# Occidental Chemical Corporation Cleanup Action Plan, Agreed Order, and Related Documents: Responsiveness Summary

***Ecology's response to public comments***

Washington State Department of Ecology
Hazardous Waste and Toxics Reduction Program
Olympia, Washington

April 2025 | Publication 25-04-022

DEPARTMENT OF ECOLOGY
State of Washington

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**Cover photo**

Occidental cleanup site in Tacoma, Washington. Photo courtesy of *The News Tribune*.

**Related Information**

- Facility Site ID: 1212
- Cleanup Site ID: 4326
- Occidental Chemical Corporation: Documents Available for Review and Comment[1]
- Focus On: Occidental Cleanup Site - Tacoma Tideflats[2]
- Public Participation Plan: Occidental Chemical Corporation[3]
- Occidental Chemical Corporation - Washington State Department of Ecology[4]

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[1] https://apps.ecology.wa.gov/publications/SummaryPages/2304053.html
[2] https://apps.ecology.wa.gov/publications/SummaryPages/2304044.html
[3] https://apps.ecology.wa.gov/publications/SummaryPages/2304054.html
[4] https://ecology.wa.gov/OccidentalSite
[5] ecology.wa.gov/contact

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# Executive Summary

The Washington State Department of Ecology (Ecology, we) oversees the cleanup of water and soil contamination at the former Occidental Chemical Corporation Site (Occidental, the Site), located at 605 Alexander Avenue in Tacoma, Washington. The sources of contamination were the release of solvents and other chemicals from manufacturing operations and the breakdown of contaminants in the environment. We held a public comment period from December 18, 2023, through March 29, 2024, for the Site's draft Cleanup Action Plan (CAP), agreed order, permit, and other documents. After reviewing public input, we finalized the CAP with the selected remedy, which includes:

- Early actions to remove sources of contamination.
- Extraction and treatment of contaminated groundwater that has migrated beyond the Site property boundary.

To protect groundwater, these measures are designed to both remove and contain contamination. See our video about the selected cleanup remedy and technologies[6] for more details.

This document summarizes Ecology's public outreach for the Occidental Site, the public comments received, and Ecology's responses.

[6] https://www.youtube.com/watch?v=d_nRtgoCvmg

# Introduction

The Occidental Chemical Corporation (Occidental) Site is in the Tacoma Tideflats at 605 E. Alexander Avenue. From 1929 to 2002, the Site was used for industrial chemical production, shipbuilding, and military activities. Occidental made chemicals to sell, such as chlorine, caustic soda (sodium hydroxide), and the solvents trichloroethene (TCE) and tetrachloroethene (PCE). Occidental manufactured about 457 million pounds of solvents at this location. An estimated one million pounds of solvents contaminate the groundwater.

Washington State Department of Ecology (we, Ecology) oversees the investigation and cleanup of the groundwater, surface water, air, and soil by applying the Model Toxics Control Act (MTCA), our state cleanup law. MTCA requires us to ensure that people, wildlife, and the environment are protected from harmful chemicals.

This document summarizes Ecology's public outreach for the Occidental Site, the public comments received, and Ecology's responses.

## Background

The Site is located on the easternmost peninsula of Commencement Bay, bounded on one side by the Hylebos Waterway and on the other side by the Blair Waterway. This area was created by dredging operations conducted over decades. Once dredging was complete, toward the end of the 1920s, industrial activities began in the area. These activities included chemical manufacturing and waste management from shipbuilding and military operations to support the war efforts for WWI and WWII. Occidental's predecessor company began operations in 1929, and the Site was continuously used for industrial operations until 2005, when aboveground facilities were demolished. Operations primarily involved the production of chlorine and caustic soda, but during various timeframes involved the production of several other chemicals, including TCE and PCE. Contamination from these operations was found in soil and groundwater at and near the property.

Ecology and the U.S. Environmental Protection Agency (EPA) have been jointly overseeing the remedial activities under an Administrative Order on Consent with Occidental. The agencies have also been using federal and state laws to regulate the management and cleanup of hazardous wastes.

Along with other federal and state cleanup laws, the federal Resource Conservation and Recovery Act (RCRA) ensures safe management and disposal of hazardous waste generated nationwide. It also established a program to handle wastes safely from the moment they are generated to their final disposal, known as "cradle to grave." Owners and operators of waste treatment, storage, and/or disposal (TSD) facilities, such as Occidental, are required to submit a

permit application covering all aspects of design, operation, maintenance, and closure of the facility. RCRA requires owners and operators of these facilities to clean up contamination resulting from past and present practices. This includes practices of previous owners. Washington has been delegated authority to regulate hazardous and dangerous wastes under both state law and RCRA. Cleanup of RCRA regulated facilities in Washington can be done under a Corrective Action Order, with review by EPA. These cleanup activities, known as corrective actions, are usually done after a facility closes with a closure permit. Ecology's preferred cleanup remedy will satisfy both state and federal law.

On November 16, 1988, Ecology and EPA jointly issued a permit for Occidental to store dangerous and hazardous waste at their facility. The permit stipulated how wastes stored at the facility were to be managed. When operations ceased in 2002, the permit was re-issued to refer to a cleanup process in an amended Administrative Order on Consent signed by EPA, Ecology, and Occidental. Occidental no longer stores dangerous wastes at the Site and its permit does not allow the company to operate as a waste management facility at this location.

As part of the cleanup process for this historical contamination, Occidental produced a remedial investigation report and conceptual Site model that Ecology made available for public comment and approved in 2016. The next phase of the project was compiled in a feasibility study and made available for public review in the first half of 2017. Ecology approved the feasibility study, as amended, after receiving public comment. Ecology developed a draft Cleanup Action Plan (CAP) based on this earlier work and input received from stakeholders and the public.

A public comment period was held December 18, 2023, through March 29, 2024. Documents available for public review included the CAP, a new Agreed Order DE 22454, a proposed permit modification with a Statement of Basis/Factsheet, a draft State Environmental Policy Act (SEPA) checklist and determination of non-significance (DNS), and a Public Participation Plan.

## Documents reviewed during this public comment period

Ecology held a public comment period for this Site from December 18, 2023, through March 29, 2024. The following documents were available for review:

- Cleanup action plan (CAP).
- New Agreed Order DE 22454.
- Proposed Dangerous Waste Corrective Action permit modification with a Statement of Basis/Factsheet
- Draft State Environmental Policy Act (SEPA) checklist and determination of non-significance (DNS).

- Public Participation Plan.

The Agreed Order, the permit modification, and public participation plan often receive public review separately. Ecology determined that it would be appropriate to include them with the CAP public review. Ecology also included the SEPA checklist package and determination of non-significance in the public comment period.

The public was invited to attend a hearing on March 6, 2024, at 4:30 p.m. at the Tacoma Convention Center, 1500 Commerce St., Tacoma, Washington.

# The cleanup process

To clean up the Site, we are following Washington State's formal cleanup process[7] as directed under the Model Toxics Control Act (MTCA[8]).

The cleanup process has many phases. The first is to identify the nature and extent of contamination in a remedial investigation report. The remedial investigation, conditionally approved after a 2015–2016 public comment period, provides important information about how Occidental investigated contamination at the Site in both soil and groundwater. It describes both historical sources of contamination and estimated amounts of released chemicals. The report also describes ongoing sources of releases from the Site. Maps in the report show the extent of a large groundwater plume that migrated, over decades, beyond the property boundary.

Following Ecology's conditional approval of the remedial investigation report, Occidental was required to study alternatives for how to address ongoing sources of contamination and past releases of contamination. To evaluate options, Occidental was required to develop a feasibility study report.

Following approval of the feasibility study, Ecology developed a draft CAP, Agreed Order DE 22454 with a scope of work to implement the CAP, a permit modification to update the permit with the new Agreed Order, and a revised public participation plan.

[7] https://ecology.wa.gov/Spills-Cleanup/Contamination-cleanup/Cleanup-process
[8] https://ecology.wa.gov/mtca

# Site contamination

The Occidental cleanup site is one of many along the Hylebos Waterway and within the Commencement Bay Nearshore/Tideflats Superfund site. There are hazardous substances in the groundwater, soil, and sediment throughout the Site. Contamination is from historical operations and waste disposal practices. Occidental and past owners and operators of the facility contributed to the contamination.

The primary contaminants from this Site include:

- Chlorinated volatile organic compounds (CVOCs)
- Sodium hydroxide
- Salt (sodium chloride)
- Metals
- By-products of chlorinated solvent production
- Polychlorinated biphenyls (PCBs)
- Dioxins/furans

## Soil contamination

CVOCs, hexachlorobenzene, PCBs, and metals are present in Site soil. CVOC and hexachlorobenzene impacts are found on Site and beneath the Hylebos Waterway. Impacts from PCBs and metals occur primarily along the bank of the Hylebos.

## Groundwater contamination

Groundwater contamination includes CVOCs, dense non-aqueous phase liquid consisting of concentrated PCE and TCE, and elevated pH. The CVOC plume extends to the north from below the Site to the northern end of the peninsula and under Commencement Bay, and to the east below the Hylebos Waterway. The plume gets deeper as it extends away from the Site. The depth of the CVOC plume extends to 160 feet below sea level.

The plume of elevated pH is mostly below the Site, and also extends to the north under the peninsula and to the east under the Hylebos Waterway. The depth of the pH plume extends to 100 feet below sea level. Other contaminants including hexachlorobenzene, PCBs, and metals were found in groundwater, but in small, limited areas.

Proximity of the facility to the Hylebos Waterway poses unique challenges for measuring the contamination. Several studies were conducted over the years to attempt to understand the hydrogeology. Efforts over the past two years have focused on filling data gaps and supplementing data.

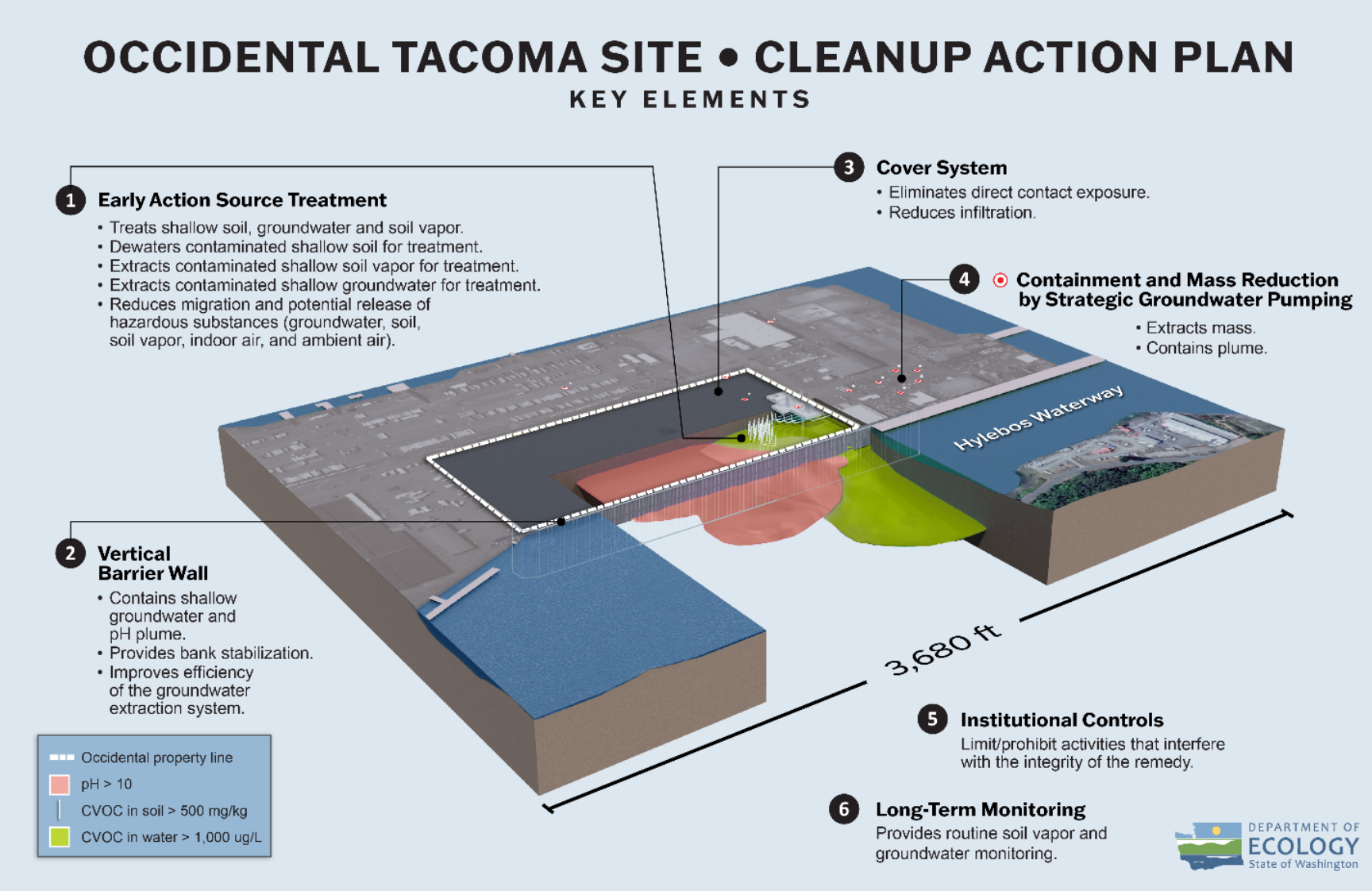



Figure 1. Key elements of the Occidental Cleanup Action Plan.

# Key Elements of the Remedy

## Early Removal Actions to Address Potential Sources of Vapor Intrusion

This remedy features a sequence of early actions that remove shallow contamination. Shallow extraction wells will dewater the groundwater in soils about 10 feet below the surface. The area targeted contains solvents that are treated by the currently operating groundwater treatment plant. Once dewatered, the exposed soils will be treated using soil vapor extraction. Occidental will continue the action until performance standards specified in the CAP are met. If performance standards are not met within a specific time frame, additional treatment will be implemented.

The soil vapor extraction system may include vertical and horizontal pipes, gravel beds, and/or trenches and will be developed and specified during the design phase. Horizontal drilling is an option to access some locations. Groundwater from the dewatering system and vapors from the soil vapor extraction system will be treated using the on-site groundwater treatment facility. Continued periodic monitoring must occur to verify that the system is achieving the performance standards identified in this CAP.

The Occidental office building at 605 E. Alexander Avenue will be removed or mitigated within three years of the implementation of the soil and soil vapor early action source treatment, unless early-action source treatment continues and soil vapor concentrations in the vicinity of the office building are meeting or approaching the cleanup levels. Once the early removal action is complete, continued monitoring is required.

## Vertical Barrier Wall Adjacent to the Hylebos Waterway

A vertical barrier wall will be constructed to contain shallow groundwater containing high pH and other sources of contamination. The barrier will be approximately 2,200 feet long and approximately 70-75 feet deep. Methods for protecting the wall from corrosion will be identified during the design phase. The design will address sea level rise and any identified impacts from climate change or seismic events expected or predicted for the lifespan of the barrier wall.

## Cover System

A direct contact exposure barrier cover will be constructed over the Site property, including specific areas with elevated VOC concentrations in shallow soil (that is, greater than 500 mg/kg) on adjacent properties, to prevent potential direct contact with shallow soil contamination. The

sloped area between the vertical barrier wall along the Hylebos Waterway and the upland, and the embankment where industrial materials were historically placed, will be backfilled and also be covered. This cover can consist of a membrane liner, reinforced concrete, asphalt, clay soil, or a combination of these materials. The specifications for the cover will be developed in the design phase and documented in the engineering design report.

## Strategic Groundwater Pumping

To address the existing plume of contamination in the groundwater that has travelled beyond the Site property boundary, the remedy includes extraction of shallow and deep groundwater that contain high chlorinated volatile organic compound (CVOC) concentrations. The design of the system at this stage will focus on reversing the direction of the plume to bring contamination back towards the property while reducing contamination. This strategy will remove mass at a higher rate than hydraulic containment alone. The extracted groundwater will be sent to a new groundwater treatment plant to be built in a new location on the Site. If necessary, wells will be moved to specific locations to avoid problem areas where high pH and high dissolved silica concentrations cause problems with pumping. When Occidental is unable to continue strategic groundwater pumping at specific locations in the remedy design, the remedy will transition to the next phase of hydraulic containment.

## Hydraulic Containment

The hydraulic containment element of the cleanup action will control Site groundwater within specified hydraulic control boundaries. The hydraulic containment system must impose an inward hydraulic gradient and perform to a specific set of performance standards. These requirements must be maintained irrespective of aquifer conditions within the control boundaries, including high pH and high dissolved silica concentrations. If it becomes technically infeasible to maintain hydraulic containment at the required performance standard an equivalent level of containment must be achieved and maintained using an alternative technology or approach. These alternative approaches are identified specifically as contingencies in the CAP and are to be implemented using an adaptive management approach with active Ecology oversight.

## Ex-Situ Groundwater Treatment

The existing groundwater treatment plant will be used for treating groundwater and soil vapor from dewatering and vapor extraction activities associated with early action source treatment. A new groundwater treatment plant will be proposed in a new National Pollutant Discharge Elimination System (NPDES) permit application that includes an engineering design report. A

study will evaluate the expected type and concentrations of constituents that will be sent to the plant for treatment.

# Public outreach and involvement

## Informing the public about the comment period

Ecology followed its previously approved public participation plan[9] for this Site, ensuring the public and stakeholders were informed about the public comment period. The public was able to review the draft documents and provide comments from December 18, 2023, through March 29, 2024. To raise awareness about the comment period, we used varied messaging and media. We posted notice on Ecology's Occidental website,[10] public involvement calendar, and Site Register.[11] A public notice mailer in both English and Spanish was sent by U.S. mail to 9,938 persons. Ecology published display ads in the *Tacoma Weekly* and the *Eatonville Dispatch* on December 13, 2023, and January 10, February 7, and March 13, 2024. Ecology also advertised in Spanish in *el Siete Dias*, a Spanish publication.

We advertised the comment period on Facebook in English and Spanish between February 19 and March 4, 2024. We also placed 300 radio ads (each 15-seconds) on KXXO Mix 96.1 between December 18, 2023, and March 29, 2024.

## Public meetings

On March 6, 2024, Ecology hosted an open house and public hearing about this Site at the Tacoma Convention Center. Handouts, display boards, and staff provided more information about the proposed decision. Ecology staff gave a brief presentation followed by a question and answer session. Ecology collected public comments formally during the public hearing.

In addition to the public open house and hearing, Ecology sent an advanced copy of the documents to The Puyallup Tribe of Indians. Presentations were offered to a number of stakeholders who submitted comments during previous public comment periods.

[9] https://apps.ecology.wa.gov/publications/SummaryPages/1504028
[10] https://ecology.wa.gov/OccidentalSite
[11] https://ecology.wa.gov/regulations-permits/guidance-technical-assistance/site-register-lists-and-data#SiteRegister

# Comments and Responses

Ecology accepted comments from December 18, 2023, through March 28, 2024.

We received eight comments on the proposed decision to approve the Cleanup Action Plan. Two were supportive and urged Ecology to proceed with the cleanup.

## Ecological risk, protection, and restoration – habitat

### Comment

Requested that the proposed sheet pile wall be designed to include features to support habitat.

### Response

The CAP requires that Occidental submit an engineering design report with a barrier wall design for Ecology's approval. Occidental is required to apply for the appropriate permits for constructing this structure on the shoreline or in the tidelands. Part of the permitting process includes considering mitigation of the impact of a new structure along the Site shoreline. Pre-design meetings will be held prior to submittal of the first design to provide input, including discussing concerns about habitat.

## Clean up the Occidental Site to the maximum extent practicable – restoration timeframe

### Comment

The length of time allotted for the cleanup could be seen as too lenient.

### Response

The restoration timeframe is based on the conceptual Site model that represents Ecology's understanding of the Site, the disproportionate cost analysis (DCA), additional data and analysis of the groundwater plume, and the potential impacts from source removal using various treatment alternatives. Ecology followed the requirements and the process in the regulations (WAC 173-340-360) for selecting the Site remedy and for considering restoration time frame in the selection decision.

Ecology considered these factors in considering the restoration time frame under the preferred remedy for the final CAP:

- Assessment of potential risks posed by the Site to human health and the environment.
- Practicability of achieving a shorter restoration time frame.
- Current use of the Site, surrounding areas, and associated resources that are, or may be, affected by releases from the Site.

- Potential future use of the Site, surrounding areas, and associated resources that are, or may be, affected by releases from the Site.
- Availability of alternative water supplies – a determination that the impacted aquifers are not potable due to natural saltwater intrusion and turbidity.
- Ability to control and monitor migration of hazardous substances from the Site.
- Natural processes that reduce concentrations of hazardous substances and are documented to occur at the Site or under similar Site conditions.

If the cleanup action selected has a greater degree of long-term effectiveness than on-site or off-site disposal, isolation, or containment options, then a longer period of time may be used for the restoration time frame for a Site to achieve cleanup levels at the point of compliance (see WAC 173-340-360(4)(c)). These considerations, combined with features in the remedy such as the early action source treatment, were determinative for Ecology.

# Addressing pH contamination

## Comment

Cleanup Barriers: The barriers posed by silica and high pH warrant cleanup actions to better facilitate the cleanup. Even if Ecology believes these factors don't produce additional risk, they do inhibit our ability to address the risk of VOC pollution.

## Response

The January 2017 feasibility study included alternatives for addressing high pH areas. The alternatives included in-situ treatment or containment of soil and groundwater in the high-pH areas. The high pH conditions in the subsurface do not pose a risk to people, the environment, or to the stability of the ground surface. The potential discharge of shallow high pH groundwater through shoreline seeps will be addressed with the vertical barrier wall that is part of the remedy.

Ecology studied and considered potential actions to address sources of high pH in the groundwater. Studies were conducted by the University of Washington at Ecology's direction to investigate the geochemistry of the Site aquifer materials and the effect of high-pH conditions. These studies helped us understand the challenges of pumping groundwater in specific areas of the Site. Ecology concluded that both high silica and high pH conditions existed together in some areas of the aquifer, and that these conditions would continue to cause problems for extracting groundwater. The excavation or large-scale removal of the areas where sodium hydroxide was still present also presented the potential to renew continued reaction in the aquifer, making extraction of VOC-contaminated groundwater even more difficult.

Ecology determined the most effective means of cutting off the migration of shallow groundwater is a barrier wall.

# Land use considered (highest/best) in DCA process

## Comment

Cleanup Timelines: Please clarify whether Ecology considered the highest and best use of that property under various cleanup scenarios. Was this factored into the disproportionate cost analysis (DCA) used to help deliberate on cleanup alternatives?

## Response

Ecology considers future use when selecting cleanup standards and when considering a reasonable restoration timeframe. Both of these considerations are part of Ecology's disproportionate cost analysis. However, the focus of the analysis is on risk to human health and the environment from current or future use, not on "highest" or "best" use. Ecology's authority under the MTCA regulations is limited to a risk-based evaluation and requirements for limitations on land use where contamination remains present (such as a restrictive land use covenant).

# Impacts to neighboring projects (Blair Waterway)

## Comment

A letter from the Army Corp of Engineers asking for verification that the Occidental cleanup would not involve or impede plans to widen and deepen the Blair Waterway and requests close coordination.

## Response

The contaminated groundwater plume is horizontally separated from and well below the base of the Blair Waterway. It is not expected to interfere with plans to dredge.

# Document repository available

## Comment

Public Participation: Ecology must make as many documents available to the public as possible, and particularly an updated database that provides past and future reports, monitoring data, cleanup progress reports, and additional planning/development resources.

## Response

Ecology maintains a dedicated Occidental cleanup documents repository[12] where key documents and updates are publicly available. This includes reports dating back to the 2016 remedial investigation report, as well as ongoing updates to the feasibility study, CAP, and other relevant documents. Ecology intends to continue to post final documents through the website.

# Stay informed

Ecology will continue to keep the public informed at major decision points and times of investigative or interim work. You can sign up for our email list[13] or join our mailing list to receive public notices. Ecology sends out updates as they are available to the Site's email list and updates the Occidental website[14] regularly. All of the reports and other documents are available in the electronic documents database[15] for Occidental. To learn more about the public outreach process, check out the  public participation plan on our website.

[12] https://apps.ecology.wa.gov/cleanupsearch/site/4326#site-documents
[13] https://public.govdelivery.com/accounts/WAECY/subscriber/new?topic_id=WAECY_104
[14] https://ecology.wa.gov/ OccidentalSite
[15] https://apps.ecology.wa.gov/cleanupsearch/site/4326#site-documents

# Appendix A.
# Plain Text Version of Figure 1

## Occidental Tacoma Site Cleanup Action Plan: Key Elements

### 1. Early action source treatment

- Treats shallow soil, groundwater and soil vapor.
- Extracts groundwater and dewaters contaminated shallow soil for treatment.
- Extracts contaminated shallow groundwater for treatment.
- Reduces migration and potential release of hazardous substances (groundwater, soil, soil vapor, indoor air, and ambient air).

### 2. Vertical barrier wall

- Contains shallow groundwater and the pH plume.
- Provides bank stabilization.
- Improves efficiency of the groundwater extraction system.

### 3. Cover system

- Eliminates direct contact exposure.
- Reduces infiltration.

### 4. Containment and mass reduction by strategic groundwater pumping

- Extracts mass.
- Contains plume.

### 5. Institutional controls

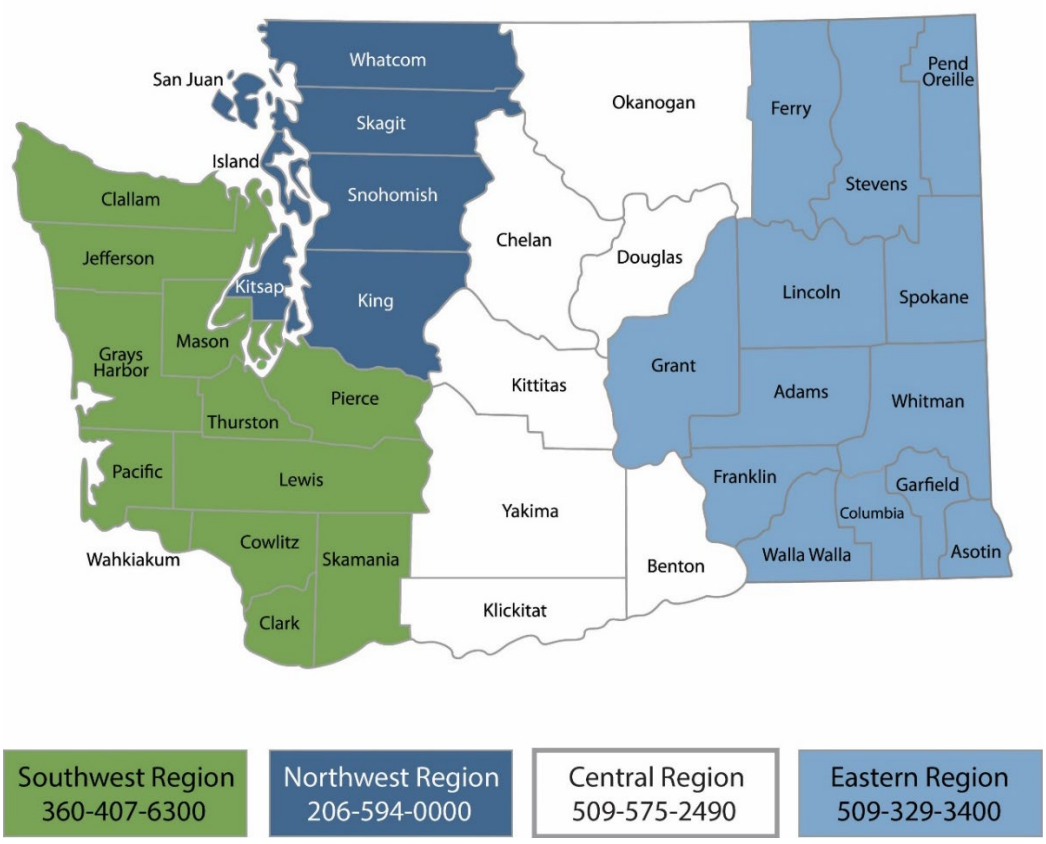
- Limit/prohibit activities that interfere with integrity of the remedy.

### 6. Long-term monitoring

- Provides routine soil vapor and groundwater monitoring.

# Department of Ecology's Regional Offices

## Map of Counties Served

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