl phenanthrene (retene)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
1-Methylnaphthalene	na	na	na	na	5.60E+02	na	na	5.60E+02	8.58E-01	na	na	8.58E-01	8.58E-01	1.68E-01	3.68E-01
2-Methylnaphthalene	na	na	na	na	3.20E+01	na	na	3.20E+01	na	na	na	na	3.20E+01	na	na
Naphthalene	na	na	na	na	1.60E+02	na	na	1.60E+02	na	na	na	na	1.60E+02	8.84E+00	8.84E+01
Phenanthrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

	Basis							
Most Stringent Potable Water PCUL (GW-1, GW-4)	Federal MCL	Federal MCLG	State MCL	Noncancer Eq.	Cancer Eq.	MCL Adj. HQ=1	MCL Adj. to 1E-5	Protect Indoor Air
PCBs								
2.19E-01							X	
2.19E-01							X	
3.37E-06							X	
Dioxins/Furans								
3.37E-06							X	
3.37E-06							X	
na								
na								
Dioxins/Furans								
na								
2.50E+05			X					
5.04E+00						X		
9.60E+02						X		
1.00E+04	X	X	X					
1.00E+03	X	X	X					
2.50E+05			X					
na								
Metals								
1.60E+04				X				
6.00E+00	X	X	X					
2.73E-02							X	
2.00E+03	X	X	X					
4.00E+00	X	X	X					
5.00E+00	X	X	X					
1.00E+02	X	X	X					
2.40E+04				X				
1.40E+00					X			
4.80E+00				X				
6.40E+02						X		
3.00E+02			X					
1.50E+01	X		X					
5.00E+01			X					
8.27E-01								X
1.60E+00				X				
8.00E+01				X				
3.20E+02				X				
5.00E+01	X	X	X					
8.00E+01						X		
1.60E-01						X		
9.60E+03				X				
8.00E+01				X				
4.80E+03						X		
Metals - Butyltins								
na								
na								
na								
4.80E+00				X				
na								
SVOCs - Polycyclic Aromatic Hydrocarbons								
4.80E+02				X				
na								
2.40E+03				X				
na								
na								
na								
na								
na								
2.00E-01	X		X					
na								
na								
8.00E+00				X				
6.40E+02				X				
3.20E+02				X				
na								
na								
1.68E-01								X
3.20E+01				X				
8.84E+00								X
na								

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Chemical (all concentrations in ug/L)	Federal MCLs 40 CFR 141	Federal MCLGs 40 CFR 141	WA State MCLs WAC 246-290	Most Stringent ARAR	MTCA-B Ground Water Noncancer Eq. 720-1 GW-Eq	ARAR Evaluation Column F / Column G	Does ARAR need adjustment for noncancer health effects?	Protection of Drinking Water Noncancer	MTCA-B Ground Water Cancer Eq. 720-2 GW-Eq	ARAR Evaluation Column F / Column K	Does ARAR need adjustment for cancer health effects?	Protection of Drinking Water Cancer	GW-1 Ground Water PCUL Protect Potable Water minimum	GW-4 Ground Water Screening Level Protect Indoor Air VI	MTCA-C GW Protect Indoor Air VI	Most Stringent Potable Water PCUL (GW-1, GW-4)	Basis: Federal MCL	Federal MCLG	State MCL	Noncancer Eq.	Cancer Eq.	MCL Adj, HQ=1	MCL Adj, to 1E-5	Protect Indoor Air
Pyrene	na	na	na	na	2.40E+02	na	na	2.40E+02	na	na	na	na	2.40E+02	na	na	2.40E+02				X				
Total LPAHs	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Total HPAHs	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Total PAHs	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Total cPAH TEQ	na	na	na	2.00E-01	na	na	na	2.00E-01	2.30E-02	8.70E+00	no	2.00E-01	2.00E-01	na	na	2.00E-01								
Other SVOCs																***Other SVOCs***								
Aniline	na	na	na	na	1.12E+02	na	na	1.12E+02	1.54E+01	na	na	1.54E+01	1.54E+01	na	na	1.54E+01					X			
Azobenzene	na	na	na	na	na	na	na	na	3.98E-01	na	na	3.98E-01	3.98E-01	na	na	3.98E-01					X			
Benzidine	na	na	na	na	4.80E+01	na	na	4.80E+01	1.00E-04	na	na	1.00E-04	1.00E-04	na	na	1.00E-04					X			
Benzoic acid	na	na	na	na	6.40E+04	na	na	6.40E+04	na	na	na	na	6.40E+04	na	na	6.40E+04				X				
Benzyl alcohol	na	na	na	na	1.60E+03	na	na	1.60E+03	na	na	na	na	1.60E+03	na	na	1.60E+03				X				
Bis(2-chloroethoxy)methane	na	na	na	na	4.80E+01	na	na	4.80E+01	na	na	na	na	4.80E+01	na	na	4.80E+01				X				
Bis(2-chloroethyl)ether	na	na	na	na	na	na	na	na	3.98E-02	na	na	3.98E-02	3.98E-02	na	na	3.98E-02					X			
Bis(chloromethyl)ether	na	na	na	na	na	na	na	na	1.99E-04	na	na	1.99E-04	1.99E-04	na	na	1.99E-04					X			
Bis(2-chloro-1-methylethyl)ether	na	na	na	na	3.20E+02	na	na	3.20E+02	6.25E-01	na	na	6.25E-01	6.25E-01	na	na	6.25E-01					X			
2,6-Bis(1,1-dimethylethyl) phenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Bis(2-ethylhexyl) phthalate	6.00E+00	na	6.00E+00	6.00E+00	3.20E+02	1.88E-02	no	6.00E+00	6.25E+00	9.60E-01	no	6.00E+00	6.00E+00	na	na	6.00E+00	X		X					
4-Bromophenyl phenyl ether	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Butyl benzyl phthalate	na	na	na	na	3.20E+03	na	na	3.20E+03	4.61E+01	na	na	4.61E+01	4.61E+01	na	na	4.61E+01					X			
Butyl diphenyl phosphate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Carbazole	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
4-Chloroaniline	na	na	na	na	6.40E+01	na	na	6.40E+01	4.38E-01	na	na	4.38E-01	4.38E-01	na	na	4.38E-01					X			
4-Chloro-3-methylphenol (chlorocresol)	na	na	na	na	1.60E+03	na	na	1.60E+03	na	na	na	na	1.60E+03	na	na	1.60E+03				X				
2-Chloronaphthalene (beta-)	na	na	na	na	6.40E+02	na	na	6.40E+02	na	na	na	na	6.40E+02	na	na	6.40E+02				X				
2-Chlorophenol	na	na	na	na	4.00E+01	na	na	4.00E+01	na	na	na	na	4.00E+01	na	na	4.00E+01				X				
4-Chlorophenyl phenyl ether	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Dibutyl phthalate	na	na	na	na	1.60E+03	na	na	1.60E+03	na	na	na	na	1.60E+03	na	na	1.60E+03				X				
Dibutyl phenyl phosphate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
1,2-Dichlorobenzene	6.00E+02	6.00E+02	6.00E+02	6.00E+02	7.20E+02	8.33E-01	no	6.00E+02	na	na	na	na	6.00E+02	2.50E+03	5.48E+03	6.00E+02	X	X	X					
1,3-Dichlorobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
1,4-Dichlorobenzene	7.50E+01	7.50E+01	7.50E+01	7.50E+01	5.60E+02	1.34E-01	no	7.50E+01	8.10E+00	9.26E+00	no	7.50E+01	7.50E+01	4.96E+00	4.96E+01	4.96E+00								X
3,3'-Dichlorobenzidine	na	na	na	na	na	na	na	na	1.94E-01	na	na	1.94E-01	1.94E-01	na	na	1.94E-01					X			
2,4-Dichlorophenol	na	na	na	na	4.80E+01	na	na	4.80E+01	na	na	na	na	4.80E+01	na	na	4.80E+01				X				
Di(2-ethylhexyl)adipate	4.00E+02	4.00E+02	4.00E+02	4.00E+02	9.60E+03	4.17E-02	no	4.00E+02	7.29E+01	5.49E+00	no	4.00E+02	4.00E+02	na	na	4.00E+02	X	X	X					
Diethyl phthalate	na	na	na	na	1.28E+04	na	na	1.28E+04	na	na	na	na	1.28E+04	na	na	1.28E+04				X				
Dimethyl phthalate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
2,4-Dimethylphenol	na	na	na	na	3.20E+02	na	na	3.20E+02	na	na	na	na	3.20E+02	na	na	3.20E+02				X				
1,2-Dinitrobenzene	na	na	na	na	1.60E+00	na	na	1.60E+00	na	na	na	na	1.60E+00	na	na	1.60E+00				X				
1,3-Dinitrobenzene	na	na	na	na	1.60E+00	na	na	1.60E+00	na	na	na	na	1.60E+00	na	na	1.60E+00				X				
1,4-Dinitrobenzene	na	na	na	na	1.60E+00	na	na	1.60E+00	na	na	na	na	1.60E+00	na	na	1.60E+00				X				
4,6-Dinitro-o-cresol (DNOC)	na	na	na	na	1.28E+00	na	na	1.28E+00	na	na	na	na	1.28E+00	na	na	1.28E+00				X				
2,4-Dinitrophenol	na	na	na	na	3.20E+01	na	na	3.20E+01	na	na	na	na	3.20E+01	na	na	3.20E+01				X				
2,4-Dinitrotoluene	na	na	na	na	3.20E+01	na	na	3.20E+01	2.82E-01	na	na	2.82E-01	2.82E-01	na	na	2.82E-01					X			
2,6-Dinitrotoluene	na	na	na	na	4.80E+00	na	na	4.80E+00	5.83E-02	na	na	5.83E-02	5.83E-02	na	na	5.83E-02					X			
Di-n-octyl phthalate	na	na	na	na	1.60E+02	na	na	1.60E+02	na	na	na	na	1.60E+02	na	na	1.60E+02				X				
1,4-Dioxane	na	na	na	na	2.40E+02	na	na	2.40E+02	4.38E-01	na	na	4.38E-01	4.38E-01	4.71E+03	4.71E+04	4.38E-01					X			
1,2-Diphenylhydrazine	na	na	na	na	na	na	na	na	1.09E-01	na	na	1.09E-01	1.09E-01	na	na	1.09E-01					X			
Hexachlorobenzene	1.00E+00	na	1.00E+00	1.00E+00	6.40E+00	1.56E-01	no	1.00E+00	2.73E-02	3.66E+01	YES	2.73E-01	2.73E-01	2.45E-01	2.45E+00	2.45E-01								X
Hexachlorobutadiene	na	na	na	na	8.00E+00	na	na	8.00E+00	5.61E-01	na	na	5.61E-01	5.61E-01	6.38E-01	6.38E+00	5.61E-01					X			
Hexachlorocyclopentadiene	5.00E+01	5.00E+01	5.00E+01	5.00E+01	4.80E+01	1.04E+00	YES	4.80E+01	na	na	na	na	4.80E+01	4.22E+00	9.22E+00	4.22E+00								X
Hexachloroethane	na	na	na	na	5.60E+00	na	na	5.60E+00	1.09E+00	na	na	1.09E+00	1.09E+00	3.85E+00	3.85E+01	1.09E+00					X			
Isophorone	na	na	na	na	3.20E+03	na	na	3.20E+03	9.21E+01	na	na	9.21E+01	9.21E+01	na	na	9.21E+01					X			
2-Methoxynaphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
2-Methylphenol (o-cresol)	na	na	na	na	8.00E+02	na	na	8.00E+02	na	na	na	na	8.00E+02	na	na	8.00E+02				X				
3-Methylphenol (m-cresol)	na	na	na	na	8.00E+02	na	na	8.00E+02	na	na	na	na	8.00E+02	na	na	8.00E+02				X				
4-Methylphenol (p-cresol)	na	na	na	na	1.60E+03	na	na	1.60E+03	na	na	na	na	1.60E+03	na	na	1.60E+03				X				
2-Nitroaniline	na	na	na	na	1.60E+02	na	na	1.60E+02	na	na	na	na	1.60E+02	na	na	1.60E+02				X				
3-Nitroaniline	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
4-Nitroaniline	na	na	na	na	6.40E+01	na	na	6.40E+01	4.38E+00	na	na	4.38E+00	4.38E+00	na	na	4.38E+00					X			
Nitrobenzene	na	na	na	na	1.60E+01	na	na	1.60E+01	na	na	na	na	1.60E+01	na	na	1.60E+01				X				
2-Nitrophenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
4-Nitrophenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
n-Nitrosodimethylamine	na	na	na	na	6.40E-02	na	na	6.40E-02	2.30E-04	na	na	2.30E-04	2.30E-04	na	na	2.30E-04					X			
n-Nitrosodiphenylamine	na	na	na	na	na	na	na	na	1.79E+01	na	na	1.79E+01	1.79E+01	na	na	1.79E+01					X			
n-Nitrosodi-n-propylamine	na	na	na	na	na	na	na	na	1.25E-02	na	na	1.25E-02	1.25E-02	na	na	1.25E-02					X			
Pentachlorophenol	1.00E+00	na	1.00E+00	1.00E+00	8.00E+01	1.25E-02	no	1.00E+00	2.19E-01	4.57E+00	no	1.00E+00	1.00E+00	na	na	1.00E+00	X		X					
Phenol	na	na	na	na	4.80E+03	na	na	4.80E+03	na	na	na	na	4.80E+03	na	na	4.80E+03				X				
Pyridine	na	na	na	na	8.00E+00	na	na	8.00E+00	na	na	na	na	8.00E+00	na	na	8.00E+00				X				
2,3,4,5-Tetrachlorophenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
2,3,4,6-Tetrachlorophenol	na	na	na	na	4.80E+02	na	na	4.80E+02	na	na	na	na	4.80E+02	na	na	4.80E+02				X				

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Chemical (all concentrations in ug/L)	Federal MCLs 40 CFR 141	Federal MCLGs 40 CFR 141	WA State MCLs WAC 246-290	Most Stringent ARAR	MTCA-B Ground Water Noncancer Eq. 720-1 GW-Eq	ARAR Evaluation Column F / Column G	Does ARAR need adjustment for noncancer health effects?	Protection of Drinking Water Noncancer	MTCA-B Ground Water Cancer Eq. 720-2 GW-Eq	ARAR Evaluation Column F / Column K	Does ARAR need adjustment for cancer health effects?	Protection of Drinking Water Cancer	GW-1 Ground Water PCUL Protect Potable Water minimum	GW-4 Ground Water Screening Level Protect Indoor Air VI	MTCA-C GW Protect Indoor Air VI	Most Stringent Potable Water PCUL (GW-1, GW-4)	Basis: Federal MCL	Federal MCLG	State MCL	Noncancer Eq.	Cancer Eq.	MCL Adj. HQ=1	MCL Adj. to 1E-5	Protect Indoor Air
1,2,4-Trichlorobenzene	7.00E+01	7.00E+01	7.00E+01	7.00E+01	8.00E+01	8.75E-01	no	7.00E+01	1.51E+00	4.64E+01	YES	1.51E+01	1.51E+01	3.85E+01	8.43E+01	1.51E+01							X	
2,4,5-Trichlorophenol	na	na	na	na	1.60E+03	na	na	1.60E+03	na	na	na	na	1.60E+03	na	na	1.60E+03				X				
2,4,6-Trichlorophenol	na	na	na	na	1.60E+01	na	na	1.60E+01	7.95E+00	na	na	7.95E+00	7.95E+00	na	na	7.95E+00					X			
Volatile Organic Compounds																***Volatile Organic Compounds***								
Acetone	na	na	na	na	7.20E+03	na	na	7.20E+03	na	na	na	na	7.20E+03	na	na	7.20E+03				X				
Acetaldehyde	na	na	na	na	na	na	na	na	na	na	na	na	na	6.23E+02	4.93E+03	6.23E+02								X
Acrolein	na	na	na	na	4.00E+00	na	na	4.00E+00	na	na	na	na	4.00E+00	2.94E+00	6.44E+00	2.94E+00								X
Acrylonitrile	na	na	na	na	8.00E+00	na	na	8.00E+00	8.10E-02	na	na	8.10E-02	8.10E-02	1.16E+01	1.16E+02	8.10E-02					X			
Benzaldehyde	na	na	na	na	8.00E+02	na	na	8.00E+02	1.09E+01	na	na	1.09E+01	1.09E+01	na	na	1.09E+01					X			
Benzene	5.00E+00	na	5.00E+00	5.00E+00	3.20E+01	1.56E-01	no	5.00E+00	7.95E-01	6.29E+00	no	5.00E+00	5.00E+00	2.39E+00	2.39E+01	2.39E+00								X
Bromobenzene	na	na	na	na	6.40E+01	na	na	6.40E+01	na	na	na	na	6.40E+01	6.34E+02	1.39E+03	6.40E+01				X				
Bromochloromethane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Bromoethane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Bromoform	8.00E+01	na	8.00E+01	8.00E+01	1.60E+02	5.00E-01	no	8.00E+01	5.54E+00	1.44E+01	YES	5.54E+01	5.54E+01	2.17E+02	2.17E+03	5.54E+01							X	
Bromomethane	na	na	na	na	1.12E+01	na	na	1.12E+01	na	na	na	na	1.12E+01	1.09E+01	2.38E+01	1.09E+01								X
2-Butoxyethanol (EGBE)	na	na	na	na	1.60E+03	na	na	1.60E+03	na	na	na	na	1.60E+03	na	na	1.60E+03				X				
n-Butylbenzene	na	na	na	na	4.00E+02	na	na	4.00E+02	na	na	na	na	4.00E+02	na	na	4.00E+02				X				
sec-Butylbenzene	na	na	na	na	8.00E+02	na	na	8.00E+02	na	na	na	na	8.00E+02	na	na	8.00E+02				X				
tert-Butylbenzene	na	na	na	na	8.00E+02	na	na	8.00E+02	na	na	na	na	8.00E+02	na	na	8.00E+02				X				
Carbon disulfide	na	na	na	na	8.00E+02	na	na	8.00E+02	na	na	na	na	8.00E+02	8.36E+02	1.83E+03	8.00E+02				X				
Carbon tetrachloride	5.00E+00	na	5.00E+00	5.00E+00	3.20E+01	1.56E-01	no	5.00E+00	6.25E-01	8.00E+00	no	5.00E+00	5.00E+00	6.17E-01	6.17E+00	6.17E-01								X
Chlorobenzene	1.00E+02	1.00E+02	1.00E+02	1.00E+02	1.60E+02	6.25E-01	no	1.00E+02	na	na	na	na	1.00E+02	3.45E+02	7.54E+02	1.00E+02	X	X	X					
Chloroethane	na	na	na	na	na	na	na	na	na	na	na	na	na	1.47E+04	3.21E+04	1.47E+04								X
2-Chloroethyl vinyl ether	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Chloroform	8.00E+01	7.00E+01	8.00E+01	7.00E+01	8.00E+01	8.75E-01	no	7.00E+01	1.41E+00	4.96E+01	YES	1.41E+01	1.41E+01	1.18E+00	1.18E+01	1.18E+00								X
Chloromethane	na	na	na	na	na	na	na	na	na	na	na	na	na	1.53E+02	3.34E+02	1.53E+02								X
3-Chloro-1-propene (allyl chloride)	na	na	na	na	na	na	na	na	2.08E+00	na	na	2.08E+00	2.08E+00	1.49E+00	3.58E+00	1.49E+00								X
2-Chlorotoluene	na	na	na	na	1.60E+02	na	na	1.60E+02	na	na	na	na	1.60E+02	na	na	1.60E+02				X				
4-Chlorotoluene	na	na	na	na	1.60E+02	na	na	1.60E+02	na	na	na	na	1.60E+02	na	na	1.60E+02				X				
Dibromochloromethane	8.00E+01	6.00E+01	8.00E+01	6.00E+01	1.60E+02	3.75E-01	no	6.00E+01	5.21E-01	1.15E+02	YES	5.21E+00	5.21E+00	na	na	5.21E+00							X	
1,2-Dibromo-3-chloropropane	2.00E-01	na	2.00E-01	2.00E-01	1.60E+00	1.25E-01	no	2.00E-01	1.40E-02	1.43E+01	YES	1.40E-01	1.40E-01	4.22E-02	1.60E+00	4.22E-02								X
Dibromomethane	na	na	na	na	8.00E+01	na	na	8.00E+01	na	na	na	na	8.00E+01	9.66E+01	2.11E+02	8.00E+01				X				
Dichlorobromomethane	8.00E+01	na	8.00E+01	8.00E+01	1.60E+02	5.00E-01	no	8.00E+01	7.06E-01	1.13E+02	YES	7.06E+00	7.06E+00	1.38E+00	1.38E+01	1.38E+00								X
trans-1,4-Dichloro-2-butene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Dichlorodifluoromethane	na	na	na	na	1.60E+03	na	na	1.60E+03	na	na	na	na	1.60E+03	4.22E+00	9.24E+00	4.22E+00								X
1,1-Dichloroethane	na	na	na	na	1.60E+03	na	na	1.60E+03	7.68E+00	na	na	7.68E+00	7.68E+00	1.10E+01	1.10E+02	7.68E+00					X			
1,2-Dichloroethane (EDC)	5.00E+00	na	5.00E+00	5.00E+00	4.80E+01	1.04E-01	no	5.00E+00	4.81E-01	1.04E+01	YES	4.81E+00	4.81E+00	3.49E+00	3.49E+01	3.49E+00								X
1,1-Dichloroethylene	7.00E+00	7.00E+00	7.00E+00	7.00E+00	4.00E+02	1.75E-02	no	7.00E+00	na	na	na	na	7.00E+00	1.30E+02	2.85E+02	7.00E+00	X	X	X					
cis-1,2-Dichloroethylene	7.00E+01	7.00E+01	7.00E+01	7.00E+01	1.60E+01	4.38E+00	YES	1.60E+01	na	na	na	na	1.60E+01	1.82E+02	3.99E+02	1.60E+01						X		
trans-1,2-Dichloroethylene	1.00E+02	1.00E+02	1.00E+02	1.00E+02	1.60E+02	6.25E-01	no	1.00E+02	na	na	na	na	1.00E+02	7.69E+01	1.68E+02	7.69E+01								X
1,2-Dichloroethylene (mixed isomers)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
1,2-Dichloropropane	5.00E+00	na	5.00E+00	5.00E+00	3.20E+02	1.56E-02	no	5.00E+00	1.18E+00	4.23E+00	no	5.00E+00	5.00E+00	1.03E+01	6.12E+01	5.00E+00	X		X					
1,3-Dichloropropane	na	na	na	na	1.60E+02	na	na	1.60E+02	na	na	na	na	1.60E+02	na	na	1.60E+02				X				
2,2-Dichloropropane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
1,1-Dichloropropene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
cis-1,3-Dichloropropene	na	na	na	na	2.40E+02	na	na	2.40E+02	4.38E-01	na	na	4.38E-01	4.38E-01	7.96E+00	7.96E+01	4.38E-01					X			
trans-1,3-Dichloropropene	na	na	na	na	2.40E+02	na	na	2.40E+02	4.38E-01	na	na	4.38E-01	4.38E-01	7.96E+00	7.96E+01	4.38E-01					X			
Diisopropyl ether	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Ethane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Ethylbenzene	7.00E+02	7.00E+02	7.00E+02	7.00E+02	8.00E+02	8.75E-01	no	7.00E+02	na	na	na	na	7.00E+02	2.78E+03	6.09E+03	7.00E+02	X	X	X					
Ethylene oxide	na	na	na	na	na	na	na	na	3.70E-02	na	na	3.70E-02	3.70E-02	5.37E-02	2.03E+00	3.70E-02					X			
Ethyl ether	na	na	na	na	1.60E+03	na	na	1.60E+03	na	na	na	na	1.60E+03	na	na	1.60E+03				X				
Ethylene dibromide (EDB)	5.00E-02	na	5.00E-02	5.00E-02	7.20E+01	6.94E-04	no	5.00E-02	2.19E-02	2.29E+00	no	5.00E-02	5.00E-02	2.95E-01	2.95E+00	5.00E-02	X		X					
Formaldehyde	na	na	na	na	1.60E+03	na	na	1.60E+03	5.50E-01	na	na	5.50E-01	5.50E-01	na	na	5.50E-01					X			
n-Hexane	na	na	na	na	4.80E+02	na	na	4.80E+02	na	na	na	na	4.80E+02	7.16E+00	1.57E+01	7.16E+00								X
2-Hexanone	na	na	na	na	4.00E+01	na	na	4.00E+01	na	na	na	na	4.00E+01	7.25E+03	1.59E+04	4.00E+01				X				
Isopropylbenzene (cumene)	na	na	na	na	8.00E+02	na	na	8.00E+02	na	na	na	na	8.00E+02	9.12E+02	1.99E+03	8.00E+02				X				
4-Isopropyltoluene (p-isopropyltoluene)	na	na	na	na	3.20E+01	na	na	3.20E+01	na	na	na	na	3.20E+01	8.83E+01	1.93E+02	3.20E+01				X				
Methane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Methyl ethyl ketone (2-butanone)	na	na	na	na	4.80E+03	na	na	4.80E+03	na	na	na	na	4.80E+03	1.71E+06	3.74E+06	4.80E+03				X				
Methyl iodide	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Methyl isobutyl ketone	na	na	na	na	6.40E+02	na	na	6.40E+02	na	na	na	na	6.40E+02	4.66E+05	1.02E+06	6.40E+02				X				
Methyl tert-butyl ether (MTBE)	na	na	na	na	na	na	na	na	2.43E+01	na	na	2.43E+01	2.43E+01	8.57E+02	8.57E+03	2.43E+01					X			
Methylene chloride	5.00E+00	na	5.00E+00	5.00E+00	4.80E+01	1.04E-01	no	5.00E+00	5.80E+00	8.62E-01	no	5.00E+00	5.00E+00	7.83E+02	7.12E+03	5.00E+00	X		X					
2-Pentanone	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
n-Propylbenzene	na	na	na	na	8.00E+02	na	na	8.00E+02	na	na	na	na	8.00E+02	2.26E+03	4.95E+03	8.00E+02				X				
Styrene	1.00E+02	1.00E+02	1.00E+02	1.00E+02	1.60E+03	6.25E-02	no	1.00E+02	na	na	na	na	1.00E+02	8.53E+03	1.87E+04	1.00E+02	X	X	X					
1,1,1,2-Tetrachloroethane	na	na	na	na	2.40E+02	na	na	2.40E+02	1.68E+00	na	na	1.68E+00	1.68E+00	7.11E+00	7.11E+01	1.68E+00					X			
1,1,2,2-Tetrachloroethane	na	na	na	na	1.60E+02	na	na	1.60E+02	2.19E-01	na	na	2.19E-01	2.19E-01	5.87E+00	5.87E+01	2.19E-01					X			
Tetrachloroethylene (PCE)	5.00E+00	na	5.00E+00	5.00E+00	4.80E+01	1.04E-01	no	5.00E+00	2.08E+01	2.40E-01	no	5.00E+00	5.00E+00	2.50E+01	1.04E+02	5.00E+00	X		X					

Chemical (all concentrations in ug/L)	Federal MCLs 40 CFR 141	Federal MCLGs 40 CFR 141	WA State MCLs WAC 246-290	Most Stringent ARAR	MTCA-B Ground Water Noncancer Eq. 720-1 GW-Eq	ARAR Evaluation Column F / Column G	Does ARAR need adjustment for noncancer health effects?	Protection of Drinking Water Noncancer	MTCA-B Ground Water Cancer Eq. 720-2 GW-Eq	ARAR Evaluation Column F / Column K	Does ARAR need adjustment for cancer health effects?	Protection of Drinking Water Cancer	GW-1 Ground Water PCUL Protect Potable Water minimum	GW-4 Ground Water Screening Level Protect Indoor Air VI	MTCA-C GW Protect Indoor Air VI	Most Stringent Potable Water PCUL (GW-1, GW-4)	Basis: Federal MCL	Federal MCLG	State MCL	Noncancer Eq.	Cancer Eq.	MCL Adj, HQ=1	MCL Adj, to 1E-5	Protect Indoor Air
Tetrahydrofuran	na	na	na	na	7.20E+03	na	na	7.20E+03	na	na	na	na	7.20E+03	5.26E+05	1.15E+06	7.20E+03				X				
Toluene	1.00E+03	1.00E+03	1.00E+03	1.00E+03	6.40E+02	1.56E+00	YES	6.40E+02	na	na	na	na	6.40E+02	1.54E+04	3.37E+04	6.40E+02						X		
1,2,3-Trichlorobenzene	na	na	na	na	6.40E+00	na	na	6.40E+00	na	na	na	na	6.40E+00	na	na	6.40E+00				X				
1,1,1-Trichloroethane	2.00E+02	2.00E+02	2.00E+02	2.00E+02	1.60E+04	1.25E-02	no	2.00E+02	na	na	na	na	2.00E+02	5.44E+03	1.19E+04	2.00E+02	X	X	X					
1,1,2-Trichloroethane	5.00E+00	3.00E+00	5.00E+00	3.00E+00	3.20E+01	9.38E-02	no	3.00E+00	7.68E-01	3.91E+00	no	3.00E+00	3.00E+00	5.13E+00	1.12E+01	3.00E+00		X						
Trichloroethylene (TCE)	5.00E+00	na	5.00E+00	5.00E+00	4.00E+00	1.25E+00	YES	4.00E+00	5.40E-01	9.26E+00	no	5.00E+00	4.00E+00	1.42E+00	8.61E+00	1.42E+00								X
Trichlorofluoroethane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Trichlorofluoromethane	na	na	na	na	2.40E+03	na	na	2.40E+03	na	na	na	na	2.40E+03	1.20E+02	2.61E+02	1.20E+02								X
1,2,3-Trichloropropane	na	na	na	na	3.20E+01	na	na	3.20E+01	3.80E-04	na	na	3.80E-04	3.80E-04	2.00E+01	4.38E+01	3.80E-04					X			
Trichlorotrifluoroethane	na	na	na	na	2.40E+05	na	na	2.40E+05	na	na	na	na	2.40E+05	1.67E+02	3.65E+02	1.67E+02								X
1,2,3-Trimethylbenzene	na	na	na	na	8.00E+01	na	na	8.00E+01	na	na	na	na	8.00E+01	4.14E+02	9.06E+02	8.00E+01				X				
1,2,4-Trimethylbenzene	na	na	na	na	8.00E+01	na	na	8.00E+01	na	na	na	na	8.00E+01	2.39E+02	5.22E+02	8.00E+01				X				
1,3,5-Trimethylbenzene	na	na	na	na	8.00E+01	na	na	8.00E+01	na	na	na	na	8.00E+01	1.67E+02	3.66E+02	8.00E+01				X				
Vinyl acetate	na	na	na	na	8.00E+03	na	na	8.00E+03	na	na	na	na	8.00E+03	8.09E+03	1.77E+04	8.00E+03				X				
Vinyl chloride	2.00E+00	na	2.00E+00	2.00E+00	2.40E+01	8.33E-02	no	2.00E+00	2.92E-02	6.86E+01	YES	2.92E-01	2.92E-01	3.34E-01	3.34E+00	2.92E-01							X	
Total xylenes	1.00E+04	1.00E+04	1.00E+04	1.00E+04	1.60E+03	6.25E+00	YES	1.60E+03	na	na	na	na	1.60E+03	3.23E+02	7.07E+02	3.23E+02								X
PFAS																***Petroleum Hydrocarbons***								
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	na	na	na	na	3.20E+00	na	na	3.20E+00	na	na	na	na	3.20E+00	na	na	3.20E+00				X				
GenX (HFPO-DA)	1.00E-02	1.00E-02	na	1.00E-02	2.40E-02	4.17E-01	no	1.00E-02	na	na	na	na	1.00E-02	na	na	1.00E-02	X	X						
Perfluorobutanoic acid (PFBA)	na	na	na	na	8.00E+00	na	na	8.00E+00	na	na	na	na	8.00E+00	na	na	8.00E+00				X				
Perfluorobutanesulfonic acid (PFBS)	na	na	na	na	4.80E+00	na	na	4.80E+00	na	na	na	na	4.80E+00	na	na	4.80E+00				X				
Perfluorodecanoic acid (PFDA)	na	na	na	na	3.20E-05	na	na	3.20E-05	na	na	na	na	3.20E-05	na	na	3.20E-05				X				
Perfluorohexanoic acid (PFHxA)	na	na	na	na	8.00E+00	na	na	8.00E+00	na	na	na	na	8.00E+00	na	na	8.00E+00				X				
Perfluorohexanesulfonic acid (PFHxS)	1.00E-02	1.00E-02	na	1.00E-02	6.40E-06	1.56E+03	YES	6.40E-06	na	na	na	na	6.40E-06	na	na	6.40E-06						X		
Perfluorononanoic acid (PFNA)	1.00E-02	1.00E-02	na	1.00E-02	4.00E-02	2.50E-01	no	1.00E-02	na	na	na	na	1.00E-02	na	na	1.00E-02	X	X						
Perfluorooctanesulfonic acid (PFOS)	4.00E-03	na	na	4.00E-03	1.60E-03	2.50E+00	YES	1.60E-03	2.22E-03	1.81E+00	no	4.00E-03	4.00E-03	na	na	4.00E-03	X							
Perfluorooctanoic acid (PFOA)	4.00E-03	na	na	4.00E-03	4.80E-04	8.33E+00	YES	4.80E-04	2.99E-06	1.34E+03	YES	2.99E-05	4.00E-03	na	na	4.00E-03	X							
Petroleum Hydrocarbons																***Petroleum Hydrocarbons***								
Gasoline range hydrocarbons, fresh	na	na	na	na	8.00E+02	na	na	8.00E+02	na	na	na	na	8.00E+02	na	na	8.00E+02				X				
Gasoline range hydrocarbons, weathered	na	na	na	na	1.00E+03	na	na	1.00E+03	na	na	na	na	1.00E+03	na	na	1.00E+03				X				
Diesel range hydrocarbons, fresh	na	na	na	na	5.00E+02	na	na	5.00E+02	na	na	na	na	5.00E+02	na	na	5.00E+02				X				
Diesel range hydrocarbons, weathered	na	na	na	na	5.00E+02	na	na	5.00E+02	na	na	na	na	5.00E+02	na	na	5.00E+02				X				
Oil range hydrocarbons	na	na	na	na	5.00E+02	na	na	5.00E+02	na	na	na	na	5.00E+02	na	na	5.00E+02				X				
Total diesel & oil range hydrocarbons	na	na	na	na	5.00E+02	na	na	5.00E+02	na	na	na	na	5.00E+02	na	na	5.00E+02				X				
Pesticides																***Pesticides***								
Aldrin	na	na	na	na	2.40E-01	na	na	2.40E-01	2.57E-03	na	na	2.57E-03	2.57E-03	na	na	2.57E-03					X			
alpha-BHC (alpha-HCH)	na	na	na	na	1.44E+01	na	na	1.44E+01	1.39E-02	na	na	1.39E-02	1.39E-02	na	na	1.39E-02					X			
beta-BHC (beta-HCH)	na	na	na	na	na	na	na	na	4.86E-02	na	na	4.86E-02	4.86E-02	na	na	4.86E-02					X			
delta-BHC (delta-HCH)	na	na	na	na	9.60E-04	na	na	9.60E-04	na	na	na	na	9.60E-04	na	na	9.60E-04				X				
Carbaryl	na	na	na	na	1.60E+03	na	na	1.60E+03	na	na	na	na	1.60E+03	na	na	1.60E+03				X				
cis-Chlordane (alpha)	na	na	na	na	4.00E+00	na	na	4.00E+00	na	na	na	na	4.00E+00	na	na	4.00E+00				X				
trans-Chlordane (gamma)	na	na	na	na	4.00E+00	na	na	4.00E+00	na	na	na	na	4.00E+00	na	na	4.00E+00				X				
Chlordane	2.00E+00	na	2.00E+00	2.00E+00	4.00E+00	5.00E-01	no	2.00E+00	1.25E-01	1.60E+01	YES	1.25E+00	1.25E+00	na	na	1.25E+00							X	
Chlorpyrifos	na	na	na	na	1.60E+01	na	na	1.60E+01	na	na	na	na	1.60E+01	na	na	1.60E+01				X				
4,4'-DDD	na	na	na	na	8.00E+00	na	na	8.00E+00	3.65E-01	na	na	3.65E-01	3.65E-01	na	na	3.65E-01					X			
4,4'-DDE	na	na	na	na	4.00E+00	na	na	4.00E+00	1.29E-01	na	na	1.29E-01	1.29E-01	na	na	1.29E-01					X			
4,4'-DDT	na	na	na	na	8.00E+00	na	na	8.00E+00	2.57E-01	na	na	2.57E-01	2.57E-01	na	na	2.57E-01					X			
Total DDD	na	na	na	na	8.00E+00	na	na	8.00E+00	3.65E-01	na	na	3.65E-01	3.65E-01	na	na	3.65E-01					X			
Total DDE	na	na	na	na	4.00E+00	na	na	4.00E+00	1.29E-01	na	na	1.29E-01	1.29E-01	na	na	1.29E-01					X			
Total DDT	na	na	na	na	8.00E+00	na	na	8.00E+00	2.57E-01	na	na	2.57E-01	2.57E-01	na	na	2.57E-01					X			
Diazinon	na	na	na	na	1.12E+01	na	na	1.12E+01	na	na	na	na	1.12E+01	na	na	1.12E+01				X				
Dieldrin	na	na	na	na	8.00E-01	na	na	8.00E-01	5.47E-03	na	na	5.47E-03	5.47E-03	na	na	5.47E-03					X			
Endosulfan I	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Endosulfan II	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Endosulfan sulfate	na	na	na	na	9.60E+01	na	na	9.60E+01	na	na	na	na	9.60E+01	na	na	9.60E+01				X				
Endrin	2.00E+00	2.00E+00	2.00E+00	2.00E+00	4.80E+00	4.17E-01	no	2.00E+00	na	na	na	na	2.00E+00	na	na	2.00E+00	X	X	X					
Endrin aldehyde	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Endrin ketone	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Heptachlor	4.00E-01	na	4.00E-01	4.00E-01	4.00E+00	1.00E-01	no	4.00E-01	9.72E-03	4.11E+01	YES	9.72E-02	9.72E-02	5.10E-01	5.10E+00	9.72E-02							X	
Heptachlor epoxide	2.00E-01	na	2.00E-01	2.00E-01	1.04E-01	1.92E+00	YES	1.04E-01	4.81E-03	4.16E+01	YES	4.81E-02	4.81E-02	na	na	4.81E-02							X	
Lindane (gamma-BHC)	2.00E-01	2.00E-01	2.00E-01	2.00E-01	4.80E+00	4.17E-02	no	2.00E-01	7.95E-02	2.51E+00	no	2.00E-01	2.00E-01	na	na	2.00E-01	X	X	X					
Malathion	na	na	na	na	3.20E+02	na	na	3.20E+02	na	na	na	na	3.20E+02	na	na	3.20E+02				X				
Methoxychlor	4.00E+01	4.00E+01	4.00E+01	4.00E+01	8.00E+01	5.00E-01	no	4.00E+01	na	na	na	na	4.00E+01	na	na	4.00E+01	X	X	X					
Mirex	na	na	na	na	1.60E+00	na	na	1.60E+00	2.43E-03	na	na	2.43E-03	2.43E-03	1.48E-02	1.48E-01	2.43E-03					X			
Nonachlor	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na								
Toxaphene	3.00E+00	na	3.00E+00	3.00E+00	1.44E+00	2.08E+00	YES	1.44E+00	7.95E-02	3.77E+01	YES	7.95E-01	7.95E-01	na	na	7.95E-01							X	

PCUL Workbook - Groundwater Detail for Protection of Fresh Surface Water

Sort Order	Chemical (all concentrations in ug/L)	WA State WQC Aquatic Life Fresh-Chronic WAC 173-201A-240, Table 240	NRWQC Aquatic Life Fresh - Chronic CWA Section 304	WA State WQC Human Health Consumption of Orgs + Water WAC 173-201A-240, Table 240	WA Toxics Rule (WTR) Human Health Consumption of Orgs + Water 40 CFR 131.45	NRWQC Human Health Consumption of Orgs + Water CWA Section 304	Aquatic Life: Literature Values Sources in Comments Attached to Cells	Most Stringent ARAR Minimum	MTCA-B Surface Water Fish Consumption Noncancer Eq. 730-1 GW-Eq	ARAR Evaluation Column I / Column J	Does ARAR need adjustment for noncancer health effects?	Protection of Surface Water Noncancer	MTCA-B Surface Water Fish Consumption Cancer Eq. 730-2 GW-Eq	ARAR Evaluation Column I / Column N	Does ARAR need adjustment for cancer health effects?	Protection of Surface Water Cancer	GW-1 Groundwater PCUL for Drinking Water PW	GW-2 Ground Water PCUL Protect Surface Water minimum cols M_iQ_iR	Basis for PCUL: State Aquatic Life	NRWQC Aquatic Life	State Human Health	WTR Human Health	NRWQC Human Health	Literat: Aquatic Life	Noncancer Equation	Cancer Equation	MQC Adj. HQ=1	WQC Adjust. to 1E-5
1	***PCBs***																											
2	Total PCB Aroclors	1.40E-02	1.40E-02	7.00E-06	7.00E-06	6.40E-05	na	7.00E-06	na	na	na	7.00E-06	2.88E-05	2.43E-01	no	7.00E-06	2.19E-01	7.00E-06				X	X							
3	Total PCB congeners	1.40E-02	1.40E-02	7.00E-06	7.00E-06	6.40E-05	na	7.00E-06	na	na	na	7.00E-06	2.88E-05	2.43E-01	no	7.00E-06	2.19E-01	7.00E-06				X	X							
4	Total PCB TEQ	na	na	6.40E-08	na	5.00E-09	na	5.00E-09	1.61E-08	3.10E-01	no	5.00E-09	4.43E-10	1.13E+01	YES	4.43E-09	3.37E-06	4.43E-09												X
5	***Dioxins/Furans***																											
6	Total dioxin/furan TEQ	na	na	6.40E-08	na	5.00E-09	na	5.00E-09	1.01E-07	4.97E-02	no	5.00E-09	2.76E-09	1.81E+00	no	5.00E-09	3.37E-06	5.00E-09							X					
7	2,3,7,8-TCDD	na	na	6.40E-08	na	5.00E-09	na	5.00E-09	1.01E-07	4.97E-02	no	5.00E-09	2.76E-09	1.81E+00	no	5.00E-09	3.37E-06	5.00E-09							X					
8	Total chlorinated dioxins	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
9	Total chlorinated furans	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
10	***Inorganics***																											
11	Ammonia	Site-specific	Site-specific	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
12	Chloride	2.30E+05	2.30E+05	na	na	na	na	2.30E+05	na	na	na	2.30E+05	na	na	na	na	2.50E+05	2.30E+05												
13	Cyanide, free	1.90E+00	5.20E+00	9.00E+00	9.00E+00	4.00E+00	na	1.90E+00	4.52E+02	4.20E-03	no	1.90E+00	na	na	na	na	5.04E+00	1.90E+00		X										
14	Fluoride	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	9.60E+02	9.60E+02												
15	Nitrate	na	na	na	na	1.00E+04	na	1.00E+04	na	na	na	1.00E+04	na	na	na	na	1.00E+04	1.00E+04							X					
16	Nitrite	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.00E+03	1.00E+03												
17	Sulfate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	2.50E+05	2.50E+05												
18	Sulfide	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
19	***Metals***																											
20	Aluminum	3.02E+02	na	na	na	na	na	3.02E+02	na	na	na	3.02E+02	na	na	na	na	1.60E+04	3.02E+02		X										
21	Antimony	na	na	6.00E+00	6.00E+00	5.60E+00	na	5.60E+00	2.87E+02	1.95E-02	no	5.60E+00	na	na	na	na	6.00E+00	5.60E+00							X					
22	Arsenic	1.30E+02	1.50E+02	1.80E-02	1.80E-02	1.80E-02	na	1.80E-02	9.79E-01	1.84E-02	no	1.80E-02	1.27E-03	1.41E+01	YES	1.27E-02	2.73E-02	1.27E-02												X
23	Barium	na	na	na	na	1.00E+03	na	1.00E+03	na	na	na	1.00E+03	na	na	na	na	2.00E+03	1.00E+03							X					
24	Beryllium	na	na	na	na	na	na	na	7.56E+01	na	na	7.56E+01	na	na	na	na	4.00E+00	4.00E+00												
25	Cadmium	4.20E-01	na	na	na	na	na	4.20E-01	1.12E+01	3.74E-02	no	4.20E-01	na	na	na	na	5.00E+00	4.20E-01		X										
26	Chromium, total	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.00E+02	1.00E+02												
27	Chromium, trivalent	6.10E+01	7.40E+01	na	na	na	na	6.10E+01	6.73E+04	9.06E-04	no	6.10E+01	na	na	na	na	2.40E+04	6.10E+01		X										
28	Chromium, hexavalent	6.60E+00	1.10E+01	na	na	na	na	6.60E+00	4.04E+01	1.63E-01	no	6.60E+00	1.14E-01	5.81E+01	YES	1.14E+00	1.40E+00	1.14E+00												X
29	Cobalt	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	4.80E+00	4.80E+00												
30	Copper	1.80E+00	na	1.30E+03	na	na	na	1.80E+00	7.98E+02	2.26E-03	no	1.80E+00	na	na	na	na	6.40E+02	1.80E+00		X										
31	Iron	na	1.00E+03	na	na	na	na	1.00E+03	na	na	na	1.00E+03	na	na	na	na	3.00E+02	3.00E+02												
32	Lead	2.50E+00	2.50E+00	na	na	na	na	2.50E+00	na	na	na	2.50E+00	na	na	na	na	1.50E+01	2.50E+00		X	X									
33	Manganese	na	na	na	na	5.00E+01	na	5.00E+01	na	na	na	5.00E+01	na	na	na	na	5.00E+01	5.00E+01							X					
34	Mercury, inorganic	1.20E-02	7.70E-01	na	na	na	na	1.20E-02	na	na	na	1.20E-02	na	na	na	na	2.00E+00	1.20E-02		X										
35	Methylmercury	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.60E+00	1.60E+00												
36	Molybdenum	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	8.00E+01	8.00E+01												
37	Nickel	1.10E+01	5.20E+01	8.00E+01	8.00E+01	6.10E+02	na	1.10E+01	3.06E+02	3.60E-02	no	1.10E+01	na	na	na	na	3.20E+02	1.10E+01		X										
38	Selenium	1.50E+00	na	6.00E+01	6.00E+01	1.70E+02	na	1.50E+00	7.48E+02	2.01E-03	no	1.50E+00	na	na	na	na	5.00E+01	1.50E+00		X										
39	Silver	1.70E-01	3.20E+00	na	na	na	na	1.70E-01	7.18E+03	2.37E-05	no	1.70E-01	na	na	na	na	8.00E+01	1.70E-01		X										
40	Thallium	na	na	2.40E-01	na	2.40E-01	na	2.40E-01	6.19E-02	3.88E+00	YES	6.19E-02	na	na	na	na	1.60E-01	6.19E-02								X		X		
41	Tin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	9.60E+03	9.60E+03												
42	Vanadium	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	8.00E+01	8.00E+01												
43	Zinc	2.40E+01	1.20E+02	1.00E+03	1.00E+03	7.40E+03	na	2.40E+01	4.58E+03	5.24E-03	no	2.40E+01	na	na	na	na	4.80E+03	2.40E+01		X										
44	***Metals - Butyltins***																											
45	Monobutyltin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
46	Dibutyltin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
47	Trybutyl tin	7.20E-02	7.20E-02	na	na	na	na	7.20E-02	na	na	na	7.20E-02	na	na	na	na	na	7.20E-02		X	X								
48	Tributyltin oxide	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	4.80E+00	4.80E+00												
49	Tetrabutyltin	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
50	***SVOCs - PAHs***																											
51	Acenaphthene	na	na	3.00E+01	3.00E+01	7.00E+01	na	3.00E+01	1.78E+02	1.69E-01	no	3.00E+01	na	na	na	na	4.80E+02	3.00E+01				X	X							
52	Acenaphthylene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
53	Anthracene	na	na	1.00E+02	1.00E+02	3.00E+02	na	1.00E+02	7.18E+03	1.39E-02	no	1.00E+02	na	na	na	na	2.40E+03	1.00E+02				X	X							
54	Benzo(a)anthracene	na	na	1.60E-04	1.60E-04	1.20E-03	na	1.60E-04	na	na	na	1.60E-04	na	na	na	na	na	1.60E-04				X	X							
55	Benzo(b)fluoranthene	na	na	1.60E-04	1.60E-04	1.20E-03	na	1.60E-04	na	na	na	1.60E-04	na	na	na	na	na	1.60E-04				X	X							
56	Benzo(k)fluoranthene	na	na	1.60E-03	1.60E-03	1.20E-02	na	1.60E-03	na	na	na	1.60E-03	na	na	na	na	na	1.60E-03				X	X							
57	Total benzofluoranthenes	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
58	Benzo(g,h,i)perylene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
59	Benzo(a)pyrene	na	na	1.60E-05	1.60E-05	1.20E-04	na	1.60E-05	7.18E+00	2.23E-06	no	1.60E-05	9.69E-03	1.65E-03	no	1.60E-05	2.00E-01	1.60E-05				X	X							
60	Chrysene	na	na	1.60E-02	1.60E-02	1.20E-01	na	1.60E-02	na	na	na	1.60E-02	na	na	na	na	na	1.60E-02				X	X							
61	Dibenz(a,h)anthracene	na	na	1.60E-05	1.60E-05	1.20E-04	na	1.60E-05	na	na	na	1.60E-05	na	na	na	na	na	1.60E-05				X	X							
62	Dibenzofuran	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	8.00E+00	8.00E+00												
63	Fluoranthene	na	na	6.00E+00	6.00E+00	2.00E+01	na	6.00E+00	2.50E+01	2.40E-01	no	6.00E+00	na	na	na	na	6.40E+02	6.00E+00				X	X							
64	Fluorene	na	na	1.00E+01	1.00E+01	5.00E+01	na	1.00E+01	9.57E+02	1.04E-02	no	1.00E+01	na	na	na	na	3.20E+02	1.00E+01				X	X							
65	Indeno(1,2,3-cd)pyrene	na	na	1.60E-04	1.60E-04	1.20E-03	na	1.60E-04	na	na	na	1.60E-04	na	na	na	na	na	1.60E-04				X	X							
66	Methyl isopropyl phenanthrene (retene)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
67	1-Methylnaphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	8.58E-01	8.58E-01												
68	2-Methylnaphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	3.20E+01	3.20E+01												
69	Naphthalene	na	na	na	na	na	na	na	1.37E+03	na	na	1.37E+03	na	na	na	na	1.60E+02	1.60E+02												
70	Phenanthrene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na												
71	Pyrene	na	na	8.00E+00	8.00E+00	2.00E+01	na	8.00E+00	7.18E+02	1.11E-02	no	8.00E+00	na	na	na	na	2.40E+02	8.00E+00				X	X							

72	Total LPAHs	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
73	Total HPAHs	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
74	Total PAHs	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
75	Total cPAH TEQ	na	na	na	na	na	na	na	na	na	na	na	9.69E-03	na	na	9.69E-03	2.00E-01	9.69E-03
76	***Other SVOCs***																	
77	Aniline	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.54E+01	1.54E+01
78	Azobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	3.98E-01	3.98E-01
79	Benzidine	na	na	2.00E-05	na	1.40E-04	na	2.00E-05	2.46E+01	8.13E-07	no	2.00E-05	1.47E-05	1.36E+00	no	2.00E-05	1.00E-04	2.00E-05
80	Benzoic acid	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	6.40E+04	6.40E+04
81	Benzyl alcohol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.60E+03	1.60E+03
82	Bis(2-chloroethoxy)methane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	4.80E+01	4.80E+01
83	Bis(2-chloroethyl)ether	na	na	2.00E-02	na	3.00E-02	na	2.00E-02	na	na	na	2.00E-02	2.36E-01	8.46E-02	no	2.00E-02	3.98E-02	2.00E-02
84	Bis(chloromethyl)ether	na	na	na	na	1.50E-04	na	1.50E-04	na	na	na	1.50E-04	na	na	na	na	1.99E-04	1.50E-04
85	Bis(2-chloro-1-methylethyl)ether	na	na	4.00E+02	4.00E+02	2.00E+02	na	2.00E+02	1.16E+04	1.72E-02	no	2.00E+02	1.04E+01	1.93E+01	YES	1.04E+02	6.25E-01	6.25E-01
86	2,6-Bis(1,1-dimethylethyl) phenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
87	Bis(2-ethylhexyl) phthalate	na	na	4.50E-02	4.50E-02	3.20E-01	na	4.50E-02	1.10E+02	4.07E-04	no	4.50E-02	9.86E-01	4.56E-02	no	4.50E-02	6.00E+00	4.50E-02
88	4-Bromophenyl phenyl ether	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
89	Butyl benzyl phthalate	na	na	1.30E-02	1.30E-02	1.00E-01	na	1.30E-02	3.47E+02	3.75E-05	no	1.30E-02	2.28E+00	5.70E-03	no	1.30E-02	4.61E+01	1.30E-02
90	Butyl diphenyl phosphate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
91	Carbazole	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
92	4-Chloroaniline	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	4.38E-01	4.38E-01
93	4-Chloro-3-methylphenol (chlorocresol)	na	na	3.60E+01	na	5.00E+02	na	3.60E+01	na	na	na	3.60E+01	na	na	na	na	1.60E+03	3.60E+01
94	2-Chloronaphthalene (beta-)	na	na	1.00E+02	1.00E+02	8.00E+02	na	1.00E+02	2.84E+02	3.52E-01	no	1.00E+02	na	na	na	na	6.40E+02	1.00E+02
95	2-Chlorophenol	na	na	1.50E+01	na	3.00E+01	na	1.50E+01	2.68E+01	5.60E-01	no	1.50E+01	na	na	na	na	4.00E+01	1.50E+01
96	4-Chlorophenyl phenyl ether	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
97	Dibutyl phthalate	na	na	8.00E+00	8.00E+00	2.00E+01	na	8.00E+00	8.07E+02	9.92E-03	no	8.00E+00	na	na	na	na	1.60E+03	8.00E+00
98	Dibutyl phenyl phosphate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
99	1,2-Dichlorobenzene	na	na	7.00E+02	7.00E+02	1.00E+03	na	7.00E+02	1.16E+03	6.02E-01	no	7.00E+02	na	na	na	na	6.00E+02	6.00E+02
100	1,3-Dichlorobenzene	na	na	2.00E+00	2.00E+00	7.00E+00	na	2.00E+00	na	na	na	2.00E+00	na	na	na	na	na	2.00E+00
101	1,4-Dichlorobenzene	na	na	2.00E+02	2.00E+02	3.00E+02	na	2.00E+02	9.04E+02	2.21E-01	no	2.00E+02	5.98E+00	3.35E+01	YES	5.98E+01	7.50E+01	5.98E+01
102	3,3'-Dichlorobenzidine	na	na	3.10E-03	na	4.90E-02	na	3.10E-03	na	na	na	3.10E-03	1.28E-02	2.42E-01	no	3.10E-03	1.94E-01	3.10E-03
103	2,4-Dichlorophenol	na	na	1.00E+01	1.00E+01	1.00E+01	na	1.00E+01	5.29E+01	1.89E-01	no	1.00E+01	na	na	na	na	4.80E+01	1.00E+01
104	Di(2-ethylhexyl)adipate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	4.00E+02	4.00E+02
105	Diethyl phthalate	na	na	2.00E+02	2.00E+02	6.00E+02	na	2.00E+02	7.87E+03	2.54E-02	no	2.00E+02	na	na	na	na	1.28E+04	2.00E+02
106	Dimethyl phthalate	na	na	6.00E+02	6.00E+02	2.00E+03	na	6.00E+02	na	na	na	6.00E+02	na	na	na	na	na	6.00E+02
107	2,4-Dimethylphenol	na	na	8.50E+01	na	1.00E+02	na	8.50E+01	1.53E+02	5.55E-01	no	8.50E+01	na	na	na	na	3.20E+02	8.50E+01
108	1,2-Dinitrobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.60E+00	1.60E+00
109	1,3-Dinitrobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.60E+00	1.60E+00
110	1,4-Dinitrobenzene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.60E+00	1.60E+00
111	4,6-Dinitro-o-cresol (DNOC)	na	na	3.00E+00	3.00E+00	2.00E+00	na	2.00E+00	na	na	na	2.00E+00	na	na	na	na	1.28E+00	1.28E+00
112	2,4-Dinitrophenol	na	na	3.00E+01	3.00E+01	1.00E+01	na	1.00E+01	9.57E+02	1.04E-02	no	1.00E+01	na	na	na	na	3.20E+01	1.00E+01
113	2,4-Dinitrotoluene	na	na	3.90E-02	na	4.90E-02	na	3.90E-02	3.78E+02	1.03E-04	no	3.90E-02	1.52E+00	2.56E-02	no	3.90E-02	2.82E-01	3.90E-02
114	2,6-Dinitrotoluene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	5.83E-02	5.83E-02
115	Di-n-octyl phthalate	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.60E+02	1.60E+02
116	1,4-Dioxane	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	4.38E-01	4.38E-01
117	1,2-Diphenylhydrazine	na	na	1.00E-02	1.00E-02	3.00E-02	na	1.00E-02	na	na	na	1.00E-02	9.01E-02	1.11E-01	no	1.00E-02	1.09E-01	1.00E-02
118	Hexachlorobenzene	na	na	5.00E-06	5.00E-06	7.90E-05	na	5.00E-06	6.61E-02	7.56E-05	no	5.00E-06	1.29E-04	3.87E-02	no	5.00E-06	2.73E-01	5.00E-06
119	Hexachlorobutadiene	na	na	1.00E-02	1.00E-02	1.00E-02	na	1.00E-02	2.58E+02	3.87E-05	no	1.00E-02	8.28E+00	1.21E-03	no	1.00E-02	5.61E-01	1.00E-02
120	Hexachlorocyclopentadiene	na	na	1.00E+00	1.00E+00	4.00E+00	na	1.00E+00	9.93E+02	1.01E-03	no	1.00E+00	na	na	na	na	4.80E+01	1.00E+00
121	Hexachloroethane	na	na	2.00E-02	2.00E-02	1.00E-01	na	2.00E-02	5.78E+00	3.46E-03	no	2.00E-02	5.16E-01	3.87E-02	no	2.00E-02	1.09E+00	2.00E-02
122	Isophorone	na	na	2.70E+01	na	3.40E+01	na	2.70E+01	3.28E+04	8.24E-04	no	2.70E+01	4.31E+02	6.26E-02	no	2.70E+01	9.21E+01	2.70E+01
123	2-Methoxynaphthalene	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
124	2-Methylphenol (o-cresol)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	8.00E+02	8.00E+02
125	3-Methylphenol (m-cresol)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	8.00E+02	8.00E+02
126	4-Methylphenol (p-cresol)	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.60E+03	1.60E+03
127	2-Nitroaniline	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	1.60E+02	1.60E+02
128	3-Nitroaniline	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
129	4-Nitroaniline	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	4.38E+00	4.38E+00
130	Nitrobenzene	na	na	3.00E+01	3.00E+01	1.00E+01	na	1.00E+01	4.97E+02	2.01E-02	no	1.00E+01	na	na	na	na	1.60E+01	1.00E+01
131	2-Nitrophenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
132	4-Nitrophenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
133	n-Nitrosodimethylamine	na	na	6.50E-04	na	6.90E-04	na	6.50E-04	2.21E+02	2.94E-06	no	6.50E-04	2.22E-01	2.93E-03	no	6.50E-04	2.30E-04	2.30E-04
134	n-Nitrosodiphenylamine	na	na	6.20E-01	na	3.30E+00	na	6.20E-01	na	na	na	6.20E-01	2.69E+00	2.30E-01	no	6.20E-01	1.79E+01	6.20E-01
135	n-Nitrosodi-n-propylamine	na	na	4.40E-03	na	5.00E-03	na	4.40E-03	na	na	na	4.40E-03	2.27E-01	1.94E-02	no	4.40E-03	1.25E-02	4.40E-03
136	Pentachlorophenol	5.40E+00	1.50E+01	2.00E-03	2.00E-03	3.00E-02	na	2.00E-03	3.26E+02	6.13E-06	no	2.00E-03	4.08E-01	4.90E-03	no	2.00E-03	1.00E+00	2.00E-03
137	Phenol	na	na	9.00E+03	9.00E+03	4.00E+03	na	4.00E+03	1.54E+05	2.60E-02	no	4.00E+03	na	na	na	na	4.80E+03	4.00E+03
138	Pyridine	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	8.00E+00	8.00E+00
139	2,3,4,5-Tetrachlorophenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
140	2,3,4,6-Tetrachlorophenol	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	4.80E+02	4.80E+02
141	1,2,4-Trichlorobenzene	na	na	3.60E-02	3.60E-02	7.10E-02	na	3.60E-02	6.30E+01	5.72E-04	no	3.60E-02	5.43E-01	6.63E-02	no	3.60E-02	1.51E+01	3.60E-02
142	2,4,5-Trichlorophenol	na	na	na	na	3.00E+02	na	3.00E+02	na	na	na	3.00E+02	na	na	na	na	1.60E+03	3.00E+02
143	2,4,6-Trichlorophenol	na	na	2.50E-01	na	1.50E+00	na	2.50E-01	4.79E+00	5.22E-02	no	2.50E-01	1.09E+00	2.30E-01	no	2.50E-01	7.95E+00	2.50E-01
144	***Volatile Organic Compounds***																	
145	Acetone	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	7.20E+03	7.20E+03
146	Acetaldehyde	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
147	Acrolein	3.00E+00	3.00E+00	1.00E+00	na	3.00E+00	na	1.00E+00	na	na	na	1.00E+00	na	na	na	na	4.00E+00	1.00E+00
148	Acrylonitrile	na	na	1.90E-02	na	6.10E-02	na	1.90E-02	2.39E+01	7.94E-04	no	1.90E-02	1.11E-01	1.71E-01	no	1.90E-02	8.10E-02	1.90E-02

							X		
Other SVOCs									
	X								
	X								
			X						
	X								
	X								
			X						
	X	X							
	X	X							
	X								
	X	X							
	X	X							
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									X
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	X	X	X						
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PCUL Workbook - Ground Water and Surface Water Equations Chemicals highlighted yellow are mutagenic

Chemical	RfDo (mg/kg-day) Param	CPFo (risk per mg/kg-day) Param	INH (unitless) Param	BCF (L/kg) Param	MTCA-B Ground Water Noncancer (ug/L) MTCA Eq. 720-1	MTCA-B Ground Water Cancer (ug/L) MTCA Eq. 720-2	MTCA-B Surface Water Noncancer (ug/L) MTCA Eq. 730-1	MTCA-B Surface Water Cancer (ug/L) MTCA Eq. 730-2
PCBs								
Total PCB Aroclors	na	2.00E+00	2	3.12E+04	na	2.19E-02	na	2.88E-05
Total PCB congeners	na	2.00E+00	2	3.12E+04	na	2.19E-02	na	2.88E-05
Total PCB TEQ	7.00E-10	1.30E+05	2	3.12E+04	5.60E-06	3.37E-07	1.61E-08	4.43E-10
Dioxins/Furans								
Total dioxin/furan TEQ	7.00E-10	1.30E+05	2	5.00E+03	5.60E-06	3.37E-07	1.01E-07	2.76E-09
2,3,7,8-TCDD	7.00E-10	1.30E+05	2	5.00E+03	5.60E-06	3.37E-07	1.01E-07	2.76E-09
Total chlorinated dioxins	na	na	2	5.00E+03	na	na	na	na
Total chlorinated furans	na	na	2	5.00E+03	na	na	na	na
Inorganics								
Ammonia	na	na	2	na	na	na	na	na
Chloride	na	na	1	na	na	na	na	na
Cyanide, free	6.30E-04	na	2	1.00E+00	5.04E+00	na	4.52E+02	na
Fluoride	6.00E-02	na	1	na	9.60E+02	na	na	na
Nitrate	1.60E+00	na	1	na	2.56E+04	na	na	na
Nitrite	1.00E-01	na	1	na	1.60E+03	na	na	na
Sulfate	na	na	1	na	na	na	na	na
Sulfide	na	na	na	na	na	na	na	na
Metals								
Aluminum	1.00E+00	na	1	na	1.60E+04	na	na	na
Antimony	4.00E-04	na	1	1.00E+00	6.40E+00	na	2.87E+02	na
Arsenic	6.00E-05	3.20E+01	1	4.40E+01	9.60E-01	2.73E-03	9.79E-01	1.27E-03
Barium	2.00E-01	na	1	na	3.20E+03	na	na	na
Beryllium	2.00E-03	na	1	1.90E+01	3.20E+01	na	7.56E+01	na
Cadmium	1.00E-03	na	1	6.40E+01	8.00E+00	na	1.12E+01	na
Chromium, total	na	na	1	na	na	na	na	na
Chromium, trivalent	1.50E+00	na	1	1.60E+01	2.40E+04	na	6.73E+04	na
Chromium, hexavalent	9.00E-04	1.60E-01	1	1.60E+01	1.44E+01	1.40E-01	4.04E+01	1.14E-01
Cobalt	3.00E-04	na	1	na	4.80E+00	na	na	na
Copper	4.00E-02	na	1	3.60E+01	6.40E+02	na	7.98E+02	na
Iron	7.00E-01	na	1	na	1.12E+04	na	na	na
Lead	na	na	1	na	na	na	na	na
Manganese	4.67E-02	na	1	na	7.47E+02	na	na	na
Mercury, inorganic	na	na	2	na	na	na	na	na
Methylmercury	1.00E-04	na	1	na	1.60E+00	na	na	na
Molybdenum	5.00E-03	na	1	na	8.00E+01	na	na	na
Nickel	2.00E-02	na	1	4.70E+01	3.20E+02	na	3.06E+02	na
Selenium	5.00E-03	na	1	4.80E+00	8.00E+01	na	7.48E+02	na
Silver	5.00E-03	na	1	5.00E-01	8.00E+01	na	7.18E+03	na
Thallium	1.00E-05	na	1	1.16E+02	1.60E-01	na	6.19E-02	na
Tin	6.00E-01	na	1	na	9.60E+03	na	na	na
Vanadium	5.00E-03	na	1	na	8.00E+01	na	na	na
Zinc	3.00E-01	na	1	4.70E+01	4.80E+03	na	4.58E+03	na

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Metals - Butyltins								
Monobutyltin	na	na	na	na	na	na	na	na
Dibutyltin	na	na	na	na	na	na	na	na
Trybutyl tin	na	na	2	na	na	na	na	na
Tributyltin oxide	3.00E-04	na	1	na	4.80E+00	na	na	na
Tetrabutyltin	na	na	1	na	na	na	na	na
SVOCs - PAHs								
Acenaphthene	6.00E-02	na	2	2.42E+02	4.80E+02	na	1.78E+02	na
Acenaphthylene	na	na	na	na	na	na	na	na
Anthracene	3.00E-01	na	2	3.00E+01	2.40E+03	na	7.18E+03	na
Benzo(a)anthracene	na	na	1	3.00E+01	na	na	na	na
Benzo(b)fluoranthene	na	na	1	3.00E+01	na	na	na	na
Benzo(k)fluoranthene	na	na	1	3.00E+01	na	na	na	na
Total benzofluoranthenes	na	na	na	na	na	na	na	na
Benzo(g,h,i)perylene	na	na	na	na	na	na	na	na
Benzo(a)pyrene	3.00E-04	1.00E+00	1	3.00E+01	4.80E+00	2.30E-02	7.18E+00	9.69E-03
Chrysene	na	na	1	3.00E+01	na	na	na	na
Dibenz(a,h)anthracene	na	na	1	3.00E+01	na	na	na	na
Dibenzofuran	1.00E-03	na	2	na	8.00E+00	na	na	na
Fluoranthene	4.00E-02	na	1	1.15E+03	6.40E+02	na	2.50E+01	na
Fluorene	4.00E-02	na	2	3.00E+01	3.20E+02	na	9.57E+02	na
Indeno(1,2,3-cd)pyrene	na	na	1	3.00E+01	na	na	na	na
Methyl isopropyl phenanthrene (retene)	na	na	na	na	na	na	na	na
1-Methylnaphthalene	7.00E-02	5.10E-02	2	na	5.60E+02	8.58E-01	na	na
2-Methylnaphthalene	4.00E-03	na	2	na	3.20E+01	na	na	na
Naphthalene	2.00E-02	na	2	1.05E+01	1.60E+02	na	1.37E+03	na
Phenanthrene	na	na	na	na	na	na	na	na
Pyrene	3.00E-02	na	2	3.00E+01	2.40E+02	na	7.18E+02	na
Total LPAHs	na	na	na	na	na	na	na	na
Total HPAHs	na	na	na	na	na	na	na	na
Total PAHs	na	na	na	na	na	na	na	na
Total cPAH TEQ	na	1.00E+00	1	3.00E+01	na	2.30E-02	na	9.69E-03
Other SVOCs								
Aniline	7.00E-03	5.70E-03	1	na	1.12E+02	1.54E+01	na	na
Azobenzene	na	1.10E-01	2	na	na	3.98E-01	na	na
Benzidine	3.00E-03	2.30E+02	1	8.75E+01	4.80E+01	1.00E-04	2.46E+01	1.47E-05
Benzoic acid	4.00E+00	na	1	na	6.40E+04	na	na	na
Benzyl alcohol	1.00E-01	na	1	na	1.60E+03	na	na	na
Bis(2-chloroethoxy)methane	3.00E-03	na	1	na	4.80E+01	na	na	na
Bis(2-chloroethyl)ether	na	1.10E+00	2	6.90E+00	na	3.98E-02	na	2.36E-01
Bis(chloromethyl)ether	na	2.20E+02	2	na	na	1.99E-04	na	na
Bis(2-chloro-1-methylethyl)ether	4.00E-02	7.00E-02	2	2.47E+00	3.20E+02	6.25E-01	1.16E+04	1.04E+01
2,6-Bis(1,1-dimethylethyl) phenol	na	na	na	na	na	na	na	na

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Chemical	RfDo (mg/kg-day) Param	CPFo (risk per mg/kg-day) Param	INH (unitless) Param	BCF (L/kg) Param	MTCA-B Ground Water Noncancer (ug/L) MTCA Eq. 720-1	MTCA-B Ground Water Cancer (ug/L) MTCA Eq. 720-2	MTCA-B Surface Water Noncancer (ug/L) MTCA Eq. 730-1	MTCA-B Surface Water Cancer (ug/L) MTCA Eq. 730-2
Bis(2-ethylhexyl) phthalate	2.00E-02	1.40E-02	1	1.30E+02	3.20E+02	6.25E+00	1.10E+02	9.86E-01
4-Bromophenyl phenyl ether	na	na	na	na	na	na	na	na
Butyl benzyl phthalate	2.00E-01	1.90E-03	1	4.14E+02	3.20E+03	4.61E+01	3.47E+02	2.28E+00
Butyl diphenyl phosphate	na	na	na	na	na	na	na	na
Carbazole	na	na	na	na	na	na	na	na
4-Chloroaniline	4.00E-03	2.00E-01	1	na	6.40E+01	4.38E-01	na	na
4-Chloro-3-methylphenol (chlorocresol)	1.00E-01	na	1	na	1.60E+03	na	na	na
2-Chloronaphthalene (beta-)	8.00E-02	na	2	2.02E+02	6.40E+02	na	2.84E+02	na
2-Chlorophenol	5.00E-03	na	2	1.34E+02	4.00E+01	na	2.68E+01	na
4-Chlorophenyl phenyl ether	na	na	na	na	na	na	na	na
Dibutyl phthalate	1.00E-01	na	1	8.90E+01	1.60E+03	na	8.07E+02	na
Dibutyl phenyl phosphate	na	na	na	na	na	na	na	na
1,2-Dichlorobenzene	9.00E-02	na	2	5.56E+01	7.20E+02	na	1.16E+03	na
1,3-Dichlorobenzene	na	na	2	na	na	na	na	na
1,4-Dichlorobenzene	7.00E-02	5.40E-03	2	5.56E+01	5.60E+02	8.10E+00	9.04E+02	5.98E+00
3,3'-Dichlorobenzidine	na	4.50E-01	1	3.12E+02	na	1.94E-01	na	1.28E-02
2,4-Dichlorophenol	3.00E-03	na	1	4.07E+01	4.80E+01	na	5.29E+01	na
Di(2-ethylhexyl)adipate	6.00E-01	1.20E-03	1	na	9.60E+03	7.29E+01	na	na
Diethyl phthalate	8.00E-01	na	1	7.30E+01	1.28E+04	na	7.87E+03	na
Dimethyl phthalate	na	na	1	3.60E+01	na	na	na	na
2,4-Dimethylphenol	2.00E-02	na	1	9.38E+01	3.20E+02	na	1.53E+02	na
1,2-Dinitrobenzene	1.00E-04	na	1	na	1.60E+00	na	na	na
1,3-Dinitrobenzene	1.00E-04	na	1	na	1.60E+00	na	na	na
1,4-Dinitrobenzene	1.00E-04	na	1	na	1.60E+00	na	na	na
4,6-Dinitro-o-cresol (DNOC)	8.00E-05	na	1	na	1.28E+00	na	na	na
2,4-Dinitrophenol	2.00E-03	na	1	1.50E+00	3.20E+01	na	9.57E+02	na
2,4-Dinitrotoluene	2.00E-03	3.10E-01	1	3.80E+00	3.20E+01	2.82E-01	3.78E+02	1.52E+00
2,6-Dinitrotoluene	3.00E-04	1.50E+00	1	na	4.80E+00	5.83E-02	na	na
Di-n-octyl phthalate	1.00E-02	na	1	na	1.60E+02	na	na	na
1,4-Dioxane	3.00E-02	1.00E-01	2	na	2.40E+02	4.38E-01	na	na
1,2-Diphenylhydrazine	na	8.00E-01	1	2.49E+01	na	1.09E-01	na	9.01E-02
Hexachlorobenzene	8.00E-04	1.60E+00	2	8.69E+03	6.40E+00	2.73E-02	6.61E-02	1.29E-04
Hexachlorobutadiene	1.00E-03	7.80E-02	2	2.78E+00	8.00E+00	5.61E-01	2.58E+02	8.28E+00
Hexachlorocyclopentadiene	6.00E-03	na	2	4.34E+00	4.80E+01	na	9.93E+02	na
Hexachloroethane	7.00E-04	4.00E-02	2	8.69E+01	5.60E+00	1.09E+00	5.78E+00	5.16E-01
Isophorone	2.00E-01	9.50E-04	1	4.38E+00	3.20E+03	9.21E+01	3.28E+04	4.31E+02
2-Methoxynaphthalene	na	na	na	na	na	na	na	na
2-Methylphenol (o-cresol)	5.00E-02	na	1	na	8.00E+02	na	na	na
3-Methylphenol (m-cresol)	5.00E-02	na	1	na	8.00E+02	na	na	na
4-Methylphenol (p-cresol)	1.00E-01	na	1	na	1.60E+03	na	na	na
2-Nitroaniline	1.00E-02	na	1	na	1.60E+02	na	na	na
3-Nitroaniline	na	na	na	na	na	na	na	na
4-Nitroaniline	4.00E-03	2.00E-02	1	na	6.40E+01	4.38E+00	na	na

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Nitrobenzene	2.00E-03	na	2	2.89E+00	1.60E+01	na	4.97E+02	na
2-Nitrophenol	na	na	na	na	na	na	na	na
4-Nitrophenol	na	na	na	na	na	na	na	na
n-Nitrosodimethylamine	8.00E-06	5.10E+01	2	2.60E-02	6.40E-02	2.30E-04	2.21E+02	2.22E-01
n-Nitrosodiphenylamine	na	4.90E-03	1	1.36E+02	na	1.79E+01	na	2.69E+00
n-Nitrosodi-n-propylamine	na	7.00E+00	1	1.13E+00	na	1.25E-02	na	2.27E-01
Pentachlorophenol	5.00E-03	4.00E-01	1	1.10E+01	8.00E+01	2.19E-01	3.26E+02	4.08E-01
Phenol	3.00E-01	na	1	1.40E+00	4.80E+03	na	1.54E+05	na
Pyridine	1.00E-03	na	2	na	8.00E+00	na	na	na
2,3,4,5-Tetrachlorophenol	na	na	na	na	na	na	na	na
2,3,4,6-Tetrachlorophenol	3.00E-02	na	1	na	4.80E+02	na	na	na
1,2,4-Trichlorobenzene	1.00E-02	2.90E-02	2	1.14E+02	8.00E+01	1.51E+00	6.30E+01	5.43E-01
2,4,5-Trichlorophenol	1.00E-01	na	1	na	1.60E+03	na	na	na
2,4,6-Trichlorophenol	1.00E-03	1.10E-02	1	1.50E+02	1.60E+01	7.95E+00	4.79E+00	1.09E+00
Volatile Organic Compounds								
Acetone	9.00E-01	na	2	na	7.20E+03	na	na	na
Acetaldehyde	na	na	2	na	na	na	na	na
Acrolein	5.00E-04	na	2	na	4.00E+00	na	na	na
Acrylonitrile	1.00E-03	5.40E-01	2	3.00E+01	8.00E+00	8.10E-02	2.39E+01	1.11E-01
Benzaldehyde	1.00E-01	4.00E-03	2	na	8.00E+02	1.09E+01	na	na
Benzene	4.00E-03	5.50E-02	2	5.20E+00	3.20E+01	7.95E-01	5.52E+02	6.28E+00
Bromobenzene	8.00E-03	na	2	na	6.40E+01	na	na	na
Bromochloromethane	na	na	2	na	na	na	na	na
Bromoethane	na	na	na	na	na	na	na	na
Bromoform	2.00E-02	7.90E-03	2	3.75E+00	1.60E+02	5.54E+00	3.83E+03	6.06E+01
Bromomethane	1.40E-03	na	2	3.75E+00	1.12E+01	na	2.68E+02	na
2-Butoxyethanol (EGBE)	1.00E-01	na	1	na	1.60E+03	na	na	na
n-Butylbenzene	5.00E-02	na	2	na	4.00E+02	na	na	na
sec-Butylbenzene	1.00E-01	na	2	na	8.00E+02	na	na	na
tert-Butylbenzene	1.00E-01	na	2	na	8.00E+02	na	na	na
Carbon disulfide	1.00E-01	na	2	na	8.00E+02	na	na	na
Carbon tetrachloride	4.00E-03	7.00E-02	2	1.88E+01	3.20E+01	6.25E-01	1.53E+02	1.37E+00
Chlorobenzene	2.00E-02	na	2	1.03E+01	1.60E+02	na	1.39E+03	na
Chloroethane	na	na	2	na	na	na	na	na
2-Chloroethyl vinyl ether	na	na	na	na	na	na	na	na
Chloroform	1.00E-02	3.10E-02	2	3.75E+00	8.00E+01	1.41E+00	1.91E+03	1.54E+01
Chloromethane	na	na	2	3.75E+00	na	na	na	na
3-Chloro-1-propene (allyl chloride)	na	2.10E-02	2	na	na	2.08E+00	na	na
2-Chlorotoluene	2.00E-02	na	2	na	1.60E+02	na	na	na
4-Chlorotoluene	2.00E-02	na	2	na	1.60E+02	na	na	na
Dibromochloromethane	2.00E-02	8.40E-02	2	3.75E+00	1.60E+02	5.21E-01	3.83E+03	5.70E+00
1,2-Dibromo-3-chloropropane	2.00E-04	8.00E-01	2	na	1.60E+00	1.40E-02	na	na
Dibromomethane	1.00E-02	na	2	na	8.00E+01	na	na	na

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Dichlorobromomethane	2.00E-02	6.20E-02	2	3.75E+00	1.60E+02	7.06E-01	3.83E+03	7.72E+00
trans-1,4-Dichloro-2-butene	na	na	2	na	na	na	na	na
Dichlorodifluoromethane	2.00E-01	na	2	na	1.60E+03	na	na	na
1,1-Dichloroethane	2.00E-01	5.70E-03	2	na	1.60E+03	7.68E+00	na	na
1,2-Dichloroethane (EDC)	6.00E-03	9.10E-02	2	1.20E+00	4.80E+01	4.81E-01	3.59E+03	1.64E+01
1,1-Dichloroethylene	5.00E-02	na	2	5.60E+00	4.00E+02	na	6.41E+03	na
cis-1,2-Dichloroethylene	2.00E-03	na	2	na	1.60E+01	na	na	na
trans-1,2-Dichloroethylene	2.00E-02	na	2	1.58E+00	1.60E+02	na	9.09E+03	na
1,2-Dichloroethylene (mixed isomers)	na	na	na	na	na	na	na	na
1,2-Dichloropropane	4.00E-02	3.70E-02	2	4.11E+00	3.20E+02	1.18E+00	6.99E+03	1.18E+01
1,3-Dichloropropane	2.00E-02	na	2	na	1.60E+02	na	na	na
2,2-Dichloropropane	na	na	na	na	na	na	na	na
1,1-Dichloropropene	na	na	na	na	na	na	na	na
cis-1,3-Dichloropropene	3.00E-02	1.00E-01	2	1.91E+00	2.40E+02	4.38E-01	1.13E+04	9.40E+00
trans-1,3-Dichloropropene	3.00E-02	1.00E-01	2	1.91E+00	2.40E+02	4.38E-01	1.13E+04	9.40E+00
Diisopropyl ether	na	na	2	na	na	na	na	na
Ethane	na	na	na	na	na	na	na	na
Ethylbenzene	1.00E-01	na	2	3.75E+01	8.00E+02	na	1.91E+03	na
Ethylene oxide	na	3.10E-01	2	na	na	3.70E-02	na	na
Ethyl ether	2.00E-01	na	2	na	1.60E+03	na	na	na
Ethylene dibromide (EDB)	9.00E-03	2.00E+00	2	na	7.20E+01	2.19E-02	na	na
Formaldehyde	2.00E-01	2.10E-02	2	na	1.60E+03	5.50E-01	na	na
n-Hexane	6.00E-02	na	2	na	4.80E+02	na	na	na
2-Hexanone	5.00E-03	na	2	na	4.00E+01	na	na	na
Isopropylbenzene (cumene)	1.00E-01	na	2	na	8.00E+02	na	na	na
4-Isopropyltoluene (p-isopropyltoluene)	4.00E-03	na	2	na	3.20E+01	na	na	na
Methane	na	na	na	na	na	na	na	na
Methyl ethyl ketone (2-butanone)	6.00E-01	na	2	na	4.80E+03	na	na	na
Methyl iodide	na	na	na	na	na	na	na	na
Methyl isobutyl ketone	8.00E-02	na	2	na	6.40E+02	na	na	na
Methyl tert-butyl ether (MTBE)	na	1.80E-03	2	na	na	2.43E+01	na	na
Methylene chloride	6.00E-03	2.00E-03	2	9.00E-01	4.80E+01	5.80E+00	4.79E+03	1.63E+02
2-Pentanone	na	na	na	na	na	na	na	na
n-Propylbenzene	1.00E-01	na	2	na	8.00E+02	na	na	na
Styrene	2.00E-01	na	2	na	1.60E+03	na	na	na
1,1,1,2-Tetrachloroethane	3.00E-02	2.60E-02	2	na	2.40E+02	1.68E+00	na	na
1,1,2,2-Tetrachloroethane	2.00E-02	2.00E-01	2	5.00E+00	1.60E+02	2.19E-01	2.87E+03	1.79E+00
Tetrachloroethylene (PCE)	6.00E-03	2.10E-03	2	3.10E+01	4.80E+01	2.08E+01	1.39E+02	2.76E+01
Tetrahydrofuran	9.00E-01	na	2	na	7.20E+03	na	na	na
Toluene	8.00E-02	na	2	1.07E+01	6.40E+02	na	5.37E+03	na
1,2,3-Trichlorobenzene	8.00E-04	na	2	na	6.40E+00	na	na	na
1,1,1-Trichloroethane	2.00E+00	na	2	5.60E+00	1.60E+04	na	2.56E+05	na
1,1,2-Trichloroethane	4.00E-03	5.70E-02	2	4.50E+00	3.20E+01	7.68E-01	6.38E+02	7.00E+00

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Trichloroethylene (TCE)	5.00E-04	4.60E-02	2	1.10E+01	4.00E+00	5.40E-01	3.26E+01	1.36E+00
Trichlorofluoroethane	na	na	na	na	na	na	na	na
Trichlorofluoromethane	3.00E-01	na	2	na	2.40E+03	na	na	na
1,2,3-Trichloropropane	4.00E-03	3.00E+01	2	na	3.20E+01	3.80E-04	na	na
Trichlorotrifluoroethane	3.00E+01	na	2	na	2.40E+05	na	na	na
1,2,3-Trimethylbenzene	1.00E-02	na	2	na	8.00E+01	na	na	na
1,2,4-Trimethylbenzene	1.00E-02	na	2	na	8.00E+01	na	na	na
1,3,5-Trimethylbenzene	1.00E-02	na	2	na	8.00E+01	na	na	na
Vinyl acetate	1.00E+00	na	2	na	8.00E+03	na	na	na
Vinyl chloride	3.00E-03	1.50E+00	2	1.17E+00	2.40E+01	2.92E-02	1.84E+03	1.02E+00
Total xylenes	2.00E-01	na	2	na	1.60E+03	na	na	na
PFAS								
6:2 Fluorotelomer sulfonic acid (6:2 FTS)	2.00E-04	na	1	na	3.20E+00	na	na	na
GenX (HFPO-DA)	3.00E-06	na	2	na	2.40E-02	na	na	na
Perfluorobutanoic acid (PFBA)	1.00E-03	na	2	na	8.00E+00	na	na	na
Perfluorobutanesulfonic acid (PFBS)	3.00E-04	na	1	na	4.80E+00	na	na	na
Perfluorodecanoic acid (PFDA)	2.00E-09	na	1	na	3.20E-05	na	na	na
Perfluorohexanoic acid (PFHxA)	5.00E-04	na	1	na	8.00E+00	na	na	na
Perfluorohexanesulfonic acid (PFHxS)	4.00E-10	na	1	na	6.40E-06	na	na	na
Perfluorononanoic acid (PFNA)	2.50E-06	na	1	na	4.00E-02	na	na	na
Perfluorooctanesulfonic acid (PFOS)	1.00E-07	3.95E+01	1	na	1.60E-03	2.22E-03	na	na
Perfluorooctanoic acid (PFOA)	3.00E-08	2.93E+04	1	na	4.80E-04	2.99E-06	na	na
Petroleum Hydrocarbons								
Gasoline range hydrocarbons, fresh	na	na	1	na	8.00E+02	na	8.00E+02	na
Gasoline range hydrocarbons, weathered	na	na	1	na	1.00E+03	na	1.00E+03	na
Diesel range hydrocarbons, fresh	na	na	1	na	5.00E+02	na	5.00E+02	na
Diesel range hydrocarbons, weathered	na	na	1	na	5.00E+02	na	5.00E+02	na
Oil range hydrocarbons	na	na	1	na	5.00E+02	na	5.00E+02	na
Total diesel & oil range hydrocarbons	na	na	na	na	5.00E+02	na	5.00E+02	na
Pesticides								
Aldrin	3.00E-05	1.70E+01	2	4.67E+03	2.40E-01	2.57E-03	4.61E-03	2.26E-05
alpha-BHC (alpha-HCH)	9.00E-04	6.30E+00	1	1.30E+02	1.44E+01	1.39E-02	4.97E+00	2.19E-03
beta-BHC (beta-HCH)	na	1.80E+00	1	1.30E+02	na	4.86E-02	na	7.67E-03
delta-BHC (delta-HCH)	6.00E-08	na	1	na	9.60E-04	na	na	na
Carbaryl	1.00E-01	na	1	na	1.60E+03	na	na	na
cis-Chlordane (alpha)	5.00E-04	na	2	na	4.00E+00	na	na	na
trans-Chlordane (gamma)	5.00E-04	na	2	na	4.00E+00	na	na	na
Chlordane	5.00E-04	3.50E-01	2	1.41E+04	4.00E+00	1.25E-01	2.55E-02	3.64E-04
Chlorpyrifos	1.00E-03	na	1	na	1.60E+01	na	na	na
4,4'-DDD	5.00E-04	2.40E-01	1	5.36E+04	8.00E+00	3.65E-01	6.70E-03	1.40E-04
4,4'-DDE	5.00E-04	3.40E-01	2	5.36E+04	4.00E+00	1.29E-01	6.70E-03	9.85E-05
4,4'-DDT	5.00E-04	3.40E-01	1	5.36E+04	8.00E+00	2.57E-01	6.70E-03	9.85E-05
Total DDD	5.00E-04	2.40E-01	1	5.36E+04	8.00E+00	3.65E-01	6.70E-03	1.40E-04

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Total DDE	5.00E-04	3.40E-01	2	5.36E+04	4.00E+00	1.29E-01	6.70E-03	9.85E-05
Total DDT	5.00E-04	3.40E-01	1	5.36E+04	8.00E+00	2.57E-01	6.70E-03	9.85E-05
Diazinon	7.00E-04	na	1	na	1.12E+01	na	na	na
Dieldrin	5.00E-05	1.60E+01	1	4.67E+03	8.00E-01	5.47E-03	7.69E-03	2.40E-05
Endosulfan I	na	na	1	na	na	na	na	na
Endosulfan II	na	na	1	na	na	na	na	na
Endosulfan sulfate	6.00E-03	na	1	na	9.60E+01	na	na	na
Endrin	3.00E-04	na	1	3.97E+03	4.80E+00	na	5.43E-02	na
Endrin aldehyde	na	na	1	na	na	na	na	na
Endrin ketone	na	na	na	na	na	na	na	na
Heptachlor	5.00E-04	4.50E+00	2	1.12E+04	4.00E+00	9.72E-03	3.21E-02	3.56E-05
Heptachlor epoxide	1.30E-05	9.10E+00	2	1.12E+04	1.04E-01	4.81E-03	8.33E-04	1.76E-05
Lindane (gamma-BHC)	3.00E-04	1.10E+00	1	1.30E+02	4.80E+00	7.95E-02	1.66E+00	1.26E-02
Malathion	2.00E-02	na	1	na	3.20E+02	na	na	na
Methoxychlor	5.00E-03	na	1	1.55E+03	8.00E+01	na	2.32E+00	na
Mirex	2.00E-04	1.80E+01	2	na	1.60E+00	2.43E-03	na	na
Nonachlor	na	na	na	na	na	na	na	na
Toxaphene	9.00E-05	1.10E+00	1	1.31E+04	1.44E+00	7.95E-02	4.93E-03	1.25E-04

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PCUL Workbook - Modified Equation 747-1 (Ground Water PCUL for Protection of Sediment at Freshwater Sites)

Sort Order	Chemical	Sediment Kd (pH 6.8, Site-specific Foc) (L/kg) Param	SMS Lower Tier Sediment PCUL (mg/kg DW) Sed-FW	GW-3 Ground Water PCUL Protect Sediment (µg/L) Modified Eq. 747-1	SMS Upper Tier Sediment PCUL (mg/kg DW) Sed-FW	Ground Water PCUL Protect Sediment SMS Upper Tier (µg/L) Modified Eq. 747-1	User-Defined Sediment PCUL (mg/kg DW) Specify Source	Ground Water PCUL to Protect User-Defined Sediment PCUL (µg/L) Modified Eq. 747-1
1	***PCBs***							
2	Total PCB Aroclors	3.91E+02	1.20E-02	3.07E-02	1.20E-02	3.07E-02		0.00E+00
3	Total PCB congeners	3.91E+02	3.50E-03	8.96E-03	3.50E-03	8.96E-03		0.00E+00
4	Total PCB TEQ	3.91E+02	7.00E-07	1.79E-06	7.00E-07	1.79E-06		0.00E+00
5	***Dioxins/Furans***							
6	Total dioxin/furan TEQ	1.25E+03	5.00E-06	4.01E-06	5.00E-06	4.01E-06		0.00E+00
7	2,3,7,8-TCDD	1.25E+03	2.86E-05	2.30E-05	1.21E-04	9.71E-05		0.00E+00
8	Total chlorinated dioxins	1.25E+03	na	na	na	na		0.00E+00
9	Total chlorinated furans	1.25E+03	na	na	na	na		0.00E+00
10	***Inorganics***							
11	Ammonia	na	na	na	na	na		na
12	Chloride	na	na	na	na	na		na
13	Cyanide, free	9.90E+00	na	na	na	na		0.00E+00
14	Fluoride	1.50E+02	na	na	na	na		0.00E+00
15	Nitrate	na	na	na	na	na		na
16	Nitrite	na	na	na	na	na		na
17	Sulfate	na	na	na	na	na		na
18	Sulfide	na	3.90E+01	na	6.10E+01	na		na
19	***Metals***							
20	Aluminum	1.50E+03	na	na	na	na		0.00E+00
21	Antimony	4.50E+01	na	na	na	na		0.00E+00
22	Arsenic	2.90E+01	9.75E-02	3.33E+00	3.85E-01	1.32E+01		0.00E+00
23	Barium	4.10E+01	na	na	na	na		0.00E+00
24	Beryllium	7.90E+02	na	na	na	na		0.00E+00
25	Cadmium	6.70E+00	7.70E-01	1.10E+02	7.70E-01	1.10E+02		0.00E+00
26	Chromium, total	1.00E+03	7.20E+01	7.20E+01	8.80E+01	8.80E+01		0.00E+00
27	Chromium, trivalent	1.00E+03	na	na	na	na		0.00E+00
28	Chromium, hexavalent	1.90E+01	7.20E+00	3.73E+02	4.16E+01	2.16E+03		0.00E+00
29	Cobalt	4.50E+01	na	na	na	na		0.00E+00
30	Copper	2.20E+01	4.00E+02	1.79E+04	1.20E+03	5.38E+04		0.00E+00
31	Iron	2.50E+01	na	na	na	na		0.00E+00
32	Lead	1.00E+04	2.10E+01	2.10E+00	2.10E+01	2.10E+00		0.00E+00
33	Manganese	6.50E+01	na	na	na	na		0.00E+00
34	Mercury, inorganic	5.20E+01	7.00E-02	1.34E+00	7.00E-02	1.34E+00		0.00E+00
35	Methylmercury	7.00E+03	6.68E+01	9.54E+00	6.68E+01	9.54E+00		0.00E+00
36	Molybdenum	2.00E+01	na	na	na	na		0.00E+00
37	Nickel	6.50E+01	2.60E+01	3.98E+02	1.10E+02	1.68E+03		0.00E+00
38	Selenium	5.00E+00	7.80E-01	1.48E+02	7.80E-01	1.48E+02		0.00E+00
39	Silver	8.30E+00	5.70E-01	6.64E+01	1.70E+00	1.98E+02		0.00E+00
40	Thallium	7.10E+01	na	na	na	na		0.00E+00
41	Tin	2.50E+02	na	na	na	na		0.00E+00
42	Vanadium	1.00E+03	na	na	na	na		0.00E+00

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43	Zinc	6.20E+01	3.20E+03	5.14E+04	4.20E+03	6.74E+04		0.00E+00
44	***Metals - Butyltins***							
45	Monobutyltin	na	5.40E-01	na	4.80E+00	na		na
46	Dibutyltin	na	9.10E-01	na	1.30E+02	na		na
47	Trybutyl tin	4.05E+01	2.10E-03	5.16E-02	2.10E-03	5.16E-02		0.00E+00
48	Tributyltin oxide	1.30E+05	2.10E-03	1.62E-05	2.10E-03	1.62E-05		0.00E+00
49	Tetrabutyltin	na	9.70E-02	na	9.70E-02	na		na
50	***SVOCs - PAHs***							
51	Acenaphthene	2.45E+01	na	na	na	na		0.00E+00
52	Acenaphthylene	na	na	na	na	na		na
53	Anthracene	1.18E+02	na	na	na	na		0.00E+00
54	Benzo(a)anthracene	1.79E+03	9.00E-03	5.03E-03	9.00E-03	5.03E-03		0.00E+00
55	Benzo(b)fluoranthene	3.00E+03	9.00E-03	3.00E-03	9.00E-03	3.00E-03		0.00E+00
56	Benzo(k)fluoranthene	2.94E+03	9.00E-03	3.07E-03	9.00E-03	3.07E-03		0.00E+00
57	Total benzofluoranthenes	na	1.20E-02	na	1.20E-02	na		na
58	Benzo(g,h,i)perylene	na	5.00E-03	na	5.00E-03	na		na
59	Benzo(a)pyrene	4.84E+03	9.00E-03	1.86E-03	9.00E-03	1.86E-03		0.00E+00
60	Chrysene	9.15E+02	9.00E-03	9.83E-03	9.00E-03	9.83E-03		0.00E+00
61	Dibenz(a,h)anthracene	8.95E+03	9.00E-03	1.01E-03	9.00E-03	1.01E-03		0.00E+00
62	Dibenzofuran	4.58E+01	2.00E-01	4.34E+00	6.80E-01	1.48E+01		0.00E+00
63	Fluoranthene	2.46E+02	5.00E-03	2.03E-02	5.00E-03	2.03E-02		0.00E+00
64	Fluorene	3.86E+01	na	na	na	na		0.00E+00
65	Indeno(1,2,3-cd)pyrene	9.75E+03	9.00E-03	9.23E-04	9.00E-03	9.23E-04		0.00E+00
66	Methyl isopropyl phenanthrene (retene)	na	na	na	na	na		na
67	1-Methylnaphthalene	1.27E+01	na	na	na	na		0.00E+00
68	2-Methylnaphthalene	1.24E+01	na	na	na	na		0.00E+00
69	Naphthalene	5.95E+00	na	na	na	na		0.00E+00
70	Phenanthrene	na	na	na	na	na		na
71	Pyrene	3.40E+02	5.00E-03	1.47E-02	5.00E-03	1.47E-02		0.00E+00
72	Total LPAHs	na	na	na	na	na		na
73	Total HPAHs	na	na	na	na	na		na
74	Total PAHs	na	1.70E+01	na	3.00E+01	na		na
75	Total cPAH TEQ	4.84E+03	2.10E-02	4.34E-03	2.10E-02	4.34E-03		0.00E+00
76	***Other SVOCs***							
77	Aniline	3.51E-01	na	na	na	na		0.00E+00
78	Azobenzene	1.88E+01	na	na	na	na		0.00E+00
79	Benzidine	5.95E+00	na	na	na	na		0.00E+00
80	Benzoic acid	3.00E-03	2.90E+00	1.00E+04	3.80E+00	1.31E+04		0.00E+00
81	Benzyl alcohol	1.08E-01	na	na	na	na		0.00E+00
82	Bis(2-chloroethoxy)methane	7.20E-02	na	na	na	na		0.00E+00
83	Bis(2-chloroethyl)ether	3.80E-01	na	na	na	na		0.00E+00
84	Bis(chloromethyl)ether	4.85E-02	na	na	na	na		0.00E+00
85	Bis(2-chloro-1-methylethyl)ether	4.15E-01	na	na	na	na		0.00E+00
86	2,6-Bis(1,1-dimethylethyl) phenol	na	na	na	na	na		na
87	Bis(2-ethylhexyl) phthalate	5.55E+02	5.00E-01	9.00E-01	2.20E+01	3.96E+01		0.00E+00
88	4-Bromophenyl phenyl ether	na	na	na	na	na		na
89	Butyl benzyl phthalate	6.85E+01	na	na	na	na		0.00E+00
90	Butyl diphenyl phosphate	na	na	na	na	na		na

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91	Carbazole	na	9.00E-01	na	1.10E+00	na		na
92	4-Chloroaniline	5.65E-01	na	na	na	na		0.00E+00
93	4-Chloro-3-methylphenol (chlorocresol)	2.46E+00	na	na	na	na		0.00E+00
94	2-Chloronaphthalene (beta-)	1.24E+01	na	na	na	na		0.00E+00
95	2-Chlorophenol	1.94E+00	na	na	na	na		0.00E+00
96	4-Chlorophenyl phenyl ether	na	na	na	na	na		na
97	Dibutyl phthalate	7.85E+00	3.80E-01	4.67E+01	1.00E+00	1.23E+02		0.00E+00
98	Dibutyl phenyl phosphate	na	na	na	na	na		na
99	1,2-Dichlorobenzene	1.90E+00	na	na	na	na		0.00E+00
100	1,3-Dichlorobenzene	1.88E+00	na	na	na	na		0.00E+00
101	1,4-Dichlorobenzene	3.08E+00	na	na	na	na		0.00E+00
102	3,3'-Dichlorobenzidine	1.60E+01	na	na	na	na		0.00E+00
103	2,4-Dichlorophenol	7.35E-01	na	na	na	na		0.00E+00
104	Di(2-ethylhexyl)adipate	1.80E+02	na	na	na	na		0.00E+00
105	Diethyl phthalate	4.10E-01	na	na	na	na		0.00E+00
106	Dimethyl phthalate	1.58E-01	na	na	na	na		0.00E+00
107	2,4-Dimethylphenol	2.46E+00	na	na	na	na		0.00E+00
108	1,2-Dinitrobenzene	1.80E+00	na	na	na	na		0.00E+00
109	1,3-Dinitrobenzene	1.76E+00	na	na	na	na		0.00E+00
110	1,4-Dinitrobenzene	1.76E+00	na	na	na	na		0.00E+00
111	4,6-Dinitro-o-cresol (DNOC)	3.77E+00	na	na	na	na		0.00E+00
112	2,4-Dinitrophenol	5.00E-05	na	na	na	na		0.00E+00
113	2,4-Dinitrotoluene	2.88E+00	na	na	na	na		0.00E+00
114	2,6-Dinitrotoluene	2.94E+00	na	na	na	na		0.00E+00
115	Di-n-octyl phthalate	7.05E+02	3.90E-02	5.53E-02	1.10E+00	1.56E+00		0.00E+00
116	1,4-Dioxane	1.32E-02	na	na	na	na		0.00E+00
117	1,2-Diphenylhydrazine	7.55E+00	na	na	na	na		0.00E+00
118	Hexachlorobenzene	4.00E+02	1.00E-03	2.50E-03	1.00E-03	2.50E-03		0.00E+00
119	Hexachlorobutadiene	4.23E+00	3.00E-04	6.65E-02	3.00E-04	6.65E-02		0.00E+00
120	Hexachlorocyclopentadiene	7.00E+00	na	na	na	na		0.00E+00
121	Hexachloroethane	9.85E-01	na	na	na	na		0.00E+00
122	Isophorone	3.26E-01	na	na	na	na		0.00E+00
123	2-Methoxynaphthalene	na	na	na	na	na		na
124	2-Methylphenol (o-cresol)	1.54E+00	na	na	na	na		0.00E+00
125	3-Methylphenol (m-cresol)	1.50E+00	na	na	na	na		0.00E+00
126	4-Methylphenol (p-cresol)	1.50E+00	2.60E-01	1.46E+02	2.00E+00	1.12E+03		0.00E+00
127	2-Nitroaniline	5.55E-01	na	na	na	na		0.00E+00
128	3-Nitroaniline	na	na	na	na	na		na
129	4-Nitroaniline	5.47E-01	na	na	na	na		0.00E+00
130	Nitrobenzene	5.95E-01	na	na	na	na		0.00E+00
131	2-Nitrophenol	na	na	na	na	na		na
132	4-Nitrophenol	na	na	na	na	na		na
133	n-Nitrosodimethylamine	1.14E-01	na	na	na	na		0.00E+00
134	n-Nitrosodiphenylamine	1.32E+01	na	na	na	na		0.00E+00
135	n-Nitrosodi-n-propylamine	1.38E+00	na	na	na	na		0.00E+00
136	Pentachlorophenol	1.12E+01	3.55E-01	3.08E+01	3.55E-01	3.08E+01		0.00E+00
137	Phenol	9.35E-01	1.20E-01	9.82E+01	2.10E-01	1.72E+02		0.00E+00
138	Pyridine	3.59E-01	na	na	na	na		0.00E+00

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139	2,3,4,5-Tetrachlorophenol	na	na	na	na	na		na
140	2,3,4,6-Tetrachlorophenol	1.40E+00	na	na	na	na		0.00E+00
141	1,2,4-Trichlorobenzene	8.30E+00	na	na	na	na		0.00E+00
142	2,4,5-Trichlorophenol	7.99E+00	na	na	na	na		0.00E+00
143	2,4,6-Trichlorophenol	1.91E+00	na	na	na	na		0.00E+00
144	***Volatile Organic Compounds***							
145	Acetone	1.18E-02	na	na	na	na		0.00E+00
146	Acetaldehyde	5.00E-03	na	na	na	na		0.00E+00
147	Acrolein	5.00E-03	na	na	na	na		0.00E+00
148	Acrylonitrile	4.26E-02	na	na	na	na		0.00E+00
149	Benzaldehyde	5.55E-02	na	na	na	na		0.00E+00
150	Benzene	3.10E-01	na	na	na	na		0.00E+00
151	Bromobenzene	1.17E+00	na	na	na	na		0.00E+00
152	Bromochloromethane	1.09E-01	na	na	na	na		0.00E+00
153	Bromoethane	na	na	na	na	na		na
154	Bromoform	6.30E-01	na	na	na	na		0.00E+00
155	Bromomethane	4.50E-02	na	na	na	na		0.00E+00
156	2-Butoxyethanol (EGBE)	1.41E-02	na	na	na	na		0.00E+00
157	n-Butylbenzene	7.40E+00	na	na	na	na		0.00E+00
158	sec-Butylbenzene	6.65E+00	na	na	na	na		0.00E+00
159	tert-Butylbenzene	5.00E+00	na	na	na	na		0.00E+00
160	Carbon disulfide	1.09E-01	na	na	na	na		0.00E+00
161	Carbon tetrachloride	7.60E-01	na	na	na	na		0.00E+00
162	Chlorobenzene	1.12E+00	na	na	na	na		0.00E+00
163	Chloroethane	1.09E-01	na	na	na	na		0.00E+00
164	2-Chloroethyl vinyl ether	na	na	na	na	na		na
165	Chloroform	2.65E-01	na	na	na	na		0.00E+00
166	Chloromethane	3.00E-02	na	na	na	na		0.00E+00
167	3-Chloro-1-propene (allyl chloride)	1.98E-01	na	na	na	na		0.00E+00
168	2-Chlorotoluene	1.92E+00	na	na	na	na		0.00E+00
169	4-Chlorotoluene	1.88E+00	na	na	na	na		0.00E+00
170	Dibromochloromethane	1.59E-01	na	na	na	na		0.00E+00
171	1,2-Dibromo-3-chloropropane	5.80E-01	na	na	na	na		0.00E+00
172	Dibromomethane	1.09E-01	na	na	na	na		0.00E+00
173	Dichlorobromomethane	1.59E-01	na	na	na	na		0.00E+00
174	trans-1,4-Dichloro-2-butene	6.60E-01	na	na	na	na		0.00E+00
175	Dichlorodifluoromethane	2.20E-01	na	na	na	na		0.00E+00
176	1,1-Dichloroethane	2.65E-01	na	na	na	na		0.00E+00
177	1,2-Dichloroethane (EDC)	1.90E-01	na	na	na	na		0.00E+00
178	1,1-Dichloroethylene	3.25E-01	na	na	na	na		0.00E+00
179	cis-1,2-Dichloroethylene	1.98E-01	na	na	na	na		0.00E+00
180	trans-1,2-Dichloroethylene	1.90E-01	na	na	na	na		0.00E+00
181	1,2-Dichloroethylene (mixed isomers)	1.78E-01	na	na	na	na		0.00E+00
182	1,2-Dichloropropane	2.35E-01	na	na	na	na		0.00E+00
183	1,3-Dichloropropane	3.61E-01	na	na	na	na		0.00E+00
184	2,2-Dichloropropane	na	na	na	na	na		na
185	1,1-Dichloropropene	na	na	na	na	na		na
186	cis-1,3-Dichloropropene	1.35E-01	na	na	na	na		0.00E+00

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187	trans-1,3-Dichloropropene	1.35E-01	na	na	na	na		0.00E+00
188	Diisopropyl ether	1.14E-01	na	na	na	na		0.00E+00
189	Ethane	na	na	na	na	na		na
190	Ethylbenzene	1.02E+00	na	na	na	na		0.00E+00
191	Ethylene oxide	1.62E-02	na	na	na	na		0.00E+00
192	Ethyl ether	4.85E-02	na	na	na	na		0.00E+00
193	Ethylene dibromide (EDB)	3.30E-01	na	na	na	na		0.00E+00
194	Formaldehyde	5.00E-03	na	na	na	na		0.00E+00
195	n-Hexane	1.71E+01	na	na	na	na		0.00E+00
196	2-Hexanone	7.50E-02	na	na	na	na		0.00E+00
197	Isopropylbenzene (cumene)	3.49E+00	na	na	na	na		0.00E+00
198	4-Isopropyltoluene (p-isopropyltoluene)	5.60E+00	na	na	na	na		0.00E+00
199	Methane	na	na	na	na	na		na
200	Methyl ethyl ketone (2-butanone)	2.26E-02	na	na	na	na		0.00E+00
201	Methyl iodide	na	na	na	na	na		na
202	Methyl isobutyl ketone	6.30E-02	na	na	na	na		0.00E+00
203	Methyl tert-butyl ether (MTBE)	5.45E-02	na	na	na	na		0.00E+00
204	Methylene chloride	5.00E-02	na	na	na	na		0.00E+00
205	2-Pentanone	na	na	na	na	na		na
206	n-Propylbenzene	4.07E+00	na	na	na	na		0.00E+00
207	Styrene	4.56E+00	na	na	na	na		0.00E+00
208	1,1,1,2-Tetrachloroethane	4.30E-01	na	na	na	na		0.00E+00
209	1,1,2,2-Tetrachloroethane	3.95E-01	na	na	na	na		0.00E+00
210	Tetrachloroethylene (PCE)	1.33E+00	na	na	na	na		0.00E+00
211	Tetrahydrofuran	5.40E-02	na	na	na	na		0.00E+00
212	Toluene	7.00E-01	na	na	na	na		0.00E+00
213	1,2,3-Trichlorobenzene	6.90E+00	na	na	na	na		0.00E+00
214	1,1,1-Trichloroethane	6.75E-01	na	na	na	na		0.00E+00
215	1,1,2-Trichloroethane	3.75E-01	na	na	na	na		0.00E+00
216	Trichloroethylene (TCE)	4.70E-01	na	na	na	na		0.00E+00
217	Trichlorofluoroethane	na	na	na	na	na		na
218	Trichlorofluoromethane	2.20E-01	na	na	na	na		0.00E+00
219	1,2,3-Trichloropropane	5.80E-01	na	na	na	na		0.00E+00
220	Trichlorotrifluoroethane	9.85E-01	na	na	na	na		0.00E+00
221	1,2,3-Trimethylbenzene	3.14E+00	na	na	na	na		0.00E+00
222	1,2,4-Trimethylbenzene	3.07E+00	na	na	na	na		0.00E+00
223	1,3,5-Trimethylbenzene	3.01E+00	na	na	na	na		0.00E+00
224	Vinyl acetate	2.79E-02	na	na	na	na		0.00E+00
225	Vinyl chloride	1.09E-01	na	na	na	na		0.00E+00
226	Total xylenes	1.17E+00	na	na	na	na		0.00E+00
227	***PFAS***							
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	4.78E+00	na	na	0.00E+00	0.00E+00		0.00E+00
229	GenX (HFPO-DA)	2.04E+00	na	na	na	na		0.00E+00
230	Perfluorobutanoic acid (PFBA)	3.80E-01	na	na	na	na		0.00E+00
231	Perfluorobutanesulfonic acid (PFBS)	3.09E-01	na	na	na	na		0.00E+00
232	Perfluorodecanoic acid (PFDA)	1.99E+00	na	na	na	na		0.00E+00
233	Perfluorohexanoic acid (PFHxA)	1.02E-01	na	na	na	na		0.00E+00
234	Perfluorohexanesulfonic acid (PFHxS)	5.60E-01	na	na	na	na		0.00E+00

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235	Perfluorononanoic acid (PFNA)	1.23E+00	na	na	na	na		0.00E+00
236	Perfluorooctanesulfonic acid (PFOS)	1.86E+00	1.12E-02	5.20E+00	1.12E-02	5.20E+00		0.00E+00
237	Perfluorooctanoic acid (PFOA)	5.75E-01	na	na	na	na		0.00E+00
238	***Petroleum Hydrocarbons***							
239	Gasoline range hydrocarbons, fresh	na	na	na	na	na		na
240	Gasoline range hydrocarbons, weathered	na	na	na	na	na		na
241	Diesel range hydrocarbons, fresh	na	3.40E+02	na	5.10E+02	na		na
242	Diesel range hydrocarbons, weathered	na	3.40E+02	na	5.10E+02	na		na
243	Oil range hydrocarbons	na	3.60E+03	na	4.40E+03	na		na
244	Total diesel & oil range hydrocarbons	na	na	na	na	na		na
245	***Pesticides***							
246	Aldrin	2.44E+02	1.00E-04	4.10E-04	1.00E-04	4.10E-04		0.00E+00
247	alpha-BHC (alpha-HCH)	8.80E+00	na	na	na	na		0.00E+00
248	beta-BHC (beta-HCH)	1.07E+01	7.20E-03	6.55E-01	1.10E-02	1.00E+00		0.00E+00
249	delta-BHC (delta-HCH)	1.41E+01	na	na	na	na		0.00E+00
250	Carbaryl	1.77E+00	na	na	na	na		0.00E+00
251	cis-Chlordane (alpha)	3.38E+02	1.00E-04	2.96E-04	1.00E-04	2.96E-04		0.00E+00
252	trans-Chlordane (gamma)	3.38E+02	1.00E-04	2.96E-04	1.00E-04	2.96E-04		0.00E+00
253	Chlordane	2.57E+02	7.43E+00	2.89E+01	3.05E+01	1.19E+02		0.00E+00
254	Chlorpyrifos	3.64E+01	1.12E+02	3.04E+03	1.12E+02	3.04E+03		0.00E+00
255	4,4'-DDD	2.29E+02	1.00E-04	4.36E-04	1.00E-04	4.36E-04		0.00E+00
256	4,4'-DDE	4.32E+02	1.00E-04	2.31E-04	1.00E-04	2.31E-04		0.00E+00
257	4,4'-DDT	3.39E+03	1.00E-04	2.95E-05	1.00E-04	2.95E-05		0.00E+00
258	Total DDD	2.29E+02	3.10E-01	1.35E+00	8.60E-01	3.75E+00		0.00E+00
259	Total DDE	4.32E+02	2.10E-02	4.86E-02	3.30E-02	7.63E-02		0.00E+00
260	Total DDT	3.39E+03	1.00E-01	2.95E-02	8.10E+00	2.39E+00		0.00E+00
261	Diazinon	1.52E+01	7.81E+01	5.06E+03	7.81E+01	5.06E+03		0.00E+00
262	Dieldrin	1.28E+02	1.00E-04	7.83E-04	1.00E-04	7.83E-04		0.00E+00
263	Endosulfan I	3.38E+01	na	na	na	na		0.00E+00
264	Endosulfan II	3.38E+01	na	na	na	na		0.00E+00
265	Endosulfan sulfate	4.93E+01	na	na	na	na		0.00E+00
266	Endrin	5.40E+01	3.35E+01	6.16E+02	3.35E+01	6.16E+02		0.00E+00
267	Endrin aldehyde	1.64E+01	na	na	na	na		0.00E+00
268	Endrin ketone	na	8.50E-03	na	na	na		na
269	Heptachlor	4.77E+01	1.00E-04	2.09E-03	1.00E-04	2.09E-03		0.00E+00
270	Heptachlor epoxide	5.05E+01	8.56E-01	1.69E+01	2.51E+00	4.94E+01		0.00E+00
271	Lindane (gamma-BHC)	6.75E+00	na	na	na	na		0.00E+00
272	Malathion	1.57E-01	na	na	na	na		0.00E+00
273	Methoxychlor	4.00E+02	na	na	na	na		0.00E+00
274	Mirex	1.79E+03	4.33E-01	2.42E-01	1.27E+00	7.10E-01		0.00E+00
275	Nonachlor	na	na	na	na	na		na
276	Toxaphene	4.79E+02	1.18E+00	2.47E+00	5.41E+00	1.13E+01		0.00E+00

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Sort Order	Chemical	Listed on CLARC VI Page Param	Hcc (unitless) Param	AR-1 MTCA-B Air (ug/m3) Air-Det	GW-4 MTCA-B Ground Water Protect Indoor Air (ug/L) VI Guidance Eq. 1	MTCA-C Air (ug/m3) Air-Det	MTCA-C Ground Water Protect Indoor Air via Vapor Intrusion (ug/L) VI Guidance Eq. 1	Commercial Air (ug/m3) Air-Det	Ground Water Protect Indoor Air via Vapor Intrusion Commercial (ug/L) VI Guidance Eq. 1	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Groundwater (ug/L) VI Guidance
1	***PCBs***									
2	Total PCB Aroclors	no	1.70E-02	4.39E-03	na	4.39E-02	na	2.05E-02	na	na
3	Total PCB congeners	no	1.70E-02	4.39E-03	na	4.39E-02	na	2.05E-02	na	na
4	Total PCB TEQ	no	1.70E-02	6.58E-08	na	6.58E-07	na	3.07E-07	na	na
5	***Dioxins/Furans***									
6	Total dioxin/furan TEQ	no	2.04E-03	6.58E-08	na	6.58E-07	na	3.07E-07	na	na
7	2,3,7,8-TCDD	no	2.04E-03	6.58E-08	na	6.58E-07	na	3.07E-07	na	na
8	Total chlorinated dioxins	no	2.04E-03	na	na	na	na	na	na	na
9	Total chlorinated furans	no	2.04E-03	na	na	na	na	na	na	na
10	***Inorganics***									
11	Ammonia	no	4.81E-04	2.29E+02	na	5.00E+02	na	1.95E+03	na	na
12	Chloride	no	0.00E+00	na	na	na	na	na	na	na
13	Cyanide, free	no	4.15E-03	3.66E-01	na	8.00E-01	na	3.11E+00	na	na
14	Fluoride	no	0.00E+00	5.94E+00	na	1.30E+01	na	5.06E+01	na	na
15	Nitrate	no	0.00E+00	na	na	na	na	na	na	na
16	Nitrite	no	0.00E+00	na	na	na	na	na	na	na
17	Sulfate	no	0.00E+00	na	na	na	na	na	na	na
18	Sulfide	no	0.00E+00	na	na	na	na	na	na	na
19	***Metals***									
20	Aluminum	no	0.00E+00	2.29E+00	na	5.00E+00	na	1.95E+01	na	na
21	Antimony	no	0.00E+00	1.37E-01	na	3.00E-01	na	1.17E+00	na	na
22	Arsenic	no	0.00E+00	5.81E-04	na	5.81E-03	na	2.72E-03	na	na
23	Barium	no	0.00E+00	2.29E-01	na	5.00E-01	na	1.95E+00	na	na
24	Beryllium	no	0.00E+00	1.04E-03	na	1.04E-02	na	4.87E-03	na	na
25	Cadmium	no	0.00E+00	1.39E-03	na	1.00E-02	na	6.49E-03	na	na
26	Chromium, total	no	0.00E+00	na	na	na	na	na	na	na
27	Chromium, trivalent	no	0.00E+00	na	na	na	na	na	na	na
28	Chromium, hexavalent	no	0.00E+00	2.30E-03	na	2.27E-03	na	1.06E-03	na	na
29	Cobalt	no	0.00E+00	2.78E-04	na	2.78E-03	na	1.30E-03	na	na
30	Copper	no	0.00E+00	na	na	na	na	na	na	na
31	Iron	no	0.00E+00	na	na	na	na	na	na	na
32	Lead	no	0.00E+00	na	na	na	na	na	na	na
33	Manganese	no	0.00E+00	2.29E-02	na	5.00E-02	na	1.95E-01	na	na
34	Mercury, inorganic	YES	1.66E-01	1.37E-01	8.27E-01	3.00E-01	1.81E+00	1.17E+00	7.05E+00	na
35	Methylmercury	no	0.00E+00	na	na	na	na	na	na	na
36	Molybdenum	no	0.00E+00	9.14E-01	na	2.00E+00	na	7.79E+00	na	na
37	Nickel	no	0.00E+00	6.40E-03	na	1.40E-02	na	4.49E-02	na	na
38	Selenium	no	0.00E+00	9.14E+00	na	2.00E+01	na	7.79E+01	na	na
39	Silver	no	0.00E+00	na	na	na	na	na	na	na
40	Thallium	no	0.00E+00	na	na	na	na	na	na	na
41	Tin	no	0.00E+00	na	na	na	na	na	na	na
42	Vanadium	no	0.00E+00	4.57E-02	na	1.00E-01	na	3.89E-01	na	na
43	Zinc	no	0.00E+00	na	na	na	na	na	na	na
44	***Metals - Butyltins***									
45	Monobutyltin	no	0.00E+00	na	na	na	na	na	na	na
46	Dibutyltin	no	0.00E+00	na	na	na	na	na	na	na
47	Trybutyl tin	no	3.65E+01	na	na	na	na	na	na	na
48	Tributyltin oxide	no	1.23E-05	na	na	na	na	na	na	na
49	Tetrabutyltin	no	0.00E+00	na	na	na	na	na	na	na
50	***SVOCs - PAHs***									
51	Acenaphthene	no	2.50E-03	na	na	na	na	na	na	na
52	Acenaphthylene	no	0.00E+00	na	na	na	na	na	na	na
53	Anthracene	no	6.51E-04	na	na	na	na	na	na	na
54	Benzo(a)anthracene	no	9.60E-05	na	na	na	na	na	na	na
55	Benzo(b)fluoranthene	no	6.04E-06	na	na	na	na	na	na	na
56	Benzo(k)fluoranthene	no	4.28E-06	na	na	na	na	na	na	na
57	Total benzofluoranthenes	no	0.00E+00	na	na	na	na	na	na	na
58	Benzo(g,h,i)perylene	no	0.00E+00	na	na	na	na	na	na	na
59	Benzo(a)pyrene	no	3.61E-06	9.14E-04	na	2.00E-03	na	7.79E-03	na	na

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Sort Order	Chemical	Listed on CLARC VI Page Param	Hcc (unitless) Param	AR-1 MTCA-B Air (ug/m3) Air-Det	GW-4 MTCA-B Ground Water Protect Indoor Air (ug/L) VI Guidance Eq. 1	MTCA-C Air (ug/m3) Air-Det	MTCA-C Ground Water Protect Indoor Air via Vapor Intrusion (ug/L) VI Guidance Eq. 1	Commercial Air (ug/m3) Air-Det	Ground Water Protect Indoor Air via Vapor Intrusion Commercial (ug/L) VI Guidance Eq. 1	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Groundwater (ug/L) VI Guidance
60	Chrysene	no	3.87E-05	na	na	na	na	na	na	na
61	Dibenz(a,h)anthracene	no	7.45E-07	na	na	na	na	na	na	na
62	Dibenzofuran	no	1.84E-05	na	na	na	na	na	na	na
63	Fluoranthene	no	9.14E-05	na	na	na	na	na	na	na
64	Fluorene	no	1.23E-03	na	na	na	na	na	na	na
65	Indeno(1,2,3-cd)pyrene	no	2.09E-06	na	na	na	na	na	na	na
66	Methyl isopropyl phenanthrene (retene)	no	0.00E+00	na	na	na	na	na	na	na
67	1-Methylnaphthalene	YES	8.16E-03	1.37E-03	1.68E-01	3.00E-03	3.68E-01	1.17E-02	1.43E+00	na
68	2-Methylnaphthalene	no	7.00E-03	na	na	na	na	na	na	na
69	Naphthalene	YES	8.32E-03	7.35E-02	8.84E+00	7.35E-01	8.84E+01	3.44E-01	4.13E+01	na
70	Phenanthrene	no	0.00E+00	na	na	na	na	na	na	na
71	Pyrene	no	1.15E-04	na	na	na	na	na	na	na
72	Total LPAHs	no	0.00E+00	na	na	na	na	na	na	na
73	Total HPAHs	no	0.00E+00	na	na	na	na	na	na	na
74	Total PAHs	no	0.00E+00	na	na	na	na	na	na	na
75	Total cPAH TEQ	no	3.61E-06	1.10E-03	na	4.17E-02	na	1.95E-02	na	na
76	***Other SVOCs***									
77	Aniline	no	3.60E-05	4.57E-01	na	1.00E+00	na	3.89E+00	na	na
78	Azobenzene	no	1.91E-04	8.06E-02	na	8.06E-01	na	3.77E-01	na	na
79	Benzidine	no	4.89E-10	9.80E-06	na	3.73E-04	na	1.74E-04	na	na
80	Benzoic acid	no	5.20E-07	na	na	na	na	na	na	na
81	Benzyl alcohol	no	4.92E-06	na	na	na	na	na	na	na
82	Bis(2-chloroethoxy)methane	no	6.56E-05	na	na	na	na	na	na	na
83	Bis(2-chloroethyl)ether	no	2.79E-04	7.58E-03	na	7.58E-02	na	3.54E-02	na	na
84	Bis(chloromethyl)ether	no	9.41E-02	4.03E-05	na	4.03E-04	na	1.88E-04	na	na
85	Bis(2-chloro-1-methylethyl)ether	no	1.35E-03	2.50E-01	na	2.50E+00	na	1.17E+00	na	na
86	2,6-Bis(1,1-dimethylethyl) phenol	no	0.00E+00	na	na	na	na	na	na	na
87	Bis(2-ethylhexyl) phthalate	no	2.34E-06	1.04E+00	na	1.04E+01	na	4.87E+00	na	na
88	4-Bromophenyl phenyl ether	no	0.00E+00	na	na	na	na	na	na	na
89	Butyl benzyl phthalate	no	1.47E-05	na	na	na	na	na	na	na
90	Butyl diphenyl phosphate	no	0.00E+00	na	na	na	na	na	na	na
91	Carbazole	no	0.00E+00	na	na	na	na	na	na	na
92	4-Chloroaniline	no	1.73E-05	na	na	na	na	na	na	na
93	4-Chloro-3-methylphenol (chlorocresol)	no	4.00E-05	na	na	na	na	na	na	na
94	2-Chloronaphthalene (beta-)	no	4.84E-03	na	na	na	na	na	na	na
95	2-Chlorophenol	no	2.08E-04	na	na	na	na	na	na	na
96	4-Chlorophenyl phenyl ether	no	0.00E+00	na	na	na	na	na	na	na
97	Dibutyl phthalate	no	1.00E-05	na	na	na	na	na	na	na
98	Dibutyl phenyl phosphate	no	0.00E+00	na	na	na	na	na	na	na
99	1,2-Dichlorobenzene	YES	3.65E-02	9.14E+01	2.50E+03	2.00E+02	5.48E+03	7.79E+02	2.13E+04	na
100	1,3-Dichlorobenzene	no	5.09E-02	na	na	na	na	na	na	na
101	1,4-Dichlorobenzene	YES	4.58E-02	2.27E-01	4.96E+00	2.27E+00	4.96E+01	1.06E+00	2.32E+01	na
102	3,3'-Dichlorobenzidine	no	1.16E-09	7.35E-03	na	7.35E-02	na	3.44E-02	na	na
103	2,4-Dichlorophenol	no	7.46E-05	na	na	na	na	na	na	na
104	Di(2-ethylhexyl)adipate	no	3.63E-06	na	na	na	na	na	na	na
105	Diethyl phthalate	no	6.52E-06	na	na	na	na	na	na	na
106	Dimethyl phthalate	no	2.29E-06	na	na	na	na	na	na	na
107	2,4-Dimethylphenol	no	1.41E-05	na	na	na	na	na	na	na
108	1,2-Dinitrobenzene	no	5.00E-07	na	na	na	na	na	na	na
109	1,3-Dinitrobenzene	no	5.06E-07	na	na	na	na	na	na	na
110	1,4-Dinitrobenzene	no	8.42E-07	na	na	na	na	na	na	na
111	4,6-Dinitro-o-cresol (DNOC)	no	5.72E-05	na	na	na	na	na	na	na
112	2,4-Dinitrophenol	no	3.52E-06	na	na	na	na	na	na	na
113	2,4-Dinitrotoluene	no	4.83E-07	2.81E-02	na	2.81E-01	na	1.31E-01	na	na
114	2,6-Dinitrotoluene	no	7.26E-06	na	na	na	na	na	na	na
115	Di-n-octyl phthalate	no	1.49E-05	na	na	na	na	na	na	na
116	1,4-Dioxane	YES	1.06E-04	5.00E-01	4.71E+03	5.00E+00	4.71E+04	2.34E+00	2.20E+04	na
117	1,2-Diphenylhydrazine	no	5.90E-06	1.14E-02	na	1.14E-01	na	5.31E-02	na	na

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118	Hexachlorobenzene	YES	2.22E-02	5.43E-03	2.45E-01	5.43E-02	2.45E+00	2.54E-02	1.14E+00	na
119	Hexachlorobutadiene	YES	1.78E-01	1.14E-01	6.38E-01	1.14E+00	6.38E+00	5.31E-01	2.98E+00	na
120	Hexachlorocyclopentadiene	YES	2.17E-02	9.14E-02	4.22E+00	2.00E-01	9.22E+00	7.79E-01	3.59E+01	na
121	Hexachloroethane	YES	5.91E-02	2.27E-01	3.85E+00	2.27E+00	3.85E+01	1.06E+00	1.80E+01	na
122	Isophorone	no	1.13E-04	9.14E+02	na	2.00E+03	na	7.79E+03	na	na
123	2-Methoxynaphthalene	no	0.00E+00	na	na	na	na	na	na	na
124	2-Methylphenol (o-cresol)	no	1.98E-05	2.74E+02	na	6.00E+02	na	2.34E+03	na	na
125	3-Methylphenol (m-cresol)	no	1.33E-05	2.74E+02	na	6.00E+02	na	2.34E+03	na	na
126	4-Methylphenol (p-cresol)	no	1.55E-05	2.74E+02	na	6.00E+02	na	2.34E+03	na	na
127	2-Nitroaniline	no	6.10E-07	2.29E-02	na	5.00E-02	na	1.95E-01	na	na
128	3-Nitroaniline	no	0.00E+00	na	na	na	na	na	na	na
129	4-Nitroaniline	no	1.08E-08	2.74E+00	na	6.00E+00	na	2.34E+01	na	na
130	Nitrobenzene	no	3.97E-04	6.25E-02	na	6.25E-01	na	2.92E-01	na	na
131	2-Nitrophenol	no	0.00E+00	na	na	na	na	na	na	na
132	4-Nitrophenol	no	0.00E+00	na	na	na	na	na	na	na
133	n-Nitrosodimethylamine	no	3.65E-05	4.70E-05	na	1.79E-03	na	8.34E-04	na	na
134	n-Nitrosodiphenylamine	no	4.95E-05	9.62E-01	na	9.62E+00	na	4.49E+00	na	na
135	n-Nitrosodi-n-propylamine	no	2.20E-04	1.25E-03	na	1.25E-02	na	5.84E-03	na	na
136	Pentachlorophenol	no	1.00E-06	4.90E-01	na	4.90E+00	na	2.29E+00	na	na
137	Phenol	no	5.53E-06	9.14E+01	na	2.00E+02	na	7.79E+02	na	na
138	Pyridine	no	2.39E-04	na	na	na	na	na	na	na
139	2,3,4,5-Tetrachlorophenol	no	0.00E+00	na	na	na	na	na	na	na
140	2,3,4,6-Tetrachlorophenol	no	3.61E-04	na	na	na	na	na	na	na
141	1,2,4-Trichlorobenzene	YES	2.37E-02	9.14E-01	3.85E+01	2.00E+00	8.43E+01	7.79E+00	3.28E+02	na
142	2,4,5-Trichlorophenol	no	2.57E-05	na	na	na	na	na	na	na
143	2,4,6-Trichlorophenol	no	4.13E-05	8.06E-01	na	8.06E+00	na	3.77E+00	na	na
144	***Volatile Organic Compounds***									
145	Acetone	no	8.75E-04	na	na	na	na	na	na	na
146	Acetaldehyde	YES	1.83E-03	1.14E+00	6.23E+02	9.00E+00	4.93E+03	5.31E+00	2.91E+03	na
147	Acrolein	YES	3.11E-03	9.14E-03	2.94E+00	2.00E-02	6.44E+00	7.79E-02	2.51E+01	na
148	Acrylonitrile	YES	3.18E-03	3.68E-02	1.16E+01	3.68E-01	1.16E+02	1.72E-01	5.40E+01	na
149	Benzaldehyde	no	4.76E-04	na	na	na	na	na	na	na
150	Benzene	YES	1.34E-01	3.21E-01	2.39E+00	3.21E+00	2.39E+01	1.50E+00	1.12E+01	na
151	Bromobenzene	YES	4.32E-02	2.74E+01	6.34E+02	6.00E+01	1.39E+03	2.34E+02	5.40E+03	na
152	Bromochloromethane	no	3.59E-02	1.83E+01	na	4.00E+01	na	1.56E+02	na	na
153	Bromoethane	no	0.00E+00	na	na	na	na	na	na	na
154	Bromoform	YES	1.05E-02	2.27E+00	2.17E+02	2.27E+01	2.17E+03	1.06E+01	1.01E+03	na
155	Bromomethane	YES	2.10E-01	2.29E+00	1.09E+01	5.00E+00	2.38E+01	1.95E+01	9.27E+01	na
156	2-Butoxyethanol (EGBE)	no	2.53E-05	7.31E+02	na	1.60E+03	na	6.23E+03	na	na
157	n-Butylbenzene	no	2.93E-01	na	na	na	na	na	na	na
158	sec-Butylbenzene	no	2.75E-01	na	na	na	na	na	na	na
159	tert-Butylbenzene	no	2.06E-01	na	na	na	na	na	na	na
160	Carbon disulfide	YES	3.83E-01	3.20E+02	8.36E+02	7.00E+02	1.83E+03	2.73E+03	7.12E+03	na
161	Carbon tetrachloride	YES	6.75E-01	4.17E-01	6.17E-01	4.17E+00	6.17E+00	1.95E+00	2.88E+00	na
162	Chlorobenzene	YES	6.63E-02	2.29E+01	3.45E+02	5.00E+01	7.54E+02	1.95E+02	2.94E+03	na
163	Chloroethane	YES	3.12E-01	4.57E+03	1.47E+04	1.00E+04	3.21E+04	3.89E+04	1.25E+05	na
164	2-Chloroethyl vinyl ether	no	0.00E+00	na	na	na	na	na	na	na
165	Chloroform	YES	9.17E-02	1.09E-01	1.18E+00	1.09E+00	1.18E+01	5.08E-01	5.53E+00	na
166	Chloromethane	YES	2.69E-01	4.11E+01	1.53E+02	9.00E+01	3.34E+02	3.50E+02	1.30E+03	na
167	3-Chloro-1-propene (allyl chloride)	YES	2.79E-01	4.17E-01	1.49E+00	1.00E+00	3.58E+00	1.95E+00	6.97E+00	na
168	2-Chlorotoluene	no	7.08E-02	na	na	na	na	na	na	na
169	4-Chlorotoluene	no	8.07E-02	na	na	na	na	na	na	na
170	Dibromochloromethane	no	2.10E-02	na	na	na	na	na	na	na
171	1,2-Dibromo-3-chloropropane	YES	2.60E-03	1.10E-04	4.22E-02	4.17E-03	1.60E+00	1.95E-03	7.47E-01	na
172	Dibromomethane	YES	1.89E-02	1.83E+00	9.66E+01	4.00E+00	2.11E+02	1.56E+01	8.23E+02	na
173	Dichlorobromomethane	YES	4.90E-02	6.76E-02	1.38E+00	6.76E-01	1.38E+01	3.16E-01	6.44E+00	na
174	trans-1,4-Dichloro-2-butene	no	1.30E-02	5.95E-04	na	5.95E-03	na	2.78E-03	na	na
175	Dichlorodifluoromethane	YES	1.08E+01	4.57E+01	4.22E+00	1.00E+02	9.24E+00	3.89E+02	3.60E+01	na

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PCUL Workbook - MTCA Method B and C, Groundwater for Protection of Indoor Air (Vapor Intrusion)

Sort Order	Chemical	Listed on CLARC VI Page Param	Hcc (unitless) Param	AR-1 MTCA-B Air (ug/m3) Air-Det	GW-4 MTCA-B Ground Water Protect Indoor Air (ug/L) VI Guidance Eq. 1	MTCA-C Air (ug/m3) Air-Det	MTCA-C Ground Water Protect Indoor Air via Vapor Intrusion (ug/L) VI Guidance Eq. 1	Commercial Air (ug/m3) Air-Det	Ground Water Protect Indoor Air via Vapor Intrusion Commercial (ug/L) VI Guidance Eq. 1	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Groundwater (ug/L) VI Guidance
176	1,1-Dichloroethane	YES	1.42E-01	1.56E+00	1.10E+01	1.56E+01	1.10E+02	7.30E+00	5.16E+01	na
177	1,2-Dichloroethane (EDC)	YES	2.76E-02	9.62E-02	3.49E+00	9.62E-01	3.49E+01	4.49E-01	1.63E+01	na
178	1,1-Dichloroethylene	YES	7.03E-01	9.14E+01	1.30E+02	2.00E+02	2.85E+02	7.79E+02	1.11E+03	na
179	cis-1,2-Dichloroethylene	YES	1.00E-01	1.83E+01	1.82E+02	4.00E+01	3.99E+02	1.56E+02	1.55E+03	na
180	trans-1,2-Dichloroethylene	YES	2.38E-01	1.83E+01	7.69E+01	4.00E+01	1.68E+02	1.56E+02	6.55E+02	na
181	1,2-Dichloroethylene (mixed isomers)	YES	0.00E+00	na	na	na	na	na	na	na
182	1,2-Dichloropropane	YES	6.54E-02	6.76E-01	1.03E+01	4.00E+00	6.12E+01	3.16E+00	4.83E+01	na
183	1,3-Dichloropropane	no	2.09E-02	na	na	na	na	na	na	na
184	2,2-Dichloropropane	no	0.00E+00	na	na	na	na	na	na	na
185	1,1-Dichloropropene	no	0.00E+00	na	na	na	na	na	na	na
186	cis-1,3-Dichloropropene	YES	7.86E-02	6.25E-01	7.96E+00	6.25E+00	7.96E+01	2.92E+00	3.72E+01	na
187	trans-1,3-Dichloropropene	YES	7.86E-02	6.25E-01	7.96E+00	6.25E+00	7.96E+01	2.92E+00	3.72E+01	na
188	Diisopropyl ether	no	6.27E-02	3.20E+02	na	7.00E+02	na	2.73E+03	na	na
189	Ethane	no	0.00E+00	na	na	na	na	na	na	na
190	Ethylbenzene	YES	1.64E-01	4.57E+02	2.78E+03	1.00E+03	6.09E+03	3.89E+03	2.37E+04	na
191	Ethylene oxide	YES	4.10E-03	2.20E-04	5.37E-02	8.33E-03	2.03E+00	3.89E-03	9.50E-01	na
192	Ethyl ether	no	3.27E-02	na	na	na	na	na	na	na
193	Ethylene dibromide (EDB)	YES	1.41E-02	4.17E-03	2.95E-01	4.17E-02	2.95E+00	1.95E-02	1.38E+00	na
194	Formaldehyde	no	9.75E-06	8.90E-02	na	3.38E+00	na	1.58E+00	na	na
195	n-Hexane	YES	4.47E+01	3.20E+02	7.16E+00	7.00E+02	1.57E+01	2.73E+03	6.10E+01	na
196	2-Hexanone	YES	1.89E-03	1.37E+01	7.25E+03	3.00E+01	1.59E+04	1.17E+02	6.18E+04	na
197	Isopropylbenzene (cumene)	YES	2.01E-01	1.83E+02	9.12E+02	4.00E+02	1.99E+03	1.56E+03	7.76E+03	na
198	4-Isopropyltoluene (p-isopropyltoluene)	YES	2.07E-01	1.83E+01	8.83E+01	4.00E+01	1.93E+02	1.56E+02	7.52E+02	na
199	Methane	no	0.00E+00	6.56E+04	na	6.56E+04	na	na	na	na
200	Methyl ethyl ketone (2-butanone)	YES	1.34E-03	2.29E+03	1.71E+06	5.00E+03	3.74E+06	1.95E+04	1.45E+07	na
201	Methyl iodide	no	0.00E+00	na	na	na	na	na	na	na
202	Methyl isobutyl ketone	YES	2.94E-03	1.37E+03	4.66E+05	3.00E+03	1.02E+06	1.17E+04	3.97E+06	na
203	Methyl tert-butyl ether (MTBE)	YES	1.12E-02	9.62E+00	8.57E+02	9.62E+01	8.57E+03	4.49E+01	4.00E+03	na
204	Methylene chloride	YES	8.43E-02	6.60E+01	7.83E+02	6.00E+02	7.12E+03	1.17E+03	1.39E+04	na
205	2-Pentanone	no	0.00E+00	na	na	na	na	na	na	na
206	n-Propylbenzene	YES	2.02E-01	4.57E+02	2.26E+03	1.00E+03	4.95E+03	3.89E+03	1.93E+04	na
207	Styrene	YES	5.36E-02	4.57E+02	8.53E+03	1.00E+03	1.87E+04	3.89E+03	7.26E+04	na
208	1,1,1,2-Tetrachloroethane	YES	4.75E-02	3.38E-01	7.11E+00	3.38E+00	7.11E+01	1.58E+00	3.32E+01	na
209	1,1,2,2-Tetrachloroethane	YES	7.35E-03	4.31E-02	5.87E+00	4.31E-01	5.87E+01	2.01E-01	2.74E+01	na
210	Tetrachloroethylene (PCE)	YES	3.84E-01	9.62E+00	2.50E+01	4.00E+01	1.04E+02	4.49E+01	1.17E+02	na
211	Tetrahydrofuran	YES	1.74E-03	9.14E+02	5.26E+05	2.00E+03	1.15E+06	7.79E+03	4.48E+06	na
212	Toluene	YES	1.49E-01	2.29E+03	1.54E+04	5.00E+03	3.37E+04	1.95E+04	1.31E+05	na
213	1,2,3-Trichlorobenzene	no	1.72E-02	na	na	na	na	na	na	na
214	1,1,1-Trichloroethane	YES	4.20E-01	2.29E+03	5.44E+03	5.00E+03	1.19E+04	1.95E+04	4.63E+04	na
215	1,1,2-Trichloroethane	YES	1.78E-02	9.14E-02	5.13E+00	2.00E-01	1.12E+01	7.30E-01	4.09E+01	na
216	Trichloroethylene (TCE)	YES	2.32E-01	3.30E-01	1.42E+00	2.00E+00	8.61E+00	2.85E+00	1.23E+01	3.10E+01
217	Trichlorofluoroethane	no	0.00E+00	na	na	na	na	na	na	na
218	Trichlorofluoromethane	YES	2.68E+00	3.20E+02	1.20E+02	7.00E+02	2.61E+02	2.73E+03	1.02E+03	na
219	1,2,3-Trichloropropane	YES	6.86E-03	1.37E-01	2.00E+01	3.00E-01	4.38E+01	1.17E+00	1.70E+02	na
220	Trichlorotrifluoroethane	YES	1.37E+01	2.29E+03	1.67E+02	5.00E+03	3.65E+02	1.95E+04	1.42E+03	na
221	1,2,3-Trimethylbenzene	YES	6.62E-02	2.74E+01	4.14E+02	6.00E+01	9.06E+02	2.34E+02	3.53E+03	na
222	1,2,4-Trimethylbenzene	YES	1.15E-01	2.74E+01	2.39E+02	6.00E+01	5.22E+02	2.34E+02	2.03E+03	na
223	1,3,5-Trimethylbenzene	YES	1.64E-01	2.74E+01	1.67E+02	6.00E+01	3.66E+02	2.34E+02	1.43E+03	na
224	Vinyl acetate	YES	1.13E-02	9.14E+01	8.09E+03	2.00E+02	1.77E+04	7.79E+02	6.89E+04	na
225	Vinyl chloride	YES	8.50E-01	2.84E-01	3.34E-01	2.84E+00	3.34E+00	1.33E+00	1.56E+00	na
226	Total xylenes	YES	1.41E-01	4.57E+01	3.23E+02	1.00E+02	7.07E+02	3.89E+02	2.75E+03	na
227	***PFAS***									
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	no	7.44E-09	na	na	na	na	na	na	na
229	GenX (HFPO-DA)	no	1.02E-02	na	na	na	na	na	na	na
230	Perfluorobutanoic acid (PFBA)	no	2.05E-03	na	na	na	na	na	na	na
231	Perfluorobutanesulfonic acid (PFBS)	no	1.21E-08	na	na	na	na	na	na	na
232	Perfluorodecanoic acid (PFDA)	no	2.16E-09	na	na	na	na	na	na	na
233	Perfluorohexanoic acid (PFHxA)	no	9.61E-09	na	na	na	na	na	na	na

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PCUL Workbook - MTCA Method B and C, Groundwater for Protection of Indoor Air (Vapor Intrusion)

Sort Order	Chemical	Listed on CLARC VI Page Param	Hcc (unitless) Param	AR-1 MTCA-B Air (ug/m3) Air-Det	GW-4 MTCA-B Ground Water Protect Indoor Air (ug/L) VI Guidance Eq. 1	MTCA-C Air (ug/m3) Air-Det	MTCA-C Ground Water Protect Indoor Air via Vapor Intrusion (ug/L) VI Guidance Eq. 1	Commercial Air (ug/m3) Air-Det	Ground Water Protect Indoor Air via Vapor Intrusion Commercial (ug/L) VI Guidance Eq. 1	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Groundwater (ug/L) VI Guidance
234	Perfluorohexanesulfonic acid (PFHxS)	no	0.00E+00	na	na	na	na	na	na	na
235	Perfluorononanoic acid (PFNA)	no	0.00E+00	na	na	na	na	na	na	na
236	Perfluorooctanesulfonic acid (PFOS)	no	1.77E-05	na	na	na	na	na	na	na
237	Perfluorooctanoic acid (PFOA)	no	1.46E-04	na	na	na	na	na	na	na
238	***Petroleum Hydrocarbons***									
239	Gasoline range hydrocarbons, fresh	YES	0.00E+00	4.60E+01	na	1.50E+03	na	3.90E+02	na	na
240	Gasoline range hydrocarbons, weathered	YES	0.00E+00	4.60E+01	na	1.50E+03	na	3.90E+02	na	na
241	Diesel range hydrocarbons, fresh	no	0.00E+00	4.60E+01	na	1.50E+03	na	3.90E+02	na	na
242	Diesel range hydrocarbons, weathered	no	0.00E+00	4.60E+01	na	1.50E+03	na	3.90E+02	na	na
243	Oil range hydrocarbons	no	0.00E+00	na	na	na	na	na	na	na
244	Total diesel & oil range hydrocarbons	no	0.00E+00	na	na	na	na	na	na	na
245	***Pesticides***									
246	Aldrin	no	8.08E-05	5.10E-04	na	5.10E-03	na	2.38E-03	na	na
247	alpha-BHC (alpha-HCH)	no	2.74E-04	1.39E-03	na	1.39E-02	na	6.49E-03	na	na
248	beta-BHC (beta-HCH)	no	1.80E-05	4.72E-03	na	4.72E-02	na	2.20E-02	na	na
249	delta-BHC (delta-HCH)	no	2.10E-04	na	na	na	na	na	na	na
250	Carbaryl	no	1.34E-07	na	na	na	na	na	na	na
251	cis-Chlordane (alpha)	no	1.99E-03	na	na	na	na	na	na	na
252	trans-Chlordane (gamma)	no	1.99E-03	na	na	na	na	na	na	na
253	Chlordane	no	2.01E-04	2.50E-02	na	2.50E-01	na	1.17E-01	na	na
254	Chlorpyrifos	no	1.20E-04	na	na	na	na	na	na	na
255	4,4'-DDD	no	2.70E-04	3.62E-02	na	3.62E-01	na	1.69E-01	na	na
256	4,4'-DDE	no	4.39E-04	2.58E-02	na	2.58E-01	na	1.20E-01	na	na
257	4,4'-DDT	no	1.28E-04	2.58E-02	na	2.58E-01	na	1.20E-01	na	na
258	Total DDD	no	2.70E-04	3.62E-02	na	3.62E-01	na	1.69E-01	na	na
259	Total DDE	no	4.39E-04	2.58E-02	na	2.58E-01	na	1.20E-01	na	na
260	Total DDT	no	1.28E-04	2.58E-02	na	2.58E-01	na	1.20E-01	na	na
261	Diazinon	no	4.62E-06	na	na	na	na	na	na	na
262	Dieldrin	no	8.78E-05	5.43E-04	na	5.43E-03	na	2.54E-03	na	na
263	Endosulfan I	no	2.90E-04	na	na	na	na	na	na	na
264	Endosulfan II	no	1.60E-05	na	na	na	na	na	na	na
265	Endosulfan sulfate	no	1.33E-05	na	na	na	na	na	na	na
266	Endrin	no	2.60E-04	na	na	na	na	na	na	na
267	Endrin aldehyde	no	1.71E-04	na	na	na	na	na	na	na
268	Endrin ketone	no	0.00E+00	na	na	na	na	na	na	na
269	Heptachlor	YES	3.77E-03	1.92E-03	5.10E-01	1.92E-02	5.10E+00	8.98E-03	2.38E+00	na
270	Heptachlor epoxide	no	2.01E-04	9.62E-04	na	9.62E-03	na	4.49E-03	na	na
271	Lindane (gamma-BHC)	no	2.10E-04	8.06E-03	na	8.06E-02	na	3.77E-02	na	na
272	Malathion	no	2.00E-07	na	na	na	na	na	na	na
273	Methoxychlor	no	8.30E-06	na	na	na	na	na	na	na
274	Mirex	YES	3.32E-02	4.90E-04	1.48E-02	4.90E-03	1.48E-01	2.29E-03	6.91E-02	na
275	Nonachlor	no	0.00E+00	na	na	na	na	na	na	na
276	Toxaphene	no	2.45E-04	7.81E-03	na	7.81E-02	na	3.65E-02	na	na
277	***Herbicides***									
278	2,4-Dichlorophenoxyacetic acid (2,4-D)	no	1.45E-06	na	na	na	na	na	na	na
279	4-(2,4-Dichlorophenoxy)butanoic acid 2,4-DB	no	0.00E+00	na	na	na	na	na	na	na
280	2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	no	3.70E-07	na	na	na	na	na	na	na
281	2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	no	3.55E-07	na	na	na	na	na	na	na
282	Dalapon	no	1.04E-06	na	na	na	na	na	na	na
283	Dicamba	no	8.91E-08	na	na	na	na	na	na	na
284	Dichloroprop	no	0.00E+00	na	na	na	na	na	na	na
285	Dinoseb	no	1.86E-05	na	na	na	na	na	na	na
286	2-Methyl-4-chlorophenoxy acetic acid (MCPA)	no	5.44E-08	na	na	na	na	na	na	na
287	(2-Methyl-4-chlorophenol)2-propionic acid (MCPP)	no	7.44E-07	na	na	na	na	na	na	na

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PCUL Workbook - Sediment Summary for Freshwater Sites for Partitioning Calculations

Sort Order	Chemical (all concentrations in mg/kg DW)	PBT List WAC 173-333-310	DMMP List 1 or 2	Bioaccum-ulative (YES in column C or D)	Lower Tier Freshwater Natural Background Param	Upper Tier Regional Background Site-Specific Param	PQL SCUM Tables 11-1, D-1	SD-3 SMS Lower Tier SCO Fresh Benthic SCUM Table 8-1	SMS Upper Tier CSL Fresh Benthic SCUM Table 8-1	SD-1 SMS Lower Tier Beach Play Direct Contact SCO SedEq	SMS Upper Tier Beach Play Direct Contact CSL SedEq	SD-2 Lower Tier Risk-Based Conc. for Seafood Consumption SCO Nat. Background & PQL	Upper Tier Risk-Based Conc. for Seafood Consumption CSL Reg. Background & PQL	SMS Lower Tier SCO PCUL	SMS Upper Tier CSL PCUL	User-Defined Sediment PCUL Specify Source	Basis SMS Lower Tier: Nat. Background	Basis SMS Lower Tier: PQL	Basis SMS Lower Tier: Benthic SCO	Basis SMS Lower Tier: Direct Contact	Basis SMS Upper Tier: Reg. Background	Basis SMS Upper Tier: PQL	Basis SMS Upper Tier: Benthic CSL	Basis SMS Upper Tier: Direct Contact
1	***PCBs***																***PCBs***							
2	Total PCB Aroclors	YES	YES	YES	na	na	1.20E-02	1.10E-01	2.50E+00	4.88E-01	2.30E+00	1.20E-02	1.20E-02	1.20E-02	1.20E-02			X					X		
3	Total PCB congeners	YES	no	YES	3.50E-03	na	na	na	na	4.88E-01	2.30E+00	3.50E-03	3.50E-03	3.50E-03	3.50E-03		X								
4	Total PCB TEQ	YES	no	YES	2.00E-07	na	7.00E-07	na	na	2.86E-05	1.21E-04	7.00E-07	7.00E-07	7.00E-07	7.00E-07			X				X			
5	***Dioxins/Furans***																***Dioxins/Furans***							
6	Total dioxin/furan TEQ	YES	YES	YES	4.00E-06	na	5.00E-06	na	na	2.86E-05	1.21E-04	5.00E-06	5.00E-06	5.00E-06	5.00E-06			X				X			
7	2,3,7,8-TCDD	YES	YES	YES	na	na	na	na	na	2.86E-05	1.21E-04	PQL	PQL	2.86E-05	1.21E-04					X					X
8	Total chlorinated dioxins	YES	na	YES	na	na	na	na	na	na	na	PQL	PQL	na	na										
9	Total chlorinated furans	YES	na	YES	na	na	na	na	na	na	na	PQL	PQL	na	na										
10	***Inorganics***																***Inorganics***							
11	Ammonia	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
12	Chloride	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
13	Cyanide, free	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
14	Fluoride	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
15	Nitrate	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
16	Nitrite	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
17	Sulfate	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
18	Sulfide	no	no	no	na	na	na	3.90E+01	6.10E+01	na	na	na	na	3.90E+01	6.10E+01				X				X		
19	***Metals***																***Metals***							
20	Aluminum	no	no	no	3.30E+04	na	na	na	na	na	na	na	na	na	na										
21	Antimony	no	no	no	5.20E+00	na	5.00E-01	na	na	na	na	na	na	na	na										
22	Arsenic	no	YES	YES	7.30E+00	na	3.00E-01	1.40E+01	1.20E+02	9.75E-02	3.85E-01	7.30E+00	7.30E+00	9.75E-02	3.85E-01					X					X
23	Barium	no	no	no	2.50E+02	na	na	na	na	na	na	na	na	na	na										
24	Beryllium	no	no	no	6.10E-01	na	na	na	na	na	na	na	na	na	na										
25	Cadmium	YES	no	YES	7.70E-01	na	7.00E-02	2.10E+00	5.40E+00	2.23E+02	2.23E+02	7.70E-01	7.70E-01	7.70E-01	7.70E-01		X								
26	Chromium, total	no	no	no	4.80E+01	na	2.00E-01	7.20E+01	8.80E+01	na	na	na	na	7.20E+01	8.80E+01				X				X		
27	Chromium, trivalent	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
28	Chromium, hexavalent	no	YES	YES	na	na	na	na	na	7.20E+00	4.16E+01	PQL	PQL	7.20E+00	4.16E+01					X					X
29	Cobalt	no	no	no	1.10E+01	na	na	na	na	na	na	na	na	na	na										
30	Copper	no	no	no	3.60E+01	na	1.00E-01	4.00E+02	1.20E+03	na	na	na	na	4.00E+02	1.20E+03				X				X		
31	Iron	no	no	no	3.60E+04	na	na	na	na	na	na	na	na	na	na										
32	Lead	YES	YES	YES	2.10E+01	na	1.00E-01	3.60E+02	1.30E+03	na	na	2.10E+01	2.10E+01	2.10E+01	2.10E+01		X								
33	Manganese	no	no	no	1.10E+03	na	na	na	na	na	na	na	na	na	na										
34	Mercury, inorganic	no	YES	YES	7.00E-02	na	2.00E-02	6.60E-01	8.00E-01	na	na	7.00E-02	7.00E-02	7.00E-02	7.00E-02		X								
35	Methylmercury	YES	YES	YES	na	na	na	na	na	6.68E+01	6.68E+01	PQL	PQL	6.68E+01	6.68E+01					X					X
36	Molybdenum	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
37	Nickel	no	no	no	4.80E+01	na	2.00E-01	2.60E+01	1.10E+02	na	na	na	na	2.60E+01	1.10E+02				X				X		
38	Selenium	no	YES	YES	7.80E-01	na	1.00E-01	1.10E+01	2.00E+01	3.34E+03	3.34E+03	7.80E-01	7.80E-01	7.80E-01	7.80E-01		X								
39	Silver	no	no	no	2.40E-01	na	1.00E-01	5.70E-01	1.70E+00	na	na	na	na	5.70E-01	1.70E+00				X				X		
40	Thallium	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
41	Tin	no	no	no	na	na	na	na	na	na	na	na	na	na	na										
42	Vanadium	no	no	no	4.50E+01	na	na	na	na	na	na	na	na	na	na										
43	Zinc	no	no	no	8.50E+01	na	1.00E+00	3.20E+03	4.20E+03	na	na	na	na	3.20E+03	4.20E+03				X				X		
44	***Metals - Butyltins***																***Metals - Butyltins***							
45	Monobutyltin	no	no	no	na	na	na	5.40E-01	4.80E+00	na	na	na	na	5.40E-01	4.80E+00				X				X		
46	Dibutyltin	no	no	no	na	na	na	9.10E-01	1.30E+02	na	na	na	na	9.10E-01	1.30E+02				X				X		
47	Trybutyl tin	no	no	no	na	na	na	4.70E-02	3.20E-01	na	na	na	na	4.70E-02	3.20E-01				X				X		
48	Tributyltin oxide	no	YES	YES	na	na	2.10E-03	na	na	3.35E+01	3.35E+01	2.10E-03	2.10E-03	2.10E-03	2.10E-03			X				X			
49	Tetrabutyltin	no	no	no	na	na	na	9.70E-02	9.70E-02	na	na	na	na	9.70E-02	9.70E-02				X				X		
50	***SVOCs - PAHs***																***SVOCs - PAHs***							
51	Acenaphthene	no	no	no	na	na	5.00E-03	na	na	na	na	na	na	na	na										
52	Acenaphthylene	no	no	no	na	na	5.00E-03	na	na	na	na	na	na	na	na										
53	Anthracene	no	no	no	na	na	5.00E-03	na	na	na	na	na	na	na	na										
54	Benzo(a)anthracene	YES	no	YES	na	na	9.00E-03	na	na	na	na	9.00E-03	9.00E-03	9.00E-03	9.00E-03			X				X			
55	Benzo(b)fluoranthene	YES	no	YES	na	na	9.00E-03	na	na	na	na	9.00E-03	9.00E-03	9.00E-03	9.00E-03			X				X			
56	Benzo(k)fluoranthene	YES	no	YES	na	na	9.00E-03	na	na	na	na	9.00E-03	9.00E-03	9.00E-03	9.00E-03			X				X			
57	Total benzofluoranthenes	YES	no	YES	na	na	1.20E-02	na	na	na	na	1.20E-02	1.20E-02	1.20E-02	1.20E-02			X				X			
58	Benzo(g,h,i)perylene	YES	no	YES	na	na	5.00E-03	na	na	na	na	5.00E-03	5.00E-03	5.00E-03	5.00E-03			X				X			
59	Benzo(a)pyrene	YES	no	YES	na	na	9.00E-03	na	na	1.74E-01	1.19E+00	9.00E-03	9.00E-03	9.00E-03	9.00E-03			X				X			
60	Chrysene	YES	no	YES	na	na	9.00E-03	na	na	na	na	9.00E-03	9.00E-03	9.00E-03	9.00E-03			X				X			
61	Dibenz(a,h)anthracene	YES	no	YES	na	na	9.00E-03	na	na	na	na	9.00E-03	9.00E-03	9.00E-03	9.00E-03			X				X			
62	Dibenzofuran	no	no	no	na	na	6.80E-02	2.00E-01	6.80E-01	na	na	na	na	2.00E-01	6.80E-01				X				X		
63	Fluoranthene	YES	YES	YES	na	na	5.00E-03	na	na	3.57E+03	3.57E+03	5.00E-03	5.00E-03	5.00E-03	5.00E-03			X				X			

64	Fluorene	no	no	no	na	na	5.00E-03	na	na	na	na	na	na	na	na									
65	Indeno(1,2,3-cd)pyrene	YES	no	YES	na	na	9.00E-03	na	na	na	na	9.00E-03	9.00E-03	9.00E-03	9.00E-03			X				X		
66	Methyl isopropyl phenanthrene (retene)	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
67	1-Methylnaphthalene	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
68	2-Methylnaphthalene	no	no	no	na	na	7.00E-03	na	na	na	na	na	na	na	na									
69	Naphthalene	no	no	no	na	na	6.00E-03	na	na	na	na	na	na	na	na									
70	Phenanthrene	no	no	no	na	na	5.00E-03	na	na	na	na	na	na	na	na									
71	Pyrene	no	YES	YES	na	na	5.00E-03	na	na	2.68E+03	2.68E+03	5.00E-03	5.00E-03	5.00E-03	5.00E-03			X				X		
72	Total LPAHs	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
73	Total HPAHs	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
74	Total PAHs	no	no	no	na	na	na	1.70E+01	3.00E+01	na	na	na	na	1.70E+01	3.00E+01				X				X	
75	Total cPAH TEQ	YES	no	YES	2.10E-02	na	9.00E-03	na	na	1.74E-01	1.19E+00	2.10E-02	2.10E-02	2.10E-02	2.10E-02		X							
76	***Other SVOCs***																***Other SVOCs***							
77	Aniline	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
78	Azobenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
79	Benzidine	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
80	Benzoic acid	no	no	no	na	na	5.03E-01	2.90E+00	3.80E+00	na	na	na	na	2.90E+00	3.80E+00				X				X	
81	Benzyl alcohol	no	no	no	na	na	1.41E-01	na	na	na	na	na	na	na	na									
82	Bis(2-chloroethoxy)methane	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
83	Bis(2-chloroethyl)ether	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
84	Bis(chloromethyl)ether	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
85	Bis(2-chloro-1-methylethyl)ether	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
86	2,6-Bis(1,1-dimethylethyl) phenol	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
87	Bis(2-ethylhexyl) phthalate	no	no	no	na	na	1.19E-01	5.00E-01	2.20E+01	na	na	na	na	5.00E-01	2.20E+01				X				X	
88	4-Bromophenyl phenyl ether	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
89	Butyl benzyl phthalate	no	no	no	na	na	8.10E-02	na	na	na	na	na	na	na	na									
90	Butyl diphenyl phosphate	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
91	Carbazole	no	no	no	na	na	na	9.00E-01	1.10E+00	na	na	na	na	9.00E-01	1.10E+00				X				X	
92	4-Chloroaniline	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
93	4-Chloro-3-methylphenol (chlorocresol)	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
94	2-Chloronaphthalene (beta-)	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
95	2-Chlorophenol	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
96	4-Chlorophenyl phenyl ether	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
97	Dibutyl phthalate	no	no	no	na	na	7.60E-02	3.80E-01	1.00E+00	na	na	na	na	3.80E-01	1.00E+00				X				X	
98	Dibutyl phenyl phosphate	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
99	1,2-Dichlorobenzene	no	no	no	na	na	6.80E-02	na	na	na	na	na	na	na	na									
100	1,3-Dichlorobenzene	no	no	no	na	na	6.80E-02	na	na	na	na	na	na	na	na									
101	1,4-Dichlorobenzene	no	no	no	na	na	6.80E-02	na	na	na	na	na	na	na	na									
102	3,3'-Dichlorobenzidine	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
103	2,4-Dichlorophenol	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
104	Di(2-ethylhexyl)adipate	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
105	Diethyl phthalate	no	no	no	na	na	9.30E-02	na	na	na	na	na	na	na	na									
106	Dimethyl phthalate	no	no	no	na	na	6.60E-02	na	na	na	na	na	na	na	na									
107	2,4-Dimethylphenol	no	no	no	na	na	2.10E-01	na	na	na	na	na	na	na	na									
108	1,2-Dinitrobenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
109	1,3-Dinitrobenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
110	1,4-Dinitrobenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
111	4,6-Dinitro-o-cresol (DNOC)	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
112	2,4-Dinitrophenol	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
113	2,4-Dinitrotoluene	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
114	2,6-Dinitrotoluene	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
115	Di-n-octyl phthalate	no	no	no	na	na	1.37E-01	3.90E-02	1.10E+00	na	na	na	na	3.90E-02	1.10E+00				X				X	
116	1,4-Dioxane	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
117	1,2-Diphenylhydrazine	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
118	Hexachlorobenzene	YES	YES	YES	na	na	1.00E-03	na	na	4.87E+00	1.43E+01	1.00E-03	1.00E-03	1.00E-03	1.00E-03			X				X		
119	Hexachlorobutadiene	YES	no	YES	na	na	3.00E-04	na	na	9.99E+01	2.92E+02	3.00E-04	3.00E-04	3.00E-04	3.00E-04			X				X		
120	Hexachlorocyclopentadiene	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
121	Hexachloroethane	no	no	no	na	na	1.00E-03	na	na	na	na	na	na	na	na									
122	Isophorone	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
123	2-Methoxynaphthalene	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
124	2-Methylphenol (o-cresol)	no	no	no	na	na	6.90E-02	na	na	na	na	na	na	na	na									
125	3-Methylphenol (m-cresol)	no	no	no	na	na	1.81E-01	na	na	na	na	na	na	na	na									
126	4-Methylphenol (p-cresol)	no	no	no	na	na	1.50E-02	2.60E-01	2.00E+00	na	na	na	na	2.60E-01	2.00E+00				X				X	
127	2-Nitroaniline	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
128	3-Nitroaniline	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
129	4-Nitroaniline	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
130	Nitrobenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
131	2-Nitrophenol	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
132	4-Nitrophenol	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
133	n-Nitrosodimethylamine	no	no	no	na	na	na	na	na	na	na	na	na	na	na									
134	n-Nitrosodiphenylamine	no	no	no	na	na	6.80E-02	na	na	na	na	na	na	na	na									

135	n-Nitrosodi-n-propylamine	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
136	Pentachlorophenol	no	YES	YES	na	na	3.55E-01	1.20E+00	1.20E+00	1.45E+00	7.05E+00	3.55E-01	3.55E-01	3.55E-01	3.55E-01			X				X				
137	Phenol	no	no	no	na	na	7.20E-02	1.20E-01	2.10E-01	na	na	na	na	1.20E-01	2.10E-01				X				X			
138	Pyridine	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
139	2,3,4,5-Tetrachlorophenol	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
140	2,3,4,6-Tetrachlorophenol	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
141	1,2,4-Trichlorobenzene	no	no	no	na	na	6.80E-02	na	na	na	na	na	na	na	na											
142	2,4,5-Trichlorophenol	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
143	2,4,6-Trichlorophenol	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
144	***Volatile Organic Compounds***																									
145	Acetone	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
146	Acetaldehyde	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
147	Acrolein	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
148	Acrylonitrile	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
149	Benzaldehyde	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
150	Benzene	no	no	no	na	na	4.10E-03	na	na	na	na	na	na	na	na											
151	Bromobenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
152	Bromochloromethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
153	Bromoethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
154	Bromoform	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
155	Bromomethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
156	2-Butoxyethanol (EGBE)	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
157	n-Butylbenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
158	sec-Butylbenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
159	tert-Butylbenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
160	Carbon disulfide	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
161	Carbon tetrachloride	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
162	Chlorobenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
163	Chloroethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
164	2-Chloroethyl vinyl ether	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
165	Chloroform	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
166	Chloromethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
167	3-Chloro-1-propene (allyl chloride)	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
168	2-Chlorotoluene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
169	4-Chlorotoluene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
170	Dibromochloromethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
171	1,2-Dibromo-3-chloropropane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
172	Dibromomethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
173	Dichlorobromomethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
174	trans-1,4-Dichloro-2-butene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
175	Dichlorodifluoromethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
176	1,1-Dichloroethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
177	1,2-Dichloroethane (EDC)	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
178	1,1-Dichloroethylene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
179	cis-1,2-Dichloroethylene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
180	trans-1,2-Dichloroethylene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
181	1,2-Dichloroethylene (mixed isomers)	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
182	1,2-Dichloropropane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
183	1,3-Dichloropropane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
184	2,2-Dichloropropane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
185	1,1-Dichloropropene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
186	cis-1,3-Dichloropropene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
187	trans-1,3-Dichloropropene	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
188	Diisopropyl ether	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
189	Ethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
190	Ethylbenzene	no	no	no	na	na	6.60E-03	na	na	na	na	na	na	na	na											
191	Ethylene oxide	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
192	Ethyl ether	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
193	Ethylene dibromide (EDB)	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
194	Formaldehyde	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
195	n-Hexane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
196	2-Hexanone	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
197	Isopropylbenzene (cumene)	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
198	4-Isopropyltoluene (p-isopropyltoluene)	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
199	Methane	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
200	Methyl ethyl ketone (2-butanone)	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
201	Methyl iodide	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
202	Methyl isobutyl ketone	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
203	Methyl tert-butyl ether (MTBE)	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
204	Methylene chloride	no	no	no	na	na	na	na	na	na	na	na	na	na	na											
205	2-Pentanone	no	no	no	na	na	na	na	na	na	na	na	na	na	na											

206	n-Propylbenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
207	Styrene	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
208	1,1,1,2-Tetrachloroethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
209	1,1,2,2-Tetrachloroethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
210	Tetrachloroethylene (PCE)	no	no	no	na	na	6.60E-03	na	na	na	na	na	na	na	na														
211	Tetrahydrofuran	no	no	no	na	na	1.01E+00	na	na	na	na	na	na	na	na														
212	Toluene	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
213	1,2,3-Trichlorobenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
214	1,1,1-Trichloroethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
215	1,1,2-Trichloroethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
216	Trichloroethylene (TCE)	no	no	no	na	na	6.60E-03	na	na	na	na	na	na	na	na														
217	Trichlorofluoroethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
218	Trichlorofluoromethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
219	1,2,3-Trichloropropane	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
220	Trichlorotrifluoroethane	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
221	1,2,3-Trimethylbenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
222	1,2,4-Trimethylbenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
223	1,3,5-Trimethylbenzene	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
224	Vinyl acetate	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
225	Vinyl chloride	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
226	Total xylenes	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
227	***PFAS***																***PFAS***												
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
229	GenX (HFPO-DA)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
230	Perfluorobutanoic acid (PFBA)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
231	Perfluorobutanesulfonic acid (PFBS)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
232	Perfluorodecanoic acid (PFDA)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
233	Perfluorohexanoic acid (PFHxA)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
234	Perfluorohexanesulfonic acid (PFHxS)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
235	Perfluorononanoic acid (PFNA)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
236	Perfluorooctanesulfonic acid (PFOS)	YES	no	YES	na	na	na	na	na	1.12E-02	1.12E-02	PQL	PQL	1.12E-02	1.12E-02					X				X					
237	Perfluorooctanoic acid (PFOA)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
238	***Petroleum Hydrocarbons***																***Petroleum Hydrocarbons***												
239	Gasoline range hydrocarbons, fresh	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
240	Gasoline range hydrocarbons, weathered	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
241	Diesel range hydrocarbons, fresh	no	no	no	na	na	1.83E+01	3.40E+02	5.10E+02	na	na	na	na	3.40E+02	5.10E+02					X				X					
242	Diesel range hydrocarbons, weathered	no	no	no	na	na	1.83E+01	3.40E+02	5.10E+02	na	na	na	na	3.40E+02	5.10E+02					X				X					
243	Oil range hydrocarbons	no	no	no	na	na	3.75E+01	3.60E+03	4.40E+03	na	na	na	na	3.60E+03	4.40E+03					X				X					
244	Total diesel & oil range hydrocarbons	no	no	no	na	na	3.75E+01	na	na	na	na	na	na	na	na														
245	***Pesticides***																***Pesticides***												
246	Aldrin	YES	no	YES	na	na	1.00E-04	na	na	4.58E-01	1.34E+00	1.00E-04	1.00E-04	1.00E-04	1.00E-04			X				X							
247	alpha-BHC (alpha-HCH)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
248	beta-BHC (beta-HCH)	no	no	no	na	na	na	7.20E-03	1.10E-02	na	na	na	na	7.20E-03	1.10E-02					X				X					
249	delta-BHC (delta-HCH)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
250	Carbaryl	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
251	cis-Chlordane (alpha)	YES	YES	YES	na	na	1.00E-04	na	na	1.11E+02	1.11E+02	1.00E-04	1.00E-04	1.00E-04	1.00E-04			X				X							
252	trans-Chlordane (gamma)	YES	YES	YES	na	na	1.00E-04	na	na	1.11E+02	1.11E+02	1.00E-04	1.00E-04	1.00E-04	1.00E-04			X				X							
253	Chlordane	YES	YES	YES	na	na	na	na	na	7.43E+00	3.05E+01	PQL	PQL	7.43E+00	3.05E+01						X								X
254	Chlorpyrifos	no	YES	YES	na	na	na	na	na	1.12E+02	1.12E+02	PQL	PQL	1.12E+02	1.12E+02						X								X
255	4,4'-DDD	no	YES	YES	na	na	1.00E-04	na	na	5.42E+00	2.48E+01	1.00E-04	1.00E-04	1.00E-04	1.00E-04			X				X							
256	4,4'-DDE	no	YES	YES	na	na	1.00E-04	na	na	2.29E+01	6.71E+01	1.00E-04	1.00E-04	1.00E-04	1.00E-04			X				X							
257	4,4'-DDT	YES	YES	YES	na	na	1.00E-04	na	na	9.18E+00	3.63E+01	1.00E-04	1.00E-04	1.00E-04	1.00E-04			X				X							
258	Total DDD	no	YES	YES	na	na	na	3.10E-01	8.60E-01	5.42E+00	2.48E+01	PQL	PQL	3.10E-01	8.60E-01					X				X					
259	Total DDE	no	YES	YES	na	na	na	2.10E-02	3.30E-02	2.29E+01	6.71E+01	PQL	PQL	2.10E-02	3.30E-02					X				X					
260	Total DDT	YES	YES	YES	na	na	na	1.00E-01	8.10E+00	9.18E+00	3.63E+01	PQL	PQL	1.00E-01	8.10E+00					X				X					
261	Diazinon	no	YES	YES	na	na	na	na	na	7.81E+01	7.81E+01	PQL	PQL	7.81E+01	7.81E+01						X								X
262	Dieldrin	YES	no	YES	na	na	1.00E-04	4.90E-03	9.30E-03	8.13E-02	3.72E-01	1.00E-04	1.00E-04	1.00E-04	1.00E-04			X				X							
263	Endosulfan I	no	YES	YES	na	na	na	na	na	na	na	PQL	PQL	na	na														
264	Endosulfan II	no	YES	YES	na	na	na	na	na	na	na	PQL	PQL	na	na														
265	Endosulfan sulfate	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
266	Endrin	YES	no	YES	na	na	na	na	na	3.35E+01	3.35E+01	PQL	PQL	3.35E+01	3.35E+01						X								X
267	Endrin aldehyde	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
268	Endrin ketone	no	no	no	na	na	na	8.50E-03	na	na	na	na	na	8.50E-03	na					X									
269	Heptachlor	YES	no	YES	na	na	1.00E-04	na	na	1.73E+00	5.07E+00	1.00E-04	1.00E-04	1.00E-04	1.00E-04			X				X							
270	Heptachlor epoxide	YES	no	YES	na	na	na	na	na	8.56E-01	2.51E+00	PQL	PQL	8.56E-01	2.51E+00						X								X
271	Lindane (gamma-BHC)	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
272	Malathion	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
273	Methoxychlor	no	no	no	na	na	na	na	na	na	na	na	na	na	na														
274	Mirex	YES	YES	YES	na	na	na	na	na	4.33E-01	1.27E+00	PQL	PQL	4.33E-01	1.27E+00						X								X
275	Nonachlor	no	no	no	na	na	1.00E-04	na	na	na	na	na	na	na	na														
276	Toxaphene	YES	no	YES	na	na	na	na	na	1.18E+00	5.41E+00	PQL	PQL	1.18E+00	5.41E+00						X								X

277	***Herbicides***															
278	2,4-Dichlorophenoxyacetic acid (2,4-D)	no	no	no	na	na	na	na	na	na	na	na	na	na	na	
279	4-(2,4-Dichlorophenoxy)butanoic acid 2,4-DB	no	no	no	na	na	na	na	na	na	na	na	na	na	na	
280	2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	no	no	no	na	na	na	na	na	na	na	na	na	na	na	
281	2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	no	no	no	na	na	na	na	na	na	na	na	na	na	na	
282	Dalapon	no	no	no	na	na	na	na	na	na	na	na	na	na	na	
283	Dicamba	no	no	no	na	na	na	na	na	na	na	na	na	na	na	
284	Dichloroprop	no	no	no	na	na	na	na	na	na	na	na	na	na	na	
285	Dinoseb	no	no	no	na	na	na	na	na	na	na	na	na	na	na	
286	2-Methyl-4-chlorophenoxy acetic acid (MCPA)	no	no	no	na	na	na	na	na	na	na	na	na	na	na	
287	(2-Methyl-4-chlorophenol)2-propionic acid (MCPP)	no	no	no	na	na	na	na	na	na	na	na	na	na	na	

Herbicides							

Number of Chemicals: 6 26 27 12 0 26 26 12

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PCUL Workbook - Sediment Equations for Freshwater Sites Chemicals highlighted yellow are mutagenic

Sort Order	Chemical (all concentrations in mg/kg, except as noted)	Bioaccum-lative	CPFo (risk per mg/kg-day) Param	CPFd (risk per mg/kg-day) Param	RfDo (mg/kg-day) Param	RfDd (mg/kg-day) Param	AB (unitless) Param	ABS (unitless) Param	Beach Play (Child) Risk = 1E-6 SMS Eq. 9-1 Modified	Subsistence Clam Digging (Adult) Risk = 1E-6 SMS Eq. 9-1 Modified	Subsistence Netfishing (Adult) Risk = 1E-6 SMS Eq. 9-1 Modified	Beach Play (Child) Risk = 1E-5 SMS Eq. 9-1 Modified	Subsistence Clam Digging (Adult) Risk = 1E-5 SMS Eq. 9-1 Modified	Subsistence Netfishing (Adult) Risk = 1E-5 SMS Eq. 9-1 Modified	Beach Play (Child) HQ = 1 SMS Eq. 9-2 Modified	Subsistence Clam Digging (Adult) HQ = 1 SMS Eq. 9-2 Modified	Subsistence Netfishing (Adult) HQ = 1 SMS Eq. 9-2 Modified	Lower Tier Beach Play (1E-6 or HQ=1)	Lower Tier Clam Digging (1E-6 or HQ=1)	Lower Tier Netfishing (1E-6 or HQ=1)	Lower Tier Beach Play Scenario	Upper Tier Beach Play (1E-5 or HQ=1)	Upper Tier Clam Digging (1E-5 or HQ=1)	Upper Tier Netfishing (1E-5 or HQ=1)	Upper Tier Beach Play Scenario
1	***PCBs***																								
2	Total PCB Aroclors	YES	2.00E+00	2.00E+00	na	na	1.00E+00	0.140	4.88E-01	2.30E-01	5.79E-01	4.88E+00	2.30E+00	5.79E+00	na	na	na	4.88E-01	2.30E-01	5.79E-01	4.88E-01	4.88E+00	2.30E+00	5.79E+00	2.30E+00
3	Total PCB congeners	YES	2.00E+00	2.00E+00	na	na	1.00E+00	0.140	4.88E-01	2.30E-01	5.79E-01	4.88E+00	2.30E+00	5.79E+00	na	na	na	4.88E-01	2.30E-01	5.79E-01	4.88E-01	4.88E+00	2.30E+00	5.79E+00	2.30E+00
4	Total PCB TEQ	YES	1.30E+05	1.30E+05	7.00E-10	7.00E-10	6.00E-01	0.030	2.86E-05	1.21E-05	2.86E-05	2.86E-04	1.21E-04	2.86E-04	2.23E-04	1.10E-03	2.60E-03	2.86E-05	1.21E-05	2.86E-05	2.86E-05	2.23E-04	1.21E-04	2.86E-04	1.21E-04
5	***Dioxins/Furans***																								
6	Total dioxin/furan TEQ	YES	1.30E+05	1.30E+05	7.00E-10	7.00E-10	6.00E-01	0.030	2.86E-05	1.21E-05	2.86E-05	2.86E-04	1.21E-04	2.86E-04	2.23E-04	1.10E-03	2.60E-03	2.86E-05	1.21E-05	2.86E-05	2.86E-05	2.23E-04	1.21E-04	2.86E-04	1.21E-04
7	2,3,7,8-TCDD	YES	1.30E+05	1.30E+05	7.00E-10	7.00E-10	6.00E-01	0.030	2.86E-05	1.21E-05	2.86E-05	2.86E-04	1.21E-04	2.86E-04	2.23E-04	1.10E-03	2.60E-03	2.86E-05	1.21E-05	2.86E-05	2.86E-05	2.23E-04	1.21E-04	2.86E-04	1.21E-04
8	Total chlorinated dioxins	YES	na	na	na	na	6.00E-01	0.030	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
9	Total chlorinated furans	YES	na	na	na	na	6.00E-01	0.030	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
10	***Inorganics***																								
11	Ammonia	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
12	Chloride	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
13	Cyanide, free	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
14	Fluoride	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
15	Nitrate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
16	Nitrite	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
17	Sulfate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
18	Sulfide	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
19	***Metals***																								
20	Aluminum	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
21	Antimony	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
22	Arsenic	YES	3.20E+01	3.20E+01	6.00E-05	6.00E-05	1.00E+00	0.030	9.75E-02	3.85E-02	8.78E-02	9.75E-01	3.85E-01	8.78E-01	1.61E+01	7.40E+01	1.69E+02	9.75E-02	3.85E-02	8.78E-02	9.75E-02	9.75E-01	3.85E-01	8.78E-01	3.85E-01
23	Barium	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
24	Beryllium	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
25	Cadmium	YES	na	na	1.00E-03	2.50E-05	1.00E+00	0.001	na	na	na	na	na	na	2.23E+02	1.07E+03	2.49E+03	2.23E+02	1.07E+03	2.49E+03	2.23E+02	2.23E+02	1.07E+03	2.49E+03	2.23E+02
26	Chromium, total	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
27	Chromium, trivalent	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
28	Chromium, hexavalent	YES	1.60E-01	6.40E+00	9.00E-04	2.25E-05	1.00E+00	0.000	7.20E+00	4.16E+00	5.29E+00	7.20E+01	4.16E+01	5.29E+01	6.01E+02	2.05E+03	4.14E+03	7.20E+00	4.16E+00	5.29E+00	7.20E+00	7.20E+01	4.16E+01	5.29E+01	4.16E+01
29	Cobalt	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
30	Copper	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
31	Iron	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
32	Lead	YES	na	na	na	na	1.00E+00	0.000	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
33	Manganese	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
34	Mercury, inorganic	YES	na	na	na	na	1.00E+00	0.000	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
35	Methylmercury	YES	na	na	1.00E-04	1.00E-04	1.00E+00	0.000	na	na	na	na	na	na	6.68E+01	2.28E+02	4.60E+02	6.68E+01	2.28E+02	4.60E+02	6.68E+01	6.68E+01	2.28E+02	4.60E+02	6.68E+01
36	Molybdenum	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
37	Nickel	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
38	Selenium	YES	na	na	5.00E-03	5.00E-03	1.00E+00	0.000	na	na	na	na	na	na	3.34E+03	1.14E+04	2.30E+04	3.34E+03	1.14E+04	2.30E+04	3.34E+03	3.34E+03	1.14E+04	2.30E+04	3.34E+03
39	Silver	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
40	Thallium	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
41	Tin	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
42	Vanadium	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
43	Zinc	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
44	***Metals - Butyltins***																								
45	Monobutyltin	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
46	Dibutyltin	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
47	Trybutyl tin	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
48	Tributyltin oxide	YES	na	na	3.00E-04	3.00E-04	1.00E+00	0.100	na	na	na	na	na	na	3.35E+01	1.78E+02	4.42E+02	3.35E+01	1.78E+02	4.42E+02	3.35E+01	3.35E+01	1.78E+02	4.42E+02	3.35E+01
49	Tetrabutyltin	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
50	***SVOCs - PAHs***																								
51	Acenaphthene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
52	Acenaphthylene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
53	Anthracene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
54	Benzo(a)anthracene	YES	na	na	na	na	1.00E+00	0.130	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
55	Benzo(b)fluoranthene	YES	na	na	na	na	1.00E+00	0.130	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
56	Benzo(k)fluoranthene	YES	na	na	na	na	1.00E+00	0.130	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
57	Total benzofluoranthenes	YES	na	na	na	na	na	0.130	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
58	Benzo(g,h,i)perylene	YES	na	na	na	na	na	0.130	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
59	Benzo(a)pyrene	YES	1.00E+00	1.00E+00	3.00E-04	3.00E-04	1.00E+00	0.130	1.74E-01	1.19E-01	1.47E-01	1.74E+00	1.19E+00	1.47E+00	2.68E+01	1.46E+02	3.67E+02	1.74E-01	1.19E-01	1.47E-01	1.74E-01	1.74E+00	1.19E+00	1.47E+00	1.19E+00
60	Chrysene	YES	na	na	na	na	1.00E+00	0.130	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
61	Dibenz(a,h)anthracene	YES	na	na	na	na	1.00E+00	0.130	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
62	Dibenzofuran	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
63	Fluoranthene	YES	na	na	4.00E-02	4.00E-02	1.00E+00	0.130	na	na	na	na	na	na	3.57E+03	1.95E+04	4.89E+04	3.57E+03	1.95E+04	4.89E+04	3.57E+03	3.57E+03	1.95E+04	4.89E+04	3.57E+03
64	Fluorene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
65	Indeno(1,2,3-cd)pyrene	YES	na	na	na	na	1.00E+00	0.130	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
66	Methyl isopropyl phenanthrene (retene)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
67	1-Methylnaphthalene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
68	2-Methylnaphthalene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
69	Naphthalene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
70	Phenanthrene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
71	Pyrene	YES	na	na	3.00E-02	3.00E-02	1.00E+00	0.130	na	na	na	na	na	na	2.68E+03	1.46E+04	3.67E+04	2.68E+03	1.46E+04	3.67E+04	2.68E+03	2.68E+03	1.46E+04	3.67E+04	2.68E+03
72	Total LPAHs	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

73	Total HPAHs	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
74	Total PAHs	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
75	Total cPAH TEQ	YES	1.00E+00	1.00E+00	na	na	1.00E+00	0.130	1.74E-01	1.19E-01	1.47E-01	1.74E+00	1.19E+00	1.47E+00	na	na	na	1.74E-01	1.19E-01	1.47E-01	1.74E-01	1.74E+00	1.19E+00	1.47E+00	1.19E+00
76	***Other SVOCs***																							
77	Aniline	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
78	Azobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
79	Benzidine	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
80	Benzoic acid	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
81	Benzyl alcohol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
82	Bis(2-chloroethoxy)methane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
83	Bis(2-chloroethyl)ether	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
84	Bis(chloromethyl)ether	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
85	Bis(2-chloro-1-methylethyl)ether	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
86	2,6-Bis(1,1-dimethylethyl) phenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
87	Bis(2-ethylhexyl) phthalate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
88	4-Bromophenyl phenyl ether	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
89	Butyl benzyl phthalate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
90	Butyl diphenyl phosphate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
91	Carbazole	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
92	4-Chloroaniline	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
93	4-Chloro-3-methylphenol (chlorocresol)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
94	2-Chloronaphthalene (beta-)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
95	2-Chlorophenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
96	4-Chlorophenyl phenyl ether	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
97	Dibutyl phthalate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
98	Dibutyl phenyl phosphate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
99	1,2-Dichlorobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
100	1,3-Dichlorobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
101	1,4-Dichlorobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
102	3,3'-Dichlorobenzidine	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
103	2,4-Dichlorophenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
104	Di(2-ethylhexyl)adipate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
105	Diethyl phthalate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
106	Dimethyl phthalate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
107	2,4-Dimethylphenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
108	1,2-Dinitrobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
109	1,3-Dinitrobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
110	1,4-Dinitrobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
111	4,6-Dinitro-o-cresol (DNOC)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
112	2,4-Dinitrophenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
113	2,4-Dinitrotoluene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
114	2,6-Dinitrotoluene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
115	Di-n-octyl phthalate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
116	1,4-Dioxane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
117	1,2-Diphenylhydrazine	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
118	Hexachlorobenzene	YES	1.60E+00	1.60E+00	8.00E-04	8.00E-04	1.00E+00	0.000	4.87E+00	1.43E+00	2.88E+00	4.87E+01	1.43E+01	2.88E+01	5.34E+02	1.83E+03	3.68E+03	4.87E+00	1.43E+00	2.88E+00	4.87E+00	4.87E+01	1.43E+01	2.88E+01	1.43E+01
119	Hexachlorobutadiene	YES	7.80E-02	7.80E-02	1.00E-03	1.00E-03	1.00E+00	0.000	9.99E+01	2.92E+01	5.90E+01	9.99E+02	2.92E+02	5.90E+02	6.68E+02	2.28E+03	4.60E+03	9.99E+01	2.92E+01	5.90E+01	9.99E+01	6.68E+02	2.92E+02	5.90E+02	2.92E+02
120	Hexachlorocyclopentadiene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
121	Hexachloroethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
122	Isophorone	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
123	2-Methoxynaphthalene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
124	2-Methylphenol (o-cresol)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
125	3-Methylphenol (m-cresol)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
126	4-Methylphenol (p-cresol)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
127	2-Nitroaniline	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
128	3-Nitroaniline	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
129	4-Nitroaniline	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
130	Nitrobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
131	2-Nitrophenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
132	4-Nitrophenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
133	n-Nitrosodimethylamine	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
134	n-Nitrosodiphenylamine	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
135	n-Nitrosodi-n-propylamine	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
136	Pentachlorophenol	YES	4.00E-01	4.00E-01	5.00E-03	5.00E-03	1.00E+00	0.250	1.45E+00	7.05E-01	1.82E+00	1.45E+01	7.05E+00	1.82E+01	2.48E+02	1.41E+03	3.65E+03	1.45E+00	7.05E-01	1.82E+00	1.45E+00	1.45E+01	7.05E+00	1.82E+01	7.05E+00
137	Phenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
138	Pyridine	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
139	2,3,4,5-Tetrachlorophenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
140	2,3,4,6-Tetrachlorophenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
141	1,2,4-Trichlorobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
142	2,4,5-Trichlorophenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
143	2,4,6-Trichlorophenol	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
144	***Volatile Organic Compounds***																								
145	Acetone	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
146	Acetaldehyde	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
147	Acrolein	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
148	Acrylonitrile	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
149	Benzaldehyde	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
150	Benzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
151	Bromobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
152	Bromochloromethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
153	Bromoethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
154	Bromoform	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

155	Bromomethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
156	2-Butoxyethanol (EGBE)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
157	n-Butylbenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
158	sec-Butylbenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
159	tert-Butylbenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
160	Carbon disulfide	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
161	Carbon tetrachloride	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
162	Chlorobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
163	Chloroethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
164	2-Chloroethyl vinyl ether	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
165	Chloroform	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
166	Chloromethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
167	3-Chloro-1-propene (allyl chloride)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
168	2-Chlorotoluene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
169	4-Chlorotoluene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
170	Dibromochloromethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
171	1,2-Dibromo-3-chloropropane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
172	Dibromomethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
173	Dichlorobromomethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
174	trans-1,4-Dichloro-2-butene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
175	Dichlorodifluoromethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
176	1,1-Dichloroethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
177	1,2-Dichloroethane (EDC)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
178	1,1-Dichloroethylene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
179	cis-1,2-Dichloroethylene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
180	trans-1,2-Dichloroethylene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
181	1,2-Dichloroethylene (mixed isomers)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
182	1,2-Dichloropropane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
183	1,3-Dichloropropane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
184	2,2-Dichloropropane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
185	1,1-Dichloropropene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
186	cis-1,3-Dichloropropene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
187	trans-1,3-Dichloropropene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
188	Diisopropyl ether	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
189	Ethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
190	Ethylbenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
191	Ethylene oxide	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
192	Ethyl ether	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
193	Ethylene dibromide (EDB)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
194	Formaldehyde	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
195	n-Hexane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
196	2-Hexanone	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
197	Isopropylbenzene (cumene)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
198	4-Isopropyltoluene (p-isopropyltoluene)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
199	Methane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
200	Methyl ethyl ketone (2-butanone)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
201	Methyl iodide	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
202	Methyl isobutyl ketone	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
203	Methyl tert-butyl ether (MTBE)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
204	Methylene chloride	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
205	2-Pentanone	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
206	n-Propylbenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
207	Styrene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
208	1,1,1,2-Tetrachloroethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
209	1,1,2,2-Tetrachloroethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
210	Tetrachloroethylene (PCE)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
211	Tetrahydrofuran	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
212	Toluene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
213	1,2,3-Trichlorobenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
214	1,1,1-Trichloroethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
215	1,1,2-Trichloroethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
216	Trichloroethylene (TCE)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
217	Trichlorofluoroethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
218	Trichlorofluoromethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
219	1,2,3-Trichloropropane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
220	Trichlorotrifluoroethane	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
221	1,2,3-Trimethylbenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
222	1,2,4-Trimethylbenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
223	1,3,5-Trimethylbenzene	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
224	Vinyl acetate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
225	Vinyl chloride	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
226	Total xylenes	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
227	***PFAS***																							
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
229	GenX (HFPO-DA)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
230	Perfluorobutanoic acid (PFBA)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
231	Perfluorobutanesulfonic acid (PFBS)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
232	Perfluorodecanoic acid (PFDA)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
233	Perfluorohexanoic acid (PFHxA)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
234	Perfluorohexanesulfonic acid (PFHxS)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
235	Perfluorononanoic acid (PFNA)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
236	Perfluorooctanesulfonic acid (PFOS)	YES	3.95E+01	3.95E+01	1.00E-07	1.00E-07	1.00E+00	0.100	3.29E-02	1.51E-02	3.73E-02	3.29E-01	1.51E-01	3.73E-01	1.12E-02	5.95E-02	1.47E-01	1.12E-02	1.51E-02	3.73E-02	1.12E-02	1.12E-02	5.95E-02	1.47E-01	1.12E-02

237	Perfluorooctanoic acid (PFOA)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
238	***Petroleum Hydrocarbons***																							
239	Gasoline range hydrocarbons, fresh	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
240	Gasoline range hydrocarbons, weathered	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
241	Diesel range hydrocarbons, fresh	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
242	Diesel range hydrocarbons, weathered	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
243	Oil range hydrocarbons	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
244	Total diesel & oil range hydrocarbons	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
245	***Pesticides***																							
246	Aldrin	YES	1.70E+01	1.70E+01	3.00E-05	3.00E-05	1.00E+00	0.000	4.58E-01	1.34E-01	2.71E-01	4.58E+00	1.34E+00	2.71E+00	2.00E+01	6.84E+01	1.38E+02	4.58E-01	1.34E-01	2.71E-01	4.58E-01	4.58E+00	1.34E+00	2.71E+00	1.34E+00
247	alpha-BHC (alpha-HCH)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
248	beta-BHC (beta-HCH)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
249	delta-BHC (delta-HCH)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
250	Carbaryl	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
251	cis-Chlordane (alpha)	YES	na	na	5.00E-04	5.00E-04	1.00E+00	0.040	na	na	na	na	na	na	1.11E+02	5.34E+02	1.24E+03	1.11E+02	5.34E+02	1.24E+03	1.11E+02	1.11E+02	5.34E+02	1.24E+03	1.11E+02
252	trans-Chlordane (gamma)	YES	na	na	5.00E-04	5.00E-04	1.00E+00	0.040	na	na	na	na	na	na	1.11E+02	5.34E+02	1.24E+03	1.11E+02	5.34E+02	1.24E+03	1.11E+02	1.11E+02	5.34E+02	1.24E+03	1.11E+02
253	Chlordane	YES	3.50E-01	3.50E-01	5.00E-04	5.00E-04	1.00E+00	0.040	7.43E+00	3.05E+00	7.11E+00	7.43E+01	3.05E+01	7.11E+01	1.11E+02	5.34E+02	1.24E+03	7.43E+00	3.05E+00	7.11E+00	7.43E+00	7.43E+01	3.05E+01	7.11E+01	3.05E+01
254	Chlorpyrifos	YES	na	na	1.00E-03	1.00E-03	1.00E+00	0.100	na	na	na	na	na	na	1.12E+02	5.95E+02	1.47E+03	1.12E+02	5.95E+02	1.47E+03	1.12E+02	1.12E+02	5.95E+02	1.47E+03	1.12E+02
255	4,4'-DDD	YES	2.40E-01	2.40E-01	5.00E-04	5.00E-04	1.00E+00	0.100	5.42E+00	2.48E+00	6.14E+00	5.42E+01	2.48E+01	6.14E+01	5.58E+01	2.97E+02	7.36E+02	5.42E+00	2.48E+00	6.14E+00	5.42E+00	5.42E+01	2.48E+01	6.14E+01	2.48E+01
256	4,4'-DDE	YES	3.40E-01	3.40E-01	5.00E-04	5.00E-04	1.00E+00	0.000	2.29E+01	6.71E+00	1.35E+01	2.29E+02	6.71E+01	1.35E+02	3.34E+02	1.14E+03	2.30E+03	2.29E+01	6.71E+00	1.35E+01	2.29E+01	2.29E+02	6.71E+01	1.35E+02	6.71E+01
257	4,4'-DDT	YES	3.40E-01	3.40E-01	5.00E-04	5.00E-04	1.00E+00	0.030	9.18E+00	3.63E+00	8.26E+00	9.18E+01	3.63E+01	8.26E+01	1.34E+02	6.16E+02	1.41E+03	9.18E+00	3.63E+00	8.26E+00	9.18E+00	9.18E+01	3.63E+01	8.26E+01	3.63E+01
258	Total DDD	YES	2.40E-01	2.40E-01	5.00E-04	5.00E-04	1.00E+00	0.100	5.42E+00	2.48E+00	6.14E+00	5.42E+01	2.48E+01	6.14E+01	5.58E+01	2.97E+02	7.36E+02	5.42E+00	2.48E+00	6.14E+00	5.42E+00	5.42E+01	2.48E+01	6.14E+01	2.48E+01
259	Total DDE	YES	3.40E-01	3.40E-01	5.00E-04	5.00E-04	1.00E+00	0.000	2.29E+01	6.71E+00	1.35E+01	2.29E+02	6.71E+01	1.35E+02	3.34E+02	1.14E+03	2.30E+03	2.29E+01	6.71E+00	1.35E+01	2.29E+01	2.29E+02	6.71E+01	1.35E+02	6.71E+01
260	Total DDT	YES	3.40E-01	3.40E-01	5.00E-04	5.00E-04	1.00E+00	0.030	9.18E+00	3.63E+00	8.26E+00	9.18E+01	3.63E+01	8.26E+01	1.34E+02	6.16E+02	1.41E+03	9.18E+00	3.63E+00	8.26E+00	9.18E+00	9.18E+01	3.63E+01	8.26E+01	3.63E+01
261	Diazinon	YES	na	na	7.00E-04	7.00E-04	1.00E+00	0.100	na	na	na	na	na	na	7.81E+01	4.16E+02	1.03E+03	7.81E+01	4.16E+02	1.03E+03	7.81E+01	7.81E+01	4.16E+02	1.03E+03	7.81E+01
262	Dieldrin	YES	1.60E+01	1.60E+01	5.00E-05	5.00E-05	1.00E+00	0.100	8.13E-02	3.72E-02	9.20E-02	8.13E-01	3.72E-01	9.20E-01	5.58E+00	2.97E+01	7.36E+01	8.13E-02	3.72E-02	9.20E-02	8.13E-02	8.13E-01	3.72E-01	9.20E-01	3.72E-01
263	Endosulfan I	YES	na	na	na	na	1.00E+00	0.000	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
264	Endosulfan II	YES	na	na	na	na	1.00E+00	0.000	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
265	Endosulfan sulfate	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
266	Endrin	YES	na	na	3.00E-04	3.00E-04	1.00E+00	0.100	na	na	na	na	na	na	3.35E+01	1.78E+02	4.42E+02	3.35E+01	1.78E+02	4.42E+02	3.35E+01	3.35E+01	1.78E+02	4.42E+02	3.35E+01
267	Endrin aldehyde	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
268	Endrin ketone	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
269	Heptachlor	YES	4.50E+00	4.50E+00	5.00E-04	5.00E-04	1.00E+00	0.000	1.73E+00	5.07E-01	1.02E+00	1.73E+01	5.07E+00	1.02E+01	3.34E+02	1.14E+03	2.30E+03	1.73E+00	5.07E-01	1.02E+00	1.73E+00	1.73E+01	5.07E+00	1.02E+01	5.07E+00
270	Heptachlor epoxide	YES	9.10E+00	9.10E+00	1.30E-05	1.30E-05	1.00E+00	0.000	8.56E-01	2.51E-01	5.06E-01	8.56E+00	2.51E+00	5.06E+00	8.68E+00	2.97E+01	5.98E+01	8.56E-01	2.51E-01	5.06E-01	8.56E-01	8.56E+00	2.51E+00	5.06E+00	2.51E+00
271	Lindane (gamma-BHC)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
272	Malathion	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
273	Methoxychlor	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
274	Mirex	YES	1.80E+01	1.80E+01	2.00E-04	2.00E-04	1.00E+00	0.000	4.33E-01	1.27E-01	2.56E-01	4.33E+00	1.27E+00	2.56E+00	1.34E+02	4.56E+02	9.20E+02	4.33E-01	1.27E-01	2.56E-01	4.33E-01	4.33E+00	1.27E+00	2.56E+00	1.27E+00
275	Nonachlor	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
276	Toxaphene	YES	1.10E+00	1.10E+00	9.00E-05	9.00E-05	1.00E+00	0.100	1.18E+00	5.41E-01	1.34E+00	1.18E+01	5.41E+00	1.34E+01	1.00E+01	5.35E+01	1.33E+02	1.18E+00	5.41E-01	1.34E+00	1.18E+00	1.00E+01	5.41E+00	1.34E+01	5.41E+00
277	***Herbicides***																								
278	2,4-Dichlorophenoxyacetic acid (2,4-D)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
279	4-(2,4-Dichlorophenoxy)butanoic acid 2,4-DB	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
280	2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
281	2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
282	Dalapon	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
283	Dicamba	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
284	Dichloroprop	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
285	Dinoseb	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
286	2-Methyl-4-chlorophenoxy acetic acid (MCPA)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na
287	(2-Methyl-4-chlorophenol)2-propionic acid (MCPP)	no	no calc	no calc	no calc	no calc	no calc	no calc	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na

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PCUL Workbook - Beach Play Sediment Cleanup Levels Based on Cancer Risk for Carcinogens with Mutagenic Mode of Action

Equations Based on SCUM

1) Age-specific ingestion intake factor: IIF = ED x EF x IR x ADAF / BW
2) Age-specific dermal contact factor: DCF = ED x EF x SA x AF x ADAF / BW
3) Ingestion cleanup level: CULi = ACR x AT x UCF / [AB x CPFo x (sum of IIFs across age groups)]
4) Dermal cleanup level: CULd = ACR x AT x UCF / [ABS x CPFd x (sum of DCFs across age groups)]
5) Individual scenario cleanup level: SCO or CSL = 1 / (1/CULi + 1/CULd)
6) Multiple scenario cleanup level: SCO or CSL = 1 / (1/CUL-beachplay + 1/CUL-other)

Age-Specific Exposure Parameters

		Child Beach Play		Adult Clamming		Adult Net Fishing		
Parameter	**Abbrev.**	**Age 0-2**	**Age 2-6**	**Age 6-16**	**Age 16-70**	**Age 6-16**	**Age 16-70**	**Source**
Exposure duration	ED	2	4	10	54	10	54	SCUM Appendix K Table 2b
Exposure frequency	EF	41	41	120	120	119	119	SCUM Appendix K Table 2b
Ingestion rate	IR	200	200	100	100	50	50	SCUM Appendix K Table 2b
Surface area	SA	2,989	4,258	8,060	12,508	3,749	5,931	SCUM Appendix K Table 2b
Adherence factor	AF	2.6	2.6	0.24	0.24	0.19	0.19	SCUM Appendix K Table 2b
Age-dependent adjustment factor	ADAF	10	3	3	1	3	1	SCUM Appendix K Table 2b
Body weight	BW	10	17	44	81	44	81	SCUM Appendix K Table 2b
Age-specific ingestion intake factor	IIF	1.64E+04	5.79E+03	8.18E+03	8.00E+03	4.06E+03	3.97E+03	Eq. 1
Age-specific dermal contact factor	DCF	6.37E+05	3.20E+05	1.58E+05	2.40E+05	5.78E+04	8.94E+04	Eq. 2

Additional Parameters

Parameter	Abbrev.	Value	Units	Source
Target cancer risk - SCO	ACRs	1E-06	unitless	SCUM Table 9-1a
Target cancer risk - CSL	ACRc	1E-05	unitless	SCUM Table 9-1a
Averaging time - cancer	AT	25,550	days	SCUM Appendix K Table 2b
Unit conversion factor	UCF	1E+06	mg/kg	--

Cancer Cleanup Levels for Child Beach Play

					Sediment Cleanup Objective (SCO)			Cleanup Screening Level (CSL)			Beach Play	
Mutagenic Chemical	**CPFo (risk per mg/kg-day)**	**CPFd (risk per mg/kg-day)**	**AB (unitless)**	**ABS (unitless)**	**Ingestion CUL (mg/kg)**	**Dermal CUL (mg/kg)**	**Beach Play SCO (mg/kg)**	**Ingestion CUL (mg/kg)**	**Dermal CUL (mg/kg)**	**Beach Play CSL (mg/kg)**	**SCO (mg/kg)**	**CSL (mg/kg)**
Chromium, hexavalent	1.60E-01	6.40E+00	1.00	0	7.20E+00	na	7.20E+00	7.20E+01	na	7.20E+01	7.20E+00	7.20E+01
Benzo(a)pyrene	1.00E+00	1.00E+00	1.00	0.13	1.15E+00	2.05E-01	1.74E-01	1.15E+01	2.05E+00	1.74E+00	1.74E-01	1.74E+00
Source	Param page	Param page	Param page	Param page	Eq. 3	Eq. 4	Eq. 5	Eq. 3	Eq. 4	Eq. 5	Column H	Column K

Cancer Cleanup Levels for Adult Clamming

					Sediment Cleanup Objective (SCO)			Cleanup Screening Level (CSL)			Clamming + Beach Play	
Mutagenic Chemical	**CPFo (risk per mg/kg-day)**	**CPFd (risk per mg/kg-day)**	**AB (unitless)**	**ABS (unitless)**	**Ingestion CUL (mg/kg)**	**Dermal CUL (mg/kg)**	**Clamming SCO (mg/kg)**	**Ingestion CUL (mg/kg)**	**Dermal CUL (mg/kg)**	**Clamming CSL (mg/kg)**	**SCO (mg/kg)**	**CSL (mg/kg)**
Chromium, hexavalent	1.60E-01	6.40E+00	1.00	0	9.87E+00	na	9.87E+00	9.87E+01	na	9.87E+01	4.16E+00	4.16E+01
Benzo(a)pyrene	1.00E+00	1.00E+00	1.00	0.13	1.58E+00	4.93E-01	3.76E-01	1.58E+01	4.93E+00	3.76E+00	1.19E-01	1.19E+00
Source	Param page	Param page	Param page	Param page	Eq. 3	Eq. 4	Eq. 5	Eq. 3	Eq. 4	Eq. 5	Eq. 6	Eq. 6

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Cancer Cleanup Levels for Adult Netfishing

Mutagenic Chemical	CPFo (risk per mg/kg-day)	CPFd (risk per mg/kg-day)	AB (unitless)	ABS (unitless)	Sediment Cleanup Objective (SCO)			Cleanup Screening Level (CSL)			Netfishing + Beach Play	
					Ingestion CUL (mg/kg)	Dermal CUL (mg/kg)	Netfishing SCO (mg/kg)	Ingestion CUL (mg/kg)	Dermal CUL (mg/kg)	Netfishing CSL (mg/kg)	SCO (mg/kg)	CSL (mg/kg)
Chromium, hexavalent	1.60E-01	6.40E+00	1.00	0	1.99E+01	na	1.99E+01	1.99E+02	na	1.99E+02	5.29E+00	5.29E+01
Benzo(a)pyrene	1.00E+00	1.00E+00	1.00	0.13	3.18E+00	1.34E+00	9.41E-01	3.18E+01	1.34E+01	9.41E+00	1.47E-01	1.47E+00
Source	Param page	Param page	Param page	Param page	Eq. 3	Eq. 4	Eq. 5	Eq. 3	Eq. 4	Eq. 5	Eq. 6	Eq. 6

Additional Abbreviations

AB - gastrointestinal absorption fraction
ABS - dermal absorption fraction
CPFd - dermal carcinogenic potency factor
CPFo - oral carcinogenic potency factor

Reference

Ecology. 2021. Sediment Cleanup User's Manual (SCUM). Publ. no. 12-09-057. Washington State Department of Ecology, Lacey, WA. December.
USEPA. 2005. Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens. EPA/630/R-03/003F. U.S. Environmental Protection Agency, Washington DC. March

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Sort Order	Chemical (all concentrations in ug/m^3)	MTCA-B Air Noncancer AR-Eq	MTCA-B Air Cancer AR-Eq	Listed on CLARC VI Page	AR-1 MTCA-B Air	SG-1 MTCA-B Soil Gas Protect Indoor Air VI Guidance Eq. 2	MTCA-C Air Noncancer AR-Eq	MTCA-C Air Cancer AR-Eq	MTCA-C Air	MTCA-C Soil Gas Protect Indoor Air Industrial VI Guidance Eq. 2	Commercial Air Noncancer AR-Eq	Commercial Air Cancer AR-Eq	Commercial Air	Commercial Soil Gas Protect Indoor Air VI Guidance Eq. 2	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Air VI Guidance	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Soil Gas VI Guidance
1	***PCBs***															
2	Total PCB Aroclors	na	4.39E-03	no	4.39E-03	na	na	4.39E-02	4.39E-02	na	na	2.05E-02	2.05E-02	na	na	na
3	Total PCB congeners	na	4.39E-03	no	4.39E-03	na	na	4.39E-02	4.39E-02	na	na	2.05E-02	2.05E-02	na	na	na
4	Total PCB TEQ	1.83E-05	6.58E-08	no	6.58E-08	na	4.00E-05	6.58E-07	6.58E-07	na	1.56E-04	3.07E-07	3.07E-07	na	na	na
5	***Dioxins/Furans***															
6	Total dioxin/furan TEQ	1.83E-05	6.58E-08	no	6.58E-08	na	4.00E-05	6.58E-07	6.58E-07	na	1.56E-04	3.07E-07	3.07E-07	na	na	na
7	2,3,7,8-TCDD	1.83E-05	6.58E-08	no	6.58E-08	na	4.00E-05	6.58E-07	6.58E-07	na	1.56E-04	3.07E-07	3.07E-07	na	na	na
8	Total chlorinated dioxins	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
9	Total chlorinated furans	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
10	***Inorganics***															
11	Ammonia	2.29E+02	na	no	2.29E+02	na	5.00E+02	na	5.00E+02	na	1.95E+03	na	1.95E+03	na	na	na
12	Chloride	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
13	Cyanide, free	3.66E-01	na	no	3.66E-01	na	8.00E-01	na	8.00E-01	na	3.11E+00	na	3.11E+00	na	na	na
14	Fluoride	5.94E+00	na	no	5.94E+00	na	1.30E+01	na	1.30E+01	na	5.06E+01	na	5.06E+01	na	na	na
15	Nitrate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
16	Nitrite	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
17	Sulfate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
18	Sulfide	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
19	***Metals***															
20	Aluminum	2.29E+00	na	no	2.29E+00	na	5.00E+00	na	5.00E+00	na	1.95E+01	na	1.95E+01	na	na	na
21	Antimony	1.37E-01	na	no	1.37E-01	na	3.00E-01	na	3.00E-01	na	1.17E+00	na	1.17E+00	na	na	na
22	Arsenic	6.86E-03	5.81E-04	no	5.81E-04	na	1.50E-02	5.81E-03	5.81E-03	na	5.84E-02	2.72E-03	2.72E-03	na	na	na
23	Barium	2.29E-01	na	no	2.29E-01	na	5.00E-01	na	5.00E-01	na	1.95E+00	na	1.95E+00	na	na	na
24	Beryllium	9.14E-03	1.04E-03	no	1.04E-03	na	2.00E-02	1.04E-02	1.04E-02	na	7.79E-02	4.87E-03	4.87E-03	na	na	na
25	Cadmium	4.57E-03	1.39E-03	no	1.39E-03	na	1.00E-02	1.39E-02	1.00E-02	na	3.89E-02	6.49E-03	6.49E-03	na	na	na
26	Chromium, total	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
27	Chromium, trivalent	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
28	Chromium, hexavalent	1.37E-02	2.30E-03	no	2.30E-03	na	3.00E-02	2.27E-03	2.27E-03	na	1.17E-01	1.06E-03	1.06E-03	na	na	na
29	Cobalt	2.74E-03	2.78E-04	no	2.78E-04	na	6.00E-03	2.78E-03	2.78E-03	na	2.34E-02	1.30E-03	1.30E-03	na	na	na
30	Copper	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
31	Iron	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
32	Lead	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
33	Manganese	2.29E-02	na	no	2.29E-02	na	5.00E-02	na	5.00E-02	na	1.95E-01	na	1.95E-01	na	na	na
34	Mercury, inorganic	1.37E-01	na	YES	1.37E-01	4.57E+00	3.00E-01	na	3.00E-01	1.00E+01	1.17E+00	na	1.17E+00	3.89E+01	na	na
35	Methylmercury	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
36	Molybdenum	9.14E-01	na	no	9.14E-01	na	2.00E+00	na	2.00E+00	na	7.79E+00	na	7.79E+00	na	na	na
37	Nickel	6.40E-03	9.62E-03	no	6.40E-03	na	1.40E-02	9.62E-02	1.40E-02	na	5.45E-02	4.49E-02	4.49E-02	na	na	na
38	Selenium	9.14E+00	na	no	9.14E+00	na	2.00E+01	na	2.00E+01	na	7.79E+01	na	7.79E+01	na	na	na
39	Silver	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
40	Thallium	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
41	Tin	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
42	Vanadium	4.57E-02	na	no	4.57E-02	na	1.00E-01	na	1.00E-01	na	3.89E-01	na	3.89E-01	na	na	na
43	Zinc	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
44	***Metals - Butyltins***															
45	Monobutyltin	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
46	Dibutyltin	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
47	Trybutyl tin	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
48	Tributyltin oxide	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
49	Tetrabutyltin	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
50	***SVOCs - PAHs***															
51	Acenaphthene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
52	Acenaphthylene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
53	Anthracene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
54	Benzo(a)anthracene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
55	Benzo(b)fluoranthene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
56	Benzo(k)fluoranthene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
57	Total benzofluoranthenes	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
58	Benzo(g,h,i)perylene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
59	Benzo(a)pyrene	9.14E-04	1.10E-03	no	9.14E-04	na	2.00E-03	4.17E-02	2.00E-03	na	7.79E-03	1.95E-02	7.79E-03	na	na	na
60	Chrysene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
61	Dibenz(a,h)anthracene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
62	Dibenzofuran	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
63	Fluoranthene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
64	Fluorene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
65	Indeno(1,2,3-cd)pyrene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
66	Methyl isopropyl phenanthrene (retene)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
67	1-Methylnaphthalene	1.37E-03	na	YES	1.37E-03	4.57E-02	3.00E-03	na	3.00E-03	1.00E-01	1.17E-02	na	1.17E-02	3.89E-01	na	na
68	2-Methylnaphthalene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
69	Naphthalene	1.37E+00	7.35E-02	YES	7.35E-02	2.45E+00	3.00E+00	7.35E-01	7.35E-01	2.45E+01	1.17E+01	3.44E-01	3.44E-01	1.15E+01	na	na
70	Phenanthrene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
71	Pyrene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na

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Sort Order	Chemical (all concentrations in ug/m^3)	MTCA-B Air Noncancer AR-Eq	MTCA-B Air Cancer AR-Eq	Listed on CLARC VI Page	AR-1 MTCA-B Air	SG-1 MTCA-B Soil Gas Protect Indoor Air VI Guidance Eq. 2	MTCA-C Air Noncancer AR-Eq	MTCA-C Air Cancer AR-Eq	MTCA-C Air	MTCA-C Soil Gas Protect Indoor Air Industrial VI Guidance Eq. 2	Commercial Air Noncancer AR-Eq	Commercial Air Cancer AR-Eq	Commercial Air	Commercial Soil Gas Protect Indoor Air VI Guidance Eq. 2	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Air VI Guidance	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Soil Gas VI Guidance
72	Total LPAHs	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
73	Total HPAHs	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
74	Total PAHs	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
75	Total cPAH TEQ	na	1.10E-03	no	1.10E-03	na	na	4.17E-02	4.17E-02	na	na	1.95E-02	1.95E-02	na	na	na
76	***Other SVOCs***															
77	Aniline	4.57E-01	1.56E+00	no	4.57E-01	na	1.00E+00	1.56E+01	1.00E+00	na	3.89E+00	7.30E+00	3.89E+00	na	na	na
78	Azobenzene	na	8.06E-02	no	8.06E-02	na	na	8.06E-01	8.06E-01	na	na	3.77E-01	3.77E-01	na	na	na
79	Benzidine	na	9.80E-06	no	9.80E-06	na	na	3.73E-04	3.73E-04	na	na	1.74E-04	1.74E-04	na	na	na
80	Benzoic acid	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
81	Benzyl alcohol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
82	Bis(2-chloroethoxy)methane	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
83	Bis(2-chloroethyl)ether	na	7.58E-03	no	7.58E-03	na	na	7.58E-02	7.58E-02	na	na	3.54E-02	3.54E-02	na	na	na
84	Bis(chloromethyl)ether	na	4.03E-05	no	4.03E-05	na	na	4.03E-04	4.03E-04	na	na	1.88E-04	1.88E-04	na	na	na
85	Bis(2-chloro-1-methylethyl)ether	na	2.50E-01	no	2.50E-01	na	na	2.50E+00	2.50E+00	na	na	1.17E+00	1.17E+00	na	na	na
86	2,6-Bis(1,1-dimethylethyl) phenol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
87	Bis(2-ethylhexyl) phthalate	na	1.04E+00	no	1.04E+00	na	na	1.04E+01	1.04E+01	na	na	4.87E+00	4.87E+00	na	na	na
88	4-Bromophenyl phenyl ether	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
89	Butyl benzyl phthalate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
90	Butyl diphenyl phosphate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
91	Carbazole	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
92	4-Chloroaniline	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
93	4-Chloro-3-methylphenol (chlorocresol)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
94	2-Chloronaphthalene (beta-)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
95	2-Chlorophenol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
96	4-Chlorophenyl phenyl ether	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
97	Dibutyl phthalate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
98	Dibutyl phenyl phosphate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
99	1,2-Dichlorobenzene	9.14E+01	na	YES	9.14E+01	3.05E+03	2.00E+02	na	2.00E+02	6.67E+03	7.79E+02	na	7.79E+02	2.60E+04	na	na
100	1,3-Dichlorobenzene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
101	1,4-Dichlorobenzene	3.66E+02	2.27E-01	YES	2.27E-01	7.58E+00	8.00E+02	2.27E+00	2.27E+00	7.58E+01	3.11E+03	1.06E+00	1.06E+00	3.54E+01	na	na
102	3,3'-Dichlorobenzidine	na	7.35E-03	no	7.35E-03	na	na	7.35E-02	7.35E-02	na	na	3.44E-02	3.44E-02	na	na	na
103	2,4-Dichlorophenol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
104	Di(2-ethylhexyl)adipate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
105	Diethyl phthalate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
106	Dimethyl phthalate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
107	2,4-Dimethylphenol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
108	1,2-Dinitrobenzene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
109	1,3-Dinitrobenzene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
110	1,4-Dinitrobenzene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
111	4,6-Dinitro-o-cresol (DNOC)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
112	2,4-Dinitrophenol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
113	2,4-Dinitrotoluene	na	2.81E-02	no	2.81E-02	na	na	2.81E-01	2.81E-01	na	na	1.31E-01	1.31E-01	na	na	na
114	2,6-Dinitrotoluene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
115	Di-n-octyl phthalate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
116	1,4-Dioxane	1.37E+01	5.00E-01	YES	5.00E-01	1.67E+01	3.00E+01	5.00E+00	5.00E+00	1.67E+02	1.17E+02	2.34E+00	2.34E+00	7.79E+01	na	na
117	1,2-Diphenylhydrazine	na	1.14E-02	no	1.14E-02	na	na	1.14E-01	1.14E-01	na	na	5.31E-02	5.31E-02	na	na	na
118	Hexachlorobenzene	na	5.43E-03	YES	5.43E-03	1.81E-01	na	5.43E-02	5.43E-02	1.81E+00	na	2.54E-02	2.54E-02	8.46E-01	na	na
119	Hexachlorobutadiene	na	1.14E-01	YES	1.14E-01	3.79E+00	na	1.14E+00	1.14E+00	3.79E+01	na	5.31E-01	5.31E-01	1.77E+01	na	na
120	Hexachlorocyclopentadiene	9.14E-02	na	YES	9.14E-02	3.05E+00	2.00E-01	na	2.00E-01	6.67E+00	7.79E-01	na	7.79E-01	2.60E+01	na	na
121	Hexachloroethane	1.37E+01	2.27E-01	YES	2.27E-01	7.58E+00	3.00E+01	2.27E+00	2.27E+00	7.58E+01	1.17E+02	1.06E+00	1.06E+00	3.54E+01	na	na
122	Isophorone	9.14E+02	na	no	9.14E+02	na	2.00E+03	na	2.00E+03	na	7.79E+03	na	7.79E+03	na	na	na
123	2-Methoxynaphthalene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
124	2-Methylphenol (o-cresol)	2.74E+02	na	no	2.74E+02	na	6.00E+02	na	6.00E+02	na	2.34E+03	na	2.34E+03	na	na	na
125	3-Methylphenol (m-cresol)	2.74E+02	na	no	2.74E+02	na	6.00E+02	na	6.00E+02	na	2.34E+03	na	2.34E+03	na	na	na
126	4-Methylphenol (p-cresol)	2.74E+02	na	no	2.74E+02	na	6.00E+02	na	6.00E+02	na	2.34E+03	na	2.34E+03	na	na	na
127	2-Nitroaniline	2.29E-02	na	no	2.29E-02	na	5.00E-02	na	5.00E-02	na	1.95E-01	na	1.95E-01	na	na	na
128	3-Nitroaniline	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
129	4-Nitroaniline	2.74E+00	na	no	2.74E+00	na	6.00E+00	na	6.00E+00	na	2.34E+01	na	2.34E+01	na	na	na
130	Nitrobenzene	4.11E+00	6.25E-02	no	6.25E-02	na	9.00E+00	6.25E-01	6.25E-01	na	3.50E+01	2.92E-01	2.92E-01	na	na	na
131	2-Nitrophenol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
132	4-Nitrophenol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
133	n-Nitrosodimethylamine	1.83E-02	4.70E-05	no	4.70E-05	na	4.00E-02	1.79E-03	1.79E-03	na	1.56E-01	8.34E-04	8.34E-04	na	na	na
134	n-Nitrosodiphenylamine	na	9.62E-01	no	9.62E-01	na	na	9.62E+00	9.62E+00	na	na	4.49E+00	4.49E+00	na	na	na
135	n-Nitrosodi-n-propylamine	na	1.25E-03	no	1.25E-03	na	na	1.25E-02	1.25E-02	na	na	5.84E-03	5.84E-03	na	na	na
136	Pentachlorophenol	na	4.90E-01	no	4.90E-01	na	na	4.90E+00	4.90E+00	na	na	2.29E+00	2.29E+00	na	na	na
137	Phenol	9.14E+01	na	no	9.14E+01	na	2.00E+02	na	2.00E+02	na	7.79E+02	na	7.79E+02	na	na	na
138	Pyridine	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
139	2,3,4,5-Tetrachlorophenol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
140	2,3,4,6-Tetrachlorophenol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
141	1,2,4-Trichlorobenzene	9.14E-01	na	YES	9.14E-01	3.05E+01	2.00E+00	na	2.00E+00	6.67E+01	7.79E+00	na	7.79E+00	2.60E+02	na	na
142	2,4,5-Trichlorophenol	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na

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Sort Order	Chemical (all concentrations in ug/m^3)	MTCA-B Air Noncancer AR-Eq	MTCA-B Air Cancer AR-Eq	Listed on CLARC VI Page	AR-1 MTCA-B Air	SG-1 MTCA-B Soil Gas Protect Indoor Air VI Guidance Eq. 2	MTCA-C Air Noncancer AR-Eq	MTCA-C Air Cancer AR-Eq	MTCA-C Air	MTCA-C Soil Gas Protect Indoor Air Industrial VI Guidance Eq. 2	Commercial Air Noncancer AR-Eq	Commercial Air Cancer AR-Eq	Commercial Air	Commercial Soil Gas Protect Indoor Air VI Guidance Eq. 2	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Air VI Guidance	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Soil Gas VI Guidance
143	2,4,6-Trichlorophenol	na	8.06E-01	no	8.06E-01	na	na	8.06E+00	8.06E+00	na	na	3.77E+00	3.77E+00	na	na	na
144	***Volatile Organic Compounds***															
145	Acetone	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
146	Acetaldehyde	4.11E+00	1.14E+00	YES	1.14E+00	3.79E+01	9.00E+00	1.14E+01	9.00E+00	3.00E+02	3.50E+01	5.31E+00	5.31E+00	1.77E+02	na	na
147	Acrolein	9.14E-03	na	YES	9.14E-03	3.05E-01	2.00E-02	na	2.00E-02	6.67E-01	7.79E-02	na	7.79E-02	2.60E+00	na	na
148	Acrylonitrile	9.14E-01	3.68E-02	YES	3.68E-02	1.23E+00	2.00E+00	3.68E-01	3.68E-01	1.23E+01	7.79E+00	1.72E-01	1.72E-01	5.73E+00	na	na
149	Benzaldehyde	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
150	Benzene	1.37E+01	3.21E-01	YES	3.21E-01	1.07E+01	3.00E+01	3.21E+00	3.21E+00	1.07E+02	1.17E+02	1.50E+00	1.50E+00	4.99E+01	na	na
151	Bromobenzene	2.74E+01	na	YES	2.74E+01	9.14E+02	6.00E+01	na	6.00E+01	2.00E+03	2.34E+02	na	2.34E+02	7.79E+03	na	na
152	Bromochloromethane	1.83E+01	na	no	1.83E+01	na	4.00E+01	na	4.00E+01	na	1.56E+02	na	1.56E+02	na	na	na
153	Bromoethane	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
154	Bromoform	na	2.27E+00	YES	2.27E+00	7.58E+01	na	2.27E+01	2.27E+01	7.58E+02	na	1.06E+01	1.06E+01	3.54E+02	na	na
155	Bromomethane	2.29E+00	na	YES	2.29E+00	7.62E+01	5.00E+00	na	5.00E+00	1.67E+02	1.95E+01	na	1.95E+01	6.49E+02	na	na
156	2-Butoxyethanol (EGBE)	7.31E+02	na	no	7.31E+02	na	1.60E+03	na	1.60E+03	na	6.23E+03	na	6.23E+03	na	na	na
157	n-Butylbenzene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
158	sec-Butylbenzene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
159	tert-Butylbenzene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
160	Carbon disulfide	3.20E+02	na	YES	3.20E+02	1.07E+04	7.00E+02	na	7.00E+02	2.33E+04	2.73E+03	na	2.73E+03	9.08E+04	na	na
161	Carbon tetrachloride	4.57E+01	4.17E-01	YES	4.17E-01	1.39E+01	1.00E+02	4.17E+00	4.17E+00	1.39E+02	3.89E+02	1.95E+00	1.95E+00	6.49E+01	na	na
162	Chlorobenzene	2.29E+01	na	YES	2.29E+01	7.62E+02	5.00E+01	na	5.00E+01	1.67E+03	1.95E+02	na	1.95E+02	6.49E+03	na	na
163	Chloroethane	4.57E+03	na	YES	4.57E+03	1.52E+05	1.00E+04	na	1.00E+04	3.33E+05	3.89E+04	na	3.89E+04	1.30E+06	na	na
164	2-Chloroethyl vinyl ether	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
165	Chloroform	9.14E-01	1.09E-01	YES	1.09E-01	3.62E+00	2.00E+00	1.09E+00	1.09E+00	3.62E+01	7.79E+00	5.08E-01	5.08E-01	1.69E+01	na	na
166	Chloromethane	4.11E+01	na	YES	4.11E+01	1.37E+03	9.00E+01	na	9.00E+01	3.00E+03	3.50E+02	na	3.50E+02	1.17E+04	na	na
167	3-Chloro-1-propene (allyl chloride)	4.57E-01	4.17E-01	YES	4.17E-01	1.39E+01	1.00E+00	4.17E+00	1.00E+00	3.33E+01	3.89E+00	1.95E+00	1.95E+00	6.49E+01	na	na
168	2-Chlorotoluene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
169	4-Chlorotoluene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
170	Dibromochloromethane	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
171	1,2-Dibromo-3-chloropropane	9.14E-02	1.10E-04	YES	1.10E-04	3.67E-03	2.00E-01	4.17E-03	4.17E-03	1.39E-01	7.79E-01	1.95E-03	1.95E-03	6.49E-02	na	na
172	Dibromomethane	1.83E+00	na	YES	1.83E+00	6.10E+01	4.00E+00	na	4.00E+00	1.33E+02	1.56E+01	na	1.56E+01	5.19E+02	na	na
173	Dichlorobromomethane	na	6.76E-02	YES	6.76E-02	2.25E+00	na	6.76E-01	6.76E-01	2.25E+01	na	3.16E-01	3.16E-01	1.05E+01	na	na
174	trans-1,4-Dichloro-2-butene	na	5.95E-04	no	5.95E-04	na	na	5.95E-03	5.95E-03	na	na	2.78E-03	2.78E-03	na	na	na
175	Dichlorodifluoromethane	4.57E+01	na	YES	4.57E+01	1.52E+03	1.00E+02	na	1.00E+02	3.33E+03	3.89E+02	na	3.89E+02	1.30E+04	na	na
176	1,1-Dichloroethane	na	1.56E+00	YES	1.56E+00	5.21E+01	na	1.56E+01	1.56E+01	5.21E+02	na	7.30E+00	7.30E+00	2.43E+02	na	na
177	1,2-Dichloroethane (EDC)	3.20E+00	9.62E-02	YES	9.62E-02	3.21E+00	7.00E+00	9.62E-01	9.62E-01	3.21E+01	2.73E+01	4.49E-01	4.49E-01	1.50E+01	na	na
178	1,1-Dichloroethylene	9.14E+01	na	YES	9.14E+01	3.05E+03	2.00E+02	na	2.00E+02	6.67E+03	7.79E+02	na	7.79E+02	2.60E+04	na	na
179	cis-1,2-Dichloroethylene	1.83E+01	na	YES	1.83E+01	6.10E+02	4.00E+01	na	4.00E+01	1.33E+03	1.56E+02	na	1.56E+02	5.19E+03	na	na
180	trans-1,2-Dichloroethylene	1.83E+01	na	YES	1.83E+01	6.10E+02	4.00E+01	na	4.00E+01	1.33E+03	1.56E+02	na	1.56E+02	5.19E+03	na	na
181	1,2-Dichloroethylene (mixed isomers)	na	na	YES	na	na	na	na	na	na	na	na	na	na	na	na
182	1,2-Dichloropropane	1.83E+00	6.76E-01	YES	6.76E-01	2.25E+01	4.00E+00	6.76E+00	4.00E+00	1.33E+02	1.56E+01	3.16E+00	3.16E+00	1.05E+02	na	na
183	1,3-Dichloropropane	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
184	2,2-Dichloropropane	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
185	1,1-Dichloropropene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
186	cis-1,3-Dichloropropene	9.14E+00	6.25E-01	YES	6.25E-01	2.08E+01	2.00E+01	6.25E+00	6.25E+00	2.08E+02	7.79E+01	2.92E+00	2.92E+00	9.73E+01	na	na
187	trans-1,3-Dichloropropene	9.14E+00	6.25E-01	YES	6.25E-01	2.08E+01	2.00E+01	6.25E+00	6.25E+00	2.08E+02	7.79E+01	2.92E+00	2.92E+00	9.73E+01	na	na
188	Diisopropyl ether	3.20E+02	na	no	3.20E+02	na	7.00E+02	na	7.00E+02	na	2.73E+03	na	2.73E+03	na	na	na
189	Ethane	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
190	Ethylbenzene	4.57E+02	na	YES	4.57E+02	1.52E+04	1.00E+03	na	1.00E+03	3.33E+04	3.89E+03	na	3.89E+03	1.30E+05	na	na
191	Ethylene oxide	1.37E+01	2.20E-04	YES	2.20E-04	7.33E-03	3.00E+01	8.33E-03	8.33E-03	2.78E-01	1.17E+02	3.89E-03	3.89E-03	1.30E-01	na	na
192	Ethyl ether	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
193	Ethylene dibromide (EDB)	4.11E+00	4.17E-03	YES	4.17E-03	1.39E-01	9.00E+00	4.17E-02	4.17E-02	1.39E+00	3.50E+01	1.95E-02	1.95E-02	6.49E-01	na	na
194	Formaldehyde	3.20E+00	8.90E-02	no	8.90E-02	na	7.00E+00	3.38E+00	3.38E+00	na	2.73E+01	1.58E+00	1.58E+00	na	na	na
195	n-Hexane	3.20E+02	na	YES	3.20E+02	1.07E+04	7.00E+02	na	7.00E+02	2.33E+04	2.73E+03	na	2.73E+03	9.08E+04	na	na
196	2-Hexanone	1.37E+01	na	YES	1.37E+01	4.57E+02	3.00E+01	na	3.00E+01	1.00E+03	1.17E+02	na	1.17E+02	3.89E+03	na	na
197	Isopropylbenzene (cumene)	1.83E+02	na	YES	1.83E+02	6.10E+03	4.00E+02	na	4.00E+02	1.33E+04	1.56E+03	na	1.56E+03	5.19E+04	na	na
198	4-Isopropyltoluene (p-isopropyltoluene)	1.83E+01	na	YES	1.83E+01	6.10E+02	4.00E+01	na	4.00E+01	1.33E+03	1.56E+02	na	1.56E+02	5.19E+03	na	na
199	Methane	6.56E+04	na	no	6.56E+04	na	6.56E+04	na	6.56E+04	na	na	na	na	na	na	na
200	Methyl ethyl ketone (2-butanone)	2.29E+03	na	YES	2.29E+03	7.62E+04	5.00E+03	na	5.00E+03	1.67E+05	1.95E+04	na	1.95E+04	6.49E+05	na	na
201	Methyl iodide	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
202	Methyl isobutyl ketone	1.37E+03	na	YES	1.37E+03	4.57E+04	3.00E+03	na	3.00E+03	1.00E+05	1.17E+04	na	1.17E+04	3.89E+05	na	na
203	Methyl tert-butyl ether (MTBE)	1.37E+03	9.62E+00	YES	9.62E+00	3.21E+02	3.00E+03	9.62E+01	9.62E+01	3.21E+03	1.17E+04	4.49E+01	4.49E+01	1.50E+03	na	na
204	Methylene chloride	2.74E+02	6.60E+01	YES	6.60E+01	2.20E+03	6.00E+02	2.50E+03	6.00E+02	2.00E+04	2.34E+03	1.17E+03	1.17E+03	3.89E+04	na	na
205	2-Pentanone	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
206	n-Propylbenzene	4.57E+02	na	YES	4.57E+02	1.52E+04	1.00E+03	na	1.00E+03	3.33E+04	3.89E+03	na	3.89E+03	1.30E+05	na	na
207	Styrene	4.57E+02	na	YES	4.57E+02	1.52E+04	1.00E+03	na	1.00E+03	3.33E+04	3.89E+03	na	3.89E+03	1.30E+05	na	na
208	1,1,1,2-Tetrachloroethane	na	3.38E-01	YES	3.38E-01	1.13E+01	na	3.38E+00	3.38E+00	1.13E+02	na	1.58E+00	1.58E+00	5.26E+01	na	na
209	1,1,2,2-Tetrachloroethane	na	4.31E-02	YES	4.31E-02	1.44E+00	na	4.31E-01	4.31E-01	1.44E+01	na	2.01E-01	2.01E-01	6.71E+00	na	na
210	Tetrachloroethylene (PCE)	1.83E+01	9.62E+00	YES	9.62E+00	3.21E+02	4.00E+01	9.62E+01	4.00E+01	1.33E+03	1.56E+02	4.49E+01	4.49E+01	1.50E+03	na	na
211	Tetrahydrofuran	9.14E+02	na	YES	9.14E+02	3.05E+04	2.00E+03	na	2.00E+03	6.67E+04	7.79E+03	na	7.79E+03	2.60E+05	na	na
212	Toluene	2.29E+03	na	YES	2.29E+03	7.62E+04	5.00E+03	na	5.00E+03	1.67E+05	1.95E+04	na	1.95E+04	6.49E+05	na	na
213	1,2,3-Trichlorobenzene	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na

Sort Order	Chemical (all concentrations in ug/m^3)	MTCA-B Air Noncancer AR-Eq	MTCA-B Air Cancer AR-Eq	Listed on CLARC VI Page	AR-1 MTCA-B Air	SG-1 MTCA-B Soil Gas Protect Indoor Air VI Guidance Eq. 2	MTCA-C Air Noncancer AR-Eq	MTCA-C Air Cancer AR-Eq	MTCA-C Air	MTCA-C Soil Gas Protect Indoor Air Industrial VI Guidance Eq. 2	Commercial Air Noncancer AR-Eq	Commercial Air Cancer AR-Eq	Commercial Air	Commercial Soil Gas Protect Indoor Air VI Guidance Eq. 2	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Air VI Guidance	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Soil Gas VI Guidance
214	1,1,1-Trichloroethane	2.29E+03	na	YES	2.29E+03	7.62E+04	5.00E+03	na	5.00E+03	1.67E+05	1.95E+04	na	1.95E+04	6.49E+05	na	na
215	1,1,2-Trichloroethane	9.14E-02	1.56E-01	YES	9.14E-02	3.05E+00	2.00E-01	1.56E+00	2.00E-01	6.67E+00	7.79E-01	7.30E-01	7.30E-01	2.43E+01	na	na
216	Trichloroethylene (TCE)	9.00E-01	3.30E-01	YES	3.30E-01	1.10E+01	2.00E+00	6.10E+00	2.00E+00	6.67E+01	7.79E+00	2.85E+00	2.85E+00	9.50E+01	7.50E+00	2.50E+02
217	Trichlorofluoroethane	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
218	Trichlorofluoromethane	3.20E+02	na	YES	3.20E+02	1.07E+04	7.00E+02	na	7.00E+02	2.33E+04	2.73E+03	na	2.73E+03	9.08E+04	na	na
219	1,2,3-Trichloropropane	1.37E-01	na	YES	1.37E-01	4.57E+00	3.00E-01	na	3.00E-01	1.00E+01	1.17E+00	na	1.17E+00	3.89E+01	na	na
220	Trichlorotrifluoroethane	2.29E+03	na	YES	2.29E+03	7.62E+04	5.00E+03	na	5.00E+03	1.67E+05	1.95E+04	na	1.95E+04	6.49E+05	na	na
221	1,2,3-Trimethylbenzene	2.74E+01	na	YES	2.74E+01	9.14E+02	6.00E+01	na	6.00E+01	2.00E+03	2.34E+02	na	2.34E+02	7.79E+03	na	na
222	1,2,4-Trimethylbenzene	2.74E+01	na	YES	2.74E+01	9.14E+02	6.00E+01	na	6.00E+01	2.00E+03	2.34E+02	na	2.34E+02	7.79E+03	na	na
223	1,3,5-Trimethylbenzene	2.74E+01	na	YES	2.74E+01	9.14E+02	6.00E+01	na	6.00E+01	2.00E+03	2.34E+02	na	2.34E+02	7.79E+03	na	na
224	Vinyl acetate	9.14E+01	na	YES	9.14E+01	3.05E+03	2.00E+02	na	2.00E+02	6.67E+03	7.79E+02	na	7.79E+02	2.60E+04	na	na
225	Vinyl chloride	4.57E+01	2.84E-01	YES	2.84E-01	9.47E+00	1.00E+02	2.84E+00	2.84E+00	9.47E+01	3.89E+02	1.33E+00	1.33E+00	4.42E+01	na	na
226	Total xylenes	4.57E+01	na	YES	4.57E+01	1.52E+03	1.00E+02	na	1.00E+02	3.33E+03	3.89E+02	na	3.89E+02	1.30E+04	na	na
227	***PFAS***															
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
229	GenX (HFPO-DA)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
230	Perfluorobutanoic acid (PFBA)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
231	Perfluorobutanesulfonic acid (PFBS)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
232	Perfluorodecanoic acid (PFDA)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
233	Perfluorohexanoic acid (PFHxA)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
234	Perfluorohexanesulfonic acid (PFHxS)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
235	Perfluorononanoic acid (PFNA)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
236	Perfluorooctanesulfonic acid (PFOS)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
237	Perfluorooctanoic acid (PFOA)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
238	***Petroleum Hydrocarbons***															
239	Gasoline range hydrocarbons, fresh	4.60E+01	na	YES	4.60E+01	1.50E+03	1.50E+03	na	1.50E+03	1.50E+03	3.90E+02	na	3.90E+02	1.30E+04	na	na
240	Gasoline range hydrocarbons, weathered	4.60E+01	na	YES	4.60E+01	1.50E+03	1.50E+03	na	1.50E+03	1.50E+03	3.90E+02	na	3.90E+02	1.30E+04	na	na
241	Diesel range hydrocarbons, fresh	4.60E+01	na	no	4.60E+01	1.50E+03	1.50E+03	na	1.50E+03	1.50E+03	3.90E+02	na	3.90E+02	1.30E+04	na	na
242	Diesel range hydrocarbons, weathered	4.60E+01	na	no	4.60E+01	1.50E+03	1.50E+03	na	1.50E+03	1.50E+03	3.90E+02	na	3.90E+02	1.30E+04	na	na
243	Oil range hydrocarbons	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
244	Total diesel & oil range hydrocarbons	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
245	***Pesticides***															
246	Aldrin	na	5.10E-04	no	5.10E-04	na	na	5.10E-03	5.10E-03	na	na	2.38E-03	2.38E-03	na	na	na
247	alpha-BHC (alpha-HCH)	na	1.39E-03	no	1.39E-03	na	na	1.39E-02	1.39E-02	na	na	6.49E-03	6.49E-03	na	na	na
248	beta-BHC (beta-HCH)	na	4.72E-03	no	4.72E-03	na	na	4.72E-02	4.72E-02	na	na	2.20E-02	2.20E-02	na	na	na
249	delta-BHC (delta-HCH)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
250	Carbaryl	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
251	cis-Chlordane (alpha)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
252	trans-Chlordane (gamma)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
253	Chlordane	3.20E-01	2.50E-02	no	2.50E-02	na	7.00E-01	2.50E-01	2.50E-01	na	2.73E+00	1.17E-01	1.17E-01	na	na	na
254	Chlorpyrifos	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
255	4,4'-DDD	na	3.62E-02	no	3.62E-02	na	na	3.62E-01	3.62E-01	na	na	1.69E-01	1.69E-01	na	na	na
256	4,4'-DDE	na	2.58E-02	no	2.58E-02	na	na	2.58E-01	2.58E-01	na	na	1.20E-01	1.20E-01	na	na	na
257	4,4'-DDT	na	2.58E-02	no	2.58E-02	na	na	2.58E-01	2.58E-01	na	na	1.20E-01	1.20E-01	na	na	na
258	Total DDD	na	3.62E-02	no	3.62E-02	na	na	3.62E-01	3.62E-01	na	na	1.69E-01	1.69E-01	na	na	na
259	Total DDE	na	2.58E-02	no	2.58E-02	na	na	2.58E-01	2.58E-01	na	na	1.20E-01	1.20E-01	na	na	na
260	Total DDT	na	2.58E-02	no	2.58E-02	na	na	2.58E-01	2.58E-01	na	na	1.20E-01	1.20E-01	na	na	na
261	Diazinon	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
262	Dieldrin	na	5.43E-04	no	5.43E-04	na	na	5.43E-03	5.43E-03	na	na	2.54E-03	2.54E-03	na	na	na
263	Endosulfan I	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
264	Endosulfan II	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
265	Endosulfan sulfate	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
266	Endrin	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
267	Endrin aldehyde	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
268	Endrin ketone	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
269	Heptachlor	na	1.92E-03	YES	1.92E-03	6.41E-02	na	1.92E-02	1.92E-02	6.41E-01	na	8.98E-03	8.98E-03	2.99E-01	na	na
270	Heptachlor epoxide	na	9.62E-04	no	9.62E-04	na	na	9.62E-03	9.62E-03	na	na	4.49E-03	4.49E-03	na	na	na
271	Lindane (gamma-BHC)	na	8.06E-03	no	8.06E-03	na	na	8.06E-02	8.06E-02	na	na	3.77E-02	3.77E-02	na	na	na
272	Malathion	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
273	Methoxychlor	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
274	Mirex	na	4.90E-04	YES	4.90E-04	1.63E-02	na	4.90E-03	4.90E-03	1.63E-01	na	2.29E-03	2.29E-03	7.63E-02	na	na
275	Nonachlor	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
276	Toxaphene	na	7.81E-03	no	7.81E-03	na	na	7.81E-02	7.81E-02	na	na	3.65E-02	3.65E-02	na	na	na
277	***Herbicides***															
278	2,4-Dichlorophenoxyacetic acid (2,4-D)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
279	4-(2,4-Dichlorophenoxy)butanoic acid 2,4-DB	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
280	2-(2,4,5-Trichlorophenoxy)propionic acid (2,4,5-TP)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
281	2,4,5-Trichlorophenoxyacetic acid (2,4,5-T)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
282	Dalapon	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
283	Dicamba	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
284	Dichloroprop	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na

Sort Order	Chemical (all concentrations in ug/m^3)	MTCA-B Air Noncancer AR-Eq	MTCA-B Air Cancer AR-Eq	Listed on CLARC VI Page	AR-1 MTCA-B Air	SG-1 MTCA-B Soil Gas Protect Indoor Air VI Guidance Eq. 2	MTCA-C Air Noncancer AR-Eq	MTCA-C Air Cancer AR-Eq	MTCA-C Air	MTCA-C Soil Gas Protect Indoor Air Industrial VI Guidance Eq. 2	Commercial Air Noncancer AR-Eq	Commercial Air Cancer AR-Eq	Commercial Air	Commercial Soil Gas Protect Indoor Air VI Guidance Eq. 2	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Air VI Guidance	TCE Short-Term Action Level for Cardiac Birth Defects Commercial Worker Soil Gas VI Guidance
285	Dinoseb	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
286	2-Methyl-4-chlorophenoxy acetic acid (MCPA)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na
287	(2-Methyl-4-chlorophenol)2-propionic acid (MCPP)	na	na	no	na	na	na	na	na	na	na	na	na	na	na	na

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PCUL Workbook - Air Equations Chemicals highlighted yellow are mutagenic

Sort Order	Chemical	RfDi (mg/kg-day) Param	CPFi (risk per mg/kd-day) Param	MTCA-B Air Noncancer (ug/m3) MTCA Eq. 750-1	MTCA-B Air Cancer (ug/m3) MTCA Eq. 750-2	MTCA-C Air Noncancer (ug/m3) MTCA Eq. 750-1 Modif. for Method C	MTCA-C Air Cancer (ug/m3) MTCA Eq. 750-2 Modif. for Method C	Commercial Air Noncancer (ug/m3) CLARC Guidance	Commercial Air Cancer (ug/m3) CLARC Guidance
1	***PCBs***								
2	Total PCB Aroclors	na	2.00E+00	na	4.39E-03	na	4.39E-02	na	2.05E-02
3	Total PCB congeners	na	2.00E+00	na	4.39E-03	na	4.39E-02	na	2.05E-02
4	Total PCB TEQ	1.14E-08	1.33E+05	1.83E-05	6.58E-08	4.00E-05	6.58E-07	1.56E-04	3.07E-07
5	***Dioxins/Furans***								
6	Total dioxin/furan TEQ	1.14E-08	1.33E+05	1.83E-05	6.58E-08	4.00E-05	6.58E-07	1.56E-04	3.07E-07
7	2,3,7,8-TCDD	1.14E-08	1.33E+05	1.83E-05	6.58E-08	4.00E-05	6.58E-07	1.56E-04	3.07E-07
8	Total chlorinated dioxins	na	na	na	na	na	na	na	na
9	Total chlorinated furans	na	na	na	na	na	na	na	na
10	***Inorganics***								
11	Ammonia	1.43E-01	na	2.29E+02	na	5.00E+02	na	1.95E+03	na
12	Chloride	na	na	na	na	na	na	na	na
13	Cyanide, free	2.29E-04	na	3.66E-01	na	8.00E-01	na	3.11E+00	na
14	Fluoride	3.71E-03	na	5.94E+00	na	1.30E+01	na	5.06E+01	na
15	Nitrate	na	na	na	na	na	na	na	na
16	Nitrite	na	na	na	na	na	na	na	na
17	Sulfate	na	na	na	na	na	na	na	na
18	Sulfide	na	na	na	na	na	na	na	na
19	***Metals***								
20	Aluminum	1.43E-03	na	2.29E+00	na	5.00E+00	na	1.95E+01	na
21	Antimony	8.57E-05	na	1.37E-01	na	3.00E-01	na	1.17E+00	na
22	Arsenic	4.29E-06	1.51E+01	6.86E-03	5.81E-04	1.50E-02	5.81E-03	5.84E-02	2.72E-03
23	Barium	1.43E-04	na	2.29E-01	na	5.00E-01	na	1.95E+00	na
24	Beryllium	5.71E-06	8.40E+00	9.14E-03	1.04E-03	2.00E-02	1.04E-02	7.79E-02	4.87E-03
25	Cadmium	2.86E-06	6.30E+00	4.57E-03	1.39E-03	1.00E-02	1.39E-02	3.89E-02	6.49E-03
26	Chromium, total	na	na	na	na	na	na	na	na
27	Chromium, trivalent	na	na	na	na	na	na	na	na
28	Chromium, hexavalent	8.57E-06	3.85E+01	1.37E-02	2.30E-03	3.00E-02	2.27E-03	1.17E-01	1.06E-03
29	Cobalt	1.71E-06	3.15E+01	2.74E-03	2.78E-04	6.00E-03	2.78E-03	2.34E-02	1.30E-03
30	Copper	na	na	na	na	na	na	na	na
31	Iron	na	na	na	na	na	na	na	na
32	Lead	na	na	na	na	na	na	na	na
33	Manganese	1.43E-05	na	2.29E-02	na	5.00E-02	na	1.95E-01	na
34	Mercury, inorganic	8.57E-05	na	1.37E-01	na	3.00E-01	na	1.17E+00	na
35	Methylmercury	na	na	na	na	na	na	na	na
36	Molybdenum	5.71E-04	na	9.14E-01	na	2.00E+00	na	7.79E+00	na
37	Nickel	4.00E-06	9.10E-01	6.40E-03	9.62E-03	1.40E-02	9.62E-02	5.45E-02	4.49E-02
38	Selenium	5.71E-03	na	9.14E+00	na	2.00E+01	na	7.79E+01	na
39	Silver	na	na	na	na	na	na	na	na
40	Thallium	na	na	na	na	na	na	na	na
41	Tin	na	na	na	na	na	na	na	na
42	Vanadium	2.86E-05	na	4.57E-02	na	1.00E-01	na	3.89E-01	na
43	Zinc	na	na	na	na	na	na	na	na
44	***Metals - Butyltins***								
45	Monobutyltin	na	na	na	na	na	na	na	na
46	Dibutyltin	na	na	na	na	na	na	na	na
47	Trybutyl tin	na	na	na	na	na	na	na	na
48	Tributyltin oxide	na	na	na	na	na	na	na	na
49	Tetrabutyltin	na	na	na	na	na	na	na	na
50	***SVOCs - PAHs***								
51	Acenaphthene	na	na	na	na	na	na	na	na

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52	Acenaphthylene	na	na	na	na	na	na	na	na
53	Anthracene	na	na	na	na	na	na	na	na
54	Benzo(a)anthracene	na	na	na	na	na	na	na	na
55	Benzo(b)fluoranthene	na	na	na	na	na	na	na	na
56	Benzo(k)fluoranthene	na	na	na	na	na	na	na	na
57	Total benzofluoranthenes	na	na	na	na	na	na	na	na
58	Benzo(g,h,i)perylene	na	na	na	na	na	na	na	na
59	Benzo(a)pyrene	5.71E-07	2.10E+00	9.14E-04	1.10E-03	2.00E-03	4.17E-02	7.79E-03	1.95E-02
60	Chrysene	na	na	na	na	na	na	na	na
61	Dibenz(a,h)anthracene	na	na	na	na	na	na	na	na
62	Dibenzofuran	na	na	na	na	na	na	na	na
63	Fluoranthene	na	na	na	na	na	na	na	na
64	Fluorene	na	na	na	na	na	na	na	na
65	Indeno(1,2,3-cd)pyrene	na	na	na	na	na	na	na	na
66	Methyl isopropyl phenanthrene (retene)	na	na	na	na	na	na	na	na
67	1-Methylnaphthalene	8.57E-07	na	1.37E-03	na	3.00E-03	na	1.17E-02	na
68	2-Methylnaphthalene	na	na	na	na	na	na	na	na
69	Naphthalene	8.57E-04	1.19E-01	1.37E+00	7.35E-02	3.00E+00	7.35E-01	1.17E+01	3.44E-01
70	Phenanthrene	na	na	na	na	na	na	na	na
71	Pyrene	na	na	na	na	na	na	na	na
72	Total LPAHs	na	na	na	na	na	na	na	na
73	Total HPAHs	na	na	na	na	na	na	na	na
74	Total PAHs	na	na	na	na	na	na	na	na
75	Total cPAH TEQ	na	2.10E+00	na	1.10E-03	na	4.17E-02	na	1.95E-02
76	***Other SVOCs***								
77	Aniline	2.86E-04	5.60E-03	4.57E-01	1.56E+00	1.00E+00	1.56E+01	3.89E+00	7.30E+00
78	Azobenzene	na	1.09E-01	na	8.06E-02	na	8.06E-01	na	3.77E-01
79	Benzidine	na	2.35E+02	na	9.80E-06	na	3.73E-04	na	1.74E-04
80	Benzoic acid	na	na	na	na	na	na	na	na
81	Benzyl alcohol	na	na	na	na	na	na	na	na
82	Bis(2-chloroethoxy)methane	na	na	na	na	na	na	na	na
83	Bis(2-chloroethyl)ether	na	1.16E+00	na	7.58E-03	na	7.58E-02	na	3.54E-02
84	Bis(chloromethyl)ether	na	2.17E+02	na	4.03E-05	na	4.03E-04	na	1.88E-04
85	Bis(2-chloro-1-methylethyl)ether	na	3.50E-02	na	2.50E-01	na	2.50E+00	na	1.17E+00
86	2,6-Bis(1,1-dimethylethyl) phenol	na	na	na	na	na	na	na	na
87	Bis(2-ethylhexyl) phthalate	na	8.40E-03	na	1.04E+00	na	1.04E+01	na	4.87E+00
88	4-Bromophenyl phenyl ether	na	na	na	na	na	na	na	na
89	Butyl benzyl phthalate	na	na	na	na	na	na	na	na
90	Butyl diphenyl phosphate	na	na	na	na	na	na	na	na
91	Carbazole	na	na	na	na	na	na	na	na
92	4-Chloroaniline	na	na	na	na	na	na	na	na
93	4-Chloro-3-methylphenol (chlorocresol)	na	na	na	na	na	na	na	na
94	2-Chloronaphthalene (beta-)	na	na	na	na	na	na	na	na
95	2-Chlorophenol	na	na	na	na	na	na	na	na
96	4-Chlorophenyl phenyl ether	na	na	na	na	na	na	na	na
97	Dibutyl phthalate	na	na	na	na	na	na	na	na
98	Dibutyl phenyl phosphate	na	na	na	na	na	na	na	na
99	1,2-Dichlorobenzene	5.71E-02	na	9.14E+01	na	2.00E+02	na	7.79E+02	na
100	1,3-Dichlorobenzene	na	na	na	na	na	na	na	na
101	1,4-Dichlorobenzene	2.29E-01	3.85E-02	3.66E+02	2.27E-01	8.00E+02	2.27E+00	3.11E+03	1.06E+00
102	3,3'-Dichlorobenzidine	na	1.19E+00	na	7.35E-03	na	7.35E-02	na	3.44E-02

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103	2,4-Dichlorophenol	na	na	na	na	na	na	na	na
104	Di(2-ethylhexyl)adipate	na	na	na	na	na	na	na	na
105	Diethyl phthalate	na	na	na	na	na	na	na	na
106	Dimethyl phthalate	na	na	na	na	na	na	na	na
107	2,4-Dimethylphenol	na	na	na	na	na	na	na	na
108	1,2-Dinitrobenzene	na	na	na	na	na	na	na	na
109	1,3-Dinitrobenzene	na	na	na	na	na	na	na	na
110	1,4-Dinitrobenzene	na	na	na	na	na	na	na	na
111	4,6-Dinitro-o-cresol (DNOC)	na	na	na	na	na	na	na	na
112	2,4-Dinitrophenol	na	na	na	na	na	na	na	na
113	2,4-Dinitrotoluene	na	3.12E-01	na	2.81E-02	na	2.81E-01	na	1.31E-01
114	2,6-Dinitrotoluene	na	na	na	na	na	na	na	na
115	Di-n-octyl phthalate	na	na	na	na	na	na	na	na
116	1,4-Dioxane	8.57E-03	1.75E-02	1.37E+01	5.00E-01	3.00E+01	5.00E+00	1.17E+02	2.34E+00
117	1,2-Diphenylhydrazine	na	7.70E-01	na	1.14E-02	na	1.14E-01	na	5.31E-02
118	Hexachlorobenzene	na	1.61E+00	na	5.43E-03	na	5.43E-02	na	2.54E-02
119	Hexachlorobutadiene	na	7.70E-02	na	1.14E-01	na	1.14E+00	na	5.31E-01
120	Hexachlorocyclopentadiene	5.71E-05	na	9.14E-02	na	2.00E-01	na	7.79E-01	na
121	Hexachloroethane	8.57E-03	3.85E-02	1.37E+01	2.27E-01	3.00E+01	2.27E+00	1.17E+02	1.06E+00
122	Isophorone	5.71E-01	na	9.14E+02	na	2.00E+03	na	7.79E+03	na
123	2-Methoxynaphthalene	na	na	na	na	na	na	na	na
124	2-Methylphenol (o-cresol)	1.71E-01	na	2.74E+02	na	6.00E+02	na	2.34E+03	na
125	3-Methylphenol (m-cresol)	1.71E-01	na	2.74E+02	na	6.00E+02	na	2.34E+03	na
126	4-Methylphenol (p-cresol)	1.71E-01	na	2.74E+02	na	6.00E+02	na	2.34E+03	na
127	2-Nitroaniline	1.43E-05	na	2.29E-02	na	5.00E-02	na	1.95E-01	na
128	3-Nitroaniline	na	na	na	na	na	na	na	na
129	4-Nitroaniline	1.71E-03	na	2.74E+00	na	6.00E+00	na	2.34E+01	na
130	Nitrobenzene	2.57E-03	1.40E-01	4.11E+00	6.25E-02	9.00E+00	6.25E-01	3.50E+01	2.92E-01
131	2-Nitrophenol	na	na	na	na	na	na	na	na
132	4-Nitrophenol	na	na	na	na	na	na	na	na
133	n-Nitrosodimethylamine	1.14E-05	4.90E+01	1.83E-02	4.70E-05	4.00E-02	1.79E-03	1.56E-01	8.34E-04
134	n-Nitrosodiphenylamine	na	9.10E-03	na	9.62E-01	na	9.62E+00	na	4.49E+00
135	n-Nitrosodi-n-propylamine	na	7.00E+00	na	1.25E-03	na	1.25E-02	na	5.84E-03
136	Pentachlorophenol	na	1.79E-02	na	4.90E-01	na	4.90E+00	na	2.29E+00
137	Phenol	5.71E-02	na	9.14E+01	na	2.00E+02	na	7.79E+02	na
138	Pyridine	na	na	na	na	na	na	na	na
139	2,3,4,5-Tetrachlorophenol	na	na	na	na	na	na	na	na
140	2,3,4,6-Tetrachlorophenol	na	na	na	na	na	na	na	na
141	1,2,4-Trichlorobenzene	5.71E-04	na	9.14E-01	na	2.00E+00	na	7.79E+00	na
142	2,4,5-Trichlorophenol	na	na	na	na	na	na	na	na
143	2,4,6-Trichlorophenol	na	1.09E-02	na	8.06E-01	na	8.06E+00	na	3.77E+00
144	***Volatile Organic Compounds***								
145	Acetone	na	na	na	na	na	na	na	na
146	Acetaldehyde	2.57E-03	7.70E-03	4.11E+00	1.14E+00	9.00E+00	1.14E+01	3.50E+01	5.31E+00
147	Acrolein	5.71E-06	na	9.14E-03	na	2.00E-02	na	7.79E-02	na
148	Acrylonitrile	5.71E-04	2.38E-01	9.14E-01	3.68E-02	2.00E+00	3.68E-01	7.79E+00	1.72E-01
149	Benzaldehyde	na	na	na	na	na	na	na	na
150	Benzene	8.57E-03	2.73E-02	1.37E+01	3.21E-01	3.00E+01	3.21E+00	1.17E+02	1.50E+00
151	Bromobenzene	1.71E-02	na	2.74E+01	na	6.00E+01	na	2.34E+02	na
152	Bromochloromethane	1.14E-02	na	1.83E+01	na	4.00E+01	na	1.56E+02	na
153	Bromoethane	na	na	na	na	na	na	na	na

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154	Bromoform	na	3.85E-03	na	2.27E+00	na	2.27E+01	na	1.06E+01
155	Bromomethane	1.43E-03	na	2.29E+00	na	5.00E+00	na	1.95E+01	na
156	2-Butoxyethanol (EGBE)	4.57E-01	na	7.31E+02	na	1.60E+03	na	6.23E+03	na
157	n-Butylbenzene	na	na	na	na	na	na	na	na
158	sec-Butylbenzene	na	na	na	na	na	na	na	na
159	tert-Butylbenzene	na	na	na	na	na	na	na	na
160	Carbon disulfide	2.00E-01	na	3.20E+02	na	7.00E+02	na	2.73E+03	na
161	Carbon tetrachloride	2.86E-02	2.10E-02	4.57E+01	4.17E-01	1.00E+02	4.17E+00	3.89E+02	1.95E+00
162	Chlorobenzene	1.43E-02	na	2.29E+01	na	5.00E+01	na	1.95E+02	na
163	Chloroethane	2.86E+00	na	4.57E+03	na	1.00E+04	na	3.89E+04	na
164	2-Chloroethyl vinyl ether	na	na	na	na	na	na	na	na
165	Chloroform	5.71E-04	8.05E-02	9.14E-01	1.09E-01	2.00E+00	1.09E+00	7.79E+00	5.08E-01
166	Chloromethane	2.57E-02	na	4.11E+01	na	9.00E+01	na	3.50E+02	na
167	3-Chloro-1-propene (allyl chloride)	2.86E-04	2.10E-02	4.57E-01	4.17E-01	1.00E+00	4.17E+00	3.89E+00	1.95E+00
168	2-Chlorotoluene	na	na	na	na	na	na	na	na
169	4-Chlorotoluene	na	na	na	na	na	na	na	na
170	Dibromochloromethane	na	na	na	na	na	na	na	na
171	1,2-Dibromo-3-chloropropane	5.71E-05	2.10E+01	9.14E-02	1.10E-04	2.00E-01	4.17E-03	7.79E-01	1.95E-03
172	Dibromomethane	1.14E-03	na	1.83E+00	na	4.00E+00	na	1.56E+01	na
173	Dichlorobromomethane	na	1.30E-01	na	6.76E-02	na	6.76E-01	na	3.16E-01
174	trans-1,4-Dichloro-2-butene	na	1.47E+01	na	5.95E-04	na	5.95E-03	na	2.78E-03
175	Dichlorodifluoromethane	2.86E-02	na	4.57E+01	na	1.00E+02	na	3.89E+02	na
176	1,1-Dichloroethane	na	5.60E-03	na	1.56E+00	na	1.56E+01	na	7.30E+00
177	1,2-Dichloroethane (EDC)	2.00E-03	9.10E-02	3.20E+00	9.62E-02	7.00E+00	9.62E-01	2.73E+01	4.49E-01
178	1,1-Dichloroethylene	5.71E-02	na	9.14E+01	na	2.00E+02	na	7.79E+02	na
179	cis-1,2-Dichloroethylene	1.14E-02	na	1.83E+01	na	4.00E+01	na	1.56E+02	na
180	trans-1,2-Dichloroethylene	1.14E-02	na	1.83E+01	na	4.00E+01	na	1.56E+02	na
181	1,2-Dichloroethylene (mixed isomers)	na	na	na	na	na	na	na	na
182	1,2-Dichloropropane	1.14E-03	1.30E-02	1.83E+00	6.76E-01	4.00E+00	6.76E+00	1.56E+01	3.16E+00
183	1,3-Dichloropropane	na	na	na	na	na	na	na	na
184	2,2-Dichloropropane	na	na	na	na	na	na	na	na
185	1,1-Dichloropropene	na	na	na	na	na	na	na	na
186	cis-1,3-Dichloropropene	5.71E-03	1.40E-02	9.14E+00	6.25E-01	2.00E+01	6.25E+00	7.79E+01	2.92E+00
187	trans-1,3-Dichloropropene	5.71E-03	1.40E-02	9.14E+00	6.25E-01	2.00E+01	6.25E+00	7.79E+01	2.92E+00
188	Diisopropyl ether	2.00E-01	na	3.20E+02	na	7.00E+02	na	2.73E+03	na
189	Ethane	na	na	na	na	na	na	na	na
190	Ethylbenzene	2.86E-01	na	4.57E+02	na	1.00E+03	na	3.89E+03	na
191	Ethylene oxide	8.57E-03	1.05E+01	1.37E+01	2.20E-04	3.00E+01	8.33E-03	1.17E+02	3.89E-03
192	Ethyl ether	na	na	na	na	na	na	na	na
193	Ethylene dibromide (EDB)	2.57E-03	2.10E+00	4.11E+00	4.17E-03	9.00E+00	4.17E-02	3.50E+01	1.95E-02
194	Formaldehyde	2.00E-03	2.59E-02	3.20E+00	8.90E-02	7.00E+00	3.38E+00	2.73E+01	1.58E+00
195	n-Hexane	2.00E-01	na	3.20E+02	na	7.00E+02	na	2.73E+03	na
196	2-Hexanone	8.57E-03	na	1.37E+01	na	3.00E+01	na	1.17E+02	na
197	Isopropylbenzene (cumene)	1.14E-01	na	1.83E+02	na	4.00E+02	na	1.56E+03	na
198	4-Isopropyltoluene (p-isopropyltoluene)	1.14E-02	na	1.83E+01	na	4.00E+01	na	1.56E+02	na
199	Methane	na	na	na	na	na	na	na	na
200	Methyl ethyl ketone (2-butanone)	1.43E+00	na	2.29E+03	na	5.00E+03	na	1.95E+04	na
201	Methyl iodide	na	na	na	na	na	na	na	na
202	Methyl isobutyl ketone	8.57E-01	na	1.37E+03	na	3.00E+03	na	1.17E+04	na
203	Methyl tert-butyl ether (MTBE)	8.57E-01	9.10E-04	1.37E+03	9.62E+00	3.00E+03	9.62E+01	1.17E+04	4.49E+01
204	Methylene chloride	1.71E-01	3.50E-05	2.74E+02	6.60E+01	6.00E+02	2.50E+03	2.34E+03	1.17E+03

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205	2-Pentanone	na	na	na	na	na	na	na	na
206	n-Propylbenzene	2.86E-01	na	4.57E+02	na	1.00E+03	na	3.89E+03	na
207	Styrene	2.86E-01	na	4.57E+02	na	1.00E+03	na	3.89E+03	na
208	1,1,1,2-Tetrachloroethane	na	2.59E-02	na	3.38E-01	na	3.38E+00	na	1.58E+00
209	1,1,2,2-Tetrachloroethane	na	2.03E-01	na	4.31E-02	na	4.31E-01	na	2.01E-01
210	Tetrachloroethylene (PCE)	1.14E-02	9.10E-04	1.83E+01	9.62E+00	4.00E+01	9.62E+01	1.56E+02	4.49E+01
211	Tetrahydrofuran	5.71E-01	na	9.14E+02	na	2.00E+03	na	7.79E+03	na
212	Toluene	1.43E+00	na	2.29E+03	na	5.00E+03	na	1.95E+04	na
213	1,2,3-Trichlorobenzene	na	na	na	na	na	na	na	na
214	1,1,1-Trichloroethane	1.43E+00	na	2.29E+03	na	5.00E+03	na	1.95E+04	na
215	1,1,2-Trichloroethane	5.71E-05	5.60E-02	9.14E-02	1.56E-01	2.00E-01	1.56E+00	7.79E-01	7.30E-01
216	Trichloroethylene (TCE)	5.71E-04	1.44E-02	9.00E-01	3.30E-01	2.00E+00	6.10E+00	7.79E+00	2.85E+00
217	Trichlorofluoroethane	na	na	na	na	na	na	na	na
218	Trichlorofluoromethane	2.00E-01	na	3.20E+02	na	7.00E+02	na	2.73E+03	na
219	1,2,3-Trichloropropane	8.57E-05	na	1.37E-01	na	3.00E-01	na	1.17E+00	na
220	Trichlorotrifluoroethane	1.43E+00	na	2.29E+03	na	5.00E+03	na	1.95E+04	na
221	1,2,3-Trimethylbenzene	1.71E-02	na	2.74E+01	na	6.00E+01	na	2.34E+02	na
222	1,2,4-Trimethylbenzene	1.71E-02	na	2.74E+01	na	6.00E+01	na	2.34E+02	na
223	1,3,5-Trimethylbenzene	1.71E-02	na	2.74E+01	na	6.00E+01	na	2.34E+02	na
224	Vinyl acetate	5.71E-02	na	9.14E+01	na	2.00E+02	na	7.79E+02	na
225	Vinyl chloride	2.86E-02	3.08E-02	4.57E+01	2.84E-01	1.00E+02	2.84E+00	3.89E+02	1.33E+00
226	Total xylenes	2.86E-02	na	4.57E+01	na	1.00E+02	na	3.89E+02	na
227	***PFAS***								
228	6:2 Fluorotelomer sulfonic acid (6:2 FTS)	na	na	na	na	na	na	na	na
229	GenX (HFPO-DA)	na	na	na	na	na	na	na	na
230	Perfluorobutanoic acid (PFBA)	na	na	na	na	na	na	na	na
231	Perfluorobutanesulfonic acid (PFBS)	na	na	na	na	na	na	na	na
232	Perfluorodecanoic acid (PFDA)	na	na	na	na	na	na	na	na
233	Perfluorohexanoic acid (PFHxA)	na	na	na	na	na	na	na	na
234	Perfluorohexanesulfonic acid (PFHxS)	na	na	na	na	na	na	na	na
235	Perfluorononanoic acid (PFNA)	na	na	na	na	na	na	na	na
236	Perfluorooctanesulfonic acid (PFOS)	na	na	na	na	na	na	na	na
237	Perfluorooctanoic acid (PFOA)	na	na	na	na	na	na	na	na
238	***Petroleum Hydrocarbons***								
239	Gasoline range hydrocarbons, fresh	na	na	4.60E+01	na	1.50E+03	na	3.90E+02	na
240	Gasoline range hydrocarbons, weathered	na	na	4.60E+01	na	1.50E+03	na	3.90E+02	na
241	Diesel range hydrocarbons, fresh	na	na	4.60E+01	na	1.50E+03	na	3.90E+02	na
242	Diesel range hydrocarbons, weathered	na	na	4.60E+01	na	1.50E+03	na	3.90E+02	na
243	Oil range hydrocarbons	na	na	na	na	na	na	na	na
244	Total diesel & oil range hydrocarbons	na	na	na	na	na	na	na	na
245	***Pesticides***								
246	Aldrin	na	1.72E+01	na	5.10E-04	na	5.10E-03	na	2.38E-03
247	alpha-BHC (alpha-HCH)	na	6.30E+00	na	1.39E-03	na	1.39E-02	na	6.49E-03
248	beta-BHC (beta-HCH)	na	1.86E+00	na	4.72E-03	na	4.72E-02	na	2.20E-02
249	delta-BHC (delta-HCH)	na	na	na	na	na	na	na	na
250	Carbaryl	na	na	na	na	na	na	na	na
251	cis-Chlordane (alpha)	na	na	na	na	na	na	na	na
252	trans-Chlordane (gamma)	na	na	na	na	na	na	na	na
253	Chlordane	2.00E-04	3.50E-01	3.20E-01	2.50E-02	7.00E-01	2.50E-01	2.73E+00	1.17E-01
254	Chlorpyrifos	na	na	na	na	na	na	na	na
255	4,4'-DDD	na	2.42E-01	na	3.62E-02	na	3.62E-01	na	1.69E-01

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256	4,4'-DDE	na	3.40E-01	na	2.58E-02	na	2.58E-01	na	1.20E-01
257	4,4'-DDT	na	3.40E-01	na	2.58E-02	na	2.58E-01	na	1.20E-01
258	Total DDD	na	2.42E-01	na	3.62E-02	na	3.62E-01	na	1.69E-01
259	Total DDE	na	3.40E-01	na	2.58E-02	na	2.58E-01	na	1.20E-01
260	Total DDT	na	3.40E-01	na	2.58E-02	na	2.58E-01	na	1.20E-01
261	Diazinon	na	na	na	na	na	na	na	na
262	Dieldrin	na	1.61E+01	na	5.43E-04	na	5.43E-03	na	2.54E-03
263	Endosulfan I	na	na	na	na	na	na	na	na
264	Endosulfan II	na	na	na	na	na	na	na	na
265	Endosulfan sulfate	na	na	na	na	na	na	na	na
266	Endrin	na	na	na	na	na	na	na	na
267	Endrin aldehyde	na	na	na	na	na	na	na	na
268	Endrin ketone	na	na	na	na	na	na	na	na
269	Heptachlor	na	4.55E+00	na	1.92E-03	na	1.92E-02	na	8.98E-03
270	Heptachlor epoxide	na	9.10E+00	na	9.62E-04	na	9.62E-03	na	4.49E-03
271	Lindane (gamma-BHC)	na	1.09E+00	na	8.06E-03	na	8.06E-02	na	3.77E-02
272	Malathion	na	na	na	na	na	na	na	na
273	Methoxychlor	na	na	na	na	na	na	na	na
274	Mirex	na	1.79E+01	na	4.90E-04	na	4.90E-03	na	2.29E-03
275	Nonachlor	na	na	na	na	na	na	na	na
276	Toxaphene	na	1.12E+00	na	7.81E-03	na	7.81E-02	na	3.65E-02

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