



DEPARTMENT OF
ECOLOGY
State of Washington

Cleanup Action Plan

Shelton C Street Landfill City of Shelton

August 10, 2021

Prepared by:

Washington State Department of Ecology

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CLEANUP ACTION PLAN
Shelton C Street Landfill
Shelton, Washington

Prepared for Department of Ecology

FEBRUARY 2021



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Acronyms

2,3,7,8-TCDD	2,3,7,8-tetrachlorodibenzo-p-dioxin
Agreed Order	Agreed Order No. DE 12929
ARARs	Applicable Relevant and Appropriate Requirements
Aspect	Aspect Consulting, LLC
bgs	below ground surface
City	City of Shelton
COCs	contaminants of concern
cPAH	carcinogenic polycyclic aromatic hydrocarbons
CSM	conceptual site model
DCA	disproportionate cost analysis
dCAP	Draft Cleanup Action Plan
DU	Decision Unit
Ecology	Washington State Department of Ecology
EM	electromagnetic induction
ER	electrical resistivity
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
IM&M	inspection, maintenance, and monitoring
ISM	incremental sampling methodology
MFS	Minimum Functional Standards
mg/kg	milligrams per kilogram
ug/L	micrograms per liter
MTCA	Model Toxics Control Act
OSHA	Occupational Safety and Health Administration
PAHs	polycyclic aromatic hydrocarbons
RCW	Revised Code of Washington
RI	Remedial Investigation

SEPA	State Environmental Policy Act
TEQ	toxic equivalent concentration
USDOT	United States Department of Transportation
WAC	Washington Administrative Code
WISHA	Washington Industrial Safety and Health Act
WSDOT	Washington State Department of Transportation
WWTP	wastewater treatment plant

1 Introduction

This cleanup action plan (CAP) describes the cleanup action selected by the Washington State Department of Ecology (Ecology) for the Shelton C Street Landfill, a former municipal solid waste landfill, located in Shelton, Washington (herein referred to as the Site; Figure 1). The Site is located on a 16.7-acre parcel owned by the City of Shelton (the Property; Figure 1). The Property is at the west end of West C Street, just west of the overpass across U.S. Highway 101 in Mason County, Washington. The City of Shelton (City) acquired the Property in 1928 and used a portion of it as a municipal solid waste landfill through the early 1980s for disposal of solid waste generated within the City limits and the surrounding areas.

The dCAP has been prepared to meet the requirements of Agreed Order No. DE 12929 (Agreed Order) between the Ecology and the City, executed on September 30, 2016. Ecology has determined that the cleanup action described here complies with the Model Toxics Control Act (MTCA), Chapter 70.105D Revised Code of Washington (RCW), and the MTCA Cleanup Regulation, Chapter 173-340 WAC. This determination is based on the Remedial Investigation and Feasibility Study (RI/FS) Report, Shelton C Street Landfill, prepared by Aspect Consulting, LLC (Aspect) on behalf of the City, and approved by Ecology (RI/FS; Aspect, 2020), and other relevant documents in the administrative record.

1.1 Purpose

A CAP is a required part of the site cleanup process under Chapter 173-340 WAC, MTCA Cleanup Regulations. The purpose of the CAP is to identify the proposed cleanup action for the Site and to provide an explanatory document for public review. More specifically, the CAP:

- Describes the Site
- Summarizes current site conditions
- Summarizes the cleanup action alternatives considered in the remedy selection process
- Describes the selected cleanup action for the Site and the rationale for selecting this alternative
- Identifies site-specific cleanup levels and points of compliance for each hazardous substance and medium of concern for the proposed cleanup action
- Identifies applicable state and federal laws for the proposed cleanup action
- Identifies residual contamination remaining on the Site after cleanup and restrictions on future uses and activities at the Site to ensure continued protection of human health and the environment
- Discusses compliance monitoring requirements
- Presents the schedule for implementing the CAP

Ecology has made a preliminary determination that the cleanup described in this CAP will comply with the requirements for selection of a remedy under WAC 173-340-360.

1.2 Previous Studies

The dCAP was developed using information presented in the RI/FS for the Site (Aspect, 2020), which was reviewed and approved by Ecology. Prior to the RI, the only known investigation of the Site was conducted in 1986 following a national U.S. Environmental Protection Agency (EPA) study of dioxin/furan-contaminated sites. The 1986 study identified the presence of dioxin/furan-contaminated baghouse residue mixed with wastewater treatment plant (WWTP) sludge that had been disposed of at the Site (CH2M Hill, 1987).

The RI consisted of five phases of Site investigation and characterization work, as follows:

- **Geophysical Survey.** In May 2017, a geophysical survey consisting of an electromagnetic induction (EM) survey, magnetic survey, and electrical resistivity (ER) survey was completed to provide preliminary information regarding the lateral extent and thickness of landfill waste at the Site.
- **Surface Characterization.** In July 2017, a surface soil characterization investigation was conducted to characterize the presence and nature and extent of contaminants in surface and shallow subsurface soil near the reported WWTP sludge disposal area. The investigation used incremental sampling methodology (ISM) in three Decision Units (DUs) to determine average concentrations of contaminants within the WWTP sludge disposal area.
- **Groundwater Evaluation.** In December 2017, a groundwater evaluation was initiated, consisting of installing four groundwater monitoring wells, followed by four quarters of groundwater sampling to evaluate hydrogeologic conditions and groundwater quality.
- **Landfill Gas and Soil Gas Investigation.** In December 2018, a landfill gas/soil gas investigation was completed, consisting of sampling from five temporary soil gas probes installed at locations where the geophysical investigation suggested that landfill waste is present.
- **Cover Soil Characterization.** In February 2020, a cover soils characterization occurred, consisting of soil sampling from four test pits excavated in areas where cover soils are present, outside of the WWTP sludge disposal area.

The final draft of the RI/FS was submitted to Ecology in May 2020. The RI/FS provides the technical basis for the cleanup actions to be conducted at the Site.

2 Site Description

The Property is a single parcel (Mason County parcel no. 42024-21-60430) totaling approximately 16.7-acres in size that is currently vacant undeveloped land, covered by shrub vegetation and trees (Figure 2). A 250-foot-wide strip of land along the eastern edge of the Property is a utility right-of-way that includes transmission towers, overhead electrical transmission lines, and a buried natural gas pipeline (Figure 2). Public access to the Property is restricted by a locking gate approximately 1,500 feet east of the Property on West C Street and signage indicating restricted access.

This section presents a discussion of the Site history; a summary of the conceptual site model (CSM) describing the contamination found at the Site and the associated environmental concerns; and the cleanup standards.

2.1 Site History

The Shelton C Street Landfill is an unlined, municipal solid waste landfill that was used by the City of Shelton between approximately 1928 and the mid-1980s (Aspect, 2020). Prior to this, the Property was privately owned and mined for sand and gravel aggregate, resulting in a deep, bowl-like depression that was ideally suited for use as a landfill.

The solid waste known to have been deposited in the landfill consists primarily of residential solid waste, but was reported to also include disposal of by-products, research waste, and demolition debris from nearby pulp mills, and sludge from the City's wastewater treatment plant. Between 1976 and 1981, processed WWTP sludge is reported to have contained fly-ash baghouse residue that was generated by a wood-burning, boiler power plant at the Simpson Timber Company Shelton timber mill. The baghouse ash contained dioxin compounds. Because of its age, the landfill contents are heavily degraded.

The Property has been generally unused since the mid-1980s, and public access to the Property and surrounding properties is restricted for safety reasons. There is no available information that documents landfill closure activities, and it is not known whether any were completed, but the results of the RI indicate that some of the landfill waste was covered with imported soil.

2.2 Conceptual Site Model

The information presented in this section is based on the CSM that was provided in the RI/FS, which should be referenced for additional details.

Native soils at the Site consist of interglacial recessional outwash, composed of silty gravels, gravelly sands and silty sands, overlying glacial till. Ground surface elevations within the bowl are 50 to 80 feet lower than the ground surface surrounding the bowl (Figure 2). Fill soils observed within the landfill consist of 2 to 15 feet of cover soil, except in the northwest portion of the landfill, where WWTP sludge is exposed at the surface. The WWTP sludge is estimated to be up to 5 feet thick, at its thickest, and pinches out to less than 6-inches thick at the perimeter of the sludge disposal area. The

cover soil and WWTP sludge overlies municipal solid waste that is approximately 20 to 25 feet thick.

Groundwater is located within the recessional outwash at depths of 83 to 105 feet below ground surface (bgs). This indicates that there is more than 35 feet of separation between the base of the landfill waste and the top of the water table. Groundwater levels fluctuate seasonally by up to 6 feet and the inferred groundwater flow direction is to the south-southeast.

The source of contaminants at the Site is the landfill waste, including the WWTP sludge. Based on the RI, the contaminants of concern (COCs) for the cleanup action consist of carcinogenic polycyclic aromatic hydrocarbons (cPAHs), dioxin/furans, and metals in surface soil, and total and dissolved iron and manganese in groundwater. The nature and extent of contamination that defines the Site is summarized as follows:

- **Soil.** Concentrations of dioxins/furans, cPAHs, and metals are contained in WWTP sludge that is present as surface soil in the northwest portion of the landfill. Dioxin/furans, mercury and lead are contained in cover soils overlying landfill waste in areas outside of the WWTP sludge disposal area.
- **Groundwater.** Iron and manganese in groundwater (both total and dissolved) are secondary contaminants in groundwater that are attributable to the subtle reducing and/or slightly acidic conditions associated with carbon dioxide in landfill gas that results in dissolution of naturally occurring constituents from native soils.

Dioxin/furans, cPAHs, and metals are at the highest concentrations in surface soil at the northwest portion of the landfill, where WWTP sludge was disposed of on the ground surface. Based on current and potential future use scenarios, the risk at the Site is to human receptors and terrestrial ecological receptors (plants and animals) who have the potential for direct contact with landfill waste and COCs in surface and shallow subsurface soil.

3 Cleanup Standards

The cleanup standards required under MTCA consist of cleanup levels for hazardous substances present at the Site and the location where cleanup levels must be met (point of compliance). All media exceeding a cleanup level is addressed through a cleanup remedy that prevents exposure to the contaminated media. The cleanup standards for the Site are presented in this section.

3.1 Contaminated Media and Points of Compliance

This section presents the contaminated media and points of compliance for the cleanup action.

3.1.1 Landfill Waste and Soil

The landfill waste itself is presumed to be contaminated with one or more hazardous substances. Due to the heterogeneous nature of waste at municipal landfills and the presumptive remedy for landfill closure, which allows for containment of the waste, the landfill contents were not fully characterized for specific hazardous substances during the RI, except for the WWTP sludge that is exposed at the ground surface. The presence of landfill waste requires that an environmental (restrictive) covenant be recorded on the ownership deed for the Site Property.

The soil point of compliance (POC) is the location or locations where the soil cleanup levels must be attained for the Site to be in compliance with the cleanup standards. The standard POC for direct contact with soil is 15 feet, based on a reasonable maximum depth of excavation and assumed placement of excavated soils at the surface where excavation occurs. The conditional POC for direct contact with soil is 6 feet when an institutional control is established to prevent soil excavation. When a physical barrier is incorporated into a cleanup remedy, the conditional POC can be set at 30 inches. The selected remedy will include installation of a geotextile isolation barrier; therefore, the POC for direct contact with soil at the Site is 30 inches.

The WWTP sludge and landfill cover soil contains dioxins/furans, cPAHs, and/or metals. The soil cleanup levels for these contaminants are summarized in Table 1.

3.1.2 Groundwater

The groundwater POC) is the point, or points, where the groundwater cleanup levels must be attained for the Site to be in compliance with the cleanup standards. The standard POC for groundwater under MTCA is throughout the Site from the uppermost level of the saturated zone extending vertically to the lowest most depth that could potentially be affected by the Site (WAC 173-340-720(8)(b)). Where it can be demonstrated that it is not practicable to meet the cleanup level throughout the Site within a reasonable restoration timeframe, Ecology may approve a conditional POC that is as close as practicable to the source and does not exceed the property boundary.

In addition to MTCA, the Site is subject to the requirements of the Minimum Functional Standards (MFS; WAC 173-304), which defines the groundwater POC as *“that part of ground water that lies beneath the perimeter of a solid waste facilities’ active area as*

that active area would exist at closure of the facility.” Ecology has approved a conditional POC for groundwater at the downgradient edge of the landfill waste, which is the same location as a MFS POC.

The maximum beneficial use of groundwater beneath and downgradient of the Site is drinking water; therefore, the groundwater cleanup levels are based on cleanup levels protective of potable groundwater.

3.2 Cleanup Levels

Cleanup levels are the concentration at which a substance does not threaten human health or the environment. The cleanup levels for the Site were developed during the RI/FS and have been approved by Ecology as the final cleanup levels. The soil and groundwater cleanup levels are the most stringent of the cleanup levels protective of human health through the direct contact and ingestion pathways and those that are protective of ecological receptors. The soil and groundwater cleanup levels are presented on Tables 1 and 2, respectively.

4 Cleanup Action Alternatives and Analysis

4.1 Alternatives Evaluated

Four remedial alternatives were developed and evaluated in the RI/FS (Aspect, 2020) to address contamination at the Site. The alternatives combined a range of potentially applicable technologies, consisting of landfill capping, source removal, institutional controls and long-term monitoring. The alternatives consisted of the following:

- **Alternative 1** – Install a low permeability soil cap, implement institutional controls, and conduct long-term monitoring
- **Alternative 2** – Install an impermeable cover system with geomembrane layer, implement institutional controls, and conduct long-term monitoring
- **Alternative 3** – Remove WWTP sludge, install a permeable soil cap, implement institutional controls, and conduct long-term monitoring
- **Alternative 4** – Conduct full removal of landfill waste

Each of the four alternatives were evaluated against the MTCA threshold criteria and other requirements, including disproportionate cost analysis procedures (WAC 173-340-360). The results of the analysis identified Alternative 1, further explained in Section 4.2, as the preferred alternative because it meets threshold requirements; is permanent to the maximum extent practicable; has a reasonable restoration timeframe; and is the most cost-effective of the four alternatives.

4.2 Rationale for the Selected Cleanup Action

The contamination at the Site requiring remedial action consists of cPAHs, dioxins/furans, and metals in shallow soil in the WWTP sludge area and landfill cover soil and the landfill waste itself. The selected cleanup action consists of construction of a permeable soil cap, and implementation of institutional controls, physical barriers, and an inspection, monitoring, and maintenance (IM&M) program. The selected cleanup action meets the threshold requirements set forth in MTCA and identified in WAC 173-340-360(2)(a), as follows:

- **Protect human health and the environment.** Construction of the permeable cap with underlying geotextile isolation barrier will protect humans and terrestrial ecological receptors from direct-contact exposure. Implementation of institutional controls (deed restriction) and the IM&M program will ensure that the cap remains protective.
- **Comply with cleanup standards.** The cleanup action will result in containment of soils with hazardous substance concentrations exceeding cleanup levels at the point of compliance. Compliance with cleanup standards will be achieved by meeting the requirements of WAC 173-340-740(6)(f), as described in this section.
- **Comply with applicable state and federal laws.** The cleanup action was specifically developed to comply with MTCA. The cleanup action is anticipated to comply with all other potential applicable, relevant, and appropriate requirements

((ARARs); see Section 5.2) because the required engineering design and agency review processes will include steps to ensure compliance. The means of compliance with ARARs will be documented in the engineering design documents and other preconstruction documentation that will be prepared during the design phase.

- **Provide for compliance monitoring.** During construction of the cap, quality control measures will ensure that cap construction is completed per design requirements. The IM&M will be conducted to ensure the long-term protectiveness of the remedy.

The cleanup action has a reasonable restoration timeframe, uses permanent solutions to the maximum extent practicable, and was provided for public review during the RI/FS public comment period. The selected cleanup action meets the MTCA threshold requirements and selection criteria per WAC 173-340-360.

5 Description of the Cleanup Action

The selected remedial alternative for implementation during the cleanup action was developed through evaluation of the Site conditions and applicable remedial technologies in the RI/FS. This section describes the selected remedial alternative.

5.1 Cleanup Action Components

The cleanup action consists of installation of a permeable soil cap and implementation of institutional controls, physical barriers, and an IM&M program, as follows:

- **Low Permeability Soil Cap.** The soil cap will be installed over the full extent of the landfill (approximately 4 acres) to prevent contact with landfill waste and contaminated soil by human and terrestrial ecological receptors and will meet the landfill closure specifications in WAC 173-304-460(e). The soil cap will consist of a geotextile isolation barrier, a minimum 2-foot-thick layer of clean, imported low permeability cover materials, and a 1-foot-thick vegetative layer of topsoil seeded with grasses or other shallow-rooted vegetation.
- **Institutional Controls.** Institutional controls will include a deed restriction to prevent future, unrestricted development or any other activities that could create exposure pathways for direct contact with the contaminated soil or landfill waste. The institutional controls are required *in perpetuity*.
- **Signage and Physical Barriers.** Signage will be installed along the main access road that connects to the terminus of West C Street, warning of the presence of landfill waste and potential risk to human health, along with a gate or other physical restriction on the access road. A fence with signage will be installed surrounding the landfill area to minimize accessibility from areas other than the access road.
- **Monitoring.** The IM&M program will include the following:
 - Annual topographic surveys for at least the first 5 years following construction,¹ to evaluate soil settlement and cap stability
 - Periodic inspection of Site conditions
 - Maintenance of the remedy (e.g., removal of large vegetation from the cap area² and filling of eroded areas), performed on an as-needed basis
 - Semiannual groundwater monitoring at the four existing monitoring wells for iron and manganese concentrations
 - Periodic reporting of IM&M activities to Ecology, including 5-year reviews

The conceptual elements of the cleanup action are depicted on Figure 3. The detailed locations and specifications will be defined in future design and specification documents.

¹ An initial topographic survey would also be conducted upon completion of cap construction.

² Trees would not be allowed to grow in the capped area, since roots of large trees could extend into the landfill waste and bring it to the surface if a tree is blown over (for example).

5.2 Applicable, Relevant, and Appropriate Requirements (ARARs)

The cleanup action has been developed to meet the requirements of MTCA and regulations implementing it, Chapter 173-340 of the Washington Administrative Code (WAC 173-430), the requirements of the Agreed Order between the City and Ecology, as well as the following other potentially applicable state and federal laws. The specific applicable or relevant and appropriate requirements (ARARs) for the cleanup action are anticipated to be identified over the course of the engineering and design reviews that will be required prior to implementation.

MTCA. The MTCA statute (Chapter 70.105D RCW) is the primary law that governs cleanup of contaminated sites in the state of Washington (Ecology, 2013). The MTCA cleanup regulation (Chapter 173-340 WAC) specifies criteria for the evaluation and conduct of a cleanup action. It requires that cleanup actions protect human health and the environment, meet environmental standards in other applicable laws, and provide for monitoring to confirm compliance with cleanup levels.

For solid waste landfills, MTCA considers MFS to be relevant and appropriate requirements and defines the solid waste closure requirements in WAC 173-304 as the minimum requirements for cleanup actions conducted at solid waste landfills under MTCA (WAC 173-340-710(7)(c)).

Minimum Functional Standards for Solid Waste Handling. These regulations (Chapter 173-304 WAC) provide the minimum requirements for cleanup actions conducted under MTCA at solid waste landfills that stopped receiving waste prior to October 9, 1991. WAC 173-304 became effective in November 1985, replacing Washington State's first MFS for solid waste landfills, Chapter 173-301 WAC.

Criteria for Municipal Solid Waste Landfills. The 173-351 regulations specify post-closure care activities for municipal solid waste landfills that received waste after October 9, 1991.

SEPA. The State Environmental Policy Act (SEPA; Chapter 197-11 WAC) and the SEPA procedures (Chapter 173-802 WAC) ensure that state and local government officials consider environmental values when making decisions. The SEPA process begins when an application for a permit is submitted to an agency, or an agency proposes to take some official action, such as implementing a Cleanup Action Plan under MTCA. Completion of a SEPA checklist would be required prior to initiating remedial construction activities.

Solid and Hazardous Waste Management. The Washington Dangerous Waste Regulations (Chapter 173-303 WAC) would apply if dangerous wastes are generated, and United States Department of Transportation (USDOT) and Washington State Department of Transportation (WSDOT) regulations regarding transport of hazardous materials (49 CFR Parts 171-180) would apply if regulated material is transported offsite as part of the cleanup action. The Washington Solid Waste Handling Standards (Chapter 173-350 WAC) regulate handling, treatment, or off-site disposal of nonhazardous solid waste.

Other:

- Occupational Safety and Health Administration (OSHA) and Washington Industrial Safety and Health Act (WISHA) regulations (29 CFR 1910.120; Chapter 296-62 WAC) governing worker safety during cleanup action execution. Compliance would be achieved through preparation and implementation of site-specific health and safety plan(s) (HASP[s]) with appropriate controls, worker training and certifications, and occupational monitoring
- Mason County Land Modification (Grading) Permit
- Washington State Water Well Construction Regulations (Chapter 173-160 WAC) regulating groundwater well installation and decommissioning as part of the cleanup action

The Archeological and Historical Preservation Act (16 USCA 496a-1) would be applicable if any subject materials are discovered during grading and excavation activities. A cultural resources assessment and archeological oversight of subsurface disturbing activities may be required elements of the project.

5.3 Restoration Timeframe

Site cleanup will be achieved upon completion of the remedy construction. Permeable cap design and construction is anticipated to be completed in under one year, which is considered a reasonable restoration timeframe in accordance with the factors listed in WAC 173-340-360(4)(b).

5.4 Compliance Monitoring and Reporting

Compliance monitoring and reporting will be implemented in accordance with WAC 173-340-410 to ensure the protectiveness of the cleanup actions. The following sections generally describe the monitoring requirements.

5.4.1 Groundwater

The goal of groundwater monitoring is to evaluate groundwater quality over time and ensure that there are no risks to human health or the environment at the point of compliance. The contaminant concentrations in groundwater downgradient of the Site currently meet the cleanup levels, except for secondary contaminants total iron and total manganese. Over time, the iron and manganese concentrations in groundwater are expected to approach background conditions as the subsurface environment becomes less anaerobic. Groundwater monitoring will be conducted to monitor these changes over time.

Groundwater monitoring will include semiannual water level measurement, sample collection from Site monitoring wells AMW-1 through AMW-4, and laboratory analysis. Measured water levels will be analyzed to determine the groundwater surface elevation and direction and rate of flow. All groundwater samples will be collected using low-flow techniques while monitoring for pH, temperature, and conductivity using calibrated field equipment, handled using standard chain-of-custody procedures, and analyzed by an accredited laboratory for total iron and total manganese.

Concentrations of total iron and total manganese will be evaluated for statistically significant trends following unified guidance provided by the EPA (EPA, 2009). These trends will be used to determine compliance with cleanup levels.

Groundwater monitoring and interpretation will be documented annually and submitted to the Ecology Site Manager. Results of laboratory analysis will be posted to Ecology's Environmental Information Management (EIM) database. Groundwater monitoring and reporting will be conducted for a minimum period of 5 years after completing the construction of the remedy and for at least 2 years after groundwater cleanup levels are met.

5.4.2 Landfill Cover

Annual inspection, maintenance and repair will be conducted to preserve the intended function of the landfill cover. The inspection will include observation and documentation of the following:

- Appearance and condition of vegetation
- Soil erosion, cracks or other changes in the surface elevation
- Intrusion by humans or animals, including holes or wildlife trails
- Any other damage or disturbance to the cover

Maintenance and repairs will be completed as needed to maintain the integrity and protectiveness of the cover. Cover inspection, maintenance, and repair will be documented annually and submitted to the Ecology Site Manager.

5.4.3 Signage and Physical Barriers

Annual inspection of notification and physical barriers will be conducted to preserve their intended function. The inspection will include observation and documentation of the following:

- Integrity and legibility of public notification signage
- Damage to the perimeter fencing

Maintenance, repairs and/or replacement will be completed as needed to maintain the protectiveness of the signage and physical barriers. Inspections, maintenance, and repair or replacement will be documented annually and submitted to the Ecology Site Manager.

5.5 Schedule for Implementation

The implementation of the cleanup action will occur after a public participation comment period on the dCAP. Construction of the remedy is expected in 2022.

5.6 Institutional Controls

Institutional controls are measures taken to limit or prohibit activities that may interfere with the integrity of a cleanup action or that may result in exposure to hazardous substances at a site (WAC 173-340-440). An environmental covenant, in the form of a deed restriction, will be developed for the Property following the remedy construction because contamination will remain after cleanup. The environmental covenant will prevent disturbance of the landfill cover and underlying contaminated soil and landfill

waste without prior notification of Ecology. The environmental covenant may also limit future property use.

5.7 Periodic Review

In accordance with WAC 173-340-420, at a site where a cleanup action requires an institutional control, Ecology will conduct a review of this Site every five years to ensure the continued protection of human health and the environment. Since the landfill waste will remain onsite and institutional controls will be required, periodic reviews will occur at the Site to assess the effectiveness of the cleanup action.

6 Cleanup Action Implementation

The cleanup will be conducted as a formal action under an Agreed Order between the City and Ecology. Prior to construction, plans and specifications will be prepared to meet the requirements of WAC 173-340-400 and will consist of the following:

- **Engineering Design Report (EDR).** The EDR will describe the engineering concepts, design criteria and operation parameters used for design of the cleanup action. The EDR will include the assumptions and calculations for the construction of the soil cap and specifications for the signage and physical barriers. Other components of the EDR will include:
 - A schedule for final design and construction.
 - A general description of construction testing that will be used during the cleanup to demonstrate adequate quality control.
 - A general description of the compliance monitoring that will be performed during and after construction.
 - A draft environmental (restrictive) covenant.
- **Construction Plans and Specifications.** The plans and specifications will be prepared in conformance with currently accepted engineering practices and techniques to detail the cleanup actions to be performed.
- **Compliance Monitoring Plan (CMP).** The CMP will describe the monitoring to be performed during construction to meet the requirements of WAC 173-340-410. The CMP will include a sampling and analysis plan to describe the sample collection, handling, and analysis procedures to be used to meet the requirements of WAC 173-340-820.
- **Inspection, Monitoring and Maintenance Plan (IM&M Plan).** The IM&M Plan will present technical guidance and regulatory requirements for the long-term inspection, maintenance, and monitoring of the cleanup action. The IM&M Plan will provide the details and specifications for compliance groundwater monitoring and sampling and inspection, maintenance and repair of the soil cap and landfill cover, signage, and physical barriers.

The schedule for preparation of these documents will be defined in the Agreed Order, based on its date of execution.

References

- Aspect Consulting, LLC, 2020, Public Review Draft Remedial Investigation and Feasibility Study Report, Shelton C Street Landfill, Shelton, Washington, May 21, 2020.
- CH2M Hill, 1987, Simpson Timber Company, Dioxin Study, Final Report, March 1987.
- Washington State Department of Ecology (Ecology), 2013, Model Toxics Control Act Regulation and Statute, Chapter 173-340 of the Washington Administrative Code (WAC 173-340), and Chapter 70.105D of the Revised Code of Washington (RCW 70.105D), Publication No. 94-06, Revised 2013.
- United States Environmental Protection Agency (EPA), 2009, Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance, Publication EPA 530-R-09-007, March 2009.

TABLES

Table 1. Soil Contaminants of Concern and Site Cleanup Levels

Shelton C Street Landfill

Contaminant of Concern	Soil Cleanup Level	Criteria ¹
Dioxins/Furans (ng/kg)		
Tetrachlorodibenzo-p-dioxin (tcdd); 2,3,7,8-	2	a
Chlorinated dibenzo-p-dioxins (PCDDs), total	2.2	b
Chlorinated dibenzofurans (PCDFs), total	2.2	b
Metals (mg/kg)		
Barium	102	a
Copper	50	c
Lead	50	d
Mercury	0.1	c
Selenium	0.78	e
Silver	2	d
Zinc	86	d
Carcinogenic Polycyclic Aromatic Hydrocarbons (cPAH; mg/kg)		
Benzo[a]anthracene	1.37	f
Benzo[a]pyrene	0.14	f
Benzo[b]fluoranthene	1.37	f
Benzo[k]fluoranthene	13.7	f
Chrysene	137	f
Dibenzo[a,h]anthracene	0.14	f
Indeno[1,2,3-cd]pyrene	1.37	f
Total cPAHs TEQ	0.14	f

Notes:

ng/kg = nanogram per kilogram

mg/kg = milligram per kilogram

TEQ = toxic equivalent concentration

¹From Aspect Consulting, LLC, 2020, Public Review Draft Remedial Investigation and Feasibility Study Report, Shelton C Street Landfill, Shelton, Washington, May 21, 2020

^aEcological Indicator Soil Concentrations for Protection of Terrestrial Plants and Animals, MTCA 173-340-7493, Table 749-3 (Eco Indicator Concentrations), wildlife criteria

^bNatural Background concentration for Dioxins/Furans in WA Soils, Ecology Technical Memorandum #8, August 9, 2010

^cEco Indicator Concentrations, soil biota criteria

^dEco Indicator Concentrations, plant criteria

^eNatural Background Soil Metals Concentrations in Washington State, October 1994

^fModel Toxics Control Act Cleanup Regulation (MTCA), WAC 173-340, Method B standard formula values

Table 2. Groundwater Contaminants of Concern and Site Cleanup Levels

Shelton C Street Landfill

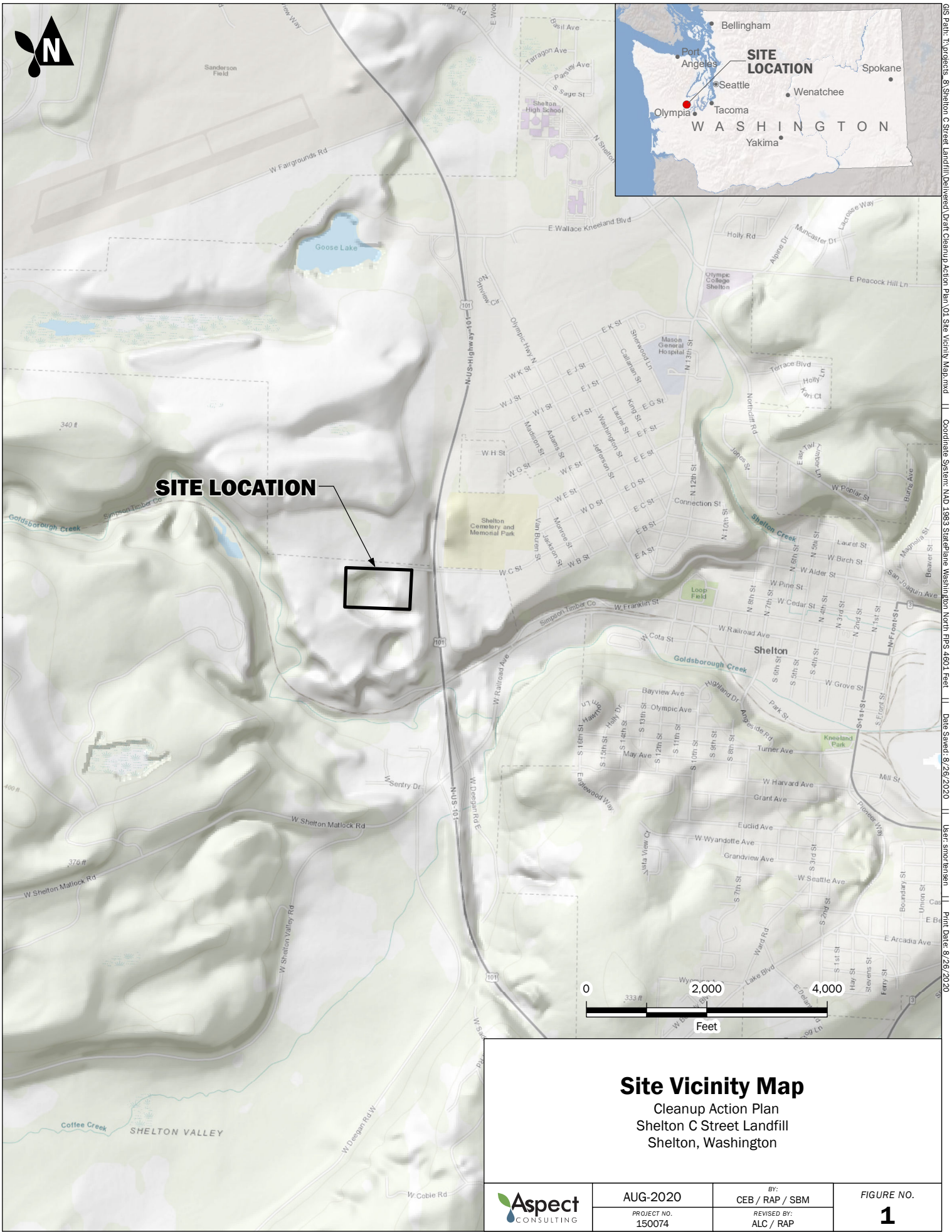
Contaminant of Concern	Groundwater Cleanup Level ¹
Conventionals (ug/L)	
Iron	300
Manganese	50

Notes:

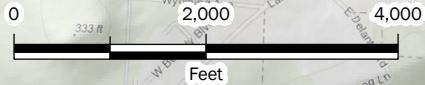
ug/L = microgram per liter

¹From Aspect Consulting, LLC, 2020, Public Review Draft Remedial Investigation and Feasibility Study Report, Shelton C Street Landfill, Shelton, Washington, May 21, 2020

FIGURES



SITE LOCATION



Site Vicinity Map
 Cleanup Action Plan
 Shelton C Street Landfill
 Shelton, Washington



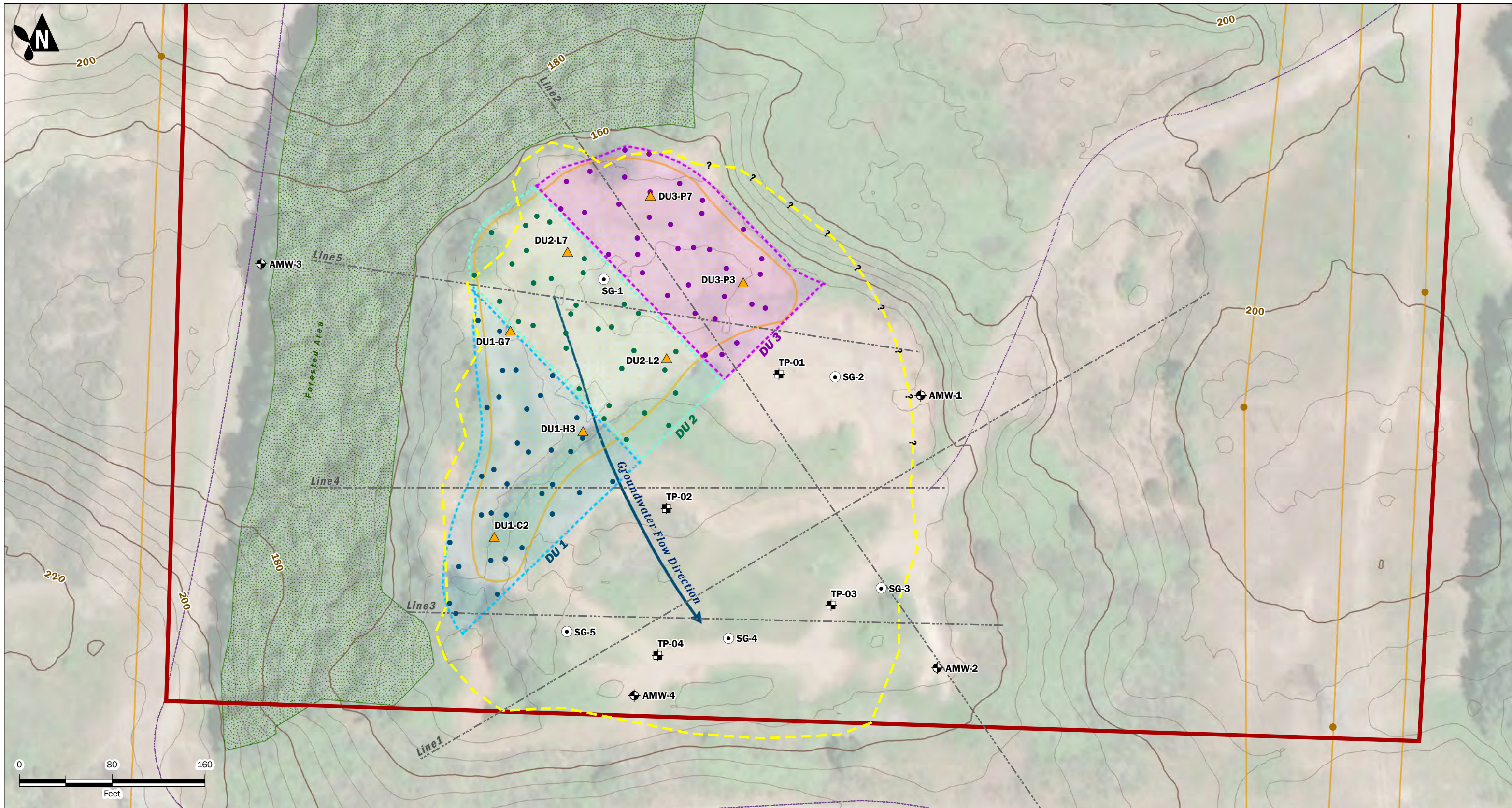
AUG-2020
 PROJECT NO.
 150074

BY:
 CEB / RAP / SBM
 REVISED BY:
 ALC / RAP

FIGURE NO.
1

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 Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

GIS Path: I:\Projects_8\Shelton C Street Landfill\Cleanup Draft Cleanup Action Plan\01 Site Vicinity Map.mxd | Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet | Date Saved: 8/26/2020 | User: smonson | Print Date: 8/26/2020



Surface Soil Characterization (Aspect, 2017)

- ▲ Discrete VOC Sampling Location
- Sample ISM-DU1-072617 Increment
- Sample ISM-DU2-072617 Increment
- Sample ISM-DU3-072617 Increment
- Decision Unit 1 (DU1)
- Decision Unit 2 (DU2)
- Decision Unit 3 (DU3)

Basemap Layer Credits || Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Geophysical Survey Results (HGI, 2017)

- Electrical Resistivity Line
- Estimated Extent of Landfill Waste

Note: All site feature locations are approximate. Topographic contours from PLS Survey October 2017. Aerial imagery from June 2017 Digital Globe Imagery.

Subsurface Explorations

- ⊕ Monitoring Well
- ⊙ Soil Gas Probe
- ⊕ Cover Soil for Test Pit
- Landfill Parcel

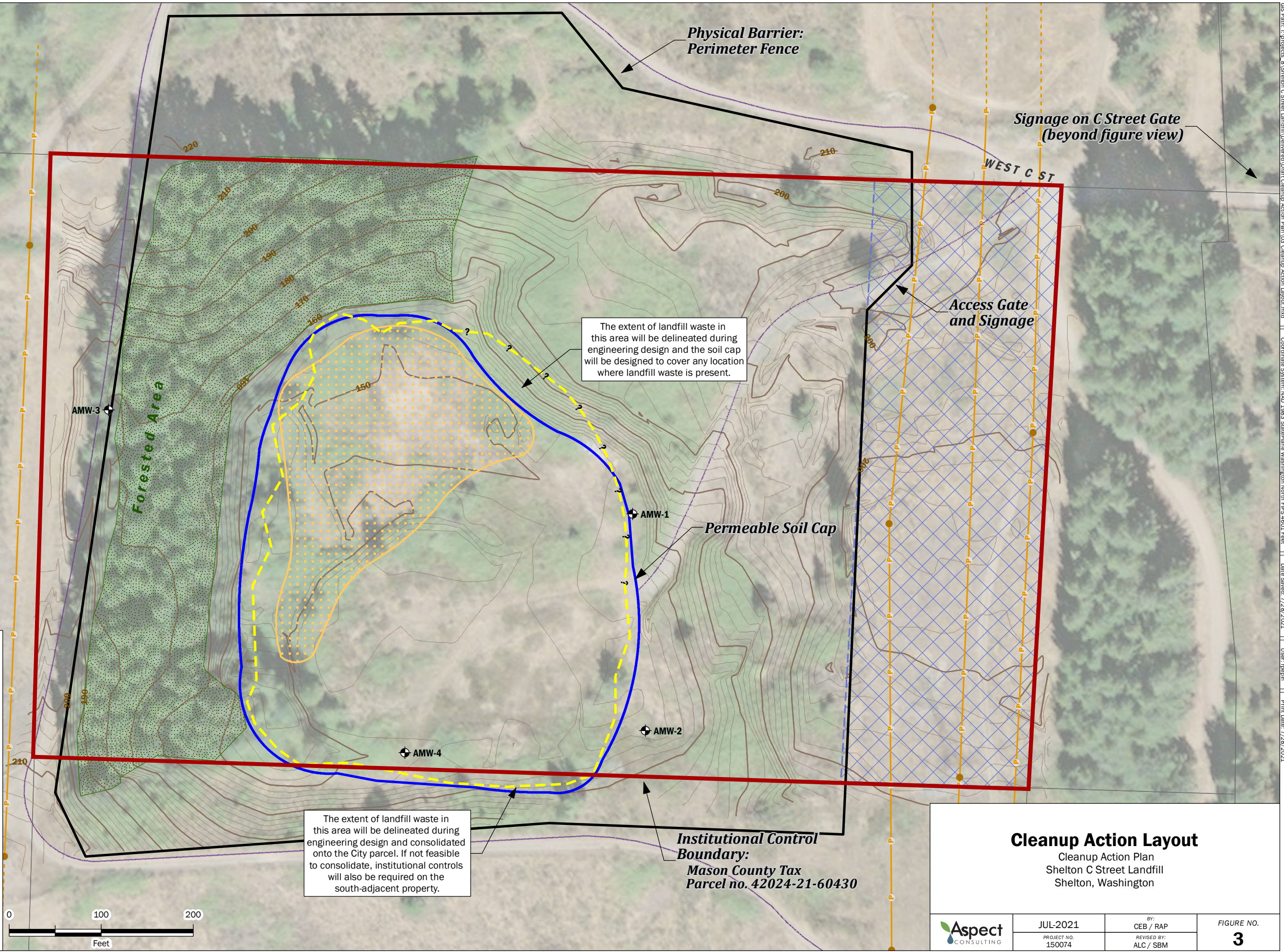
- ▨ Forested Area
- Access Road
- Transmission Tower
- Transmission Line
- ▨ 1986 Sludge Disposal Area











Remedial Investigation Details

Cleanup Action Plan
Shelton C Street Landfill
Shelton, Washington

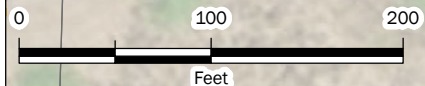
	SEP-2020	BY: ALC / RAP	FIGURE NO. 2
	PROJECT NO. 150074	REVISED BY: ---	

GIS Path: T:\projects_8\Shelton_CStreet_Landfill\Delivered\Draft_Cleanup_Action_Plan\02_Remedial_Investigation_Details.mxd || Coordinate System: NAD_1983_StatePlane_Washington_North_FIPS_4901_Feet || Date Saved: 9/14/2020 || User: rjapin || Print Date: 9/14/2020



-  Point of Compliance Groundwater Monitoring Well
-  Landfill Parcel
-  Estimated Extent of Landfill Waste
-  1986 Sludge Disposal Area
-  Forested Area
-  Access Road
-  Transmission Line Easement
-  Transmission Tower
-  Transmission Line
-  Tax Parcel

Note: All site feature locations are approximate. Topographic contours from PLS Survey October 2017. Aerial imagery from June 2017 Digital Globe Imagery.




Basemap Layer Credits || Source: Esri, Maxar, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

The extent of landfill waste in this area will be delineated during engineering design and the soil cap will be designed to cover any location where landfill waste is present.

The extent of landfill waste in this area will be delineated during engineering design and consolidated onto the City parcel. If not feasible to consolidate, institutional controls will also be required on the south-adjacent property.

Institutional Control Boundary:
Mason County Tax
Parcel no. 42024-21-60430

Cleanup Action Layout		
Cleanup Action Plan Shelton C Street Landfill Shelton, Washington		
	JUL-2021 PROJECT NO. 150074	BY: CEB / RAP REVISED BY: ALC / SBM
		FIGURE NO. 3

GIS Path: T:\projects... Shelton C Street Landfill Cleanup Action Plan GIS Cleanup Action Layout.mxd || Coordinate System: NAD 1983 StatePlane Washington North FIPS 4601 Feet || Date Sheet: 7/28/2021 || User: rmapin || Print Date: 7/28/2021