LIMITED FEASIBILITY STUDY (LFS) / DISPROPORTIONATE COST ANALYSIS (DCA)

Department of Ecology VCP No.: SW3615
2119 Mildred Street West
Fircrest, Washington

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1.0 INTRODUCTION

This document presents the results of a Limited Feasibility Study (LFS) / Disproportionate Cost Analysis (DCA) conducted pursuant to WAC 173-340 for the parcel located at 2119 Mildred Street West in Fircrest, Washington (the Property)(Appendix A, Figures 1 and 2). This study was conducted as an independent remedial action under the Washington Department of Ecology's (Ecology) Voluntary Cleanup Program (VCP); the VCP number assigned to the Subject Site is SW3615. The LFS/DCA was developed to select a cleanup action based on remedy selection criteria and requirements as defined by the Washington State Model Toxics Control Act (MTCA) Regulation in Chapters 173-340-350 through 173-340-390 of the Washington Administrative Code (WAC).

As established in WAC 173-340-200, the "Site" is defined by the full lateral and vertical extent of contamination that has resulted from: the former operation of a design, manufacture, and repair facility for boat auto pilot devices, as well as the apparent impact from the Tacoma Asarco Smelter Plume. Based on the findings of environmental investigations discussed within this report, the Site has been defined as soil contaminated with tetrachloroethylene (PCE) and arsenic prior to any remedial action.

1.1 Document Purpose

The purpose of this document is to develop and evaluate remedial alternatives for the Site and to select the most appropriate alternative based on the criteria specified in MTCA 173-340-360(2) as listed below:

- Protect human health and the environment;
- Comply with cleanup standards outlined in WAC 173-340-700 through 173-340-760;
- Comply with applicable state and federal laws; and
- Provide for compliance monitoring outlined in WAC 173-340-410.

MTCA (173-340-360(2b)) also requires that the cleanup alternative:

- Use permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration time frame; and
- Consider public concerns on the proposed cleanup action alternative.

2.0 BACKGROUND

The following section provides a description of the Site and its physical characteristics, as well as a summary of previous environmental investigations conducted on the Site.

2.1 Site Location and Description

The Property consists of a single tax parcel (Pierce County #0220112005) which occupies approximately 9.49 acres of land. The Property is improved with two buildings and a storage shed, which are approximately 25,000 square feet, 600 square feet, and 80 square feet in size respectively (Appendix A, Figure 3). The larger of the two buildings was reportedly used as an office space and sales room, the smaller was used as a painting building, and the shed was used to store paint. Previous environmental investigations also suggest the former presence of two 700 square foot buildings one used to clean parts and equipment and the other for cardboard storage.

2.2 Site Geology and Hydrogeology

2.2.1 Regional Geology

The Subject Site is located in the physiographic setting called the Puget Sound Lowlands. This area is filled in with deep deposits of glacial debris which can reach thicknesses of at least 2,000 feet in the Tacoma area (Alt and Hyndman 1984). The Puget Sound Lowlands lie between the Olympic Peninsula and northern Willapa Hills on the west, and the Cascade subcontinent on the east. Bedrock beneath the thick glacial deposits in the Puget Sound Lowlands consists of oceanic crustal rocks.

Multiple periods of continental glaciation occurred in the region during the Pleistocene Epoch (2.5 million to 11,000 years ago) as Cordilleran glaciers advanced into the Puget Sound Lowland. The most recent of these, the Vashon, was about 5,000 feet thick near Seattle, and approximately 1,500-feet thick in the area of the Site. The terminus of these glaciers was approximately 12 miles south of Olympia. After the last glacial retreat (approximately 10,000 years ago), incision of the valleys in the Puget Sound Lowlands and subsequent deposition of fluvial and alluvial deposits has occurred to the present.

According to the Pierce County Soil Survey generated by the USDA Soil Classification Service, the dominant soil composition found on the Site is listed as “Spanaway”, a gravelly-loam common to the region.

2.2.2 Regional Groundwater Conditions

The regional hydrogeologic setting is defined as the Puget-Willamette Trough Regional Aquifer system (USGS, 1994). This regional aquifer system underlies an elongated basin that extends from near the Canadian border in Washington State to central Oregon. The regional aquifer system is delineated into three areas: 1) the Puget Sound Lowlands in northern Washington, 2) a central area that extends southward from the Puget Sound Lowlands to northern Oregon, and 3) the Willamette River Valley, which extends southward from the Columbia River to central Oregon (USGS, 1994). The Property lies in the southern extent of the Puget Sound Lowlands.

The regional aquifers are hosted in unconsolidated sediments. In the Puget Sound Lowlands, the unconsolidated deposits are as much as 3,000-feet thick near Seattle. The aquifers are located within discontinuous lenses of sands and gravels that can yield large volumes of water. Some wells within the permeable aquifers can yield as much as 2,000 gallons per minute or more. The Central Pierce County Aquifer System consists primarily of unconsolidated sediments deposited by glaciers and associated melt water. The groundwater moves regionally toward the Puget Sound and river valleys that constitute the aquifer system boundaries (EPA Website, 2013).

2.2.3 Site Groundwater Conditions

According to a previous geotechnical evaluation conducted by Kleinfelder, Inc. in 2005, a static and consistent groundwater table was not encountered to the maximum depth explored of 45.8 feet bgs. Seepage was observed in many of the borings, which was likely attributed to surface water infiltration into the loose fill on the Property. This perched water is discontinuous in nature and would not meet the criteria of potable groundwater as defined by MTCA (WAC 173-340-720 (2)). According to various well logs searched on Ecology's website, groundwater in the vicinity of the Property was encountered at depths greater than 50 feet bgs.

2.3 Previous Investigations/Remedial Actions

2.3.1 *Don Golden, Inc - 1994*

In 1994, Don Golden, Inc. (DGI) completed a "*Underground Storage Tank Removal and Remediation Report"* dated April 8, to record site activities performed in conjunction with underground storage tank (UST) decommissioning. Two USTs reported as one 1,000-gallon tank containing Chevron Solvent 140 / Chevron Solvent 410 BW and one 1,000 gallon diesel tank were decommissioned by removal (Appendix A, Figure 4). A total of nine soil samples were collected; six from the excavation (#1-#6) and three from the stockpiles (#7-#9). Laboratory analysis reported no detectable concentrations of diesel range organics (DRO), gasoline range organics (GRO) or benzene, toluene, ethylbenzene and xylenes (BTEX) (Appendix B, Table 1). One sample collected from the west excavation stockpile was also analyzed for solvents {semi-volatile organic compounds (SVOCs), volatile organic compounds (VOCs)} and the results were also below laboratory minimum reporting limits.

2.3.2 *Creative Environmental Technologies, Inc. – 1999*

Creative Environmental Technologies, Inc. (CETI) authored the "*Site Characterization and Contaminated Soil Remediation Report",* dated May 5, 1999 that describes the Pace Industries oil release of April 26, 1999 and subsequent remedial action. Pace Industries, located on the adjacent property to the north, suffered equipment failure that caused a pressure release of a large quantity of heavy-oil range petroleum fluids on the Property). The point of impact was located northeast of the main building, to the east of the telephone poles along the northern Property boundary and flowed toward the southeast, channeling the 200-foot long storm water drainage ditch along the eastern side of the Property

(Appendix A, Figure 5). A total of 31 soil samples (performance and confirmation) were analyzed. At the conclusion of remedial activities, the highest concentration of oil-range organics (ORO) was under the release point S29 at 5,800 milligrams per kilogram (mg/kg) (Appendix B, Table 1). An estimated eighty cubic tons of impacted soil was removed from the Site. All confirmation samples reported ORO concentrations below laboratory minimum reporting limits except those collected on the northern Property boundary. The CETI report concluded the Property to be free of release related petroleum impacts but the northern property remained impacted with high concentrations of ORO. This was confirmed again in February of 2000, when CETI collected four additional soil samples along the northern Property boundary where previous samples indicated ORO concentrations above the MTCA Method A Cleanup Level. The laboratory reported one soil sample with a HRO concentration of 35,000 mg/kg (Appendix B, Table 1).

This release is not considered part of the Site, as the point source origin was from the neighboring property to the north, and the contamination that migrated onto the Property was removed.

2.3.3 *Creative Environmental Technologies, Inc. – 1999 through 2001*

In May of 1999, CETI completed a "Level 1 Environmental Site Assessment which identified several areas in need of further investigation, including:

Area A – Located immediately east of the painting shed, paint storage shed, and materials preparation shed where solvents may have been spilled.

Area B – Located east of the paint storage shed, within the undeveloped potion of the Property which acted as the facility drain field. Contaminants of concern in this area were SVOCs and metals which may have been transported via the floor drain located in the materials preparation shed.

Area C – Located east of the rear gravel driveway. This area had pits that were excavated and lined with lime for neutralization and disposal of acid. The acid was used in etching metal, so the contaminants of concern in this area was metals.

Area D – Located south of the cardboard box storage shed, where a diesel UST formerly existed.

In February of 2000, twenty-five direct push borings were advanced on the Property to evaluate these areas as well as re-evaluate conditions on the northern Property boundary (Appendix A, Figure 6). Twelve soil samples were collected within Area A, at depths ranging between 1 and 8 feet bgs, one sample was collected from Area B at a depth of 4 to 6 feet bgs, and two soil samples were collected from area C at depths ranging between 4 and 10 feet bgs. No soil samples were collected from Area D, as previous reports indicated that concentrations of contaminants of concern (COCs) were below applicable cleanup levels, and no visual or olfactory evidence of contamination was present within the

boring advanced in this area. Four samples were also collected from the northern Property boundary as discussed in section 2.2.2; one from a soil boring, and three using hand tools.

Three of the twelve soil samples collected within Area A contained concentrations of PCE above the MTCA Method A Cleanup Level (CUL). All other soil samples contained concentrations of contaminants of concern below the MTCA Method A CUL and/or laboratory reporting limit (Appendix B, Table 1).

In September 2000, excavation activities were conducted at the Property to remove the PCE impacted soil identified during CETI's February, 2000 drilling event (Appendix A, Figure 7). Confirmation soil samples collected along the sidewalls and the base of the final excavation limits confirmed that the PCE concentrations in soil were below the MTCA Method A CUL (Appendix B, Table 1). No additional investigation or remediation was recommended at that time and the Washington State Department of Ecology provided a No Further Action opinion letter dated March 6, 2015.

2.3.4 *Sound Environmental Strategies - 2000*

In August of 2000, Sound Environmental Strategies (SES) collected a surface soil sample along the east end of the Property where a red-colored stain was observed by the Property owner. The soil sample was analyzed for PCE and total metals (arsenic, barium, cadmium, chromium, lead, mercury, selenium, and silver). The soil sample contained concentrations of arsenic and cadmium above their respective MTCA Method A Cleanup Levels.

Based on these results SES collected eight additional samples in the same general vicinity to evaluate if the contamination was a wide spread issue, or limited to the stained area (Appendix A, Figure 8). All eight soil samples were analyzed for PCE, total petroleum hydrocarbons, and/or total metals. One sample contained a concentrations of arsenic slightly above the MTCA Method A CUL. All other soil samples reported concentrations of COCs below their respective CUL and/or laboratory reporting limit (Appendix B, Table 1). SES concluded that there was not a direct correlation between the red stained soil and the metals contamination on the Site.

2.3.5 *Sound Environmental Strategies - 2002*

In May of 2002, SES decommissioned two 80-gallon kerosene USTs located on the western side of the main building (Appendix A, Figure 9). It was reported that both the USTs were associated with a circulating system for parts cleaning and were in good condition upon removal.

Soil samples were collected from the sidewalls and base of the excavation and analyzed for total petroleum hydrocarbons by EPA Method 8015 HCID; select soil samples were also analyzed VOCs. One soil sample (S9-3.0) contained a concentration of petroleum hydrocarbons in the intermediate range exceeding the MTCA Method A Cleanup Level for gasoline range organics, but below the MTCA Method A Cleanup Level for diesel and oil; this area was over excavated. None of the confirmation soil samples

contained concentrations of kerosene or VOCs above the MTCA Method A CUL (Appendix B, Table 1). No further remedial action was recommended by SES at that time.

2.3.6 *Kleinfelder, Inc. - 2005*

In May, June, and September of 2005, Kleinfelder, Inc (KI) completed a Phase I Environmental Site Assessment ESA, Limited Phase II ESA, and a Supplemental Phase II ESA at the Site. KI also completed an extensive geotechnical report characterizing the physical properties for commercial redevelopment that included 56 exploratory borings on the Site. These borings were not related to the environmental site assessments for potential hazardous material impact.

The KI Phase I ESA included testing for lead-based paint and asbestos analysis of suspect building materials. Eleven areas were detected with lead-based paint, one of which exceeded the maximum level of 5,000 mg/kg, within the former spray paint shed. HVAC sealant, four types of vinyl flooring, and caulking were reported as asbestos containing. The KI Phase I ESA also, identified numerous areas of potential contamination from hazardous material stored, used, and disposed of at the facility. Target areas were identified and subsurface investigation was recommended.

KI conducted a Limited Phase II ESA based on the findings reported in their Phase I ESA that identified potential areas of impact on the Property. KI completed 20 borings and collected 29 soil samples (Appendix A, Figures 10 and 11). Five of the 20 borings were completed inside the building. Laboratory analysis reported three soil samples with ORO concentrations (random spot locations in undeveloped area) and two soil samples with PCE concentrations (drainfield area) exceeding their respective MTCA Method A CULs. Metals were identified in numerous soil samples below MTCA Method A CULs (Appendix B, Table 1).

KI reported that a static groundwater level was not encountered to the maximum depth explored during their investigations, however five temporary groundwater monitoring wells were installed along the central east portion of the Property (MW66-MW70 and MW78). A perched water sample collected from MW70 contained an arsenic concentration of 9.47µg/L, exceeding the MTCA Method A CUL. The perched water was encountered at 16.6 to 19.6 feet bgs when present. KI recommended additional subsurface investigation that was subsequently authorized and conducted in September 2005.

Fourteen additional soil samples were collected from seven borings located in the central portion of the Property. Laboratory analysis reported PCE and ORO concentrations in excess of their respective MTCA Method A CULs (Appendix B, Table 1). KI estimated the quantity of PCE impacted soil as approximately 2,000 to 3,000 cubic yards in the sink drainfield area. The ORO impacted soils were identified intermittently at random areas ranging from 5 to 15 feet bgs in approximately 6-inch thicknesses and could not be completely quantified. One groundwater sample collected from newly installed MW78 contained an arsenic concentration of 14.6µg/L, exceeding the MTCA Method A CUL, but the

concentration is reported to fall within the natural background concentrations of arsenic within the Tacoma Smelter Plume, according to Ecology documentation. KI recommended removal of ORO, PCE, and paraffin impacted soils, removal of former lime pits, if encountered, and removal of the two recovery USTs, septic tanks, and remnants of the transite cement water pipe prior to the demolition and development of the Property.

2.3.7 *Terracon Consultants, Inc. - 2008*

In June, 2008, Terracon Consultants, Inc. (TCI) completed a Phase I ESA which included a review of the above mentioned events, an extensive interview with Michael Freeman (representative for owner), and a database review and historical research summaries. TCI reported the following locations as recognized environmental conditions (RECs) identified during their site walk: the two disposal USTs, drains, and the catch basin due to former storage of solvents, degreasers and paints. TCI reported the following historical RECs from their review of previous reports and the personal interview:

- *Previous reported impact by environmental assessment appears to remain on-site*
- *Reported asbestos pipe*
- *Former sink drain outlet/drainfield for waste fluids prior to 1992 (solvents, metals)*
- *Fluorescent light bulbs (mercury containing) reported disposed into east field*
- *Former lime-lined pits historically utilized for disposal of processed acids, (metals, pH)*
- *Former drum storage area, drums contained solvents, petroleum products, degreasers*
- *Area of former impact from north adjacent property(petroleum hydrocarbons)*
- *Imported fill material may have unknown contaminants*
- *Lacquer and spray paint process area west of loading dock prior to installation of paint process building*
- *Three reported septic tanks*

TCI also reported RECs from the database review at surrounding properties including:

- *Pace Industries*
- *Leland McArthur former fueling station*

The recommendation TCI provided was to conduct additional subsurface investigation.

2.3.8 *EcoCon Inc. – 2011*

In September and October, 2011, EcoCon Inc. (ECI) completed a Focused Subsurface Investigation (FSI) at the Site to supplement previous subsurface investigation completed by others. The primary goal of

the FSI was to better quantify the extent of PCE contaminated soil, and substantiate the ORO concentrations reported by KI in 2005, which appeared discontinuous in nature. It was speculated, that due to organic matter in the underlying soil, these concentrations may have been biased high and not representative.

ECI completed two sampling events, September 27, 2011 and October 3, 2011. Soil sample locations were selected using Kleinfelder previous investigation derived data. Boring locations were placed at areas adjacent to Kleinfelder's 2005 boring locations and other areas of concern following a review of previous environmental reports (Appendix A, Figures 10 and 11).

During ECI's September 27, 2011 sampling event, twelve borings were advanced on the Site, ranging in depth from 5 to 25 feet bgs. Thirty-six soil samples were collected and analyzed. Sample analysis included twenty samples for diesel range organics (DRO) and ORO using EPA Method 3630C (Silica Gel Cleanup) to remove organic interference, seven samples for gasoline range organics (GRO), two samples for polycyclic aromatic hydrocarbons (PAHs), four samples for VOCs and twenty samples for total metals arsenic (As), chromium (Cr) and hexavalent chromium (Cr VI).

During ECI's October 3, 2011 sampling event, eight borings were advanced on the Site, ranging in depth from 5 to 25 feet bgs. Fifteen soil samples were collected and analyzed. Sample analysis included two samples for DRO/ORO, five samples for GRO, five samples for VOCs and eight samples for As.

Four soil samples (B1:5', B13:7', B14:5' and B14:9') were reported with PCE concentrations exceeding the MTCA Method A CUL. Sample B1:10' was reported containing a concentration of benzene exceeding the MTCA Method A CUL and concentrations of toluene, ethylbenzene xylene and naphthalene exceeding the laboratory reporting limit. The remaining five soil samples were reported below the laboratory reporting limit or "non-detect" (Appendix B, Table 1). The concentration of benzene (0.032mg/kg) was slightly above the MTCA Method A CUL (0.03mg/kg) and appeared unusual with respect to known COCs in this area. The benzene concentration was recommended to be further evaluated during subsequent remedial activities.

Ten soil samples (B4:10', B4:15', B5:10', B5:15', B6:15', B7:15', B9:12', B10:15', B11:4' and B12:10') reported concentrations of ORO concentrations exceeding the laboratory MRL but below the MTCA-A CUL. The remaining twelve soil samples were reported below the laboratory reporting limit or "non-detect".

All seven soil samples analyzed for GRO contained concentrations below the laboratory reporting limit or "non-detect".

Six soil samples (B4:15', B16:20', B7:10', B10:15', B18:15' and B19:15') contained concentrations of arsenic exceeding the MTCA Method A CUL. Fourteen samples were reported with arsenic concentration exceeding the laboratory reporting limit, but below the MTCA Method A CUL. The remaining samples reported arsenic concentrations below the laboratory reporting limit. Thirteen soil samples were reported containing chromium exceeding the laboratory reporting limit but below the MTCA Method A CUL. The remaining samples reported concentrations of chromium below the laboratory reporting limit or "non-detect". ECI also analyzed each of the twenty chromium samples for hexavalent chromium (CrVI); one sample reported a concentration exceeding the laboratory reporting limit but below the MTCA Method A CUL. The remaining samples reported concentrations of CrVI below the laboratory MRL or "non-detect".

2.3.9 *EcoCon Inc. – 2012*

Based on the results of the 2011 FSI, ECI recommended excavation and removal of the PCE contaminated soil as the preferred remedial alternative. The extent of impact was properly delineated using a combination of data obtained by KI in 2005 and ECI in 2011. The area appeared to be approximately 25-50 feet by 50-100 feet in dimension (Appendix A, Figure 12).

Excavation activities were performed on August 7th and 8th, 2012, and involved the removal of approximately 250 cubic yards of soil. Nine confirmation soil samples were collected from the sidewalls of the excavation and six from the excavation floor. All 15 soil samples reported concentrations of PCE and associated degradation compounds below their respective laboratory reporting limits and/or MTCA Method A CULs (Appendix B, Table 1). Based on these results, it appears no further remedial action is warranted with respect to PCE contamination in soil.

Performance samples were collected from the excavated soil stockpile for the purposes of profiling and disposal. Ten composite soil samples were collected from the stockpile, with four of the ten reporting concentrations of PCE above the MTCA Method A CUL.

2.3.10 *EcoCon Inc. – 2012*

In August of 2012, ECI completed an FSI to further evaluate the extent of arsenic contaminated soil on the Site previously identified by ECI and others.

ECI advanced a total of 10 borings, during two separate field mobilizations, across the eastern half of the Property (Appendix A, Figure 13). This area had previously been identified as the location where fill material was imported onto the Property. Soil samples were collected from both the fill material, generally encountered between 0 and 20 feet bgs, and the native material, identified below 20 feet bgs. Twenty nine soil samples were collected from the fill, while 3 were collected from the underlying native material.

Three soil samples collected from the fill material contained concentrations of arsenic above the MTCA Method A CUL; eleven soil samples contained concentrations of arsenic above the laboratory reporting limit, but below the MTCA Method A CUL; and fifteen soil samples reported concentrations of arsenic below the laboratory reporting limit (Appendix B, Table 1). The soil samples containing concentrations of arsenic above the MTCA Method A CUL were collected from borings AB2 and AB5, from depths between 12 and 20 feet bgs.

One soil sample collected from the native material contained a concentration of arsenic above the MTCA Method A CUL. The remaining two soil samples reported concentrations of arsenic below the laboratory reporting limit.

3.0 CONCEPTUAL SITE MODEL

This section provides a summary of the conceptual site model, which includes a discussion of the contaminants of concern (COCs), the media of concern, the distribution of contamination in soil, and the potential exposure pathways for the Site.

3.1 Contaminants of Concern

Based upon the results of previous investigations and interim remedial actions, the remaining COC on site is arsenic.

3.2 Media of Concern

Based upon the results of previous investigations, interim remedial actions, and analysis of regional vs site-specific groundwater conditions, soil is the only media of concern for the Site.

3.3 Distribution of Contamination in Soil

Arsenic contaminated soil appears to be fairly widespread throughout the Property and not associated with any particular point source release. The source of the arsenic is likely attributable to former operation of the Tacoma Asarco smelter plant, however the import of fill material on the eastern half of the Property has made the stratigraphic isolation of this contaminant impossible. On the eastern half of the Property, soils with concentrations of arsenic above the MTCA Method A CUL, were identified from ground surface to 26 feet bgs.

3.3 Exposure Pathways

The following section discusses the confirmed and potential human and ecological exposure pathways at the Site.

3.3.1 Soil Pathway

Potential exposure pathways for soil contamination include direct dermal contact or ingestion. The Property is not currently improved with any engineering controls to prevent direct contact, therefore the soil pathway is complete at this time.

3.3.2 Groundwater Pathway

Potential exposure pathways for groundwater contamination include direct dermal contact or ingestion by construction workers encountering perched water via surface infiltration. This exposure pathway will be considered complete until such time surface water infiltration is controlled via engineering controls. Regional groundwater, which could potentially be considered a potable drinking water source, is at a depth greater than 50 feet below ground surface, and over 15 feet below the lowest point in which contamination was encountered; therefore, human health exposure via ingestion of groundwater is not considered a complete exposure pathway at the Site.

3.4 Points of Compliance

The point compliance is the location where the enforcement limits will be measured and cannot be exceeded.

3.4.1 Point of Compliance for Soil

The point of compliance for direct contact is throughout the Site, from ground surface to 15 feet bgs. This is the depth at which one would reasonably assume workers could encountered contaminated soil during construction or development activities. In situations where achieving the standard point of compliance is not practicable, conditional points of compliance may be established, or institutional controls implemented to prevent direct contact and protect human health and the environment.

3.5 Terrestrial Ecological Evaluation

This Site qualifies for an exclusion to the Terrestrial Ecological Evaluation based on an incomplete exposure pathway for soil. Both remedial alternatives described in section 4.0 would prevent plants of wildlife from being exposed to contaminated soil.

4.0 REMEDIAL ALTERNATIVE ASSESSMENT AND DISPROPORTIONATE COST ANALYSIS

The purpose of the Remedial Alternative Assessment and Disproportionate Cost Analysis is to develop and evaluate cleanup action alternatives to facilitate selection of a final cleanup action at the Site using MTCA evaluation criteria. According to MTCA, a cleanup action must satisfy all of the following:

- Protect human health and the environment;
- Comply with cleanup standards outlined in WAC 173-340-700 through 173-340-760;

- Comply with applicable state and federal laws; and
- Provide for compliance monitoring outlined in WAC 173-340-410.

MTCA (173-340-360(2b)) also requires that the cleanup alternative:

- Use permanent solutions to the maximum extent practicable;
- Provide for a reasonable restoration time frame; and
- Consider public concerns on the proposed cleanup action alternative.

Utilizing the information obtained during previous Site investigations and ECI's understanding of the conceptual site model, two possible cleanup alternatives were evaluated:

- **Alternative 1:** Excavation and Disposal

  The entire east half of the Property would be excavated to the native interface to remove the imported contaminated fill. Assuming a gradual slope from the midpoint of the Property to an average depth of approximately 20 feet bgs at the eastern Property boundary, the resulting volume of soil would equate to a weight of approximately 82,500 tons. The native soil would then be evaluated for surficial soil contamination and mixed with deeper, clean soils, to bring the average arsenic concentrations to below the regulatory cleanup standard.

- **Alternative 2:** Leaving Contamination in Place with Institutional Controls (Preferred Alternative)

  This alternative would involve implantation of engineering an institutional controls to manage the potential exposure pathways identified for the Site. The entire property would be capped with asphalt and a restrictive covenant would be placed on the Property, noting the distribution and magnitude of the contamination and that soil must be managed appropriately should site usage change.

MTCA (WAC 173-340-360(3)(f) specifies the evaluation criteria that shall be used to evaluate and compare each cleanup alternative when conducing a DCA. The criteria are:

- ***Overall protectiveness*** of human health and the environment, including the degree to which existing risks are reduced, the time required to reduce the existing risks and attain cleanup standards, risks from implementation, and improvement of overall environmental quality,

- ***Permanence***, as the degree of reduction in toxicity, mobility, and volume of hazardous substances, including the adequacy of the alternative in destroying the hazardous substances, the reduction or elimination of hazardous substance releases and sources of releases, the

degree of irreversibility of waste treatment process, and the characteristics and quantity of treatment residuals generated,

- ***Long-term effectiveness***, including the degree of certainty that the alternative will be successful, long-term reliability, the magnitude of residual risk, and the effectiveness of controls required to manage treatment residues and remaining waste,

- ***Management of short-term risks***, including the protection of human health and the environment associated with the alternative during construction and implementation,

- ***Implementability***, including consideration of whether the alternative is technically possible, the availability of necessary offsite facilities, services and materials, administrative and regulatory requirements, scheduling, size, complexity, monitoring requirements, access for construction operations and monitoring, and integration with existing facility operations and other current or potential remedial actions,

- ***Consideration of public concerns***, including the extent to which the alternative addresses the concerns of the public. This process includes identifying and addressing concerns from individuals, community groups, local governments, tribes, federal and state agencies, or any other organization that may have an interest in or knowledge of the site.

The benefits of each alternative are ranked under the criteria. The costs are compared against these benefits and the relationship between the costs and benefits determined. This analysis defines which alternative is permanent to the maximum extent practicable. Relative rankings for the alternatives were determined by assigning a value on a scale from 1 to 10, where 10 is the highest benefit/value, for each criterion, multiplying each value by a weighting factor, and summing the weighted values to determine an overall alternative benefit ranking score.

Weighting factors are based on Ecology guidance, which includes six evaluation criteria and associated weighting factors:

- Overall protectiveness: 30 percent
- Permanence: 20 percent
- Long-term effectiveness: 20 percent
- Short-term risk management: 10 percent
- Implementability: 10 percent
- Considerations of public concerns: 10 percent.

Table 2 in Appendix B summarizes the results of the comparative benefit ranking, which reflect the factors discussed above. Alternative 1 ranks at 9.0 (weighted score), while Alternative 2 ranks at 7.9 (weighted score).

Alternative 1 has a greater benefit score, however, when the costs are considered, Alternative 2 has the lowest cost/benefit ratio at 0.95; over 6 times lower than Alternative 1. Due to the extensive distribution of arsenic in Site fill material, invasive remediation is not practical; Alternative 1 is disproportionately higher in cost and does not produce a similar increase in benefit. For these reasons, Alternative 2 is the preferred remedial alternative.

5.0 CONCLUSIONS

ECI has completed this LFS/DCA pursuant to WAC 173-340 for the Property located at 2119 Mildred Street West in Fircrest, Washington. Given the current understanding of the conceptual site model and extensive and discontinuous distribution of arsenic in soil, it is the opinion of ECI that using the combination of engineering and institutional controls is the appropriate remedial alternative for the Site. An asphalt cap across the Property and the implementation of an environmental covenant will prevent ecological receptors from being exposed to subsurface contamination.

6.0 REFERENCES

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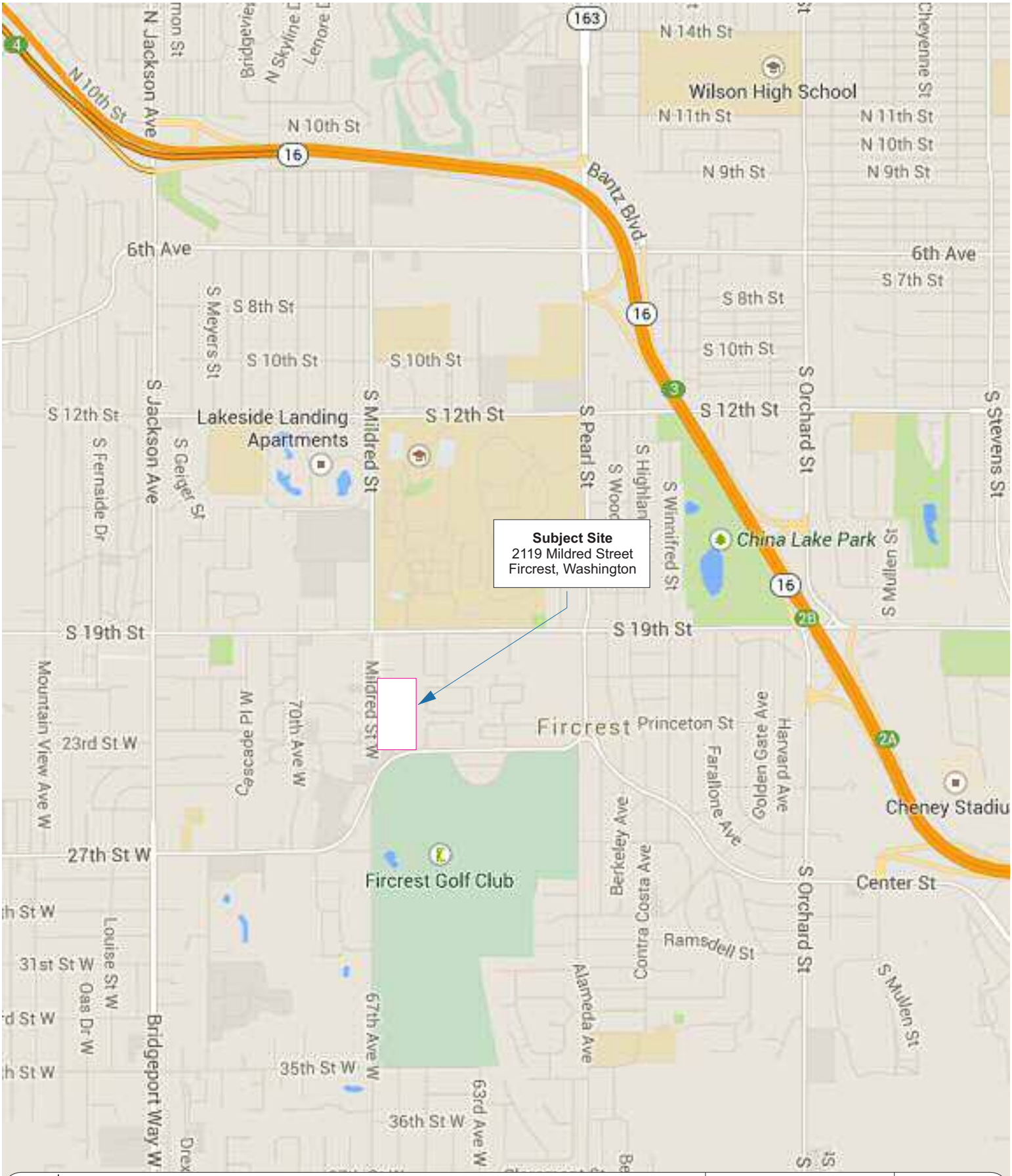
Appendix A

Project Figures



N
Not To Scale

Site Location Map
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
Completed By:	K.Spencer
Reviewed By.:	B. Dixon
Version:	ECI-001
Project No.:	0422-05

Figure No.: 01
Sheet 01 of 13

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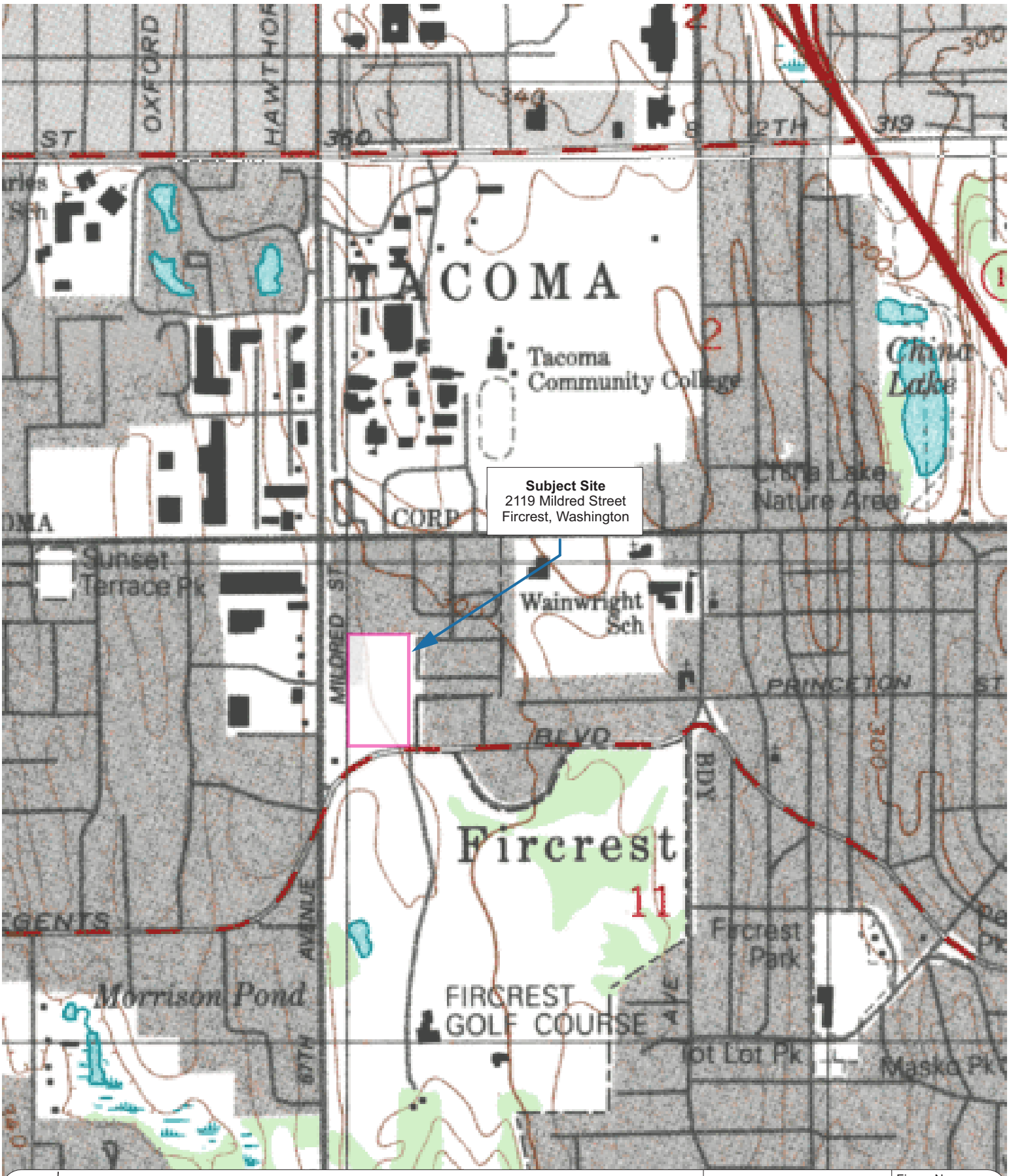

N
Not To Scale

Site Topographic Map
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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Reviewed By.:	B. Dixon
Version:	ECI-001
Project No.:	0422-05

Figure No.: 02
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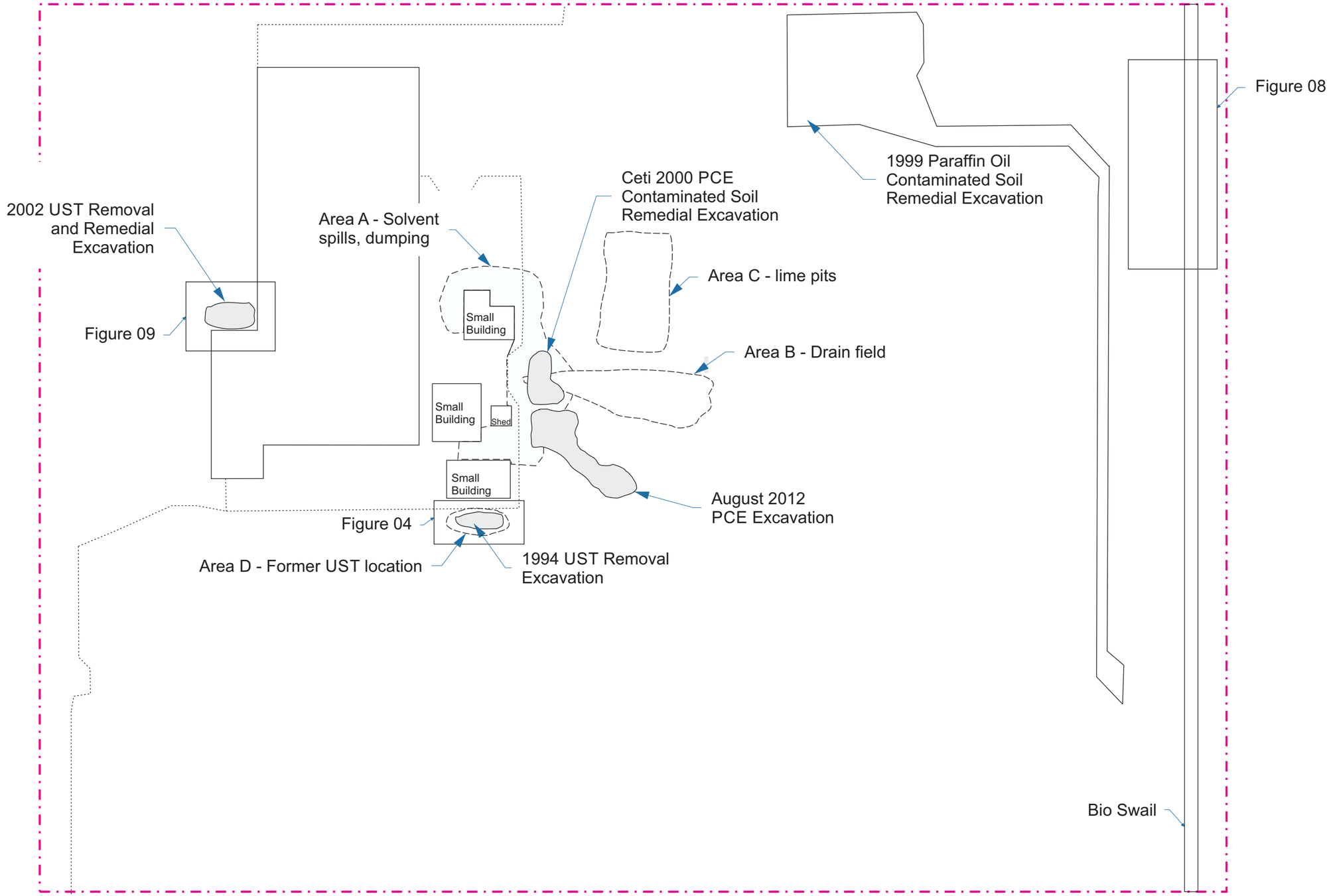

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Site Historical Overview Map
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
Completed By:	K.Spencer
Reviewed By.:	B. Dixon
Version:	ECI-001
Project No.:	0422-05

Figure No.: 03
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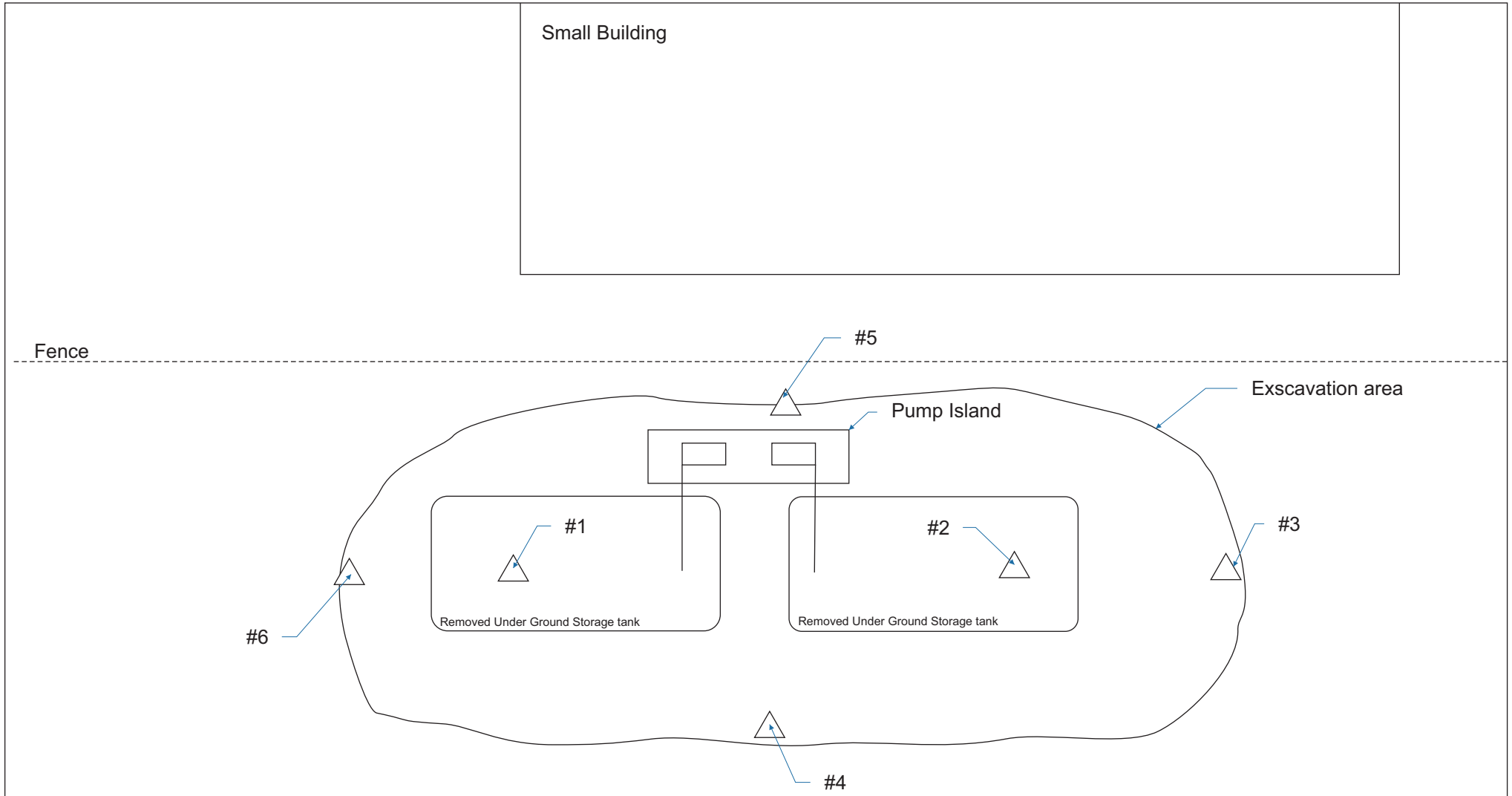

Legend

Confirmation Sample Location

Performance Soil Sample Location Exceeding MTCA-A CULs

Golden 1994 UST Removal Sample Locations
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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Version:	ECI-001
Project No.:	0422-05

Figure No.: 04

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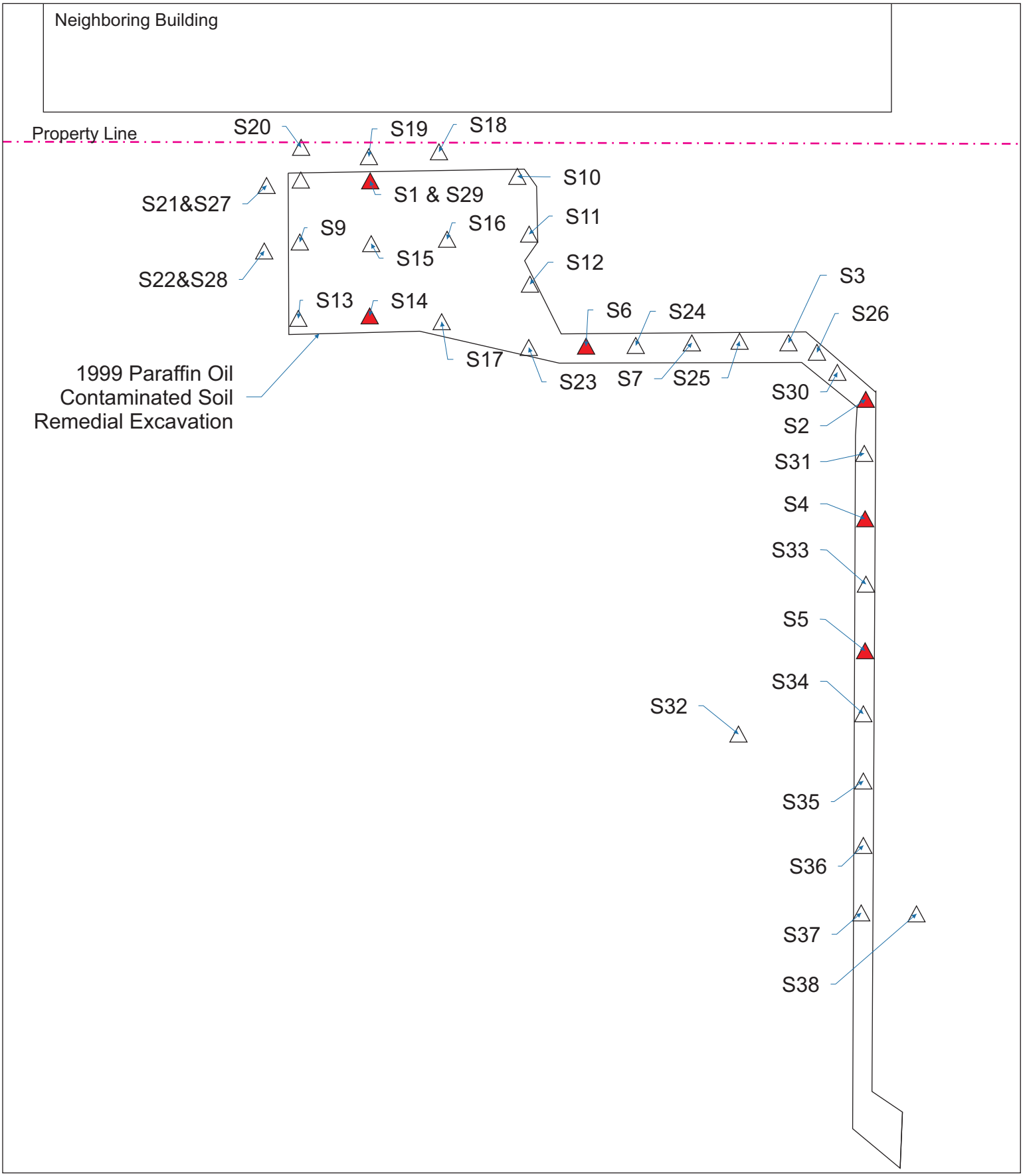

N

Not To Scale

Legend

Confirmation Sample Location

Performance Soil Sample Location
Exceeding MTCA-A CULs

CETI 1999 Paraffin Oil Remedial Excavation
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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Figure No.: 05

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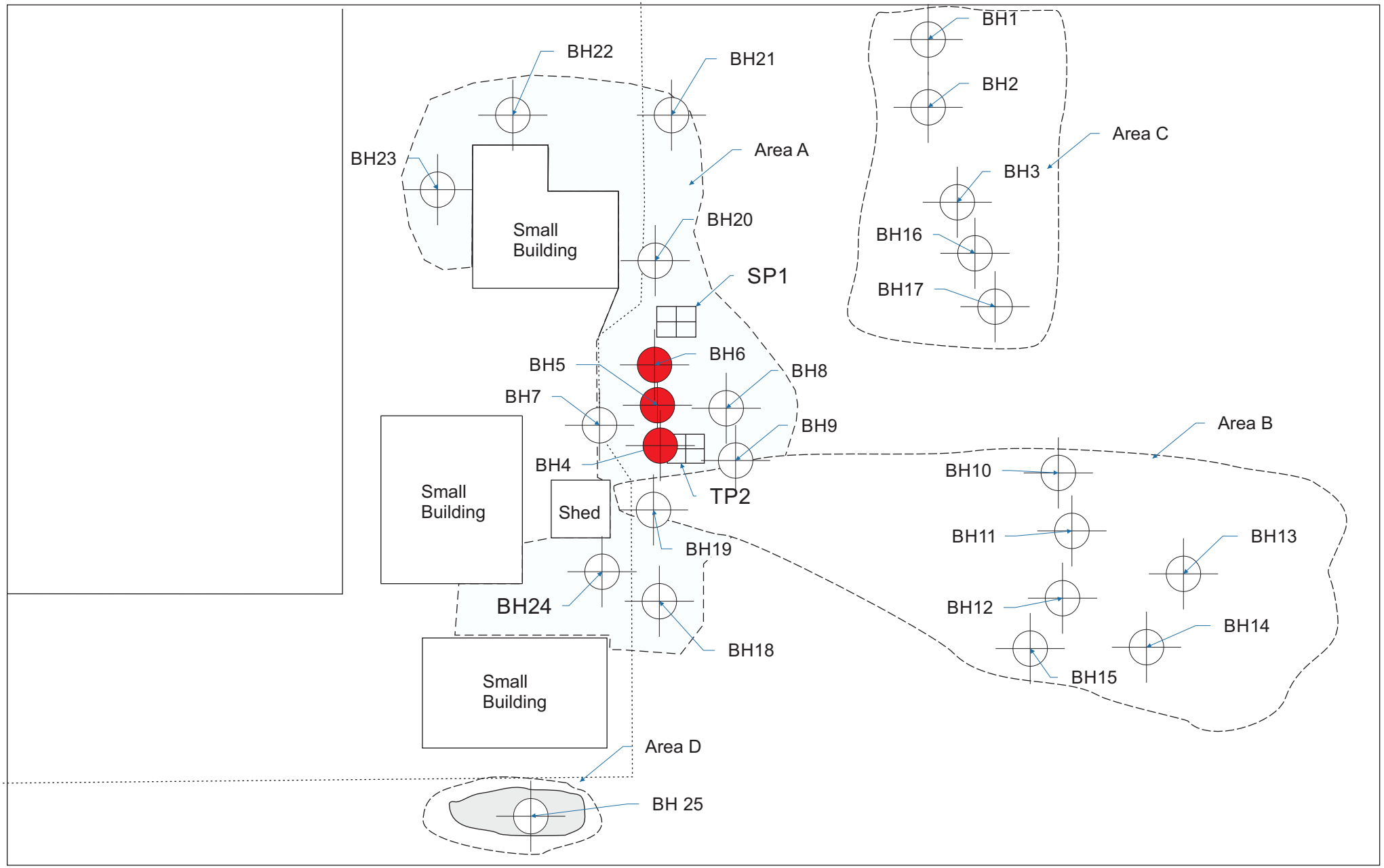

Legend

Boring Locations

Boring With Soil Sample Exceeding MTCA-A CULs

N

CETI 2000 Phase II Boring Locations
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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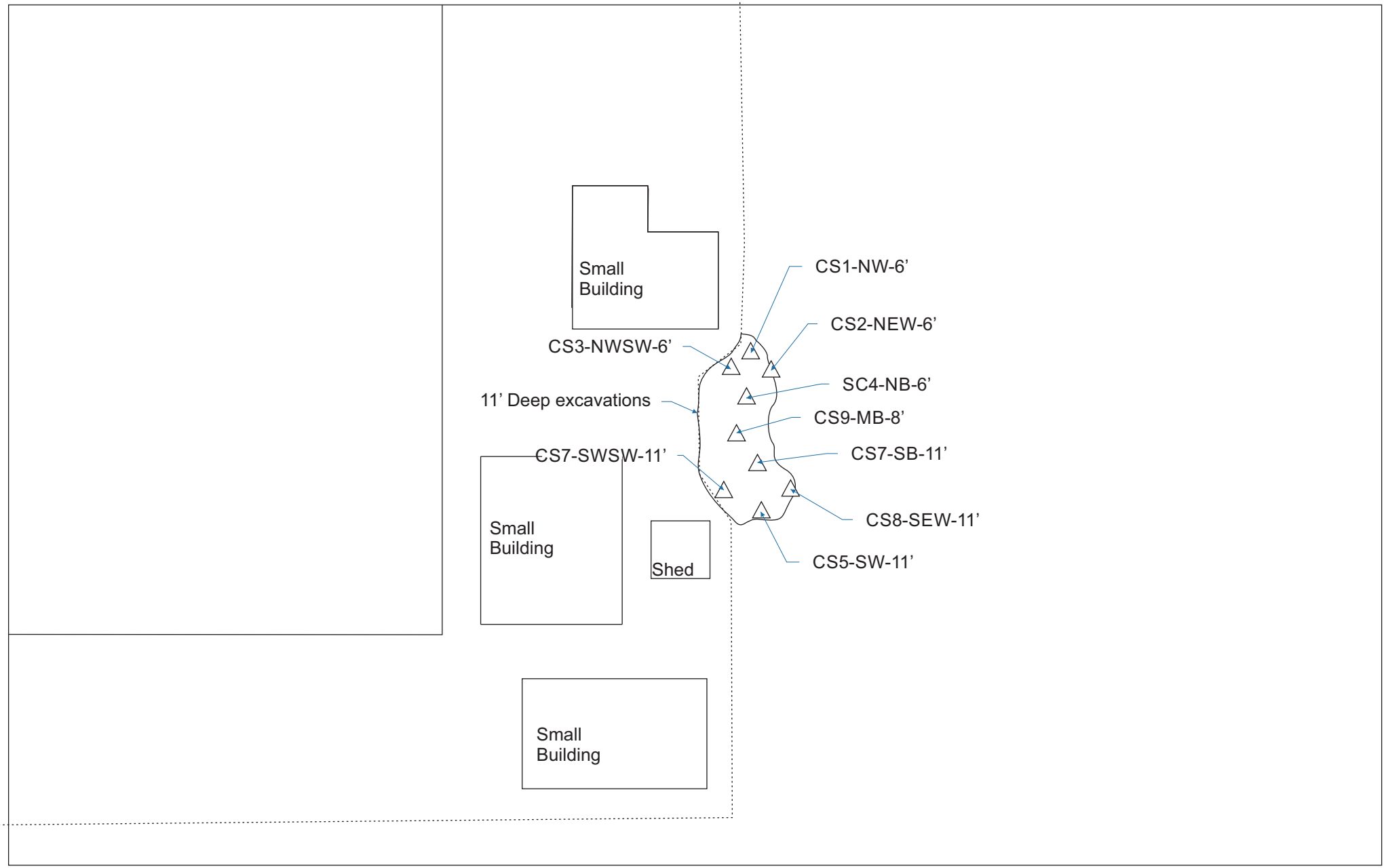

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Legend

Confirmation Sample Location

Performance Soil Sample Location Exceeding MTCA-A CULs

CETI 2000 PCE Remediation Sample Locations
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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Project No.:	0422-05

Figure No.: 07

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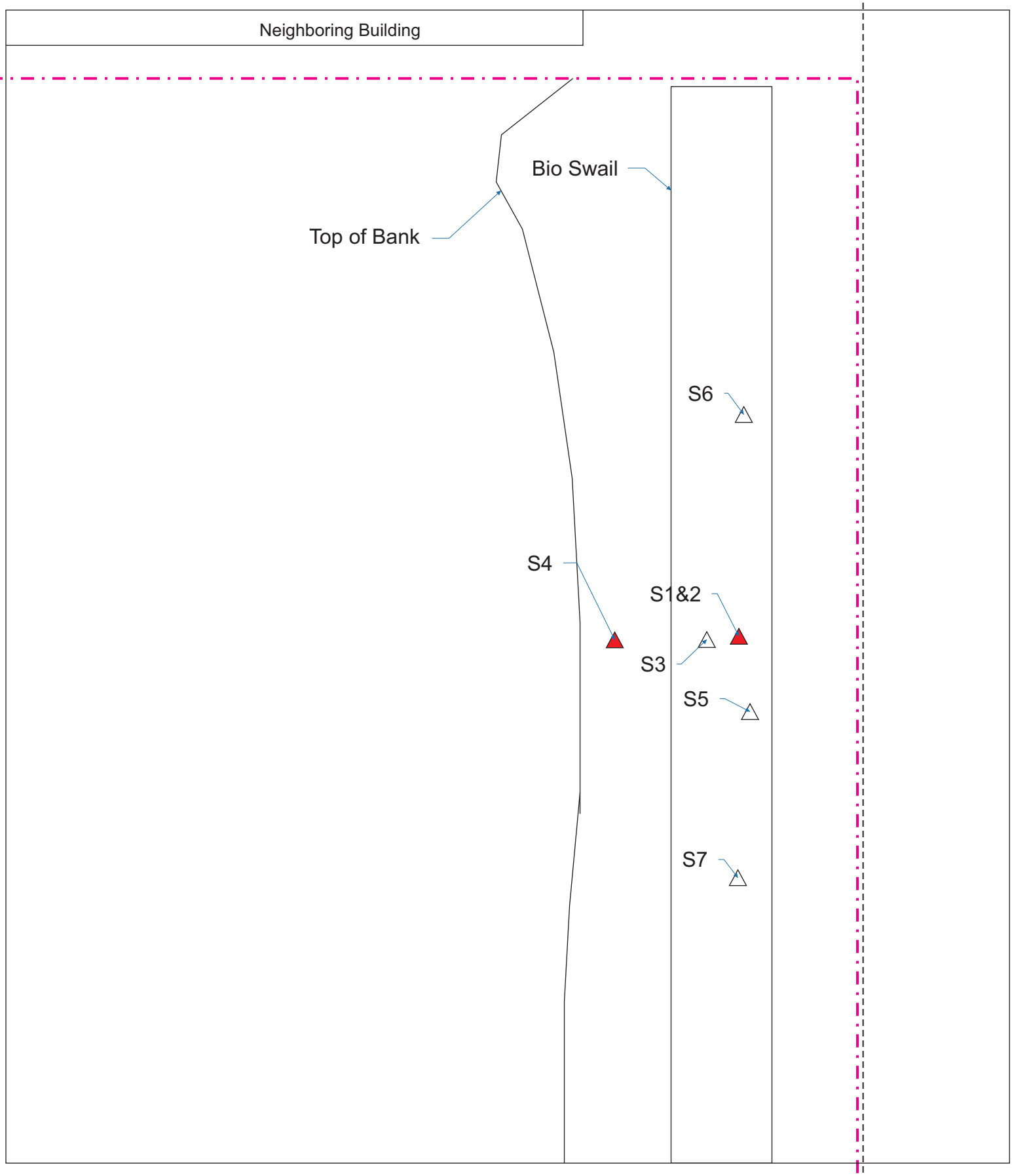

Legend

Confirmation Sample Location

Performance Soil Sample Location Exceeding MTCA-A CULs

N

Not To Scale

SES 2000 Investigation Samples
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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Version:	ECI-001
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Figure No.: 08

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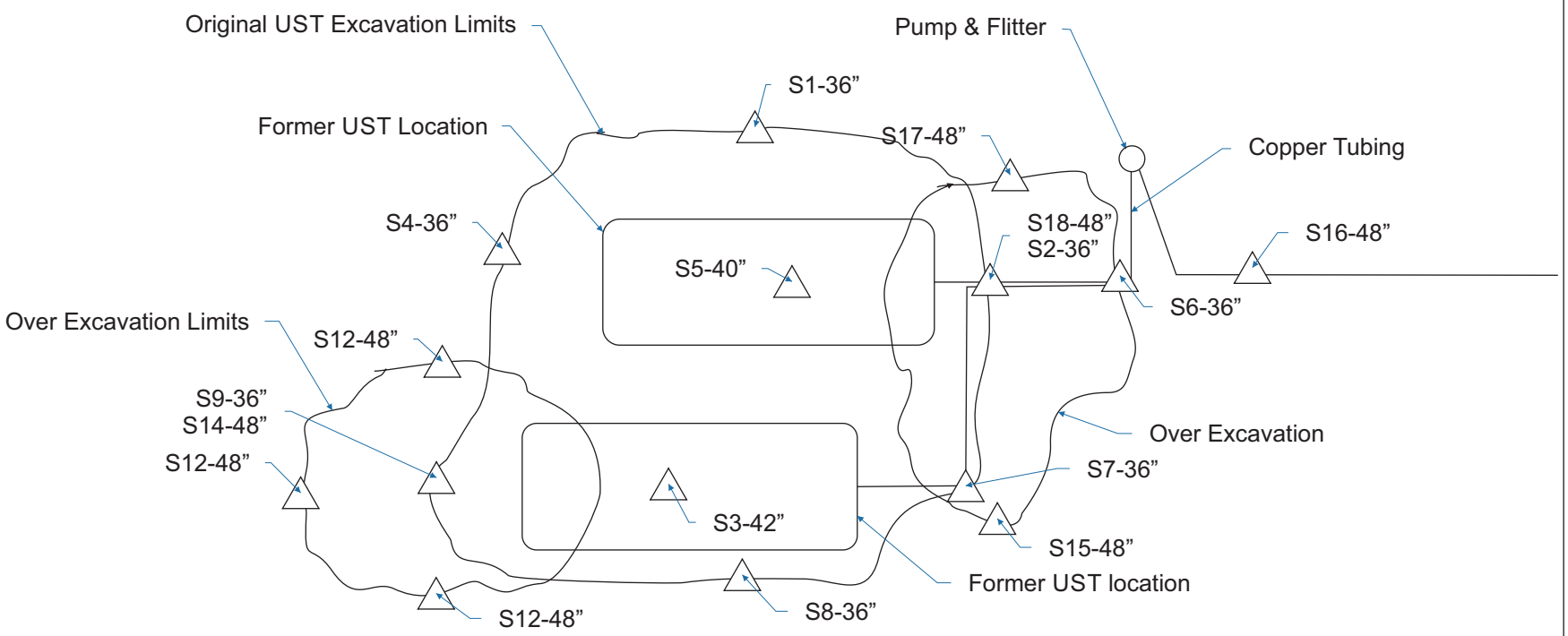

Legend

Confirmation Sample Location

Performance Soil Sample Location Exceeding MTCA-A CULs

SES 2002 UST Removal & Remedial Sample Locations
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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Figure No.: 09

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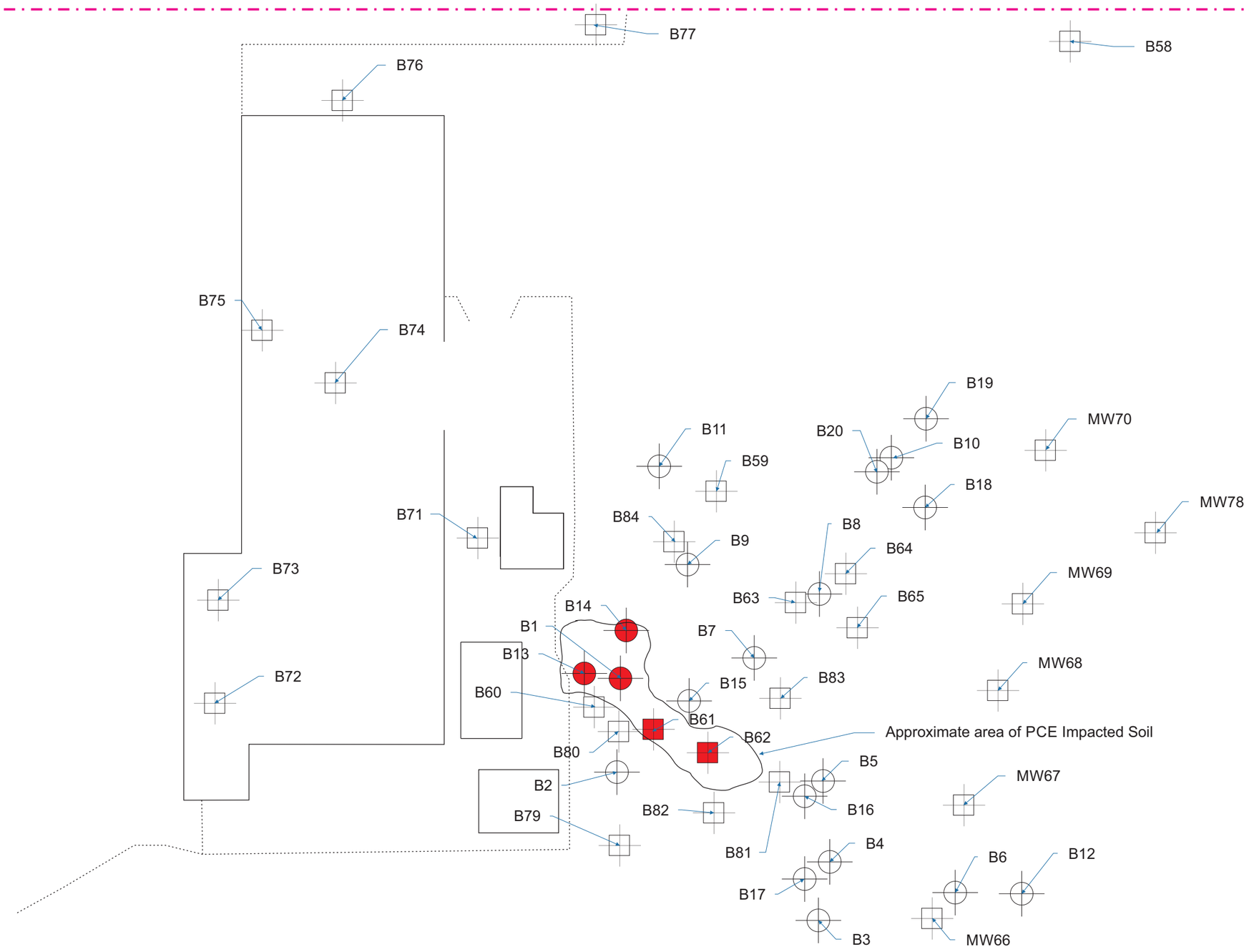

Legend

- ECI 2011 Boring
- ECI 2011 Boring Sample With Soil Sample Exceeding MTCA-A CULs for PCE
- Kleinfelder 2005 Boring
- Kleinfelder 2005 Boring With Soil Sample Exceeding MTCA-A CULs for PCE

N

PCE Boring Location Map
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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Figure No.: 10
Sheet 10 of 13

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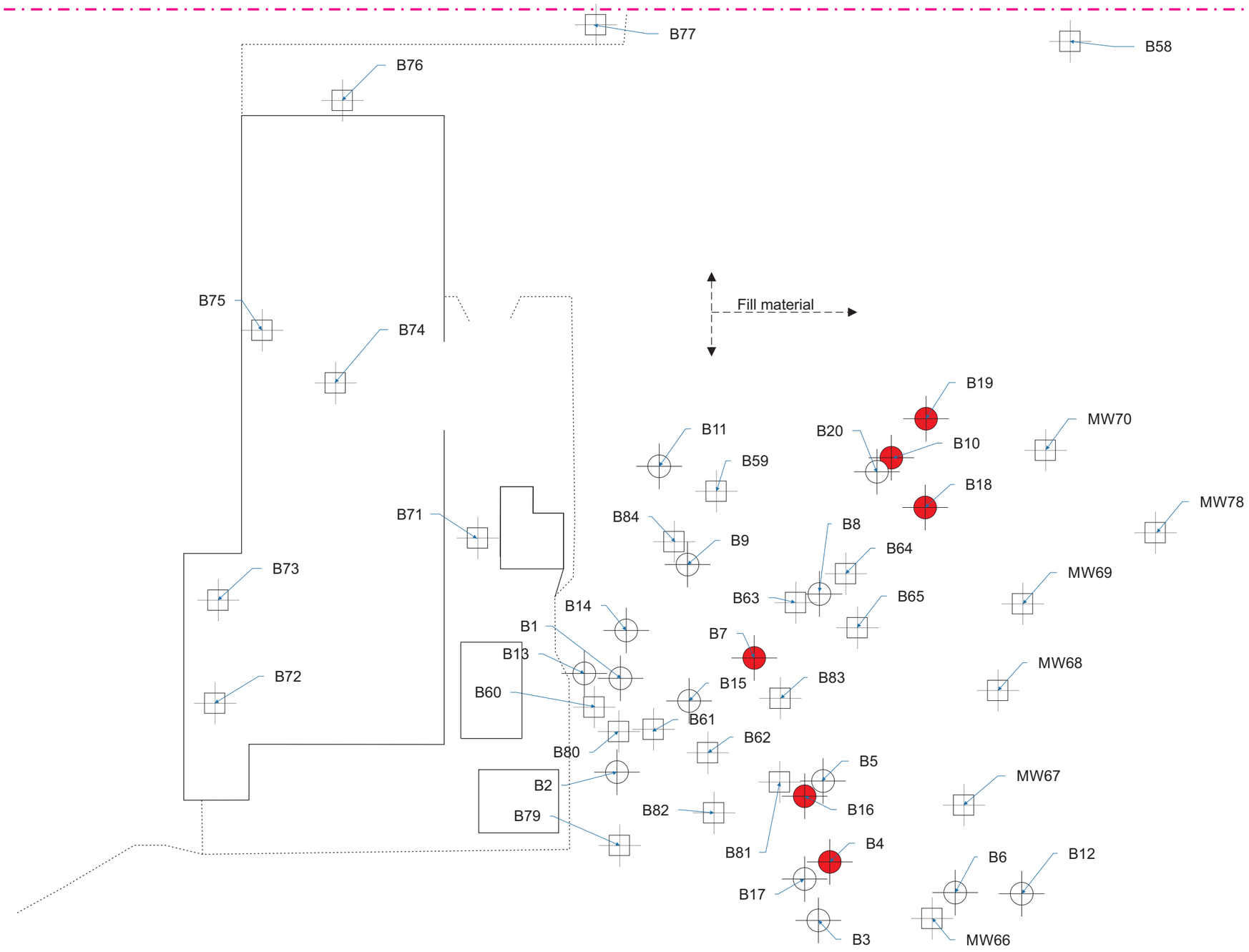

Legend

- ECI 2011 Boring
- ECI 2011 Boring Sample With Soil Sample Exceeding MTCA-A CULs for Arsenic
- Kleinfelder 2005 Boring
- Kleinfelder 2005 Boring With Soil Sample Exceeding MTCA-A CULs for Arsenic

N

Arsenic Boring Location Map
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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Version:	ECI-001
Project No.:	0422-05

Figure No.: 11
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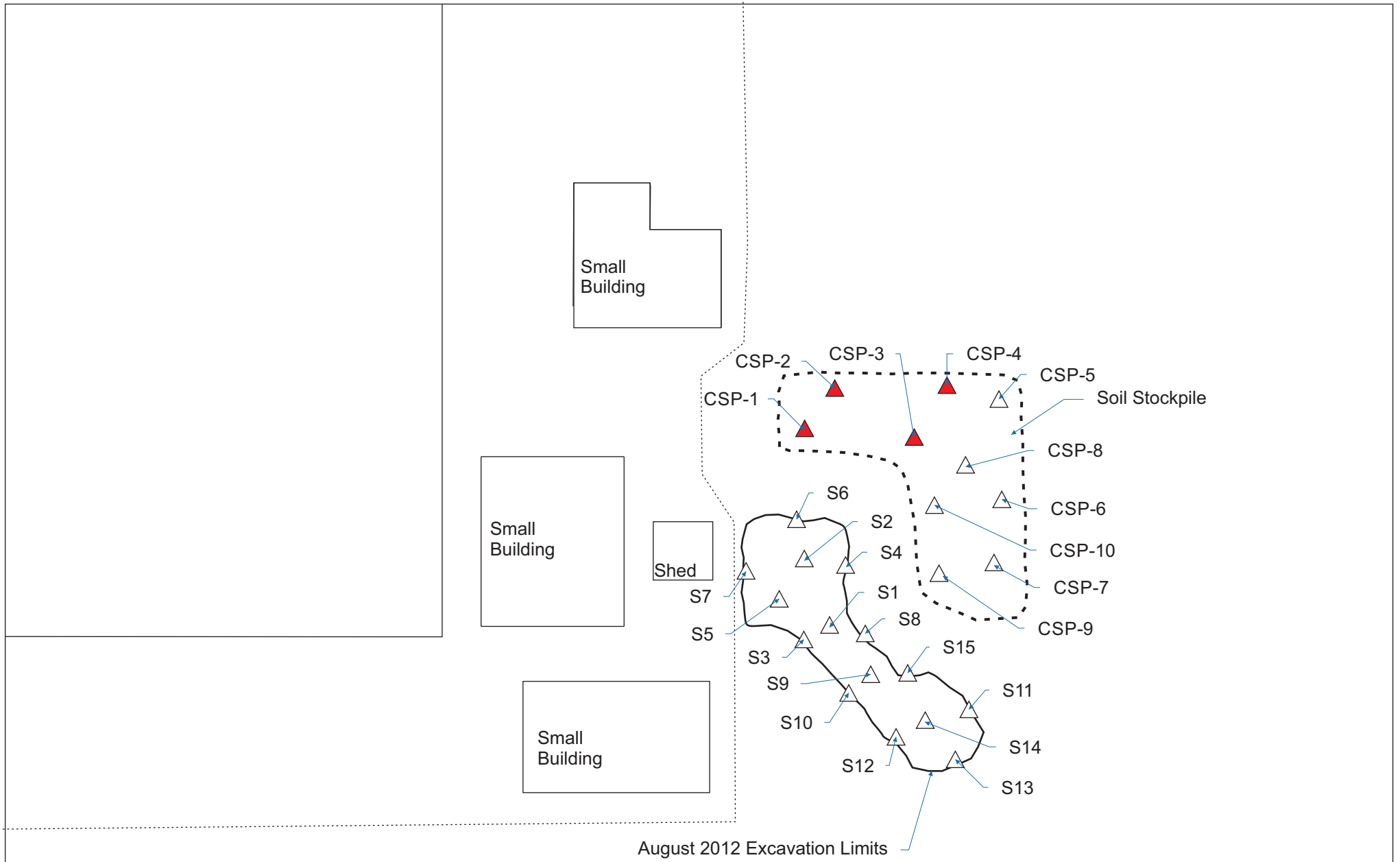

Legend

Conformation Sample Location

Performance Soil Sample Location Exceeding MTCA-A CULs

N

ECI 2012 PCE Remediation Sample Locations
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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Version:	ECI-001
Project No.:	0422-05

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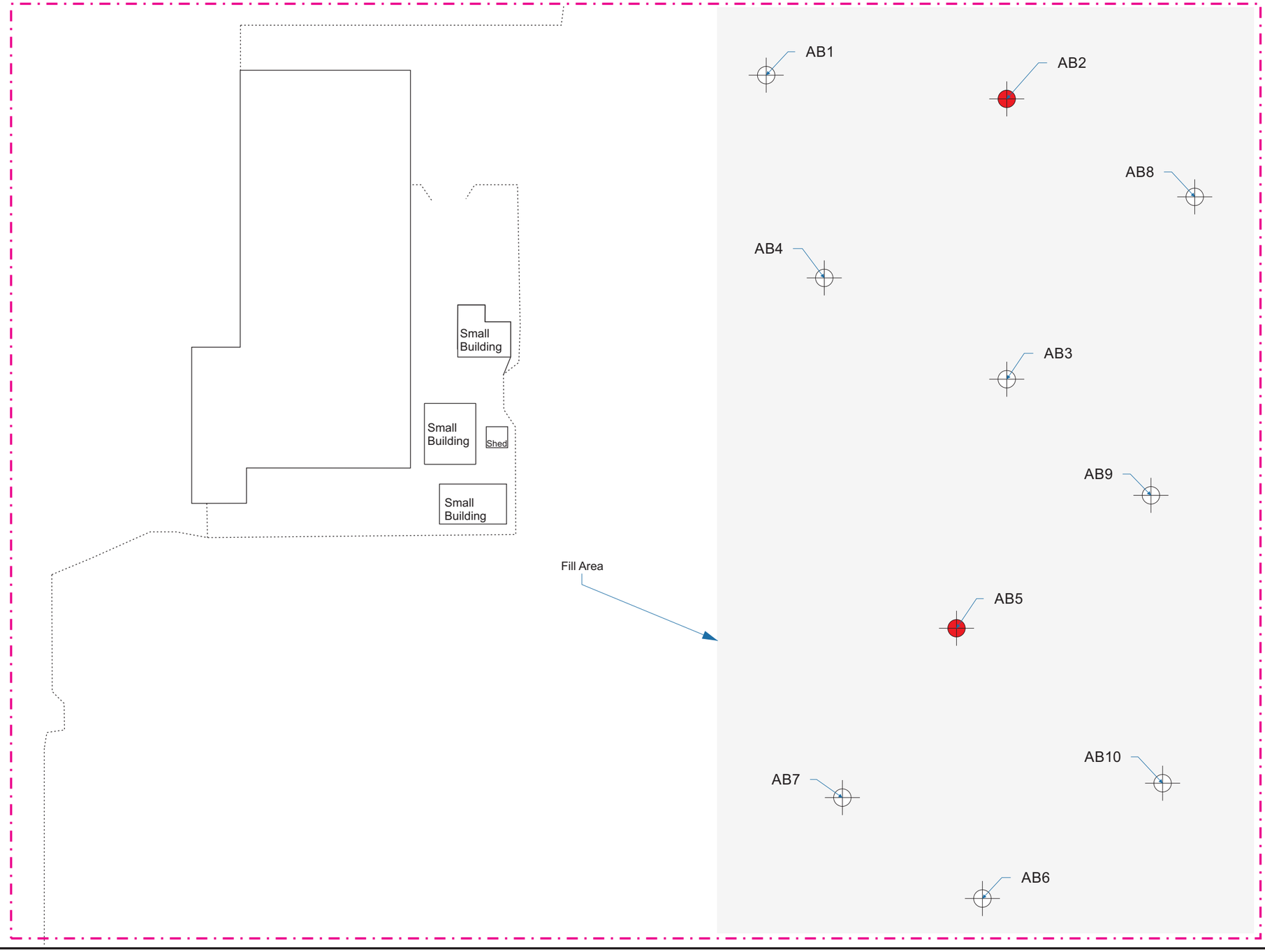

Legend

ECI 2011 Boring

ECI 2011 Boring With Soil Sample Exceeding MTCA-A CULs for Arsenic

Arsenic Soil Sample Location Map
FS/DCA
2119 Mildred Street
Fircrest, Washington

Date:	May 13, 2015
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Version:	ECI-001
Project No.:	0422-05

Figure No.: 13

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Appendix B

Project Tables

Table 1: Summary of Soil Analytical Results

Table 2: Remedial Alternative Assessment and Disproportionate Cost Analysis

Table 1: Summary of Soil Analytical Results

Sample Location	Sample Name	Sample Date	Sample Depth	Sample Type	PCE (mg/kg)	Arsenic (mg/kg)	Cadmium (mg/kg)	Total Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Total Petroleum Hydrocarbons (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
											Gasoline-Range	Diesel- Range	Motor Oil-Range				
Don Golden Inc. - 1994																	
West Floor	#1	3/7/1994	Unknown	Confirmation	--	--	--	--	--	--	<20	<50	<100	ND	ND	ND	ND
East Floor	#2	3/7/1994	Unknown	Confirmation	--	--	--	--	--	--	<20	<50	<100	ND	ND	ND	ND
East Wall	#3	3/7/1994	Unknown	Confirmation	--	--	--	--	--	--	<20	<50	<100	ND	ND	ND	ND
South Wall	#4	3/7/1994	Unknown	Confirmation	--	--	--	--	--	--	<20	<50	<100	ND	ND	ND	ND
North Wall	#5	3/7/1994	Unknown	Confirmation	--	--	--	--	--	--	<20	<50	<100	ND	ND	ND	ND
West Wall	#6	3/7/1994	Unknown	Confirmation	--	--	--	--	--	--	<20	<50	<100	ND	ND	ND	ND
Comp. West Small Pile Excav	#7	3/7/1994	Unknown	Confirmation	--	--	--	--	--	--	<20	<50	<100	ND	ND	ND	ND
Comp. West Large Pile Excav	#8	3/7/1994	Unknown	Confirmation	--	--	--	--	--	--	<20	<50	<100	--	--	--	--
Comp. East Large Pile Excav	#9	3/7/1994	Unknown	Confirmation	--	--	--	--	--	--	<20	<50	<100	--	--	--	--
Creative Environmental Technologies (CETI) - 1999 through 2001																	
Parafin Oil Spill - S1	S1-42799	4/27/1999	Unknown	Performance	--	--	--	--	--	--	--	<25	**14,000**	--	--	--	--
Parafin Oil Spill - S2	S2-42799	4/27/1999	Unknown	Performance	--	--	--	--	--	--	--	<25	**1,000**	--	--	--	--
Parafin Oil Spill - S3	S3-42799	4/27/1999	Unknown	Performance	--	--	--	--	--	--	--	74	**81,000**	--	--	--	--
Parafin Oil Spill - S4	S4-42799	4/27/1999	Unknown	Performance	--	--	--	--	--	--	--	<25	**3,900**	--	--	--	--
Parafin Oil Spill - S5	S5-42799	4/27/1999	Unknown	Performance	--	--	--	--	--	--	--	<25	**1,800**	--	--	--	--
Parafin Oil Spill - S6	S6-42799	4/27/1999	Unknown	Performance	--	--	--	--	--	--	--	<25	**1,400**	--	--	--	--
Parafin Oil Spill - S7	S7-42799	4/27/1999	Unknown	Performance	--	--	--	--	--	--	--	<25	**1,100**	--	--	--	--
Parafin Oil Spill - S10	S10-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S11	S11-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S12	S12-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S13	S13-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S14	S14-42899	4/28/1999	Unknown	Performance	--	--	--	--	--	--	--	<25	**1,100**	--	--	--	--
Parafin Oil Spill - S15	S15-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S16	S16-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S17	S17-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S23	S23-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S24	S24-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S25	S25-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S26	S26-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S27	S27-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S28	S28-42899	4/28/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S29	S29-42899	4/28/1999	Unknown	Performance	--	--	--	--	--	--	--	<25	**5,800**	--	--	--	--
Parafin Oil Spill - S30	S30-43099	4/30/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S31	S31-43099	4/30/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S32	S32-43099	4/30/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S33	S33-43099	4/30/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S34	S34-43099	4/30/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S35	S35-43099	4/30/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S36	S36-43099	4/30/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S37	S37-43099	4/30/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
Parafin Oil Spill - S38	S38-43099	4/30/1999	Unknown	Confirmation	--	--	--	--	--	--	--	<25	<100	--	--	--	--
BH4 - Area A	S1-13100	1/31/2000	2-4'	Exploratory	**1.26**	--	--	--	--	--	--	--	--	<0.25	<0.25	<0.25	<0.25
BH5- Area A	S4-13100	1/31/2000	4-8'	Exploratory	**0.64**	--	--	--	--	--	--	--	--	<0.25	<0.25	<0.25	<0.25
BH6- Area A	S6-13100	1/31/2000	0-4'	Exploratory	**2.22**	<5	<0.3	21	9	0.09	--	--	--	<0.25	<0.25	<0.25	<0.25
BH7- Area A	S8-13100	1/31/2000	4-8'	Exploratory	<0.25	--	--	--	--	--	--	--	--	<0.25	<0.25	<0.25	<0.25
BH8- Area A	S9-13100	1/31/2000	0-4'	Exploratory	<0.25	--	--	--	--	--	--	--	--	<0.25	<0.25	<0.25	<0.25
BH9- Area A	S11-13100	1/31/2000	0-4'	Exploratory	<0.25	--	--	--	--	--	--	--	--	<0.25	<0.25	<0.25	<0.25
BH12- Area B	S17-13100	1/31/2000	4-6'	Exploratory	--	<5	<0.3	38	8	<0.05	--	--	--	--	--	--	--
BH16- Area C	S24-13100	1/31/2000	9-10'	Exploratory	--	<5	<0.3	62	28	0.07	--	--	--	--	--	--	--
BH16- Area C	S25-13100	1/31/2000	11-12'	Exploratory	--	<5	<0.3	21	5	<0.05	--	--	--	--	--	--	--
BH18- Area A	S26-13100	1/31/2000	3-4'	Exploratory	<0.25	--	--	--	--	--	--	--	--	<0.25	<0.25	<0.25	<0.25
BH19- Area A	S27-13100	1/31/2000	3-4'	Exploratory	<0.25	--	--	--	--	--	--	--	--	<0.25	<0.25	<0.25	<0.25
BH21- Area A	S29-13100	1/31/2000	3-4'	Exploratory	<0.25	--	--	--	--	--	--	--	--	<0.25	<0.25	<0.25	<0.25
BH22- Area A	S1-2100	2/1/2000	2-4'	Exploratory	<0.25	--	--	--	--	--	--	--	--	<0.25	<0.25	<0.25	<0.25
BH23- Area A	S3-2100	2/1/2000	0-4'	Exploratory	<0.25	--	--	--	--	--	--	--	--	<0.25	<0.25	<0.25	<0.25
BH24- Area A	S6-2100	2/1/2000	2-4'	Exploratory	--	12	<0.3	16	39	<0.05	--	--	--	--	--	--	--

Sample Location	Sample Name	Sample Date	Sample Depth	Sample Type	PCE (mg/kg)	Arsenic (mg/kg)	Cadmium (mg/kg)	Total Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Total Petroleum Hydrocarbons (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
											Gasoline-Range	Diesel- Range	Motor Oil-Range				
Parafin Oil Spill - S1	S1- 21500	2/15/2000	?	Performance	--	--	--	--	--	--	--	--	**35,000**	--	--	--	--
Parafin Oil Spill - S3	S3- 21500	2/15/2000	?	Confirmation	--	<5	<0.3	20	16	<0.05	--	--	--	--	--	--	--
Test Pit 2	S3-80400	8/4/2000	4'8"	Exploratory	**13.9**	--	--	--	--	--	--	--	--	--	--	--	--
0-4' Stockpile	SP2-N-4	9/11/2000	4'	Stockpile	<0.25	--	--	--	--	--	--	--	--	--	--	--	--
0-4' Stockpile	SP4-SW-4	9/11/2000	4'	Stockpile	0.34	--	--	--	--	--	--	--	--	--	--	--	--
0-4' Stockpile	SP6-SE-4	9/11/2000	4'	Stockpile	<0.25	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - CS1	CS1-NSW-6	9/11/2000	6'	Confirmation	<0.25	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - CS2	CS2-NWSW-6	9/11/2000	6'	Confirmation	<0.25	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - CS3	CS3-NESW-6	9/11/2000	6'	Confirmation	0.39	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - CS4	CS4-NB-6	9/11/2000	6'	Confirmation	<0.25	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - CS5	CS5-SW-11'	9/11/2000	11'	Confirmation	<0.25	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - CS6	CS6-SWSW-11'	9/11/2000	11'	Confirmation	<0.25	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - CS7	CS7-SB-11'	9/11/2000	11'	Confirmation	<0.25	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - CS8	CS8-SEW-11'	9/11/2000	11'	Confirmation	<0.25	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - CS9	CS9-MB-8'	9/11/2000	8'	Confirmation	<0.25	--	--	--	--	--	--	--	--	--	--	--	--
4-11' Stockpile	DSP-1-929	9/29/2000	NA	Stockpile	**2.15**	--	--	--	--	--	--	--	--	--	--	--	--
4-11' Stockpile	DSP-2-929	9/29/2000	NA	Stockpile	0.42	--	--	--	--	--	--	--	--	--	--	--	--
4-11' Stockpile	DSP-3-929	9/29/2000	NA	Stockpile	**1.23**	--	--	--	--	--	--	--	--	--	--	--	--
4-11' Stockpile	DSP-4-929	9/29/2000	NA	Stockpile	0.3	--	--	--	--	--	--	--	--	--	--	--	--
4-11' Stockpile	DSP-5-929	9/29/2000	NA	Stockpile	0.18	--	--	--	--	--	--	--	--	--	--	--	--
4-11' Stockpile	DSP-6-929	9/29/2000	NA	Stockpile	0.16	--	--	--	--	--	--	--	--	--	--	--	--
Sound Environmental Strategies (SES) 2000																	
Easten Swale	S1- 82900	8/29/2000	0-6"	Performance	<0.25	**160**	**30**	6.7	18	<0.05	--	--	--				
Easten Swale	S1- 91500	9/15/2000	0-6"	Confirmation	--	<5	--	--	--	--	--	--	--				
Easten Swale	S2- 91500	9/15/2000	0-6"	Confirmation	--	<5	--	--	--	--	--	--	--				
Easten Swale	S3- 91500	9/15/2000	0-6"	Confirmation	--	<5	--	--	--	--	--	--	--				
Easten Swale	S4- 91500	9/15/2000	0-6"	Performance	--	**29**	--	--	--	--	--	--	--				
Easten Swale	S5- 91500	9/15/2000	0-6"	Confirmation	--	<5	1.3	18	12	<0.05	--	--	--				
Easten Swale	S6- 91500	9/15/2000	0-6"	Confirmation	--	<5	--	--	--	--	--	--	--				
Easten Swale	S7- 91500	9/15/2000	0-6"	Confirmation	--	<5	--	--	--	--	--	--	--				
Unknown	CS-NESW2-7	9/15/2000	7'	Unknown	<0.25	--	--	--	--	--	--	--	--				
Easten Swale	S1-112700	11/27/2000	0-6"	Confirmation	--	<5	<0.3	--	8	--	<20	<50	<100				
MTCA Method A Cleanup Level prior to 2001 (mg/kg)					0.5	20	2	--	250	1	100	200	200	0.5	40	20	20
Sound Environmental Strategies (SES) 2002																	
North Sidewall	S1-3.0'	4/5/2002	3'	Confirmation	--	--	--	--	--	--	--	<20	<40	--	--	--	--
East Sidewall - North	S2-3.0'	4/5/2002	3'	Performance	ND	--	--	--	--	--	--	1,700	<40	ND	ND	ND	ND
UST 2 Floor	S3-3.5'	4/5/2002	3.5'	Confirmation	ND	--	--	--	--	--	--	<20	<40	ND	ND	ND	ND
West Sidewall	S4-3.0'	4/5/2002	3'	Confirmation	--	--	--	--	--	--	--	<20	<40	--	--	--	--
UST 1 Floor	S5-3.5'	4/5/2002	3.5'	Confirmation	ND	--	--	--	--	--	--	25	<40	ND	ND	ND	ND
Pipe Housing Floor	S6-3.5'	4/5/2002	3.5'	Confirmation	ND	--	--	--	--	--	--	<20	<40	ND	ND	ND	ND
East Sidewall - South	S7-3.0'	4/5/2002	3'	Performance	ND	--	--	--	--	--	--	440	<40	ND	ND	ND	ND
South Sidewall	S8-3.0'	4/5/2002	3'	Confirmation	--	--	--	--	--	--	--	<20	<40	--	--	--	--
West Sidewall - South	S9-3.0'	4/5/2002	3'	Performance	--	--	--	--	--	--	**160***	<20	<40	--	--	--	--
North Sidewall	S1A-3.0'	5/23/2002	3'	Confirmation	--	--	--	--	--	--	--	<20	<40	--	--	--	--
UST 2 Floor	S3A-3.5'	5/23/2002	3.5'	Confirmation	--	--	--	--	--	--	--	<20	<40	--	--	--	--
UST 1 Floor	S5A-3.5'	5/23/2002	3.5'	Confirmation	--	--	--	--	--	--	--	<20	<40	--	--	--	--
South Sidewall	S8A-3.0'	5/23/2002	3'	Confirmation	--	--	--	--	--	--	--	<20	<40	--	--	--	--
West Sidewall - 2nd Exe.	S11-4.0'	5/23/2002	4'	Confirmation	--	--	--	--	--	--	--	<20	<50	--	--	--	--
North Sidewall - Over Exe.	S12-4.0'	5/23/2002	4'	Confirmation	--	--	--	--	--	--	--	<20	<50	--	--	--	--
South Sidewall - Over Exe.	S13-4.0'	5/23/2002	4'	Confirmation	--	--	--	--	--	--	--	<20	<50	--	--	--	--
Floor - Over Exe.	S14-4.0'	5/23/2002	4'	Confirmation	--	--	--	--	--	--	--	<20	<50	--	--	--	--
Pipe Housing Sidewall South	S15-4.0'	5/23/2002	4'	Confirmation	--	--	--	--	--	--	--	<20	<50	--	--	--	--
Pipe Housing Sidewall East	S16-4.0'	5/23/2002	4'	Confirmation	--	--	--	--	--	--	--	<20	<50	--	--	--	--
Pipe Housing Sidewall North	S17-4.0'	5/23/2002	4'	Confirmation	--	--	--	--	--	--	--	<20	<50	--	--	--	--
Pipe Housing Sidewall Floow	S18-4.0'	5/23/2002	4'	Confirmation	--	--	--	--	--	--	--	<20	<50	--	--	--	--

Sample Location	Sample Name	Sample Date	Sample Depth	Sample Type	PCE (mg/kg)	Arsenic (mg/kg)	Cadmium (mg/kg)	Total Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Total Petroleum Hydrocarbons (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
											Gasoline-Range	Diesel- Range	Motor Oil-Range				
Kleinfelder (KI) 2005																	
B58	B58-4	5/27/2005	10'	Exploratory	<0.02	<5	<1	<5	<5	<0.5	<5.0	<20	850	--	--	--	--
	B58-5	5/27/2005	12.5'	Exploratory	<0.02	<5	<1	8.4	14	<0.5	<5.0	<20	740	--	--	--	--
B59	B59-2	5/26/2005	5'	Exploratory	<0.02	<5	<1	7.9	15	<0.5	<5.0	<20	**6,500**	--	--	--	--
B60	B60-2	5/26/2005	5'	Exploratory	0.02	<5	<1	<5	<5	<0.5	<5.0	<20	<50	--	--	--	--
B61	B61-2	5/26/2005	5'	Exploratory	**0.2**	<5	<1	6.7	<5	<0.5	<5.0	<20	<50	--	--	--	--
B62	B62-2	5/26/2005	5'	Exploratory	**0.1**	<5	<1	<5	8	<0.5	<5.0	<20	<50	--	--	--	--
B63	B63-6	5/26/2005	15'	Exploratory	<0.02	<5	<1	<5	<5	<0.5	<5.0	<20	**6,200**	--	--	--	--
B64	B64-4	5/26/2005	8.5'	Exploratory	<0.02	<5	<1	5.3	12	<0.5	<5.0	<20	**1,400**	--	--	--	--
	B64-6	5/26/2005	15'	Exploratory	<0.02	<5	<1	5.9	15	<0.5	<5.0	<20	170	--	--	--	--
B65	B65-7	5/26/2005	15'	Exploratory	<0.02	<5	<1	6.5	12	<0.5	<5.0	<20	<50	--	--	--	--
B67	B67-6	5/27/2005	15'	Exploratory	<0.02	<5	<1	<5	<5	<0.5	<5.0	<20	**6,600**	--	--	--	--
B68	B68-2	5/27/2005	5'	Exploratory	<0.02	<5	<1	<5	13	<0.5	<5.0	<20	<50	--	--	--	--
B69	B69-4	5/27/2005	11.5'	Exploratory	<0.02	<5	<1	<5	26	<0.5	<5.0	<20	940	--	--	--	--
	B69-9	5/27/2005	22.5'	Exploratory	<0.02	15	<1	<5	60	<0.5	<5.0	<20	<50	--	--	--	--
B70	B70-2	5/27/2005	5'	Exploratory	<0.02	<5	<1	5.5	<5	<0.5	<5.0	<20	<50	--	--	--	--
	B70-9	5/27/2005	22.5'	Exploratory	<0.02	<5	<1	<5	8	<0.5	<5.0	<20	<50	--	--	--	--
B71	B71-2	6/1/2005	5'	Exploratory	<0.02	<5	<1	<5	<5	<0.5	<5.0	<20	<50	--	--	--	--
B72	B72-1	6/1/2005	1'	Exploratory	<0.02	<5	<1	<5	<5	<0.5	<5.0	<20	<50	--	--	--	--
B73	B73-1	6/1/2005	1'	Exploratory	<0.02	<5	<1	<5	<5	<0.5	<5.0	<20	<50	--	--	--	--
B74	B74-1	6/1/2005	1'	Exploratory	<0.02	<5	<1	<5	<5	<0.5	<5.0	<20	<50	--	--	--	--
B75	B75-1	6/1/2005	1'	Exploratory	<0.02	<5	<1	<5	8.7	<0.5	<5.0	<20	<50	--	--	--	--
B76	B76-1	6/1/2005	1'	Exploratory	<0.02	<5	<1	<5	<5	<0.5	<5.0	<20	<50	--	--	--	--
B77	B77-2	8/19/2005	5'	Exploratory	--	<5	<1	<5	<5	<0.5	<5.0	<20	<50	--	--	--	--
B80	B80-4	8/19/2005	10'	Exploratory	0.04	<5	--	--	--	--	--	<20	54	--	--	--	--
	B80-7	8/19/2005	17.5'	Exploratory	0.02	<5	--	--	--	--	--	<20	<50	--	--	--	--
B81	B81-5	8/19/2005	12.5'	Exploratory	<0.02	<5	--	--	--	--	--	410	**3,700**	--	--	--	--
Drain	Drain	8/19/2005	--	Exploratory	<0.02	<5	--	--	--	--	--	420	1,700	--	--	--	--
B85	B85-2	8/19/2005	5'	Exploratory	0.04	<5	--	--	--	--	--	<20	<50	--	--	--	--
EcoCon Inc. (ECI) 2011																	
B1	B-1:5	9/27/2011	5	Exploratory	0.23	--	--	--	--	--	<10	-	-	<0.02	<0.02	<0.03	<0.03
	B-1:10	9/27/2011	10	Exploratory	<0.03	--	--	--	--	--	--	-	-	**0.032**	0.17	0.058	0.34
B2	B-2:5	9/27/2011	5	Exploratory	<0.03	--	--	--	--	--	--	-	-	<0.02	<0.02	<0.03	<0.03
	B-2:7.5	9/27/2011	7.5	Exploratory	<0.03	--	--	--	--	--	<10	-	-	<0.02	<0.02	<0.03	<0.03
B3	B-3:12	9/27/2011	12	Exploratory	-	6.5	--	<5	--	--	--	<25	<40	-	-	-	-
	B-3:15	9/27/2011	15	Exploratory	-	13	--	5.4	--	--	--	<25	<40	-	-	-	-
B4	B-4:10	9/27/2011	10	Exploratory	-	<5	--	5.8	--	--	--	<25	162	-	-	-	-
	B-4:15	9/27/2011	15	Exploratory	-	**29**	--	7.2	--	--	--	<25	592	-	-	-	-
	B-17:20 (B-4)	10/3/2011	20	Exploratory	-	<5	--	--	--	--	--	<25	<40	--	--	--	--
B5	B-5:5	9/27/2011	5	Exploratory	-	--	--	--	--	--	--	--	--	--	--	--	--
	B-5:10	9/27/2011	10	Exploratory	-	8.2	--	9.9	--	--	--	<25	62	--	--	--	--
	B-5:15	9/27/2011	15	Exploratory	-	8.8	--	1.1	--	--	--	<25	373	--	--	--	--
B6	B-6:10	9/27/2011	10	Exploratory	-	6.7	--	5.5	--	--	--	<25	<40	--	--	--	--
	B-6:15	9/27/2011	15	Exploratory	-	5.4	--	10	--	--	--	<25	87	--	--	--	--
B7	B-7:10	9/27/2011	10	Exploratory	-	**41**	--	5.3	--	--	--	<25	<40	--	--	--	--
	B-7:15	9/27/2011	15	Exploratory	-	9.8	--	9.3	--	--	--	<25	50	--	--	--	--
B8	B-8:5	9/27/2011	5	Exploratory	-	5.5	--	5.6	--	--	--	<25	<40	--	--	--	--
	B-8:10	9/27/2011	10	Exploratory	-	5.1	--	<5	--	--	--	<25	<40	--	--	--	--
	B-8:15	9/27/2011	15	Exploratory	-	47	--	--	--	--	--	<25	<40	--	--	--	--
B9	B-9:4	9/27/2011	4	Exploratory	-	11	--	6.2	--	--	--	<25	<40	--	--	--	--
	B-9:12	9/27/2011	12	Exploratory	-	5.7	--	<5	--	--	--	<25	89	--	--	--	--
B10	B-10:10	9/27/2011	10	Exploratory	-	9.6	--	6.1	--	--	--	<25	<40	--	--	--	--
	B-10:15	9/27/2011	15	Exploratory	-	45	--	<5	--	--	--	<25	82	--	--	--	--
B11	B-11:4	9/27/2011	4	Exploratory	-	10.4	--	8.2	--	--	--	<25	109	--	--	--	--
	B-11:12	9/27/2011	12	Exploratory	-	<5	--	<5	--	--	--	<25	<40	--	--	--	--
B12	B-12:5	9/27/2011	5	Exploratory	-	--	--	--	--	--	--	--	--	--	--	--	--
	B-12:10	9/27/2011	10	Exploratory	-	<5	--	<5	--	--	--	<25	240	--	--	--	--
	B-12:15	9/27/2011	15	Exploratory	-	<5	--	9.1	--	--	--	<25	<40	--	--	--	--
B13	B-13:7	10/3/2011	7	Exploratory	**0.14**	--	--	--	--	--	<10	--	--	<0.02	<0.02	<0.03	<0.03
B14	B-14:5	10/3/2011	5	Exploratory	**0.19**	--	--	--	--	--	<10	--	--	<0.02	<0.02	<0.03	<0.03
	B-14:9	10/3/2011	9	Exploratory	0.087	--	--	--	--	--	<10	--	--	<0.02	<0.02	<0.03	<0.03
B15	B-15:5	10/3/2011	5	Exploratory	<0.03	--	--	--	--	--	<10	--	--	<0.02	<0.02	<0.03	<0.03
	B-15:11	10/3/2011	11	Exploratory	<0.03	--	--	--	--	--	<10	--	--	<0.02	<0.02	<0.03	<0.03

Sample Location	Sample Name	Sample Date	Sample Depth	Sample Type	PCE (mg/kg)	Arsenic (mg/kg)	Cadmium (mg/kg)	Total Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Total Petroleum Hydrocarbons (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
											Gasoline-Range	Diesel- Range	Motor Oil-Range				
B5	B-16:20 (B-5)	10/3/2011	20	Exploratory	-	29	--	--	--	--	--	<25	<40	--	--	--	--
	B-16:23 (B-5)	10/3/2011	23	Exploratory	-	<5	--	--	--	--	--	--	--	--	--	--	--
B18	B-18:15	10/3/2011	15	Exploratory	-	**47**	--	--	--	--	--	--	--	--	--	--	--
	B-18:20	10/3/2011	20	Exploratory	-	<5	--	--	--	--	--	--	--	--	--	--	--
B19	B-19:15	10/3/2011	15	Exploratory	-	**43**	--	--	--	--	--	--	--	--	--	--	--
	B-19:20	10/3/2011	20	Exploratory	-	<5	--	--	--	--	--	--	--	--	--	--	--
B10	B-20:20 (B-10)	10/3/2011	20	Exploratory	-	6	--	--	--	--	--	--	--	--	--	--	--
EcoCon Inc. (ECI) 2012																	
PCE Excavation - S1	S1:11-12’	8/8/2012	11-12’	Confirmation	<0.02	--	--	--	--	--	--	--	--	<0.02	<0.05	<0.02	<0.03
PCE Excavation - S2	S2:11-12’	8/8/2012	11-12’	Confirmation	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S3	S3:7-8’	8/8/2012	7-8’	Confirmation	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S4	S4-7-8’	8/8/2012	7-8’	Confirmation	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S5	S5:11-12’	8/8/2012	11-12’	Confirmation	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S6	S6:7-8’	8/8/2012	7-8’	Confirmation	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S8	S8:8-9’	8/8/2012	8-9’	Confirmation	0.021	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S9	S9:11-12’	8/8/2012	11-12’	Confirmation	<0.02	--	--	--	--	--	--	--	--	<0.02	<0.05	<0.02	<0.03
PCE Excavation - S10	S10:8-9’	8/8/2012	8-9’	Confirmation	0.027	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S11	S11:8-9’	8/8/2012	8-9’	Confirmation	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S12	S12:12-13’	8/8/2012	12-13’	Confirmation	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S13	S13:7-8’	8/8/2012	7-8’	Confirmation	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S14	S14:7-8’	8/8/2012	7-8’	Confirmation	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
PCE Excavation - S15	S15:11-12’	8/8/2012	11-12’	Confirmation	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	SP1	8/8/2012	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	SP2	8/8/2012	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	SP3	8/8/2012	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	SP4	8/8/2012	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	SP5	8/8/2012	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
AB1	AB1-3-4	8/8/2012	3-4'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
	AB1-6-7	8/8/2012	6-7'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
	AB1-9-10	8/8/2012	9-10'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
AB2	AB2-4-5	8/8/2012	3-4'	Exploratory	--	5.9	--	--	--	--	--	--	--	--	--	--	--
	AB2-8-9	8/8/2012	6-9'	Exploratory	--	7.1	--	--	--	--	--	--	--	--	--	--	--
	AB2-13-14	8/8/2012	13-14'	Exploratory	--	6.1	--	--	--	--	--	--	--	--	--	--	--
	AB2-16-17	8/8/2012	16-17'	Exploratory	--	**34**	--	--	--	--	--	--	--	--	--	--	--
AB3	AB3-3-4	8/8/2012	3-4'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
	AB3-11-12	8/8/2012	11-14'	Exploratory	--	9.3	--	--	--	--	--	--	--	--	--	--	--
	AB3-19-20	8/8/2012	19-20'	Exploratory	--	7.1	--	--	--	--	--	--	--	--	--	--	--
	AB3-25-26	8/8/2012	25-26'	Exploratory	--	**37**	--	--	--	--	--	--	--	--	--	--	--
AB4	AB4-3-4	8/8/2012	3-4'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
	AB4-11-12	8/8/2012	11-12'	Exploratory	--	8.4	--	--	--	--	--	--	--	--	--	--	--
	AB4-19-20	8/8/2012	19-20'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
	AB4-27-28	8/8/2012	27-28'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
AB5	AB5-3-4	8/8/2012	3-4'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
	AB5-11-12	8/8/2012	11-12'	Exploratory	--	**49**	--	--	--	--	--	--	--	--	--	--	--
	AB5-19-20	8/8/2012	19-20'	Exploratory	--	**35**	--	--	--	--	--	--	--	--	--	--	--
	AB5-24-25	8/8/2012	24-25'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
AB6	AB6-2-3	8/8/2012	2-3'	Exploratory	--	9.9	--	--	--	--	--	--	--	--	--	--	--
	AB6-6-7	8/8/2012	6-7'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
	AB6-8-9	8/8/2012	8-9'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
AB7	AB7-3-4	8/8/2012	3-4'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
	AB7-8-9	8/8/2012	8-9'	Exploratory	--	5.1	--	--	--	--	--	--	--	--	--	--	--
	AB7-10-11	8/8/2012	10-11'	Exploratory	--	<5	--	--	--	--	--	--	--	--	--	--	--
	AB7-18-19	8/8/2012	18-19'	Exploratory	--	7.4	--	--	--	--	--	--	--	--	--	--	--
AB8	AB8-2-3	8/23/2015	2-3'	Exploratory	--	<5											
	AB8-5-6	8/23/2015	5-6'	Exploratory	--	5.2											
AB9	AB9-2-3	8/23/2015	2-3'	Exploratory	--	8.9											
	AB9-5-6	8/23/2015	5-6'	Exploratory	--	<5											
AB10	AB10-2-3	8/23/2015	2-3'	Exploratory	--	<5											
	AB10-4-5	8/23/2015	4-5'	Exploratory	--	<5											
Stockpile	CSP-1	8/23/2015	NA	Stockpile	**0.36**	--	--	--	--	--	--	--	--	--	--	--	--
	CSP-1	8/30/2015	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	CSP-2	8/23/2015	NA	Stockpile	**0.082**	--	--	--	--	--	--	--	--	--	--	--	--
	CSP-2	8/30/2015	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--

Sample Location	Sample Name	Sample Date	Sample Depth	Sample Type	PCE (mg/kg)	Arsenic (mg/kg)	Cadmium (mg/kg)	Total Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Total Petroleum Hydrocarbons (mg/kg)			Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylenes (mg/kg)
											Gasoline-Range	Diesel- Range	Motor Oil-Range				
Stockpile	CSP-3	8/23/2015	NA	Stockpile	**0.1**	--	--	--	--	--	--	--	--	--	--	--	--
	CSP-3	8/30/2015	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	CSP-4	8/23/2015	NA	Stockpile	**0.064**	--	--	--	--	--	--	--	--	--	--	--	--
	CSP-4	8/30/2015	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	CSP-5	8/23/2015	NA	Stockpile	0.041	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	CSP-6	8/23/2015	NA	Stockpile	0.042	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	CSP-7	8/23/2015	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	CSP-8	8/23/2015	NA	Stockpile	0.021	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	CSP-9	8/23/2015	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
Stockpile	CSP-10	8/23/2015	NA	Stockpile	<0.02	--	--	--	--	--	--	--	--	--	--	--	--
MTCA Method A Cleanup Level (mg/kg)					0.05	20	2	2,000	250	2	100/30	2,000	2,000	0.03	7	6	9

* Reported as intermediate range hydrocarbons.

Table 2: Remedial Alternative Assessment and Disproportionate Cost Analysis

Alternative Name/Description	**Excavation and Disposal**			**Left in Place**		
Evaluation Criteria						
	Score	Weighting Factor	Weighted Score	Score	Weighting Factor	Weighted Score
Overall Protectiveness	10	0.3	3	8	0.3	2.4
Permanence	10	0.2	2	5	0.2	1
Long Term Effectiveness	10	0.2	2	8	0.2	1.6
Manageability of Short Term Risk	5	0.1	0.5	10	0.1	1
Implementability	5	0.1	0.5	10	0.1	1
Consideration of Public Concerns	10	0.1	1	9	0.1	0.9
Comparative Benefit Score			**9**			**7.9**
Estimation of Cost						
Permitting			$ 2,500			$ 1,000
Excavation, Transport and Disposal - 82,500 tons @ $65/ton			$ 5,362,500			$ -
Environmental Oversight and Sampling			$ 25,000			$ -
Site Prep Work, Grading, Compaction, and Capping - $5/square foot			$ -			$ 750,000
Total			**$ 5,390,000**			**$ 751,000**
Cost to Benefit Ratio (Divided by 100,000)			**5.99**			**0.95**