Pacific Environmental &
Redevelopment Corporation

July 30, 2015

Marv Coleman
Site Manager
Washington State Department of Ecology
TCP-SWRO
PO Box 47775
Olympia, WA 98504-7775

RE: Final Cleanup Action Plan for On-Property Soils and Perched Water at the Superlon Plastics Site (Facility Site I.D. # 2776343)

Dear Marv:

On behalf of the potentially liable parties (PLPs), The Chemours Company, FC, LLC and White Birch, LLC, attached is the Cleanup Action Plan (CAP) for On-Property Soils and Perched Water (OSP) at the Superlon Plastics facility. The February 2015 Draft CAP was revised consistent with the responses to Ecology comments that were discussed with Ecology in April 12, 2015.

This CAP-OSP summarizes the technical approach that will be undertaken to remediate soils and perched water on the Property only. Definition of the Site (per MTCA) and an evaluation of data from other off-Property media will be presented in a future Remedial Investigation/Feasibility Study (RI/FS) and CAP for the Site. This approach, which has been approved by Ecology, was adopted in order to continue progress toward a final remedy for on-Property media, while continuing to investigate off-Property issues and to define the Site boundary (Ecology 2013). The Agreed Order will be updated to indicate that once the actions identified in the FS-OSP/CAP-OSP are implemented no further action is necessary to complete cleanup for on-Property soils and perched water.

We look forward to your approval of the CAP-OSP, the associated public comment period for the FS-OSP and the CAP-OSP, and the continued progress on the Superlon site. Please feel free to call me at (425) 238-2212 with any questions about the document.

Sincerely:

Jeffrey D. King, L.G.
Project Manager

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Cleanup Action Plan for On-Property Soils and Perched Water for the Superlon Plastics Site Tacoma, Washington

Prepared for:

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and

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July 30, 2015

Jeffrey D. King, L.G., Project Manager

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EXECUTIVE SUMMARY

The Superlon Plastics Company, Inc. (Superlon) Site (Site) is being investigated and cleaned up under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D of the Revised Code of Washington (RCW), and the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC). A portion of the Site (as defined in MTCA) includes the Superlon property (the Property), which is located at 2116 Taylor Way and owned by White Birch LLC (White Birch).

A Remedial Investigation (RI) for on-Property Soils and Surface Water (OSS) and a Feasibility Study (FS) for on-Property Soils and Perched Water (OSP) were conducted as part of the site investigation (Pacific Environmental and Redevelopment Corporation [PERC] 2013, 2014a). Approximately 1,300 soil samples were evaluated in the RI-OSS. Sampling results indicated that concentrations of arsenic and lead in soil exceeded industrial MTCA Method C direct contact screening levels (i.e., cleanup levels [CLs]) throughout the Property, and may have contributed to concentrations of these constituents in perched water on the Property.

In the FS-OSP, site-specific soil and perched water remediation levels (RELs) were determined, and arsenic and lead were identified as constituents of concern for the Property (PERC 2014a). The FS-OSP, which was approved by the Washington State Department of Ecology (Ecology) on January 26, 2015 (Ecology 2015), selected a preferred cleanup alternative for remediating arsenic and lead in soils and perched water on the Property.

This CAP-OSP summarizes the technical approach that will be undertaken to remediate soils and perched water on the Property only. Definition of the Site (per MTCA) and an evaluation of data from other off-Property media will be presented in a future Remedial Investigation/Feasibility Study (RI/FS) and CAP for the Site. This approach, which has been approved by Ecology, was adopted in order to continue progress toward a final remedy for on-Property media, while continuing to investigate off-Property issues and to define the Site boundary (Ecology 2013). The Agreed Order will be updated to indicate that once the actions identified in the FS-OSP/CAP-OSP are implemented no further action is necessary to complete cleanup for on-Property soils and perched water.

Preferred Cleanup Alternative

Five potential cleanup alternatives were identified in the FS-OSP (PERC 2014a). The preferred alternative had the best overall evaluation score because it could be implemented in the shortest period of time, had the lowest potential for public concerns, and was the most environmentally sustainable alternative. The Ecology-selected preferred alternative includes six cleanup actions, which are listed below and presented on Figure ES-1.

On-Property Soils and Perched Water Cleanup Actions

- Excavate and dispose of on-Property soils to meet CLs/RELs.

- Excavate and stabilize on-Property soils in Operable Units (OUs) 1, 2 and 3 to meet soil-to-perched water RELs, and reuse the stabilized soils on the Property.
- Install a below ground slurry or grout wall along the Property boundary to contain perched water.
- Treat perched water inside slurry or grout wall to meet the perched water RELs.
- Install a geotextile and gravel cover over the entire Property to control storm water.
- Implement institutional controls (ICs) to ensure the ongoing protectiveness of the remedy.

After completion of the six cleanup actions, on- and off-Property groundwater will be monitored to determine the progress of natural attenuation.

Cleanup Standards

Final cleanup criteria for arsenic and lead were identified for soils and perched water based on industrial land use and taking into account that perched water and groundwater are non-potable (PERC 2014a). Compliance monitoring will be implemented at the locations where cleanup criteria must be met, (i.e., the points of compliance).

The soils point of compliance is everywhere within an OU, with the exception of the footprints of buildings that will remain after the cleanup actions are complete. The soils point of compliance depth will be from ground surface to 15 feet below ground surface (bgs). Perched water consists of discontinuous water in the fill zone that periodically daylights. The perched water point of compliance is the saturated zone located underneath Building A and the former Building B footprint within the fill unit, which extends from ground surface to approximately 15 feet bgs (since this is the primary area where perched water is present).

Implementation Schedule and Restoration Time Frame

Implementation of the preferred alternative includes the following tasks:

- Submitting a remedial design report to Ecology (consistent with 173-340-400(4)(a)) for approval;
- Obtaining necessary permits;
- Implementing the cleanup actions;
- Developing an Operation and Maintenance Plan, as needed, consistent with WAC 173-340-400(4)(c) and submit to Ecology for approval;
- Preparing a construction completion report that includes as-builts and other information (consistent with WAC 173-340-400(6)(b)) and submit to Ecology for approval; and,
- Developing and implement an Institutional Controls Plan that establishes restrictive covenants.

The restoration time frame is the period of time needed to achieve cleanup standards at the points of compliance (i.e. the locations where CLs/RELs must be met). The restoration time frame for on-Property

soils and perched water is estimated to be six years from the time the Final CAP-OSP is approved by Ecology.

Compliance with WAC 173-340-360

The selected cleanup action complies with the provisions of WAC 173-340-360. It will be protective of human health and the environment, comply with cleanup standards and applicable state and federal laws, and provide compliance monitoring. Soils will either be removed or treated to achieve compliance with cleanup standards. Perched water will be treated to achieve compliance with cleanup standards. The ICs will include notification regarding the presence of residual contaminated soils, and regulation of the disturbance/management of the soils and the cleanup alternative components. The ICs will also provide long-term monitoring and stewardship of the cleanup actions. Additionally, the selected cleanup alternative, which considers public concerns, uses permanent solutions to the maximum extent practicable and can be implemented in a timely manner.

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Abbreviations and Acronyms

Acronym	Description
ARAR	Applicable or Relevant and Appropriate Requirements
bgs	Below Ground Surface
CAP-OSP	Cleanup Action Plan for On-Property Soils and Perched Water
Chemours	The Chemours Company FC, LLC
CL	Cleanup Level
COC	Constituent of Concern
CY	Cubic yards
DCA	Disproportionate Cost Analysis
DuPont	E. I. du Pont de Nemours and Company
Ecology	Washington State Department of Ecology
FS	Feasibility Study
FS-OSP	FS for On-Property Soils and Perched Water
IA	Interim Action
IC	Institutional Control
MMP	Materials Management Plan
MTCA	Model Toxics Control Act
PERC	Pacific Environmental and Redevelopment Corporation
RAO	Remedial Action Objectives
RCW	Revised Code of Washington
REL	Remediation Level
RI	Remedial Investigation
RI-OSS	RI for On-Property Soils and Surface Water
Site	Superlon Site
SPLP	Synthetic Precipitation Leaching Procedure
Superlon	Superlon Plastics Company, Inc.
TCLP	Toxic Characteristic Leaching Procedure
µg/dl	Microgram per Deciliter
USEPA	United States Environmental Protection Agency
WAC	Washington Administrative Code

Chapter 1. Introduction and Background

1.1. Introduction

The Superlon Plastics Company, Inc. (Superlon) Site (Site) is being investigated and cleaned up under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D of the Revised Code of Washington (RCW), and the MTCA Cleanup Regulation, Chapter 173-340 of the Washington Administrative Code (WAC). A portion of the Site (as defined in MTCA) includes the Superlon property (i.e., the Property), which is located at 2116 Taylor Way and owned by White Birch LLC (White Birch). The Property location is presented on Figure 1. A Remedial Investigation (RI) for on-Property Soils and Surface Water (OSS) and a Feasibility Study (FS) for on-Property Soils and Perched Water (OSP) were conducted as part of the Site investigation (Pacific Environmental and Redevelopment Corporation [PERC] 2013, 2014a). The RI-OSS and FS-OSP were prepared in accordance with Agreed Order DE 5940 between the Washington State Department of Ecology (Ecology), White Birch, and E. I. du Pont de Nemours and Company (DuPont). Table 1 presents the details of the Agreed Order for the Site.

Table 1: Site Regulatory Information

Site Name:	**Superlon Plastics Co., Inc.**
Site Location:	2116 Taylor Way in Tacoma, Washington
Facility Site Identification No.:	2776343
Agreed Order No.:	DE 5940
Effective Date of Order:	March 23, 2009
Parties to the Order:	Ecology, White Birch, DuPont
Current Property Owner:	White Birch

Based on the FS-OSP, which was approved by Ecology on January 26, Ecology selected a preferred cleanup alternative for remediating soils and perched water on the Property (Ecology 2015). This Cleanup Action Plan for On-Property Soils and Perched Water (CAP-OSP) presents the Ecology-selected cleanup alternative, the basis for the selection, and the approach that will be used to remediate soils and perched water on the Property. The cleanup alternative will be conducted in accordance with Agreed Order DE 5940 between Ecology, White Birch, and The Chemours Company FC, LLC (Chemours). The Agreed Order will be updated to indicate that once the actions identified in the FS-OSP/CAP-OSP are implemented no further action is necessary to complete cleanup for on-Property soils and perched water.

Definition of the Site (per MTCA) and an evaluation of groundwater and other off-Property media will be presented in a future Remedial Investigation/Feasibility Study (RI/FS) in accordance with Agreed Order DE 5940. This approach, which has been approved by Ecology, was adopted in order to continue progress toward a final remedy for on-Property soil and perched water, while continuing to investigate groundwater and off-Property issues and to define the Site boundary (Ecology 2013). Once the Site is defined, the remaining RI/FS is completed, then the Cleanup Action Plan for the Site will be issued by Ecology.

1.2. Purpose

As specified in WAC 173-340-380, this CAP-OSP presents the following:

- The selected preferred alternative (Chapter 2)
- Cleanup standards (Chapter 3)
- Implementation schedule and restoration time frame (Chapter 4)
- Institutional controls (Chapter 5)
- Applicable state and federal laws (Chapter 6)
- Compliance with WAC 173-340-360 (Chapter 7)
- References (Chapter 8)

1.3. Property Description

The Property is owned by White Birch and operated by Superlon, an extruded plastic pipe manufacturer. It is located in the Tacoma Tidal Flats, in a highly industrialized area between the Blair and Hylebos Waterways, and is approximately 3.1 acres (see Figure 1 and Figure 2). The Property is listed as tax parcel number 0321351042 in Pierce County. Several Ecology and United States Environmental Protection Agency (USEPA) hazardous waste cleanup sites are located within 0.25 miles of the Property. The sites and the owners of the sites are listed in Table 2.

Table 2: Hazardous Waste Sites within 0.25 Miles of the Superlon Site

Site Name:	**Owner:**
Reichhold Chemical/SSA Container Site	SSA Container and the Puyallup Tribe
Arkema Site	Port of Tacoma
US Gypsum/Thermafiber Plant Site (US Gypsum Site)	Port of Tacoma
Atofina (formerly ELF Atochem) Site	Port of Tacoma
Former Murray Pacific Log Yard #1	Port of Tacoma

The Tacoma Tide Flats were filled and developed in the early 1900s. In general, there are at least three layers of fill materials in the area: two layers of dredge sands were placed in the area in the early 1900's and one layer of fill materials was deposited in the area between 1959 and 1972. These three layers are separated by layers of silty clay. The fill materials consist of silty sand, waste, and debris.

Five types of fill material have been found on the Property (see Figure 3):

- Black shot waste from the US Gypsum Site;
- Lime;

- Lead and arsenic related to the manufacturing of lead arsenate and calcium arsenate products;
- Mixed waste associated with the filling of the Property in the 1960s and 1970s; and,
- Wastewater treatment sludge (Occisludge).

The origins of the mixed waste are, as yet, unknown (PERC 2013).

1.4. Interim Actions

In accordance with MTCA (WAC 173-340-430) and Ecology-approved work plans, four interim actions (IAs) have been conducted to remove soil, waste, and/or debris from discrete locations at the Site (see Figure 4). Three IAs were conducted between 2009 and 2012 and a fourth IA is ongoing.

1. Property Preparation and Building B Demolition (PERC 2012a)
2. Occidental Sludge Removal and Disposal (PERC 2012b)
3. Building D Sub-Soil Removal and Disposal (PERC 2014b). US Gypsum black shot waste was encountered, excavated, and disposed of as part of this interim action.

The fourth IA (Building B Soil Removal, Stabilization, and Disposal) began in 2012 and will be completed in 2016.

Soils and/or wastes impacted by Site constituents of concern (COCs) have been removed, or will be removed, during the four IAs. The total volume of materials removed from the Property (through August 31, 2014) includes approximately:

- 4,500 tons of soils and waste mixtures;
- 1,200 tons of wastewater treatment sludge;
- 700 tons of building debris; and,
- 10 cubic yards (CY) of asbestos-containing material.

All materials were characterized and sent to Ecology-approved landfills.

1.5. Remedial Investigation

The RI-OSS was completed in accordance with Agreed Order DE 5940 and associated works plans, and achieved the objective of characterizing the conditions at the Property to enable the completion of the FS-OSP (PERC 2013). Site soils, perched water, groundwater, surface water, and sediment were investigated in three phases. Due to the length of time anticipated to characterize groundwater, surface water, and sediment, the RI was bifurcated into two separate evaluations. The first evaluation characterized soils and perched water on the Property (PERC 2013). The second evaluation will characterize groundwater on and off the Property, and surface water, sediment, and soil off of the Property. This approach will accelerate the remediation of the Property, and was previously approved by Ecology (Ecology 2013).

Nearly 1,300 soil samples were collected at the Property during the RI-OSS (PERC 2013). The sample locations are presented on Figure 5. Sampling results indicated that concentrations of arsenic and lead in soil exceeded industrial MTCA Method C direct contact screening levels throughout the Property, and may have contributed to concentrations of these constituents in perched water on the Property. Five perched water samples were collected in the vicinity of the former Building B basement footprint and under Building A (see Figure 5). Concentrations of arsenic and lead above MTCA Method B levels were detected in the perched water samples.[1]

The RI-OSS concluded that fill materials and residual materials associated with the historic production of lead arsenate and calcium arsenate pesticides were the major sources of environmental contamination at the Property (PERC 2013).

1.6. Feasibility Study

The FS is also being conducted as two separate evaluations. The first evaluation characterized soils and perched water on the Property (PERC 2014a). The second evaluation will characterize groundwater on and off the Property, and surface water, sediment, and soil off of the Property. This approach, which was approved by Ecology, will accelerate the remediation of the Property (Ecology 2013).

Remedial action objectives (RAOs) were identified in the FS-OSP to guide the development of remedial alternatives that would protect people and the environment from risks associated with exposure to hazardous constituents in soils and perched water on the Property. The following Property-specific RAOs were developed during the FS-OSP:

- Soil
  - Achieve 10^{-5} residual cancer risk across entire Property
  - Protect perched water and groundwater on the Property
- Perched Water
  - Prevent contact with contaminated perched water on the Property
  - Protect groundwater on the Property

These objectives would be met by:

- Achieving cleanup levels (CLs) and remediation levels (RELs) that will be protective of human health and the environment;
- Complying with chemical-, location-, and action-specific applicable or relevant and appropriate requirements (ARARs); and,

[1] Water at the property is non-potable.

- Complying with Ecology policies.

The affected media at the Property include soils and perched water. Cleanup standards for these media consist of:

1. CLs/RELs, defined by regulatory criteria, that are adequately protective of human health and the environment; and,
2. The points of compliance at which the CLs/RELs must be met.

In addition, six OUs were identified in the FS-OSP, based on fill types (see Figure 6). Perched water on the Property was designated as an additional, separate OU (OU7).

Cleanup alternatives for soils and perched water on the Property were developed and evaluated during the FS-OSP based on criteria specified in MTCA, Chapter 173-340 WAC. A preferred alternative was selected by Ecology based on the results presented in the FS-OSP report.[2]

1.7. Cleanup Action Plan

This CAP-OSP presents the Ecology-selected preferred alternative (i.e., cleanup action) for the Property, and provides additional information in accordance with WAC 173-340-380(1)(a). Consistent with Chapter 70.105D RCW (Hazardous Waste Cleanup – MTCA), as implemented by Chapter 173-340 WAC, it was determined that the proposed cleanup alternative:

- Is protective of human health and the environment;
- Attains federal and state requirements that are ARARs;
- Complies with cleanup standards;
- Provides for compliance monitoring;
- Uses permanent solutions to the maximum extent practicable;
- Provides for a reasonable restoration time frame; and,
- Considers public concerns raised prior to or during public comment.

[2] The FS-OSP report will be subject to public comment concurrently with this CAP.

Chapter 2. Selected Preferred Alternative

2.1. Preferred Alternative

The preferred alternative (presented as Alternative 3 in the FS-OSP) selected by Ecology includes six cleanup actions, which are described in Table 3. The six cleanup actions are also presented on Figure 7. After completion of the six cleanup actions, on- and off-Property groundwater will be monitored to determine the progress of natural attenuation.

Table 3: Components of the Preferred Cleanup Alternative

Technical Component	**Description**	**Rationale**
Excavate and dispose of soils to meet direct contact CLs/RELS.	Excavate soils with elevated COC concentrations to achieve compliance with direct contact CLs/RELs to the depth delineated by the RI-OSS or by additional sampling results. The soils will be stockpiled for dewatering and then screened to remove any recoverable debris. The soils will then be disposed of off-Property at a hazardous or non-hazardous waste landfill.	Reduce COC concentrations in soils to achieve compliance with direct contact CLs/RELs.
Excavate and stabilize soils to meet soil-to-perched water RELs in OUs 1, 2 and 3 and reuse soils on-Property.	Excavate soils remaining after compliance with direct contact CLs/RELs is complete to achieve compliance with soil-to-perched water RELs in OUs 1, 2, and 3. This soil/fill mixture will be stockpiled for dewatering and then will be screened to remove any recoverable debris. The soils will then be stabilized by chemically converting COCs into less soluble/mobile forms. This will require the design and installation of an on-Property soil processing plant. The stabilized soils will then be reused on the Property.	Reduce COC concentrations in soils in OUs 1, 2, and 3 to achieve compliance with soil-to-perched water RELs.
Install a below ground slurry or grout wall to contain perched water.	Construct an underground slurry or grout wall of highly durable, impermeable, engineered materials along the Property boundary.	Minimize or eliminate lateral migration of perched water onto and off of the Property.

Treat perched water inside slurry or grout wall to meet the perched water RELs.	Treat perched water using electrocoagulation or other treatment system to reduce COC concentrations in perched water to meet perched water RELs. The treated water will be returned to the perched water body, recycled, and re-treated until the COC concentrations in the water extracted for treatment are in compliance with perched water RELs.	Reduce arsenic concentrations in perched water to achieve compliance with perched water RELs.
Install a geotextile and gravel cover to control storm water.	Place a minimum of four inches of gravel over a geotextile liner in areas where there is no asphalt or buildings. The thickness of the gravel cover will depend on the requirements of the Property's storm water permit.	Control storm water and act as a barrier for potential human exposure.
Implement institutional controls.	Administrative and legal controls, such as a deed restriction, will be imposed to ensure ongoing industrial land use, appropriate use of groundwater, and safe practices for future construction activities at the Property.	Ensure the protectiveness of the cleanup by controlling exposure to residual contamination.

2.2. Other Cleanup Alternatives Evaluated in the FS

The process for identifying the preferred alternative for on-Property soils and perched water is presented in Figure 8 and briefly described in this section.

Potential remedial technologies and processes were identified for soils and perched water and were evaluated to determine if they could potentially (1) meet the RAOs or (2) act as a component of an alternative that would meet RAOs for each medium and/or fill type. Technologies were screened against effectiveness, implementability, and cost criteria, per WAC 173-340-360(3)(b)). A list of the prospective technologies and processes were presented to Ecology and approved for further evaluation in the FS-OSP (Ecology 2014a). None of the individual media-specific technologies met all of the RAOs or Ecology policies; therefore, the retained technologies were combined into five remedial alternatives that were further evaluated in the FS-OSP. The four cleanup alternatives that were not selected are summarized in Table 4.

Table 4: Other Cleanup Alternatives Evaluated in the FS

Alternative	**Description**
1	No action
2	• Install a slurry or grout wall; • Treat perched water on the Property; • Excavate and dispose of soils at an off-Property landfill to achieve compliance with direct contact CLs/RELs; • Cover with a geotextile and gravel and cap with asphalt; and, • Apply a deed restriction to restrict the Property to industrial land use.

3	Selected alternative (see previous section)
4	• Install a slurry or grout wall; • Treat on-Property perched water; • Excavate and dispose of soils at an off-Property landfill to achieve compliance with direct contact CLs/RELs; • Excavate and dispose of soils at an off-Property landfill to achieve compliance with soil-to-perched water REL in OUs 1,2, and 3; • Cover with a geotextile and gravel for storm water controls; and, • Apply a deed restriction to restrict the Property to industrial land use.
5	• Install a slurry or grout wall; • Treat on-Property perched water; • Excavate and dispose of soils at an off-Property landfill to achieve compliance with MTCA default CLs; • Cover with a geotextile and gravel for storm water controls; and, • Apply a deed restriction to restrict the Property to industrial land use.

Alternatives 1 and 2 were not selected as the preferred alternative because they did not meet the RAOs. The three remaining alternatives (Alternatives 3, 4, and 5) were evaluated based on MTCA criteria.

According to WAC 173-340-360(3) preference is given to a cleanup action that offers a permanent solution, to the maximum extent practicable. To determine whether or not a cleanup action uses a permanent solution to the maximum extent practicable, a disproportionate cost analysis (DCA) should be conducted. Per WAC 173-340-360(3)(e)), "…costs are disproportionate to benefits if the incremental costs of the alternative over that of a lower cost alternative exceed the incremental degree of benefits achieved by the alternative over that of the other lower cost alternative." A DCA was conducted during the FS-OSP to assess the extent to which the remedial alternatives would use permanent solutions to the maximum extent practicable. In the DCA, the benefits of each alternative were quantified, and the benefits versus costs for each alternative were compared.

Alternative 3 had the best overall evaluation score. This alternative could be implemented in the shortest period of time, had the lowest potential for public concerns, and was the most environmentally sustainable alternative.

Alternative 4 had benefits similar to *Alternative 3*. However, it was not as cost effective as Alternative 3 and, because it would cause 40% more truck traffic, it was not as sustainable as *Alternative 3*.

Alternative 5 had the highest associated costs. The protectiveness, permanence, effectiveness over the long-term (especially as it applies to risk), management of short-term risks, consideration of public concerns, and technical and administrative implementability were no greater than *Alternative 3* and *Alternative 4*, but the cost associated with Alternative 5 was disproportionately higher.

Under MTCA, *Alternative 3* was identified as the alternative that would be permanent to the maximum extent practicable. The components of Alternative 3, and the rationale for using the components, are summarized

in Table 3. The locations on the Property where the remedial components will be implemented are presented on Figure 7. Additional details on the DCA and the alternatives that were evaluated are included in the FS-OSP report (PERC 2014a).

Chapter 3. Cleanup Standards

3.1. Cleanup Criteria

Cleanup criteria were identified for soils and perched water based on an industrial land use scenario and taking into account that perched water and groundwater are non-potable. The initial cleanup criteria are presented in Table 5 and the final cleanup criteria are presented in Table 6 and are discussed in the following sections.

3.1.1. Non-Potable Groundwater Cleanup Levels and Perched Water Remediation Levels

All current and future perched water exposure pathways for aquatic biota and people on the Property are incomplete. However, due to the potential for the perched water to impact the underlying groundwater, non-potable groundwater CLs were identified to serve as the basis for on-Property groundwater and soil-to-groundwater RELs. Consistent with MTCA, a site-specific risk assessment was performed to identify the reasonable maximum exposure scenario and calculate non-potable groundwater CLs and perched water RELs. The risk assessment considered the potential for an industrial worker (e.g. a Superlon employee) to come in contact with groundwater while maintaining a groundwater-fed process cooling water system. Specific exposure parameters for the frequency and duration of such contact were based on site-specific information collected from Superlon managers (PERC 2014a). Non-potable groundwater CLs and perched water RELs for arsenic and lead are presented in Table 5.

3.1.2. Soil-to-Perched Water Remediation Levels

Constituents in soil may be transported through infiltration/percolation of water to perched water at the Property, and subsequently to groundwater. Soil samples were analyzed using the synthetic precipitation leaching procedure (SPLP) or the Toxic Characteristic Leaching Procedure (TCLP) to estimate the soil concentration that would produce leachate that could impact groundwater above the non-potable groundwater CLs (WAC 173-340-747(7)(b)(i)). The arsenic and lead SPLP and TCLP results were compared to the perched water RELs to determine a corresponding soil concentration that would be protective of perched water, and consequently, groundwater, for each OU. These RELS, which vary by OU depending on the leachability of the material in each area, were developed for arsenic and lead, and are presented in Table 5.

3.1.3. Direct Contact Soil Remediation Levels

In the FS-OSP, arsenic and lead were the only constituents with concentrations greater than the default MTCA Method C soil direct contact CLs, and hence were identified as soil direct contact COCs (PERC 2014a).

Terrestrial ecological exposure pathways were incomplete, and the property qualified for an exclusion from a terrestrial ecological evaluation under WAC 173-340-7491 (PERC 2013).

Consistent with MTCA (WAC 173-340-708(3)), a site-specific reasonable maximum exposure scenario expected to occur under both current and potential future site use conditions was used to determine the REL for arsenic. The exposure scenario considered future site use by a utility worker who may perform underground utility work. Operations managers for organizations that may perform utility work at properties in the Tacoma Tidal Flats were surveyed to determine the frequency and duration of work visits by utility workers to Tacoma Tidal Flats properties. This information was used to determine the soil direct contact REL for arsenic (see Table 5 and Table 6). An REL was not calculated for lead since arsenic and lead are typically co-located and remediation of arsenic in on-Property soils will reduce lead concentrations to below the lead industrial CL of 1,000 mg/kg. Details on the development of all RELS are presented in the FS-OSP (PERC 2014a).

Table 5: Initial Cleanup Criteria

Constituents	**Non-Potable Groundwater CLs and Non-Potable Perched Water RELs[(1)] (mg/L)**	**Soil-to-Perched Water RELs[(2)] (mg/kg)**						**Soil Direct Contact RELs (mg/kg)**
		OU1	OU2	OU3	OU4	OU5	OU6	
Arsenic	0.67	242	91	114	761	8,587	1,388	588[(3)]
Lead	1.7	679	5,610	2,121	2,396	23,685	7,013	1,000[(4)]

Notes:
[(1)] RELs were based on use of non-potable groundwater for process cooling water, a hazard quotient of 1, a cancer risk benchmark of 1E-05, and a blood lead level of 10 µg/dl.
[(2)] Soil-to-Perched Water RELs represent the lowest soil concentration in an OU that is expected to leach at levels that comply with the non-potable perched water REL.
[(3)] The REL was based on a utility worker exposure scenario, a hazard quotient of 1, and a cancer risk benchmark of 1E-05.
[(4)] MTCA Industrial Method C CL.

3.1.4. Final Cleanup Criteria

The final soil cleanup criteria for arsenic and lead were determined by selecting the most protective (i.e., the lowest) of the soil-to-perched water or the soil direct contact criteria (see Table 5). The Final cleanup criteria (presented in Table 6) represent the most conservative cleanup criteria for arsenic and lead at the Property for each OU.

Table 6: Final Cleanup Criteria

Constituents	**Final Perched Water Non-Potable RELs (mg/L)**	**Final Soil CLs/RELs (mg/kg)**					
		OU1	OU2	OU3	OU4	OU5	OU6
Arsenic	0.67	242[(1)]/588[(2)]	91[(1)]/588[(2)]	114[(1)]/588[(2)]	588[(2)]	588[(2)]	588[(2)]
Lead	1.7	679[(1)]/1,000[(2)]	1,000[(2)]	1,000[(2)]	1,000[(2)]	1,000[(2)]	1,000[(2)]

Notes:
[(1)] The level above which soil will be stabilized to address the soil-to-perched water pathway.
[(2)]The level above which soil will be excavated and disposed of off-Property at a landfill.

3.2. Compliance Monitoring

Monitoring is a threshold requirement under Chapter 173-340-360(2)(a)(iv). Compliance monitoring will be implemented in accordance with Chapter 173-340-410. The three types of compliance monitoring are:

- **Protection Monitoring**: Protection monitoring helps reduce impacts on human health and the environment during the construction, maintenance, and operation periods. Protection monitoring will be developed as part of the site health and safety plan.
- **Performance Monitoring**: Performance monitoring determines if the preferred cleanup action has met performance standards. Performance monitoring will include construction quality-assurance monitoring that will be conducted to demonstrate that the slurry or grout wall will perform as planned.
- **Confirmation Monitoring**: Confirmation monitoring determines the long-term effectiveness of the cleanup action. Soils and perched water sampling analyses will confirm that CLs/RELs are achieved.

Samples will be collected in accordance with the *Sample and Analytical Plan & Quality Assurance Project Plan for the Superlon Plastics Site*, and will be sent to an independent Washington State certified laboratory (PERC 2010). Consistent with 173-340-410, the *Quality Assurance Project Plan* will be updated to identify any additional objectives, methodologies, or other considerations for performing the compliance monitoring.

3.3. Points of Compliance

In accordance with WAC 173-340-700(3), it is necessary to specify the locations where CLs/RELs must be met, (i.e., the points of compliance). The points of compliance for on-Property soils and perched water are discussed below.

3.3.1. On-Property Soils

For each OU, the soils point of compliance is everywhere within an OU, with the exception of the footprints of buildings that will remain after the cleanup actions are complete. The soils point of compliance depth will be from ground surface to 15 feet below ground surface (bgs), in accordance with WAC 173-340-740(6)(d). Compliance with RELs will be evaluated using statistical tools, in accordance with WAC 173-340-740(7)(d)–(f).

3.3.2. On-Property Perched Water

Perched water consists of discontinuous water in the fill zone that periodically daylights. The perched water point of compliance is the saturated zone located underneath Building A and the former Building B footprint within the fill unit, which extends from ground surface to approximately 15 feet bgs (since this is the primary area where perched water is present). Compliance with RELs will be evaluated using statistical tools in accordance with WAC 173-340-740(7)(d)–(f).

Chapter 4. Implementation Schedule and Restoration Time Frame

4.1. Implementation Schedule

Table 7 presents the deliverables for the cleanup action. This table identifies the schedule for submitting design and construction documents to Ecology for review and approval, as well as the schedule for obtaining required permits. One of the first deliverables (following the submittal of the CAP-OSP and the finish of the public comment period) will be a detailed project schedule that identifies subsequent project deliverables and other major project elements throughout the design and construction of the cleanup alternative. Because many of the project deliverables and milestones are contingent on the completion, review, and approval of preceding project tasks, the project schedule will be a living document that will require periodic updating throughout the project. Key tasks include the following:

Table 7: Remediation Schedule for Soils and Perched Water

Task	Anticipated Duration (days)	Anticipated Start Date	Anticipated Completion Date
Submit a remedial design report to Ecology for approval	290	1/26/2015	3/4/2016
Obtain necessary permits	100	4/6/2016	8/23/2016
Implement the cleanup action	1,036	8/24/2016	8/12/2020
Develop an Operation and Maintenance Plan, as needed, and submit to Ecology for approval	88	4/13/2020	8/12/2020
Prepare a construction completion report and submit to Ecology for approval	100	8/13/2020	12/30/2020
Develop and implement an Institutional Controls Plan that establishes restrictive covenants	90	3/3/2021	7/6/2021

4.2. Restoration Time Frame

The restoration time frame is the period of time needed to achieve the CLs/RELs required at the points of compliance. The restoration time frame for on-Property soils and perched water is estimated to be six years from the time the Final CAP-OSP is approved by Ecology.

Chapter 5. Institutional Controls

Proper management of potentially-contaminated materials that will remain on the Property after the cleanup is complete is necessary to ensure that future development-related activities are consistent with the CAP-OSP. Ecology, White Birch, and Chemours will develop a plan for on-Property institutional controls (ICs) that will include environmental covenants in accordance with WAC 173-340-440 and RCW 64.70. The ICs will be implemented in order to:

- Maintain an industrial land use for the Property;
- Provide notification regarding the presence of residual contaminated materials, and regulate the disturbance/management of those materials and the cleanup alternative components;
- Prohibit extraction of water for drinking use;
- Prohibit activities that (without prior written approval from Ecology) may impact or interfere with the remedial action and any operation, maintenance, inspection, or monitoring;
- Prohibit activities that may threaten continued protection of human health or the environment without prior written approval from Ecology;
- Prohibit conveyance of any interest in any portion of the Property without providing for the continued adequate and complete operation, maintenance, and monitoring of remedial actions and continued compliance with the restrictive covenant, and notification and approval from Ecology;
- Restrict leases, for all portions of the Property, to uses and activities consistent with the restrictive covenant;
- Notify all lessees of the use restrictions for the Property; and,
- Require public comment and Ecology approval for amendments to the restrictive covenant.

In addition, a Materials Management Plan (MMP) will be developed in order to identify the procedures required for managing materials (soils, debris, and perched water) encountered during post-cleanup activities. The MMP will also include specifications for land use inspections that will be conducted to ensure that the ICs are being followed as intended.

All ICs will be implemented using an environmental covenant in accordance with WAC 173-340-440. Specifically, per WAC 173-340-440(8)(a), the ICs "shall be described in a restrictive covenant on the property. The covenant shall be executed by the property owner and recorded with the register of deeds [Auditor] for the county in which the site is located. This restrictive covenant shall run with the land, and be binding on the owner's successors and assigns."

An attempt to terminate the environmental covenant per RCW Chapter 64.70.100 will only be made if COC concentrations at the Site are less than default MTCA industrial CLs, and if Ecology concurs with the termination.

Chapter 6. Applicable State and Federal Laws

WAC 173-340-710(1) requires that site cleanup actions comply with all applicable state and federal laws. These state and federal laws guide the cleanup process and address hazardous substances, cleanup actions, location-specific criteria, and other circumstances relevant to the Property. While these laws may not specifically address the conditions at the Site, they do provide guidance for situations that are sufficiently similar to those at the Site. These collective laws are referred to as ARARs in MTCA. The FS-OSP provides an overview of all potential ARARs for the Property, and the criteria used to determine the final ARARS for the Property (PERC 2014).

The ARARs for the Property are cleanup standards (under MTCA), CLs/RELs, and procedures for implementing a cleanup under MTCA and the ARARs identified to date are presented on Table 8. Additional ARARs may be identified during the designing and permitting processes for the cleanup.

Table 8: Cleanup Action ARARs

Category	**ARAR**	**Description**
Cleanup, CLs/RELs Chemical-Specific	The Model Toxics Control Act (Chapter 173-340 WAC)	Establishes cleanup standards and regulations addressing implementation of cleanup actions.
	Dangerous Waste Regulations (Chapter 173-303 WAC)	Provides cleanup standards for dangerous waste if dangerous waste is discovered or generated during the cleanup process.
	Washington Industrial Safety and Health Act (RCW 49.17)	Establishes requirements related to construction activities.
	Federal Occupational Safety and Health Act (29 CFR 1910, 1926)	Establishes requirements related to construction activities.
Location-Specific Requirements	Pierce County Development Regulations—Critical Areas (Title 18E)	Protects critical areas like wetlands, streams, geologic hazard areas, and fish and wildlife habitat areas by limiting the actions that can occur within a certain distance.
	Archaeological Resources Protection Act (16 USC 470aa et seq.; 43 CFR Part 7)	Applies only if archaeological items are discovered during implementation of the selected remedy. Requires that excavation of archaeological resources be conducted under a permit by professional archaeologists.
	Potential Action-Specific Requirements (Various)	See the FS-OSP (PERC 2014a).

Washington Dangerous Waste Regulations	Solid Waste Management Act (Chapter 70.95 RCW; Chapter 173-304 and 173-351 WAC)	MTCA specifically includes solid waste landfill closure requirements as a potential ARAR. Property cleanup actions potentially include the on-Property treatment and consolidation of solid wastes. If wastes or contaminated soils are to be disposed of on-Property, the design requirements of the solid waste landfill regulations may be relevant and appropriate.
	Water Quality Standards for Surface Waters of the State of Washington (Chapters 90.48 and 90.54 RCW; Chapter 173-201A WAC)	Governs the discharge of wastewater to surface water and groundwater, including discharges from municipal sewer systems to surface water or groundwater. Provides the best management practices for storm water management on construction sites. Remedial actions at the property (e.g., soil movement and disposal) cannot result in any exceedance of surface water quality standards (e.g., turbidity, temperature, and metal limits).

Chapter 7. Compliance with WAC 173-340-360

The selected cleanup action complies with the provisions of WAC 173-340-360. It will be protective of human health and the environment, comply with cleanup standards and applicable state and federal laws, and provide compliance monitoring. Soils will either be removed or treated to achieve compliance with cleanup standards. Perched water will be treated to achieve compliance with cleanup standards. The ICs will include notification regarding the presence of residual contaminated soils, and regulation of the disturbance/management of the soils and the cleanup alternative components. The ICs will also provide long-term monitoring and stewardship of the cleanup actions. Additionally, the selected cleanup alternative uses permanent solutions to the maximum extent practicable, can be implemented in a timely manner, and considers public concerns.

Chapter 8. References

Ecology. 2013. Electronic mail from Marv Coleman to Tim Bingman regarding Ecology approval to separate on-property soils investigations into a separate Remedial Investigation and Feasibility Study track. January 13.

Ecology. 2014. Verbal Communication from Marv Coleman to Tim Bingman Regarding Ecology Approval of the Initial Screening of Technologies. July 7.

Ecology. 2015. Electronic mail from Marv Coleman to Jeff King, Brad Grimsted, and Tim Bingman regarding Ecology approval of the Final on-Property Feasibility Study. January 26.

PERC. 2010. *Sample and Analytical Plan & Quality Assurance Project Plan for the Superlon Plastics Site*. February 22.

PERC. 2012a. *Phase I Interim Action Report for the Superlon Plastics Site*, Tacoma, Washington. January.

PERC. 2012b. *Sludge Excavation and Disposal Report for the Superlon Plastics Site*, Tacoma, Washington. March.

PERC. 2013. *Remedial Investigation Report for On-Property Soils and Surface Water at the Superlon Plastics Property*, Tacoma, Washington. August.

PERC. 2014a. *Feasibility Study Report for On-Property Soils and Perched Water at the Superlon Plastics Property*, Tacoma, Washington. December.

PERC. 2014b. *Soil Excavation and Disposal Report – Building D Subsoil for the Superlon Plastics Site*, Tacoma, Washington. January.

Figures

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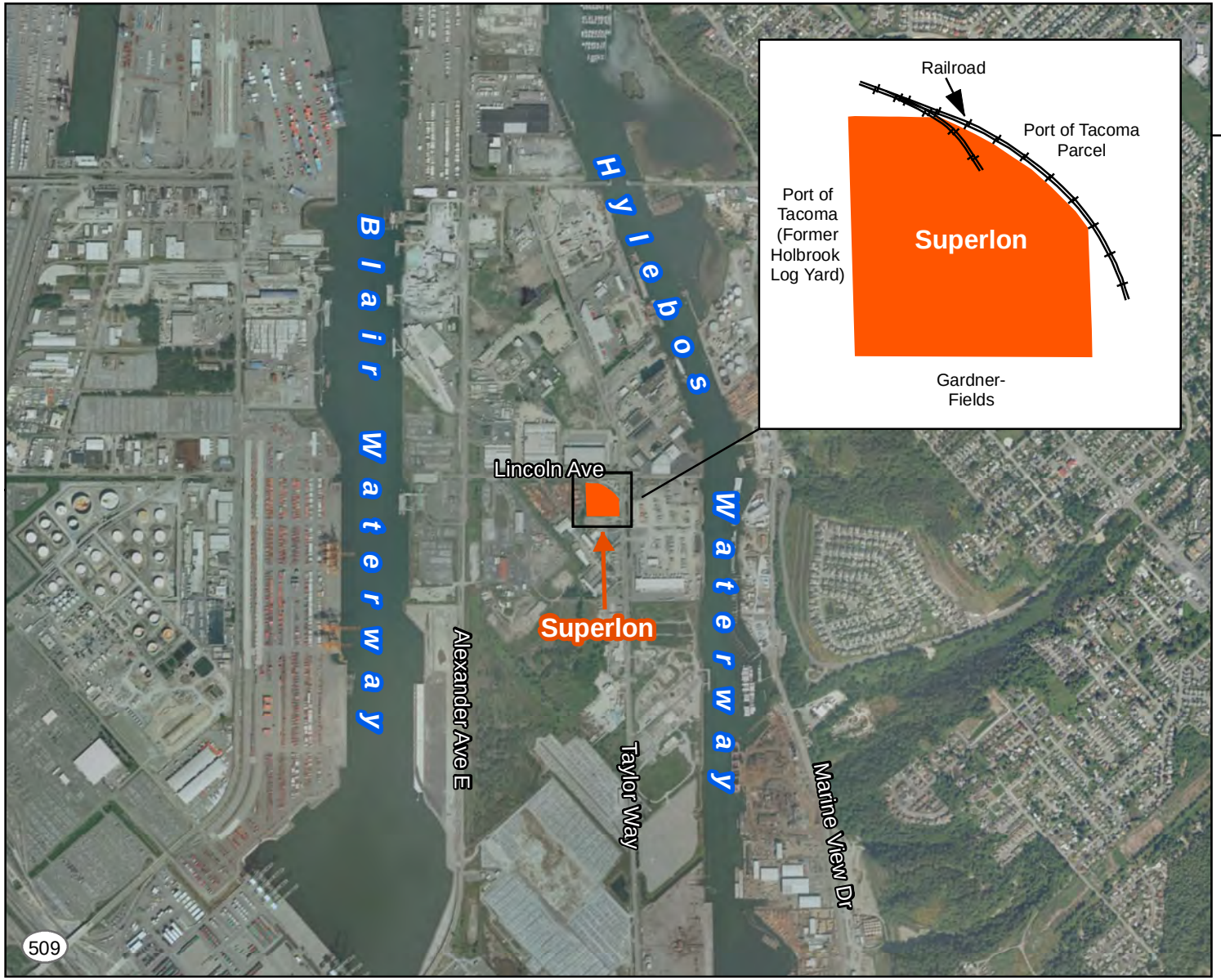

Legend

Superlon Property

0 0.25 0.5 Miles

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Superlon Property Location
Cleanup Action Plan for On-Property Soils and Perched Water
Superlon Plastics Site, Tacoma, Washington

Figure 1

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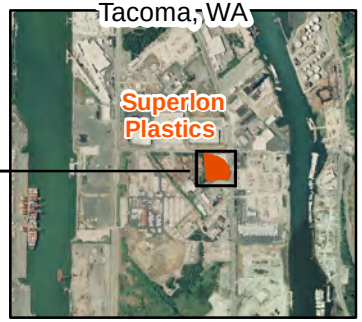

Legend

- Former Building B Footprint
- Railroad
- Fence
- Ditch
- Property Boundary

0 50 100 150 200 Feet

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Property Layout
Cleanup Action Plan for On-Property Soils and Perched Water
Superlon Plastics Site, Tacoma, Washington

Figure 2

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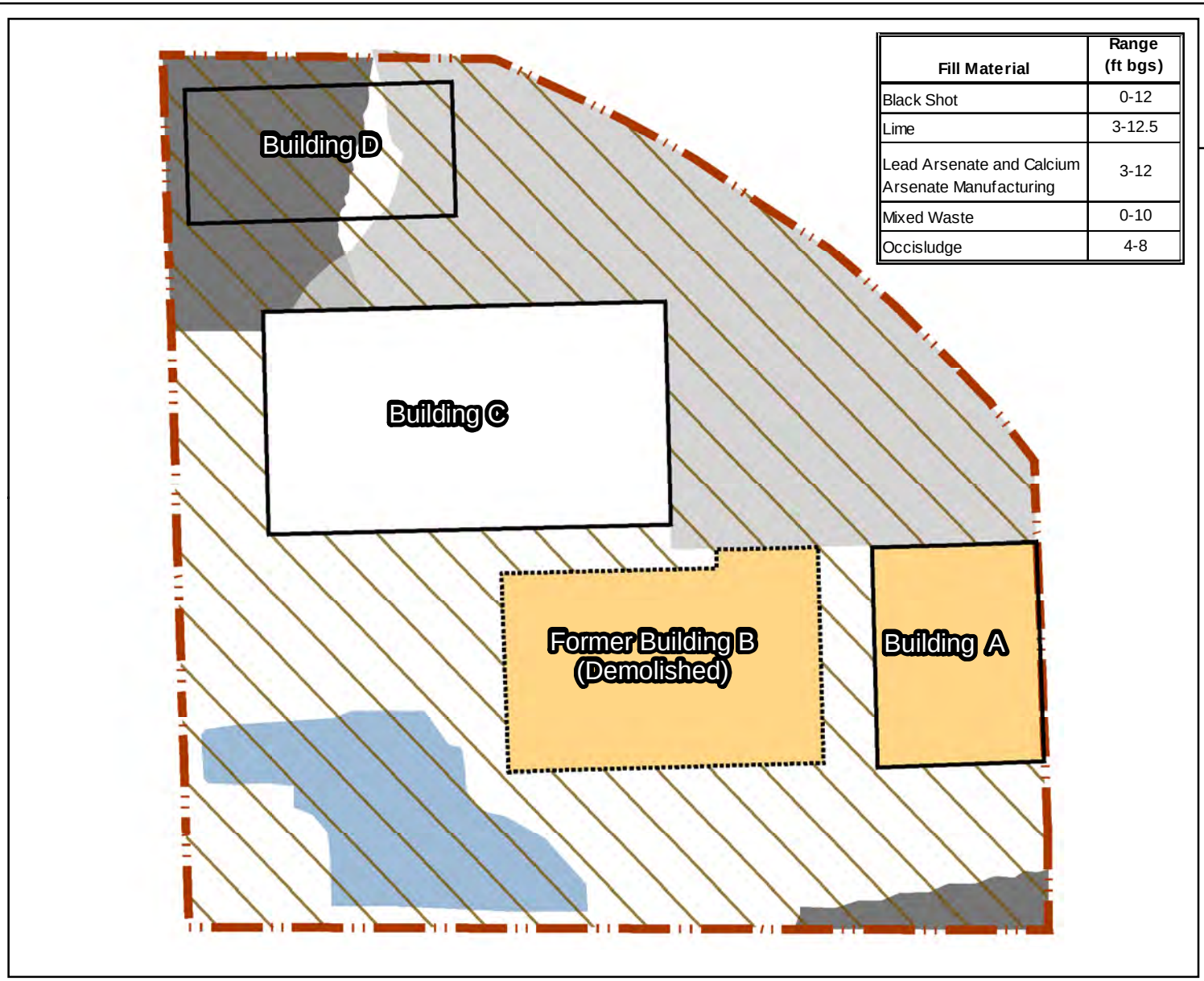
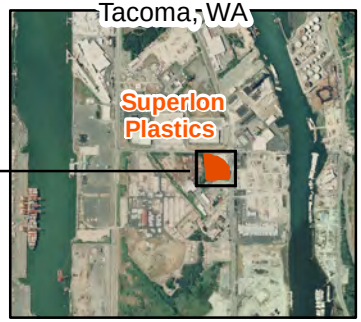


Fill Material	Range (ft bgs)
Black Shot	0-12
Lime	3-12.5
Lead Arsenate and Calcium Arsenate Manufacturing	3-12
Mixed Waste	0-10
Occisludge	4-8



Legend

- Building
- Former Building B Footprint
- Property Boundary

Fill Materials

- Black Shot
- Gypsum / Lime
- Lead Arsenate and Calcium Arsenate Manufacturing
- Mixed Waste
- OcciSludge

Notes:
- ft bgs: feet below ground surface

0 25 50 75 100 Feet

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Fill Materials within the Property Boundary
Cleanup Action Plan for On-Property Soils and Perched Water
Superlon Plastics Site, Tacoma, Washington

Figure 3

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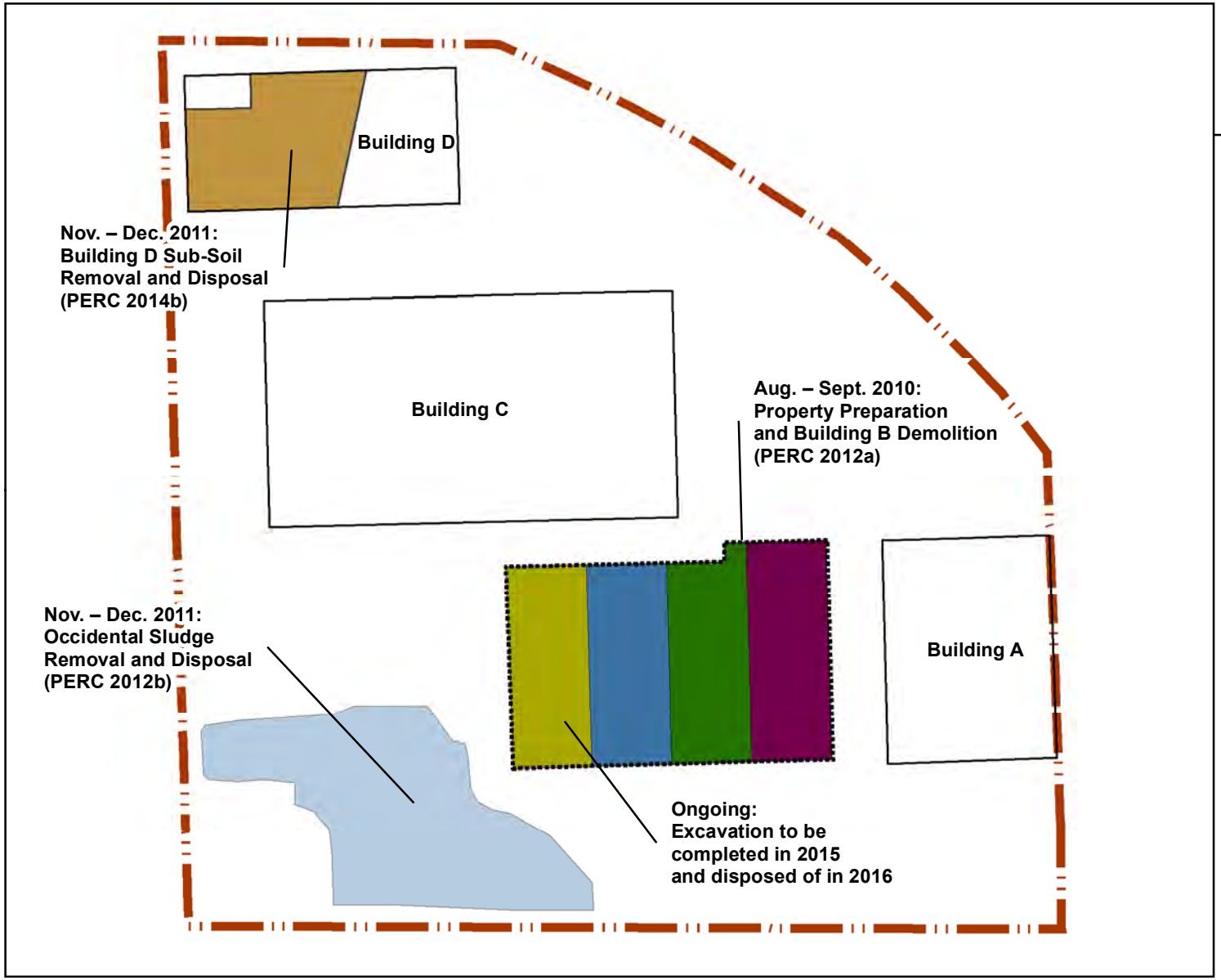

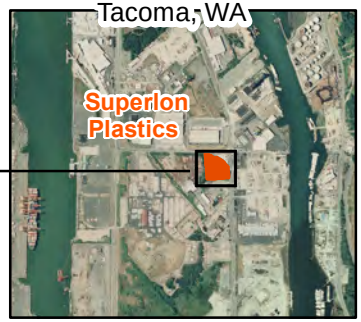

Legend

- Building
- Property Boundary

Building B Interim Actions

- Former Building B Footprint
- Soil Disposed Off-Site: 2012
- Soil Disposed Off-Site: 2013
- Soil Stockpiled: 2014
- Soil Excavation: 2015

Other Interim Actions

- Building D Sub-Soil Removal and Disposal
- OcciSludge Removal and Disposal

0 25 50 75 100 Feet

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Interim Actions
Cleanup Action Plan for On-Property Soils and Perched Water
Superlon Plastics Site, Tacoma, Washington

Figure 4

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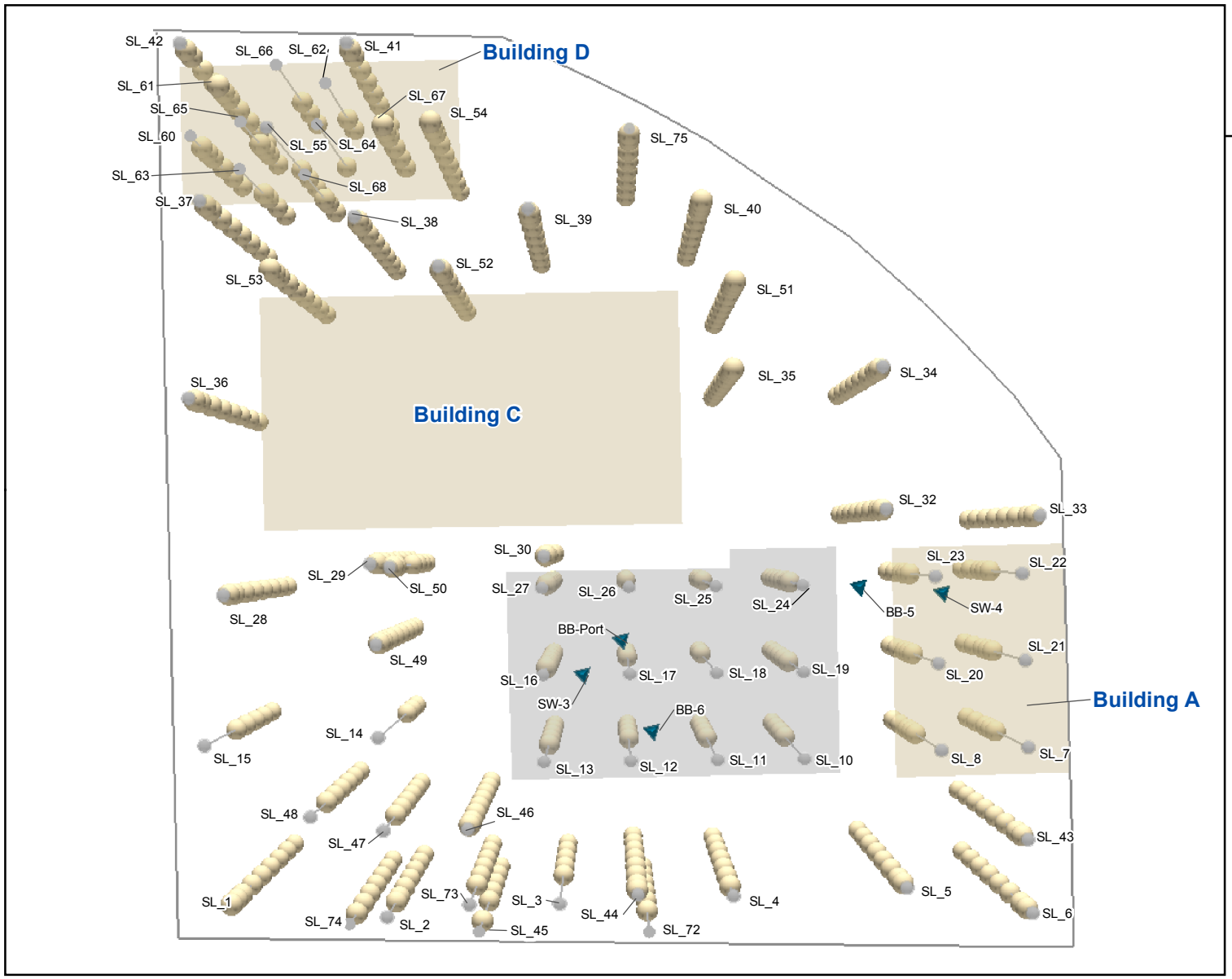

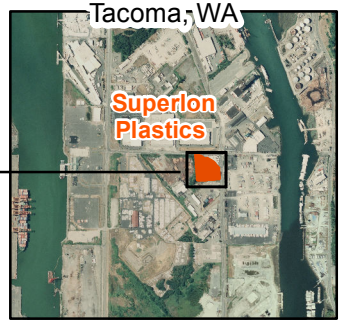

Legend

- Building
- Former Building B Footprint
- Property Boundary
- Actual Boring Location
- Soil Sample
- Perched Water Sample

Notes:
- Each sphere represents a sample.

- Vertical dimension is expanded by 25x to improve visibility. The gray dot above each boring represents the boring's actual location.

0 50 100 Feet

PIONEER TECHNOLOGIES CORPORATION

Soils and Perched Water Sample Locations
Cleanup Action Plan for On-Property Soils and Perched Water
Superlon Plastics Site, Tacoma, Washington

Figure 5

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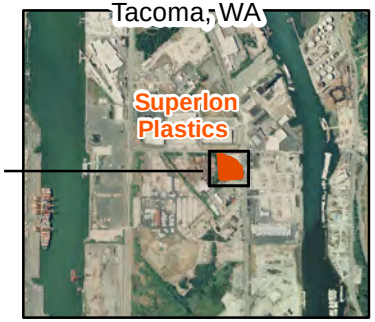

Legend

- Building
- Ditch
- Fence
- Railroad
- Property Boundary

Operable Units

- Operable Unit 1
- Operable Unit 2
- Operable Unit 3
- Operable Unit 4
- Operable Unit 5
- Operable Unit 6

Notes: Operable Unit 7 is on-Property perched water.

0 25 50 75 100 Feet

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Operable Units
Cleanup Action Plan for On-Property Soils and Perched Water
Superlon Plastics Site, Tacoma, Washington

Figure 6

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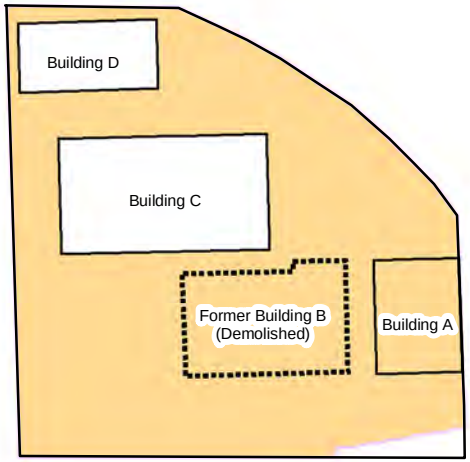
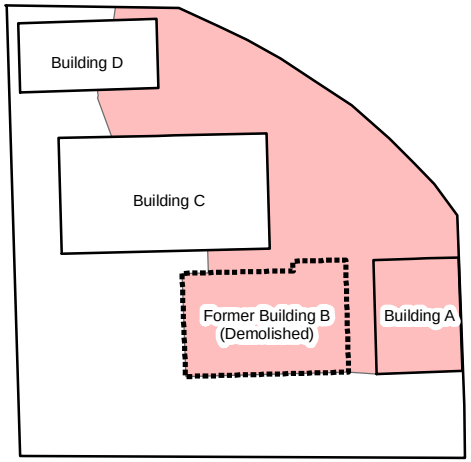
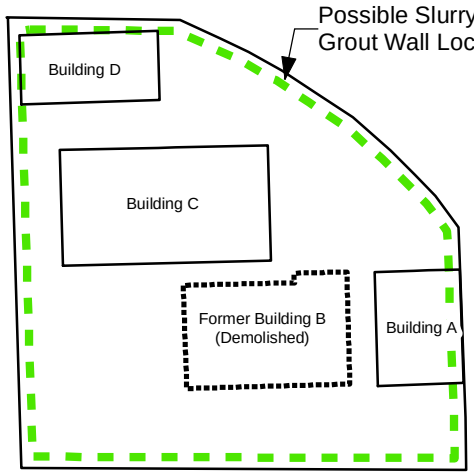


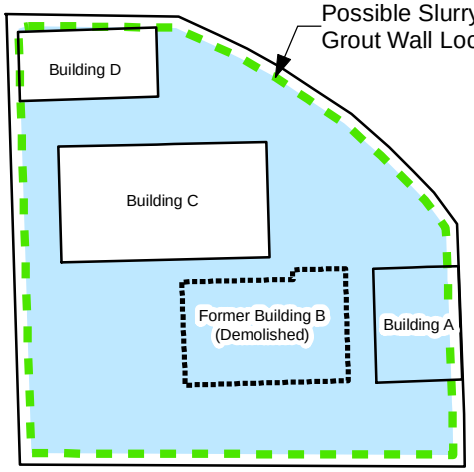
Excavate and dispose of soils to meet direct contact CLs/RELs.



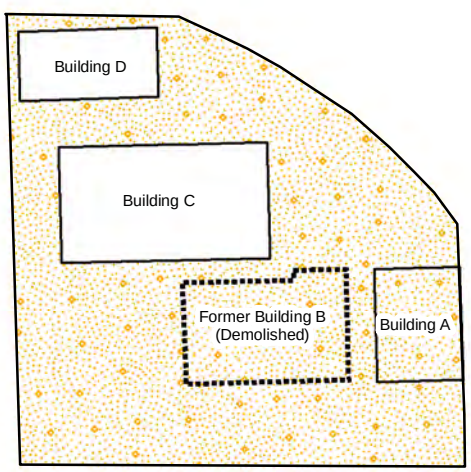
Excavate and stabilize soils in OUs 1, 2, and 3, after direct contact CLs/RELs are met, to achieve soil-to-perched water RELs and reuse soils on the Property.



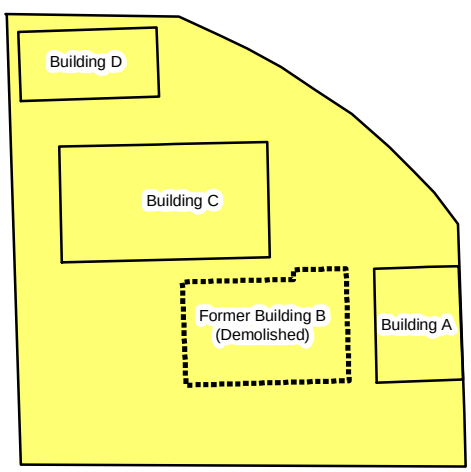
Install a below ground slurry or grout wall to contain perched water.



Treat perched water inside slurry or grout wall to meet the perched water RELs.



Install a geotextile and gravel cover to control storm water.



Implement institutional controls.

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Preferred Alternative Cleanup Action Components
Cleanup Action Plan for On-Property Soils and Perched Water
Superlon Plastics Site, Tacoma, Washington

Figure 7

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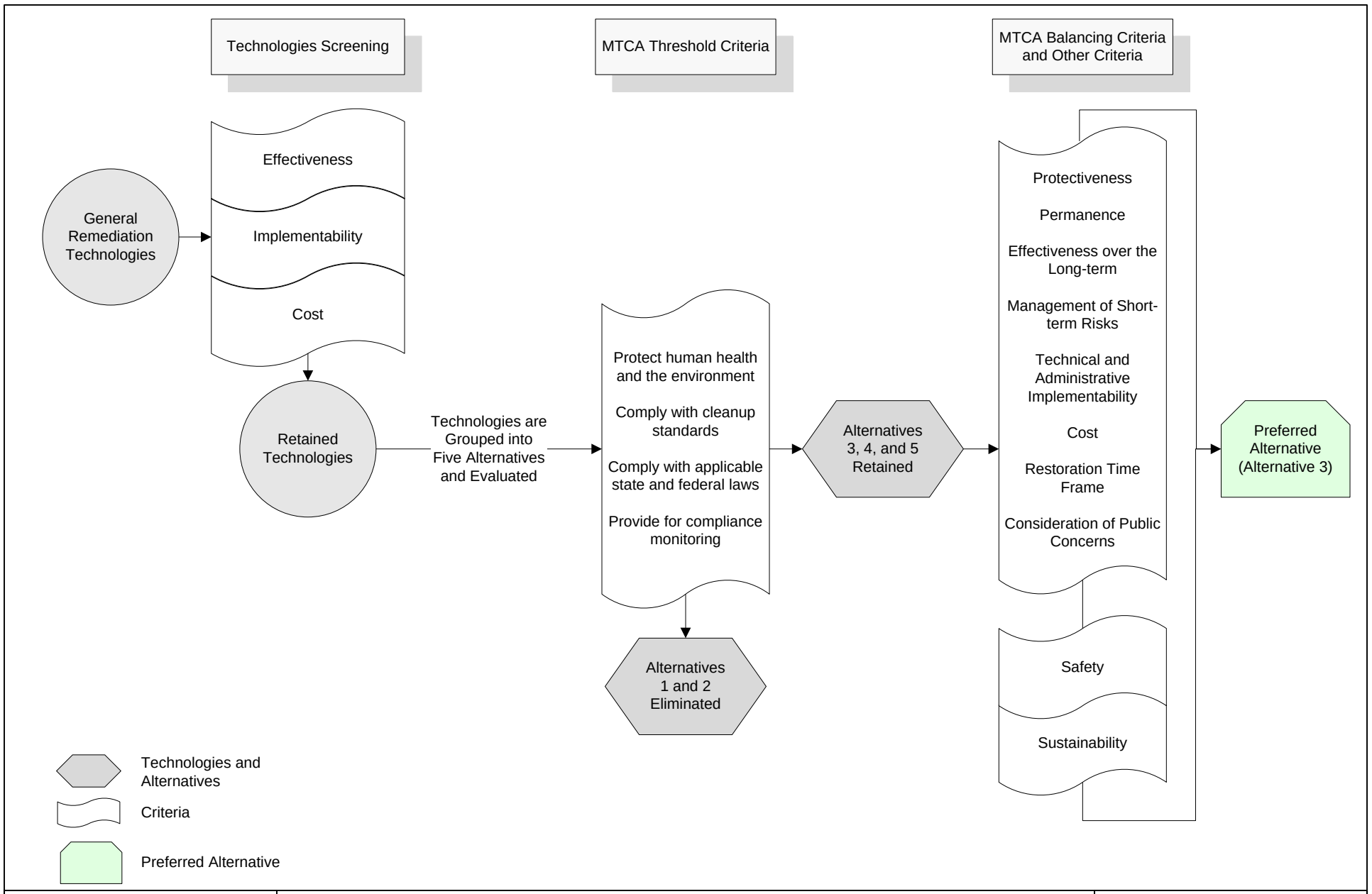

PIONEER TECHNOLOGIES CORPORATION

FS-OSP Technologies and Alternative Evaluation Process
Cleanup Action Plan
Superlon Plastics Site, Tacoma, Washington

Figure 8

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