

CONTAMINATED MEDIA MANAGEMENT PLAN

Former Troh Legacy Landfill

Eastern part of Tax Lot 401 of the East Scouts Mountain Development
10010 SE Vradenburg Road
Happy Valley, Clackamas County, Oregon

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1.0 INTRODUCTION

Creekside Environmental Consulting, LLC (Creekside) was retained by The Holt Group / Holt Homes to prepare a Contaminated Media Management Plan for impacted soil and water that may be encountered at the property located at 10010 SE Vradenburg Road, Happy Valley, Clackamas County, Oregon, (Former Troh Legacy Landfill, eastern part of Tax Lot 401 of the East Scouts Mountain Development) hereafter referenced as the site or subject property. A site location map is presented as Figure 1. A general site plan is presented as Figure 2.

1.1 PURPOSE AND USE

This Contaminated Media Management Plan was prepared with the goal of protecting humans and the environment from exposure to hazardous substances and to establish a decision-making structure to assist with the identification and management of contaminated media. This plan:

- Describes the site.
- Summarizes environmental investigations at the site and explains the current understanding of nature and extent of residual impacted soil and water.
- Lists project initiation (pre-fieldwork) considerations and requirements.
- Outlines guidance and requirements for managing contaminated soil and water in a manner that is protective of human health and the environment.
- Provides a contact information list (Appendix A).

Contractors working on the subject property (see attached figures) must follow this plan.

This plan should be reviewed and signed all on-site field personnel involved in any subsurface work at the subject site prior to any soil disturbance. A copy of this plan will be made available to all field personnel, including all earthwork contractors, as a reference. In order to document review and understanding, an acknowledgement page has been appended to this plan (Appendix B) and must be signed by all contractors and field personnel.

1.2 PLAN REVISIONS

Users of this Contaminated Media Management Plan are advised that state, federal or other applicable regulations may change in the future and should be reviewed prior to commencing any subsurface work. If it is believed that requirements or regulations have changed, revisions to the plan may be necessary to reflect current regulatory standards.

Additionally, the Contact Information listed in Appendix A should be kept current.

2.0 SITE DESCRIPTION

The former Troh Legacy Landfill is centered near 45.4488°N, 122.4957°, within Township 1 South, Range 2 East (Willamette Meridian), Section 25D. The nearest street address is 10010 SE Vradenburg Road in Happy Valley, Clackamas County, Oregon.

The outline of the property owned by The Holt Group / Holt Home's and proposed for redevelopment is shown on Figures 2, 3, and 4. Figure 3 further identifies the locations of the following specific areas of interest considered during investigations at the site:

- The **North Cell** (Troh Legacy Landfill) is located in the eastern half of Tax Lot (TL) 401 and covers approximately 1.5 acres.
- The **South Cell** which is comprised of the following two adjoining areas:
 - o Former Cleared Area – is centered on 45.4473471°N, 122.4966401°W, and it is present in the southern third of TL400, the southwest corner of TL1800, the western half of TL1801, and an off-site area south of TL400.
 - o Benched Fill Area – is centered on 45.4469064°N, 122.4983458°W, it is present in the southwest part of TL400, northeast corner of TL200, and an off-site area south of TL400 and east of TL200.
 - o The total area of the South Cell is approximately seven acres.

To be clear, **this Contaminated Media Management Plan has been prepared specifically for the North Cell (former Troh Legacy Landfill)**; however, information on the entire site is included in Sections 2 and 3 for completeness.

2.1 SITE USE AND DESCRIPTION

There are no current regulated operations on site. Current use appears to be limited to three residences. A residential house is located on the western portion of TL401, a second residential structure is present in the northwestern portion of TL1801, and a third residential structure is located on the southern portion of TL200. Otherwise, the site is predominantly wooded with undergrowth and varies in terrain from generally flat to steeply sloping. A power line cuts through the eastern portion of the property on a southwest-northeast trend.

Previously, the site was operated as the Troh Legacy Landfill from 1966 to 1971 and accepted construction and demolition wastes. A small abandoned airport hanger observed near the Troh Legacy Landfill and former air strips are remnants of the small private airport that formerly occupied the site.

2.2 TOPOGRAPHY

The subject area is located within the US Geological Survey Damascus 7.5-minute quadrangle, on the east side of Scouters Mountain. The subject area slopes moderately towards the east. The majority of fill in the North Cell on TL401 appears to have been placed in the eastern portion of the tax lot, between the elevations of 700 and 750 feet above mean sea level (amsl; Figure 1), while the South Cell's benched fill area on TL200 and TL400 appears to have been placed in a drainage feature between elevations 730 and 780 feet amsl.

The primary drainage in this area appears to be Rock Creek, which is located 4,000 feet to the east. The drainage feature in TL400, as well as other ephemeral and perennial drainages in this area appear to discharge to Rock Creek.

2.3 GEOLOGIC SETTING

The site is located within the Portland Basin. The Portland Basin is bounded to the west by the Tualatin Mountains and Portland Hills, and to the east by the Cascade Range and Columbia Gorge. The subject property is located in the central portion of the Portland Basin. The Portland Basin is largely underlain by Holocene sediments and glacial outburst flood deposits of the late Pleistocene Missoula Floods; the latter has been mapped at up to 400 feet elevation amsl with the Portland Basin area. However, the subject site is located east of Portland on a topographic prominence (Scouters Mountain) comprised of Basalt of Mt. Scott, which is up to 260 feet thick in the mapped area and is one of many small shield volcanoes that along with cinder cones comprise the Pleistocene Boring Lava Field¹. Basalt of Mt. Scott consists of light gray to nearly black basalt which mainly occur in flows, the upper surfaces of which are scoriaceous. Near eruptive vents, the formation locally contains cinders, tuff, and tuff breccia². Textures are mostly intergranular grading to intersertal. Boring Lavas are generally resistant to erosion and protect underlying rocks from erosion, thus accounting for broad uplands and some steep-walled canyons; however, in places, Boring Lavas may be greatly dissected and modified by fluvial processes.

2.4 HYDROGEOLOGIC SETTING

Localized perched water bodies can occur within or above the Boring Lavas (i.e., within scoriaceous flow-top breccia), the saturated thickness of which depends on the structure and lithology of the rocks, topographic position, and extent of surficial weathering². Logs of wells completed in the site vicinity indicated that ground water was first encountered at depths ranging from 193 to 630 feet below ground surface (static water levels ranging from 170 to 586 feet), in these 270 to 700-foot-deep wells³. The yield of these wells of 2 to 28 gallons per minute confirm that perched water bodies of the type encountered in Boring Lavas are not that productive because they are small and discontinuous in character. The Springwater Formation or Troutdale Formation underlie the Boring Lavas. Ground water movement will follow topography and is expected to migrate to the east and south towards Rock Creek and the Clackamas Basin.

Trapped water in the landfill was encountered in test pit borings (see geologic profiles in Appendix C). Surface water seeps were also observed originating from landfill material.

2.5 SURFACE WATER

The proposed development site occupies most of the top of the eastern side of a topographical high point. Topology falls away in elevation from all sides of the site. Perennial and ephemeral (intermittent) streams originate on and leave the site through channeled ravines, predominantly on the east side eventually reaching Rock Creek, located approximately 1 mile south and east of the site.

A wetland consisting of marshy ground and wetland grasses was identified⁴ at the western part of the site as shown on Figure 6. An area of ponding at the southwest corner of the North Cell was observed during the field work.

Ground water seeps to the surface have been identified proximate to the North and South Cells (see Figure 6 for locations):

¹ Madin, I.P. 1994. Geologic map of the Damascus quadrangle, Clackamas and Multnomah Counties, Oregon. Geologic Map Series 60

² Leonard, A.R. and Collins, C.A., 1983, Ground Water in the Northern Part of Clackamas County, Oregon: US Geological Survey Open-File Report 80-1049, prepared in cooperation with Oregon Water Resources Department in Ground Water Report No. 29, 36 pages, 2 plates, 9 figures, 4 tables.

³ Oregon Water Resource Department, Water Well Reports 322, 324, 327, 326, and 51598 (http://apps.wrd.state.or.us/apps/gw/well_log/default.aspx)

- SEEP01 was observed east of the southern portion of the North Cell and drains to an intermittent stream⁴. Another seep is suspected east of the northern portion of the North Cell, but it was not accessible due to the occurrence of thick blackberry vines in the area. Seep01 is comprised of a few discharge points over an approximate 700 square-foot area. The water is clear and colorless; however, the ground surface is stained brown-orange where in contact with the water. Discharge rate was not measured, but it is estimated to be less than 1 gallon per minute (gpm) from any one of the single discharge points (negligible flow over a broad area).
- SEEP02 was observed within the South Cell's former cleared area east of test pit TP2 and drains to perennial stream⁴. This seep is composed of an elongate discharge over an approximate 400 square-foot area. The water is clear and colorless; however, the ground surface is stained brown-orange where in contact with the water. The cumulative flow from Seep02 was not measured, but it is estimated to be from 1 to 5 gpm (negligible flow over a broad area).

2.6 INVESTIGATION-DERIVED GEOLOGIC FINDINGS

Creekside excavated eighteen (18) test pits to characterize the former Troh Legacy Landfill as described in Section 3. Test pit logs were referenced for the following local, near-surface geologic descriptions.

2.7 NORTH CELL

Test pit logs were used to prepare three geologic cross-section profiles (A-A', B-B', and C-C') through the North Cell. Cross-section alignment is shown on Figure 5. The geologic cross-section profiles are presented on Figures C-1, C-2, and C-3 in Appendix C and may be referenced for the following discussion.

Longitudinal Section A-A'. Geologic section A-A' (Figure C-1) approximates the longitudinal section of the landfill and its southern extent. At TP14, a 2-foot-thick landfill cap composed of clayey silt covers approximately 10 feet of solid waste consisting of metal, concrete, wood, and plastic debris in a soil matrix. Native silty clay soil underlies the solid waste. At TP12, a 2-foot-thick silty clay cap covers 12+ feet of solid waste consisting of metal, plastic, rubber, concrete, and wood debris in a soil matrix. Due to water that was trapped within the landfill mass seeping into TP12, it was not possible to tag native soil underlying the solid waste. The south edge of the landfill lies between TP12 and TP10-ALT, for only native silty clay was encountered in TP10-ALT. The mapped extent of the North Cell is shown in Figure 5.

Lateral Section B-B'. Geologic section B-B' (Figure C-2) approximates the lateral section of the landfill from the southwest to northeast. As described above, a two-foot-thick cap covers 10 feet of solid waste at TP14. To the southwest at TP11, a 1.5-foot-thick silty clay cap covers approximately 8 feet of solid waste consisting of metal, rubber, brick, and wood debris in a soil matrix. Native silty clay underlies the solid waste at approximately 9.5 feet below ground surface (bgs). The landfill is believed to pinch out between the north lobe at TP14 and the south lobe at TP11 based on topographic considerations. Only native silty clay soil was encountered at TP15, which indicates that the western edge of the landfill occurs between TP11 and TP15 as shown on Figure C-2 and Figure 5.

Lateral Section C-C'. Geologic section C-C' approximates the lateral section of the landfill from the northwest to the southeast. At TP13, a 3-foot-thick clayey silt cap covers 8 feet of solid waste consisting of rope, plastic, tires, and wood debris in a soil matrix. Native silt with clay underlies the solid waste at a depth of approximately 11 feet bgs. As described above, a 1.5-foot-thick cap covers approximately 8 feet of solid waste at TP11. To the southeast, native soil is encountered

⁴ SWCA, Burright Properties Wetland and Water Mapping, Happy Valley, Clackamas County, Oregon.

at TP10-ALT, which indicates that the east edge of the landfill occurs between TP11 and TP10-ALT as shown on Figure 5.

The physical characteristics of the North Cell are outlined below.

- Length: approximately 350 feet north to south.
- Width: approximately 250 feet at the north end, <100 feet near the center, and approximately 275 feet near the south end.
- Depth: greater than 14 feet (including soil cap).
- Area: approximately 62,500 square feet (1.5 acres).
- Landfill Cap: 1.5 to 3 feet thick and composed of silt and clay soil. The cap is generally free of solid waste.
- Solid Waste: greater than 12 feet thick at its center and composed of solid waste in a clay-silt matrix. The solid waste to soil ratio is estimated to range from 1:10 to 1:4. The soil matrix was typically dark gray and moist to wet in the presence of decomposing solid waste below a depth of 4 feet. An odor of decomposing waste was present in one of the test pits (TP12).
- Elevation: approximately 710 feet above mean sea level (amsl) at its toe (east) to 760 feet amsl at its west side.
- Native Soil: native silty clay underlies the North Cell.
- Trapped Water: was encountered within the legacy landfill at depths of 8.5 feet in TP11, 9.5 feet in TP12, 13 feet at TP13, and 11 feet at TP14.

2.8 SOUTH CELL

Benched Fill Area. No solid waste was encountered in the benched fill and/or native soil in test pits TP1, TP2, TP3, TP4, TP5, TP5-Hill1, TP5-Hill2, and TP6-Hill1 excavated in this area. Metal debris at a small surface dump site near TP5-Hill1, TP5-Hill2 and TP6-Hill1 were the only solid waste encountered in the west benched area (Figure 6).

Former Cleared Area. No solid waste was encountered in test pits TP5, TP6, TP7, TP8-ALT, or TP9 in the former cleared area (Figure 6). Furthermore, no solid waste was encountered at TP10-ALT or TP15 to the south of the North Cell. This is sufficient evidence to conclude that disposal of C&D debris was confined to the North Cell and not practiced elsewhere at the site.

3.0 CURRENT UNDERSTANDING OF CONTAMINATED MEDIA

Recent (2014) investigations by contamination have identified residual contamination in soil, as described in this section. Table 1 summarizes soil sampling analytical data. Figure 6 shows soil, seep and soil gas sampling locations.

3.1 BIBLIOGRAPHY

The following documents provide information regarding investigations at the site.

- CH2M Hill, May 21, 1971, ***Solid Waste Landfill Study: An Engineering Report on the Clackamas County Solid Waste Landfill Study***: Prepared for Clackamas County Board of County Commissioners.
- Metro, March 2004, ***Our Landfill Legacy: Metro-area landfills closed since 1960 and their impact on region's urban and natural environment. #114 Troh Landfill***: Prepared by Metro Engineering and Environmental Services Solid Waste and Recycling Department.
- Creekside, March 29, 2011, ***Preliminary Investigation of Troh Landfill***, Happy Valley, Oregon.
- Oregon Department of Environmental Quality (ODEQ), March 16, 2011, ***Troh Landfill Site Visit for Preliminary Assessment***.
- ODEQ, June 2011, ***Federal Preliminary Assessment***, Troh Legacy Landfill, 10010 SE Vradenburg Road, Happy Valley OR 97086, EPA ID #ORN00100298: Prepared for Joanne LaBaw, Site Assessment Program, U.S. Environmental Protection Agency Region 10. Prepared by Sarah Miller, ODEQ, 26 pages, 3 appendices, and 11 tables.
- Creekside, April 2014, ***Landfill Characterization Work Plan***, Former Troh Landfill, 10010 SE Vradenburg Road, Happy Valley OR 97086.
- Creekside, June 2014, ***Initial Subsurface Landfill Investigation Report***, Former Troh Landfill, 10010 SE Vradenburg Road, Happy Valley OR 97086.

3.2 SUMMARY OF ENVIRONMENTAL WORK

In 1971, CH2M Hill conducted a study of the landfill and concluded that the site was adequate for the (continued) operation of a demolition landfill, or with enough soil cover a small sanitary landfill. CH2M Hill's final recommendation to the Clackamas County Commissioners was to permit the site as a sanitary landfill operation in the future. Notwithstanding CH2M Hill's study, the site was never permitted as a sanitary (municipal solid waste) landfill, and it was subsequently closed as a demolition and construction debris landfill. In 2004, Metro Government added the former Troh Legacy Landfill to its Legacy Landfill database.

In 2011, Creekside conducted a preliminary investigation of the Troh Legacy Landfill concurrent with ODEQ's Federal Preliminary Assessment. Creekside observed that several acres had been used as a landfill. Debris consisting of old tires, scrap metal and wood, roofing, old drums, carpet scraps, automobile parts, and old appliances were present between five to ten feet below ground surface, and landfill leachate was draining from the southern tip of the landfill.

For the Federal Preliminary Assessment, ODEQ prepared a Memorandum which summarized the results of the Troh Legacy Landfill site visit conducted by Ms. Miller and Mr. Fortuna on March 15, 2011. They observed landfilled debris that appeared to be disposed of recently (i.e., between 1971 and present day) consisting of tires, metal, containers (metal, glass, plastic), old drums, demolition wastes (pavement, concrete, roofing, shingles, wood), carpet & foam padding, automotive items (car seats and enamel containers). Orange leachate was observed to be draining from the toe of the landfill. The leachate drained into an ephemeral stream which flowed south and off the property line.

In their *Federal Preliminary Assessment* report, ODEQ indicated that nearby construction or demolition projects at the time may have deposited wastes at the Troh Legacy Landfill; e.g., the adjacent Troh's Nest airport serviced many small planes and may have dumped oils at the landfill. ODEQ also determined that other names for the landfill include the "Troh's Nest", and "Obrist & Chaney".

ODEQ stated that they "did not find any existing analytical data or documented contamination on the property". Notwithstanding, ODEQ assembled the following list of preliminary contaminants of concern at the Troh Legacy Landfill:

- Metals – found in debris pile
- Polynuclear aromatic hydrocarbons (PAHs) – from petroleum-based products, including asphalt roofing shingles, tires, pavement, residuals from automotive containers
- Polychlorinated biphenyls (PCBs) – building materials, sealants, and plasticizers
- Polybrominated diphenyl ethers (PBDEs) – from carpet, foam padding and car seats
- Semi-volatile organics (SVOCs) – building materials, paints and coatings
- Methane gases – decomposition of building materials and wood
- Pesticides (DDx and Dieldrin) – possible residual from discarded containers and demolition associated soils

Within Oregon Water Resources Department (OWRD) database, ODEQ identified 652 ground water wells within a 4-mile radius of the site, seven of which were domestic wells within one-half mile of the site. One of the seven domestic wells is an on-site well that serves the residential house on the same tax lot as the former landfill. Domestic wells in the landfill vicinity are 200 to 700 feet deep and pull water from the aquifer below the basalt strata. Based on this information, ODEQ concluded that the landfill is not likely to contaminate local ground water wells, given the basalt layer is estimated to lie approximately 200 feet beneath the landfill.

The leachate generated by the landfill drains to an ephemeral stream, which drains to an ephemeral creek, which drains to Rock Creek (perennial stream), which has its confluence with Clackamas River at river mile 6.2.

ODEQ concluded in their *Federal Preliminary Assessment* report that further site investigation appeared warranted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) on the basis of: absence of analytical data, presence of leachate from landfill, pathway of leachate moves off the property and into surface waters, on-site domestic drinking water well, and some wastes not completely covered with soil.

In May 2014, Creekside conducted landfill characterization to delineate fill boundaries and depth, characterize the buried waste and investigate subsurface impacts with collection of representative soil samples at selected locations. Work also included collecting leachate water samples from two landfill cell seeps and soil gas samples from the periphery of landfill areas. Results of this work are described next.

3.3 NATURE AND EXTENT OF KNOWN RESIDUAL CONTAMINATION

Eighteen test pits were excavated at selected locations. Profiles (locations, depths and presence) of the solid waste present in the North Cell were further developed. Waste materials appeared to consist generally of construction and demolition debris, e.g., concrete, metal, drums, wire, wood, plastic sheeting, rubber hoses, and mattress springs. Household waste was not observed. Test pits conducted throughout the South Cell did not encounter any buried solid waste, but did find a general area of surface-waste deposits. One surface soil sample proximate to TP6 in the South Cell and four solid waste samples (in a soil matrix) from the North Cell were submitted to the laboratories for analysis.

The surface sample and one of the solid waste samples (from TP12) contained constituents at concentrations exceeding their respective screening-level risk-based concentrations (SLRBCs) in soils: lead, the pesticides aldrin, chlordane, and dieldrin, and the PAHs benzo(a)pyrene and benzo(b)fluoranthene were identified as preliminary COPCs. In addition, aldrin, chlordane, DDD, DDE, dieldrin, benzo(a)pyrene, benzo(b)fluoranthene, cadmium, copper, and lead exceeded ODEQ Clean Fill Screening concentrations.

Trapped water is in direct contact with solid waste in the landfill cell, and two seeps with visible leachate discoloration were sampled during the characterization activities. The seeps were located at the east toe of the North Cell (SEEP01) and at the former cleared area of the South Cell (SEEP02). Neither seep water sample contained impacts exceeding ODEQ SLRBCs or Water Quality Criteria.

Soil gas was screened at eleven locations at a depth of five feet with a landfill gas indicator around the perimeter of the proposed development proximate to the North and South Cells. Depleted oxygen and enriched carbon dioxide measured in three of the soil gas probes suggest that methanogenesis may be active in the vicinity of both the North Cell and the South Cell's benched fill area. Notwithstanding, potentially explosive conditions were not indicated by the data. The highest concentrations of total volatiles detected (at SG10) are not significant in terms of potential soil impacts.

Note to Contractors: Due to the historic use at the property as a landfill, and due to the variable nature of material that maybe found at a historic landfill, all subsurface work at the property should be conducted with the understanding that as-yet unidentified areas of residual soil or water contamination may be encountered. Also, while not indicated by perimeter testing, explosive conditions may be present in the historical landfill and precautions should be taken accordingly.

4.0 PROJECT INITIATION

This section describes work to be conducted and requirements to be met prior to beginning work at the site.

4.1 NOTIFICATIONS, PERMITS AND OTHER APPROVALS

All notifications, legally-required permits or other approvals required to conduct the work to be performed will be made or obtained prior to starting work at the site.

4.2 CONTRACTOR REQUIREMENTS

Contractors and/or subcontractors hired to conduct earthwork at the site will be competent and experienced in the management of contaminated media. Pre-planning of anticipated work with the environmental consultant (contact information in Appendix A) is recommended to determine the most cost-effective approach to soil management, testing and disposal.

4.3 ON-SITE PERSONNEL

All field personnel who have the potential for coming in contact with impacted media will:

- Have their Hazardous Waste Operations and Emergency Response Standard (HAZWOPER) Forty (40) Hour training and certification, as well as annual updates.
- Have a copy and be familiar with the Health and Safety Plan.
- Have reviewed and signed the acknowledgement page of this Contaminated Media Management Plan.

The signed acknowledgement pages will be available for the property owner's or site management's inspection and permanent record-keeping, if requested.

4.4 HEALTH AND SAFETY PLAN

A Health and Safety Plan specific to the work to be performed will be prepared according to industry standards. At a minimum, Occupational Safety & Health Administration (OSHA) standards specific to the work to be performed will be met. The Plan should be prepared by a qualified specialist knowledgeable about health and safety issues, the contaminants identified at the site, the previously documented site conditions, and the contractors' proposed scope of work. The Health and Safety Plan should include and expand upon the following basic protective measures to protect workers from contaminated soil.

On-site workers may be exposed to contaminants through incidental:

- Ingestion
- Dermal contact
- Inhalation of impacted airborne dust or vapor

To reduce exposure:

- ✓ All personnel will minimize their contact with soil and ground water, and wear project-specific personal protective equipment identified by the Health and Safety Plan. At a minimum, clothing shall include long-sleeve shirts, work pants or overalls (no shorts/cut-offs), gloves, and American National Standards Institute (ANSI)-approved safety vest, footwear and hardhat.
- ✓ Personnel will thoroughly wash their hands and other exposed body parts, as necessary, upon leaving the work area and before eating, drinking, or other activities.

- ✓ Release of dust to the air should be minimized, and all personnel will remain upwind of the work areas to the maximum extent practical.
- ✓ Contaminated clothing should be washed with a strong detergent and hot water before reuse.

4.5 PROTECTIVE MEASURES FOR THE ENVIRONMENT

This section provides general measures to be taken to protect the environment from contaminants in soil and water. The environment may be exposed to contaminants through incidental:

- Wind-borne dispersion
- Transport by surface water
- Transport by site equipment or workers
- Contact by public or environmental receptors (e.g., birds and animals) that enter the work area

To reduce exposure:

- ✓ Minimize the area being worked on at one time to the extent possible.
- ✓ Control access to earthwork area through fencing, signage, or other means.
- ✓ Remove any dirt from equipment or personnel prior to leaving the work area.
- ✓ Implement dust-control methods, if needed.
- ✓ Prevent any surface water from leaving the work area.
- ✓ Erosion controls, e.g. silt fences, wattles, and storm drain filters, to prevent any surface water and sediment from leaving the work area and entering the storm water system.

Implement controls to prevent migration of impacted soils from tires of construction equipment and trucks to adjacent areas and city streets.

5.0 SOIL MANAGEMENT

The ODEQ requires contaminated media to be adequately characterized to determine how it should be managed. When soil is highly contaminated, the generation, treatment, transportation and disposal may fall under state and federal hazardous waste regulations.⁵ Contaminated media that is not hazardous waste is regulated under Oregon Administrative Rule Chapter 340-093 for solid waste.

It is important for field personnel to know how to identify, characterize (if appropriate), and manage contaminated soil. To minimize expenses from any subsurface project, we recommend reviewing the scope with the Environmental Consultant.

If soil exhibiting evidence of contamination is encountered during excavation, this should be brought to the immediate attention of a representative of The Holt Group / Holt Homes. They may ask the Environmental Consultant to conduct additional field screening, to coordinate with ODEQ (as appropriate), and to direct soil characterization and handling activities in areas of contamination.

5.1 IDENTIFICATION OF CONTAMINATED SOIL

Due to the variable nature of a landfill, any work in fill areas must be prepared to manage contaminated soil, which may be identified based on any combination of the following factors:

- Visual observation of soil:
 - o Staining. Petroleum-hydrocarbon impacted soil typically exhibits gray or black staining. Other contaminants may also cause staining. However, gray or black soil may also be the result of other natural conditions and does not necessarily imply the presence of hazardous materials.
 - o Sheen. Some impacted soils may exhibit a sheen (soil will appear shiny and reflective). Sheens associated with heavily-impacted soil may appear iridescent with rainbow-like colors. However, some naturally occurring organics might also create this visual affect.
- Olfactory observation of an odor. Soil impacted with petroleum hydrocarbons, VOCs, and other types of contamination may release vapors creating a chemical odor. It should be noted that inhalation of vapors from impacted soil can be harmful to human health. Therefore this should be an inadvertent field indicator, not a method used for continuous soil screening.
- Knowledge of the extent of impacted soil based on previous environmental work (described in Section 3).

All subsurface work conducted in former landfill fill areas must include field screening as follows:

1. Observe soil/fill material and note nature of material and any staining, sheen, and/or odor. Location should be documented (survey or high accuracy GPS data is recommended) and pictures with a frame of reference should be taken.
2. Collect samples by hand or trowel (approximately one handful) that are representative of the material being excavated. If used, the trowel will be decontaminated between sampling intervals. Soil samples collected for field screening or laboratory analysis will be collected from materials exhibiting the highest levels of contamination.

⁵ When soil is contaminated by a listed or characteristic hazardous waste, then soil contains a hazardous waste and must be managed accordingly. ODEQ hazardous waste generator requirements are triggered when the contaminated soil is removed from its original location.

3. Retain a portion of the soil sample (approximately the size of half a sugar cube) for sheen testing that includes dropping the soil into a black pan to observe the degree of soil sheen (no sheen, slight sheen, moderate sheen, or heavy sheen).
4. Place the majority of the grab soil sample into a plastic bag with trapped air. The bagged sample is allowed to sit for approximately one minute and then tested for headspace vapor using a hand-held instrument designed for screening for volatile constituents (e.g., photoionization detector [PID]). Based on the routine field screening process and the use of standard bag size, we can assume the amount of trapped air in each bag will be approximately equivalent for all field-screened samples. Calibration of the PID will be conducted on a daily basis and will be recorded in a calibration log. The calibration log will document the PID model calibration standard used and background level after calibration.
5. Record the field screening evidence of contamination, headspace measurements, and a brief description of the soil type on a soil field screening log. The log will identify the location of the screened material and summarize the individual field screening results.

5.2 INSPECTION FOR OTHER CONTAMINANTS

All excavated or disturbed soil will be evaluated for other potential impacts using visual observations and olfactory responses. Some potential contaminants based on historic use at the site might not be readily apparent based on visual screening. Therefore, precautions to protect works and the environment described in Section 4 should be implemented during all scopes of work.

Any soils identified through sight or smell as being potentially impacted shall be **should be brought to the immediate attention of a representative of The Holt Group / Holt Homes** who may ask the Environmental Consultant to direct soil characterization and handling and to coordinate with ODEQ (as appropriate).

Any excavated potentially-impacted soils should be stockpiled on site following the protocol in Section 5.3.1, below.

5.3 MANAGEMENT OF IMPACTED SOIL

Before any soil at the site is excavated or disturbed, a project manager should decide how impacted soil will be managed. Based on analytical soil data (existing or acquired during work), soil generated during subsurface work may potentially be handled as either 1) clean fill, 2) solid waste, or 3) hazardous waste. It is highly advised that the Environmental Consultant be contacted prior to starting work to develop the least expensive approach to working with residual impacted soils.

PLEASE NOTE: A representative of The Holt Group / Holt Homes must be notified and approve of all off-site disposal locations regardless of soil quality.

5.3.1 Stockpile Management

***** Soil that is placed in temporary stockpiles must be well maintained at all times*****

- Stockpile soil temporarily on-site for either:
 - ✓ Future (within 30 days) off-site disposal at a pre-approved facility, or
 - ✓ Assessment by the Environmental Consultant for possible reuse on site.

- These soils may be temporarily managed on-site for no more than 30 days. Any longer on-site storage/management will require a solid waste treatment permit.⁶

All temporary stockpiled soil must be placed on impermeable plastic sheeting (minimum 6-mil-thick) with a berm around the perimeter of the stockpile. The plastic sheeting and berm will prevent the runoff of soil and potential contaminants to surrounding areas. The berm can be constructed with straw/hay bales or wattles, mounded soil, dimensional lumber, or other equivalent methods. The bottom plastic sheeting should be lapped over the berm materials, and the soil stockpile should be covered with plastic sheeting to prevent erosion or leaching of contaminants to underlying soil and prevent exposure to precipitation and wind. Plastic sheeting that covers the soil stockpile should be weighted using sand bags or equivalent. Following removal, the soil stockpile area should be restored to a pre-stockpile condition. Residual plastic or debris should not be left unattended at the project site following stockpile removal.

5.3.2 On-Site Re-use

Contaminated soil generated during subsurface work may qualify for re-use on site depending on the type and concentrations of contaminants (as reported by the analytical laboratory). This approach potentially requires a project-specific sampling and analysis plan and may require approval by ODEQ prior to implementation. *Please contact the Environmental Consultant to decide if re-use on-site is a cost-effective and viable option for the project.*

5.3.3 Off-Site Disposal

Contaminated soils may either be excavated directly to transport vehicles or may be stored in stockpiles and then excavated to transport vehicles for off-site disposal. **A permit will need to be obtained from the disposal facility prior to hauling and disposal.** Copies of the permit should accompany each load transported to the selected disposal facility. (Nearest landfill information is included in Appendix A.)

Disposal facilities often have the following requirements prior to accepting material at their facility:

- No material will be received without a completed contaminated soil profile and permit application (to be prepared by the earthwork contractor), an approval of credit application on file, and permit from the disposal facility.
- Trucks will be permitted to weigh in and cannot exceed the tonnage limit negotiated with the facility.
- The receiving facility may sample the excavated material upon receipt. Any truckloads that are not consistent with the soil profile may be rejected.
- Exported soil must not contain any free liquids or foreign material (i.e., rebar, pipe/fittings, cans, plastic, wood, etc.). Truck loads found with excessive foreign or organic material may be reloaded and returned to the contractor or screened, sorted, and disposed by the disposal facility for an additional fee.

Due to some facilities restriction on foreign material, a plan should be developed for the management and disposal of any removed landfill debris prior to beginning work.

⁶ ODEQ, August 2011, *Fact Sheet: Petroleum Contaminated Soils Handling Options*, Publication No. 09-LQ-083.

5.3.4 Loading and Hauling

Soil that has been characterized and requires off-site disposal can be loaded directly into trucks for transport to the receiving facility once the disposal permit has been issued. The contractor must exercise care during loading of the impacted soil to help minimize spillage of the soil onto the ground surface. All trucks leaving the project site must be free of loose soil on the exterior of the trucks and tires and may require covers. Impacted soil loaded into trucks should be covered if weather conditions could cause soil to blow out (dry, warm, or windy conditions) or drain/leach out (wet, rainy conditions) during transport to the disposal facility. The contractor must use care not to track soil onto roads and must routinely wash down the roads if soil is being tracked onto them. Trucks should not be allowed to leave the project site if liquids are draining from the load. Transport tracking tickets may be required, which document the haul to the approved disposal facility for each individual truck leaving the project site.

5.3.5 Record Keeping and Reporting Requirements

The contractor is responsible for and shall keep and provide upon request detailed daily records of all work related to contaminated soil. At a minimum, the following shall be documented:

- Appendix B consisting of original signatures of all field personnel indicating that they have read and understood the content of this Contaminated Media Management Plan.
- Company or companies performing work, personnel overseeing work, purpose of work and site conditions.
- Documentation of the locations (areal and vertical extents) where work was conducted and any impacted media encountered. A photo-documentation log of the field work and survey or high accuracy GPS data is highly recommended.
- Documentation (including photographs, as appropriate) of the location of, method of collection, and analytical results of any samples collected and analyzed. Chain-of-custody documentation should also be retained with the analytical data.
- If any impacted soil is stored on-site, dates, locations and methods of storage.
- All communications regarding methods of contaminated soil management and disposal.
- Disposition of any impacted media, including permit and disposal receipts, as appropriate. All waste disposal receipts must be retained on site and available for inspection.

Based on these records, a report may be prepared and submitted to ODEQ.

6.0 WATER MANAGEMENT

Both surface water at and around the landfill and trapped water in the landfill cells have the potential to be impacted and require management. **Work during the dry season is recommended to minimize the potential volume of water needing to be managed.**

- Surface water has the possibility of ponding in low spots and becoming impacted by soil contamination during subsurface work. Additionally, surface water discharges from the down-slope portions of the landfill (e.g., Seep01) and has the potential to be impacted. Any surface water present that becomes or was in contact with landfill material within the area of work must be managed as described in this section.
- Trapped water was encountered in the landfill during test pit work at variable depths. Any dewatering activities will require management as described in this section.

6.1 MANAGING REMOVED WATER

Any dewatering of surface water or trapped water as described above will require management using one of the following methods:

- Above-ground management in a temporary holding vessel prior to disposal. Temporary holding vessels prior to disposal may consist of a 55-gallon drum, a small above-ground storage tank (AST), one (1) or more large ASTs (such as Baker® or Frac®-Tanks), or other suitable storage vessels, depending on the amount of water to be removed. During the dewatering process, care should be taken to minimize the uptake of soil and sediment, so as not to require additional waste treatment or acceptance charges.
- Direct transfer to a truck designed and permitted to transport such wastes.

Dewatered fluids may require sampling and testing, dependent upon the disposal method(s) to be used. Contact the Environmental Consultant to ensure correct sampling protocol and methods are used and whether onsite disposal following characterization is possible, or to assist with determining an appropriate disposal method.

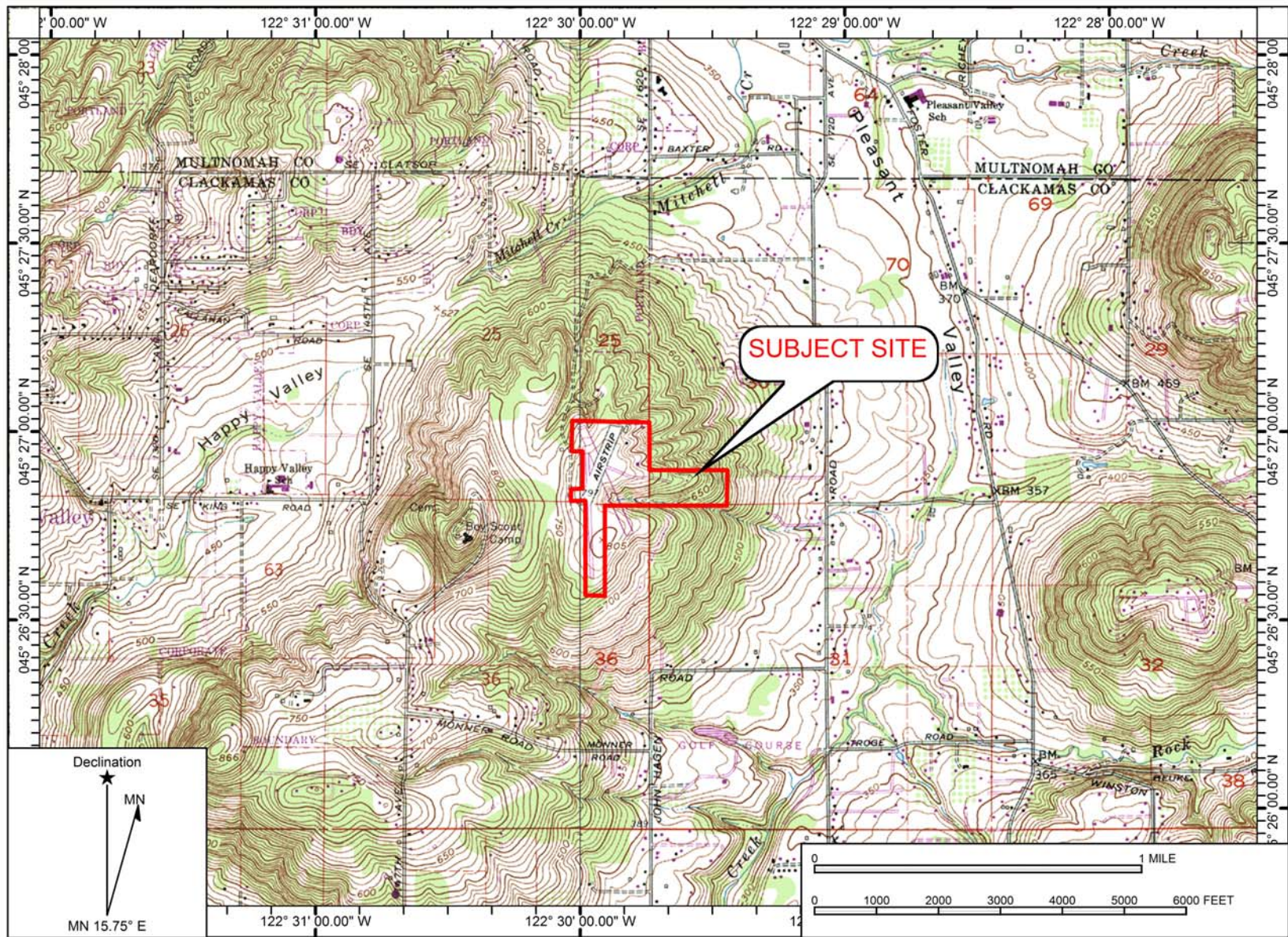
6.2 RECORD-KEEPING FOR REMOVED WATER

The contractor is responsible for and shall keep and provide upon request detailed daily records of all work related to water management and disposal. The following information must be submitted to the Environmental Consultant for each batch of water:

- Company performing work
- Batch identification
- Batch laboratory results
- Documentation of approval for discharge or waste manifest/receipt of trucking company
- Date discharged/transported
- Total gallons discharged/transported

Once work is complete, this information will be summarized for all occurrences and submitted to the appropriate agencies by the Environmental Consultant.

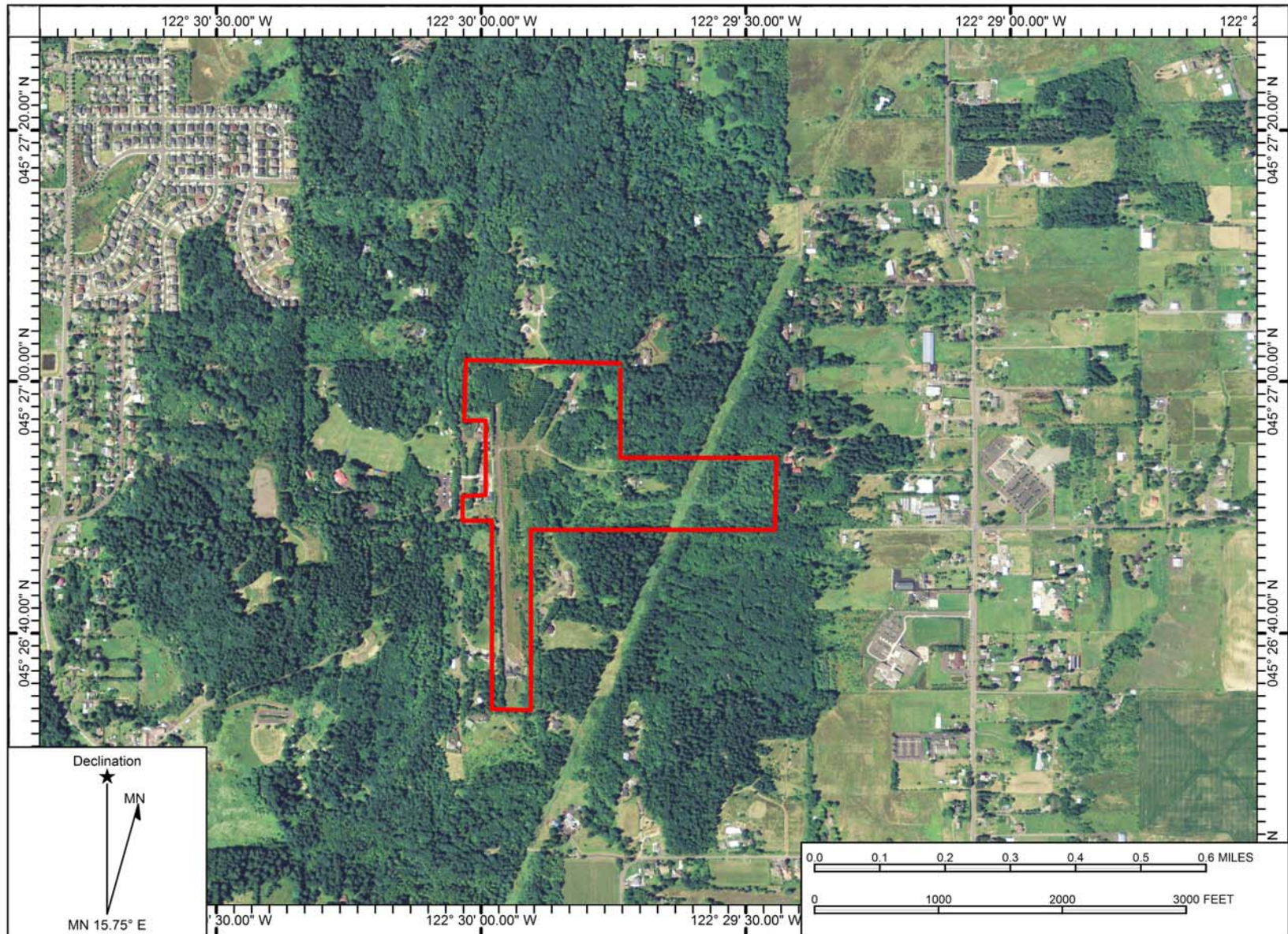
FIGURES



Source: USGS Topographic Map, 7.5 Minute Damascus, OR Quadrangle

Map Publish Date: 1961 / Revision Date: 1984

	Date Drawn: 5/30/2014 CAD File Name: 351-14002fig1sv_map(v02).docx Drawn By: KMC Approved By: BJ	Troh Landfill 45° 26' 57.59"N / 122° 29' 49.78" W Happy Valley, Oregon	Site Vicinity Map	Project No. 351-14002-01 Figure No. 1
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Source: USGS Topographic Map, 7.5 Minute Damascus NW, OR Quadrangle

Map Publish Date: Jul 6, 2012 / Revision Date: Jul 6, 2012

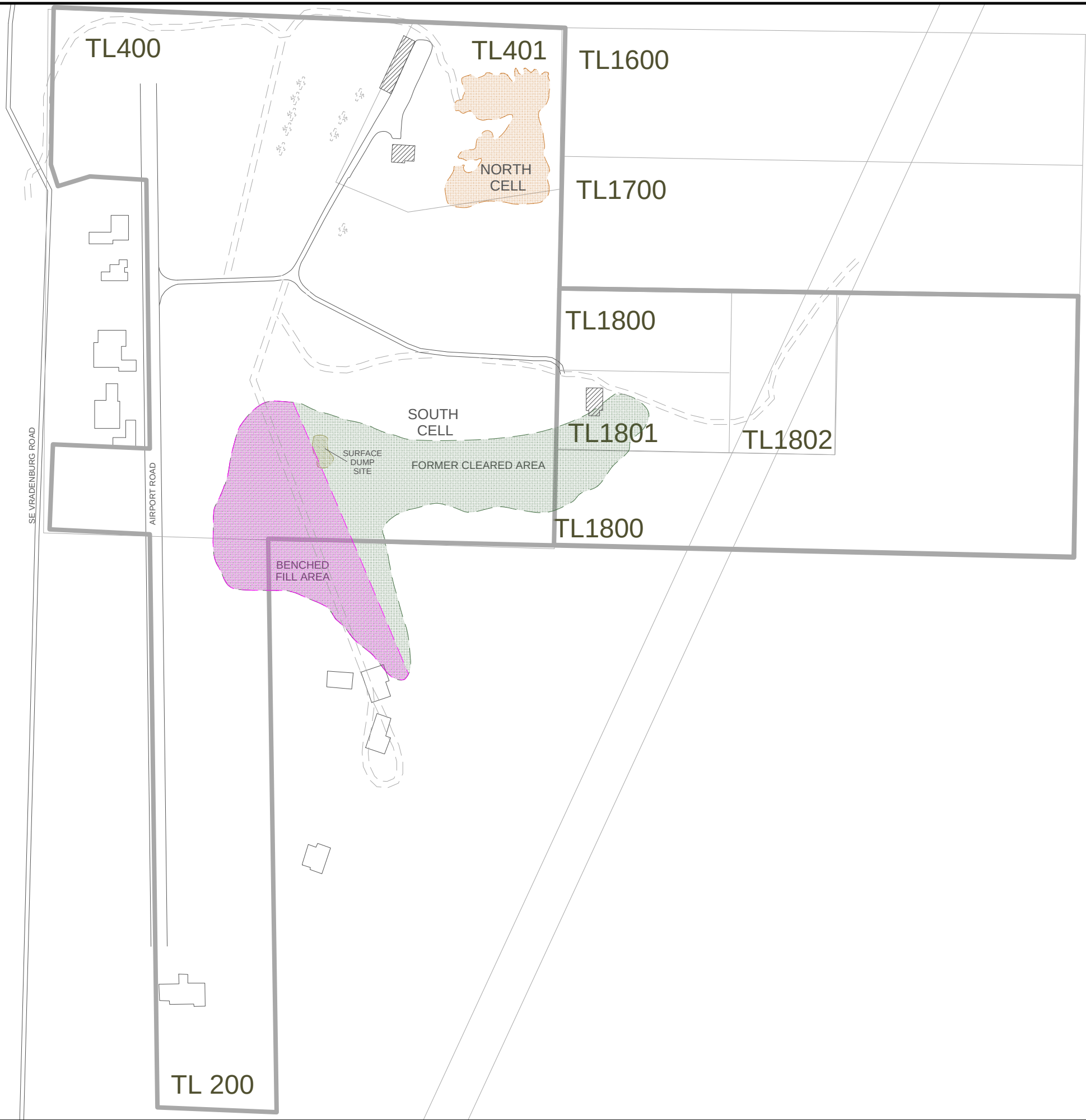


Date Drawn: 5/30/2014
CAD File Name: 351-14002fig2aerial.docx
Drawn By: KMC
Approved By: BJ

POINT LAMUUIII
45° 26' 57.59"N / 122° 29' 49.78" W
Happy Valley, Oregon

**Aerial Photo Map
(2012)**

351-14002-01
Figure No.
2

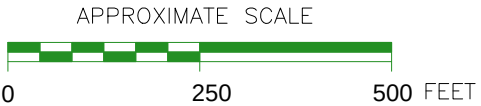


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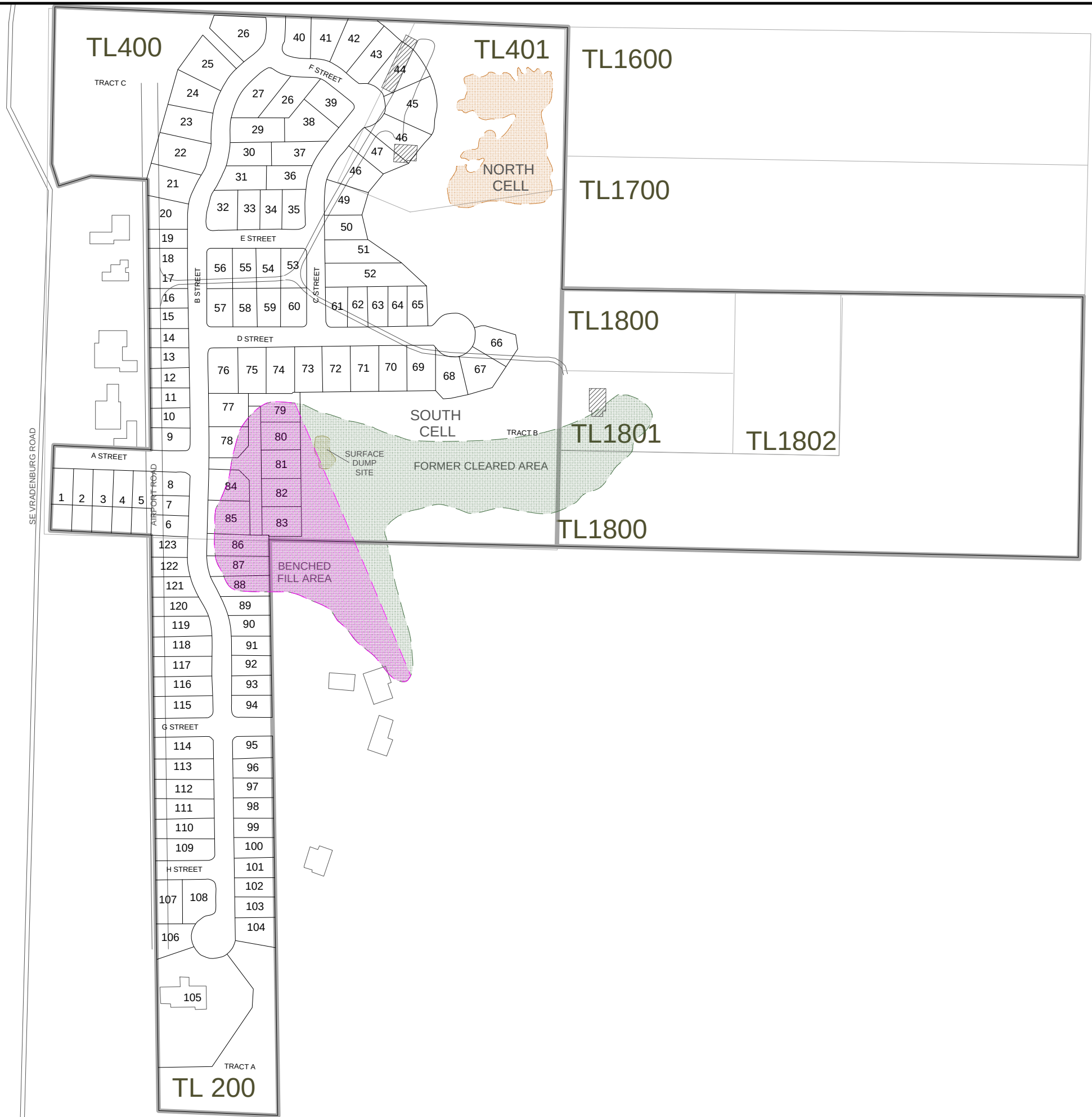
- SUBJECT BUILDINGS
- BUILDINGS
- TAX LOT BOUNDARIES
- SUBJECT PROPERTY BOUNDARIES
- TROH LEGACY LANDFILL
- FORMER CLEARED AREA
- SURFACE DUMP SITE
- BENCHED FILL AREA
- FORMER ROADS AND AIRSTRIPS
- FORMER AIRCRAFT PARKING

NOTES:

1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2012.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.



	CREEKSIDE ENVIRONMENTAL CONSULTING, LLC 21790 SW CHEHALIS COURT TUALATIN, OREGON 97062 (503)692-8118
FIGURE 3 SITE PLAN TROH LANDFILL 45° 26' 57.59"N 122° 29' 49.78" W HAPPY VALLEY, OREGON	

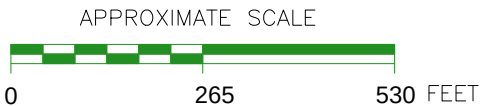


LEGEND:

- SUBJECT BUILDINGS
- BUILDING LOCATIONS
- TAX LOT BOUNDARIES
- FORMER LANDFILL AREAS
- FORMER CLEARED AREA
- SURFACE DUMP SITE
- BENCHED FILL AREA
- SUBJECT PROPERTY BOUNDARIES
- BUILDING LOTS (PROPOSED)

NOTES:

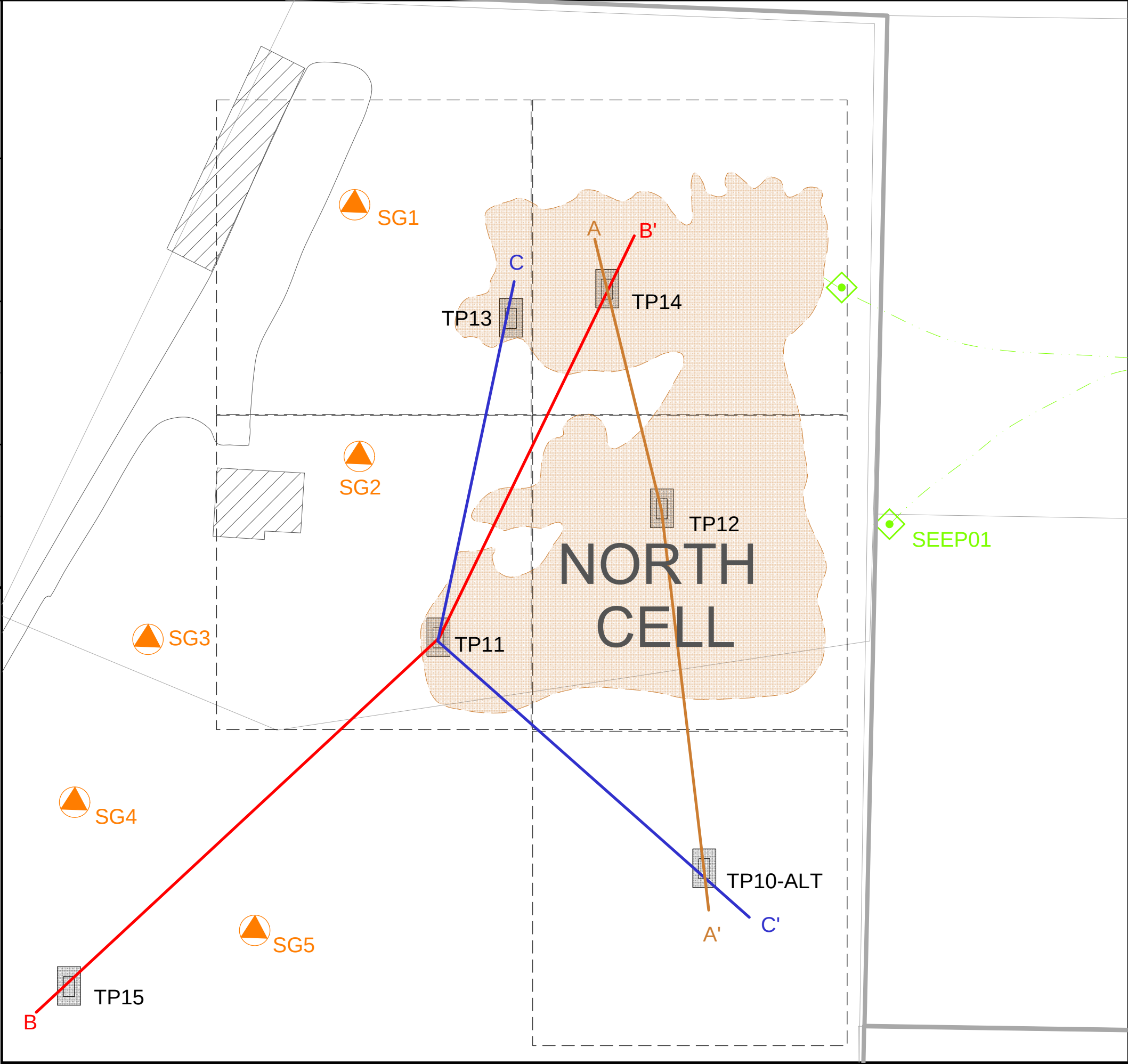
1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2012.
2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.



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CONSULTING, LLC
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(503)692-8118

FIGURE 4
SUBDIVISION LOTS

TROH LANDFILL
45° 26' 57.59"N 122° 29' 49.78" W
HAPPY VALLEY, OREGON



LEGEND:

- SUBJECT BUILDINGS
- BUILDING LOCATIONS
- TAX LOTS
- SUBJECT PROPERTY BOUNDARIES
- FORMER LANDFILL AREAS
- STREAM INTERMITTENT
- STREAM PERENNIAL
- TEST PITS (ONE PER 200' GRID)
- TP1
- SYSTEMATIC SAMPLING GRID (200' X 200')
- LANDFILL GAS PROBES
- SG1
- SEEPS
- SEEP01
- GEOLOGIC CROSS SECTIONS'
- B-B'

NOTES:

- BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2012 AND FIELD NOTES.
- ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.

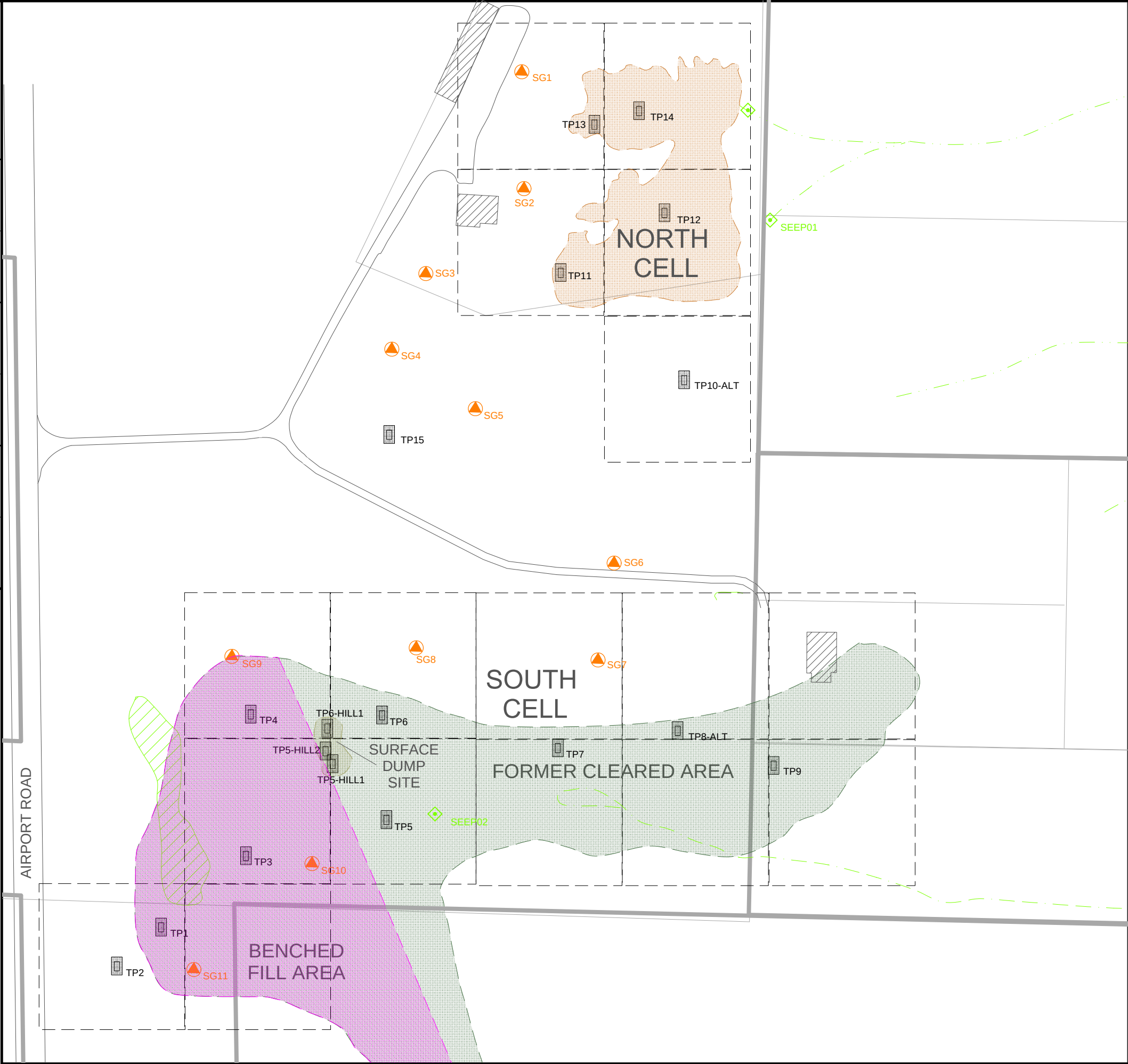
APPROXIMATE SCALE

0 65 130 FEET

N

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(503)692-8118

FIGURE 5
LINE OF SECTIONS PROXIMAL TO LEGACY LANDFILL
TROH LANDFILL
45° 26' 57.59"N 122° 29' 49.78" W
HAPPY VALLEY, OREGON



LEGEND:

BUILDING LOCATIONS

TAX LOTS

PROPOSED DEVELOPMENT AREA

FORMER LANDFILL AREAS

SURFACE DUMP SITE

STREAM INTERMITTENT

STREAM PERENNIAL

WETLAND

TEST PITS (ONE PER 200' GRID)

SYSTEMATIC SAMPLING GRID (200' X 200')

SOIL GAS PROBES

SEEPS

SUBJECT BUILDINGS

FORMER CLEARED AREA

BENCHED FILL AREA

- NOTES:
1. BASE MAP DEVELOPED FROM AN AERIAL PHOTOGRAPH MAP DATED 2012 AND FIELD NOTES.

2. ALL BUILDING, STREET, AND FEATURE LOCATIONS ARE APPROXIMATE.

N

APPROXIMATE SCALE

0

140

280 FEET

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(503)692-8118

FIGURE 6
SAMPLE LOCATION DIAGRAM
(SOIL, SOIL GAS, AND SEEPS)
TROH LANDFILL
45° 26' 57.59"N 122° 29' 49.78" W
HAPPY VALLEY, OREGON

APPENDIX A CONTACT LIST

CONTACTS

Site Contacts

Holt Group (Property Owner)

Ryan Tuttle

Office: 360-892-0514

Clackamas County Water Environmental Services (for Water Disposal to municipal sewer)

503-742-4567

Creekside Environmental Consulting, LLC, Environmental Consultant

Brent Jorgensen, Project Manager, 503-692-8118

Project Support

Waste Management Inc. Permits Manager

Kristin Castner, Hazardous Material Specialist: 503-493-7834

Hillsboro Landfill (Subtitle D Landfill)

Creekside Environmental, Brent Jorgensen, Project Manager, 503-692-8118

National Pollutant Discharge Elimination System (discharge permitting)

Creekside Environmental, Brent Jorgensen, Project Manager, 503-692-8118

APPENDIX B ACKNOWLEDGEMENT SIGNATURE PAGE

CONTAMINATED MEDIA MANAGEMENT PLAN

ACKNOWLEDGMENT SIGNATURE PAGE

To be signed by all on-site personnel:

I have read this Contaminated Media Management Plan, and I agree to abide by these measures and safety rules and all applicable safety regulations while working at this site. I understand that any violation of these rules will result in my removal from the work area.

Signature / Title - Project Role

Date

Signature / Title - Project Role

Date

Signature / Title - Project Role

Date

Signature / Title - Project Role

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Signature / Title - Project Role

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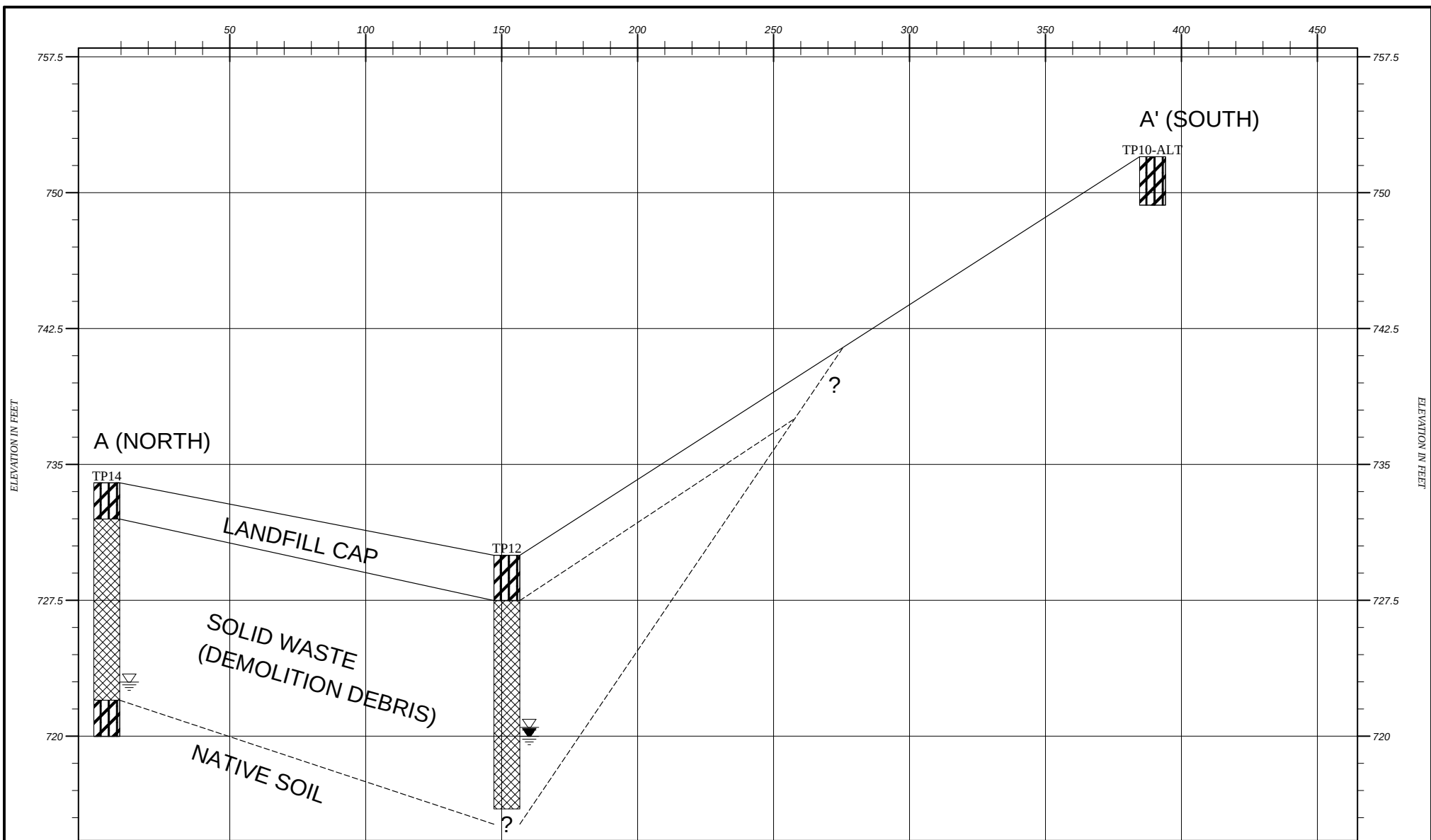
Signature / Title - Project Role

Date

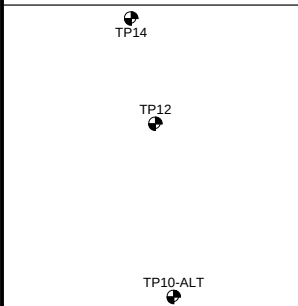
Signature / Title - Project Role

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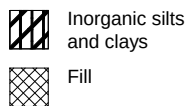
APPENDIX C GEOLOGIC PROFILES



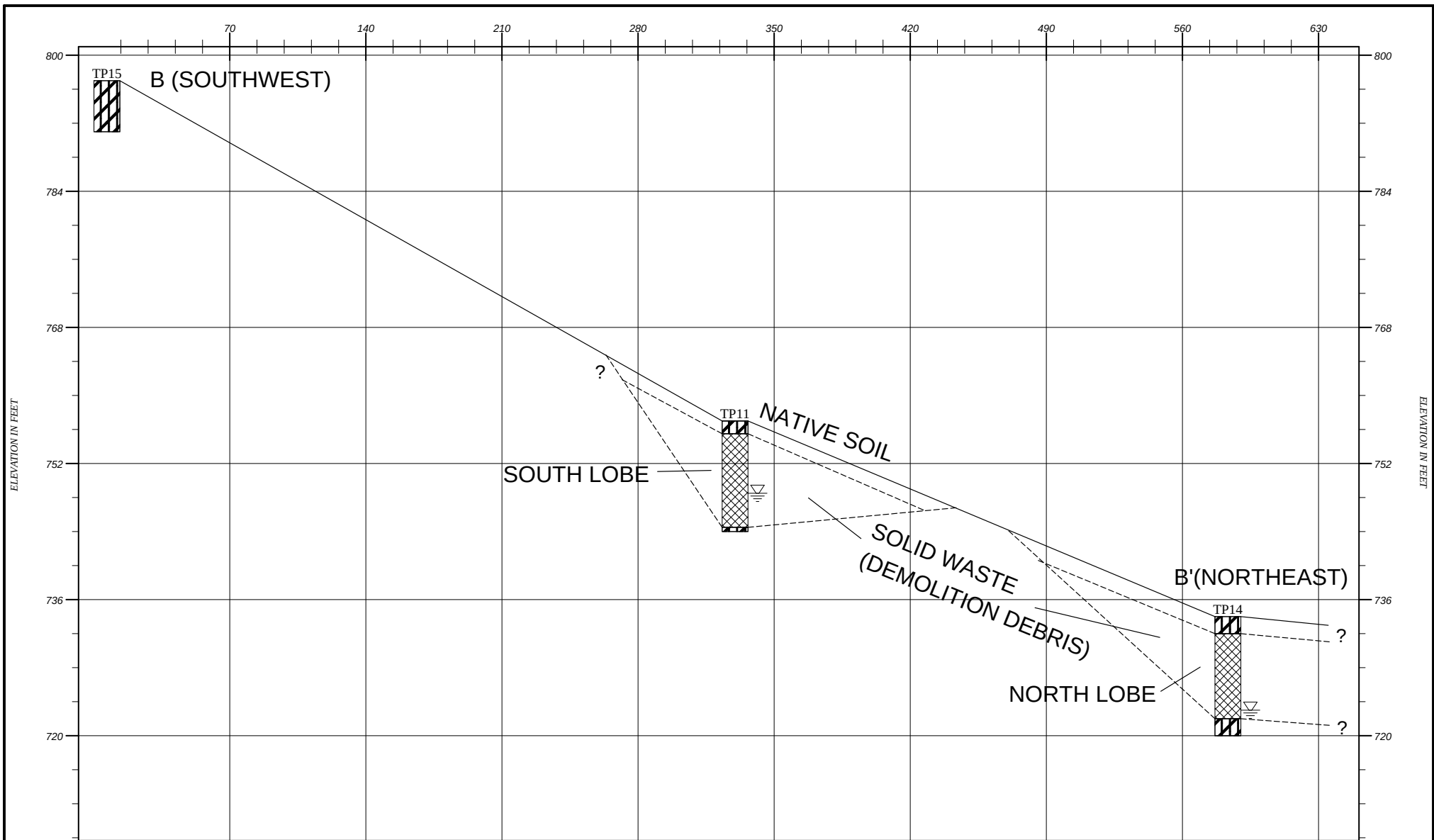
Plan View



Strata symbols

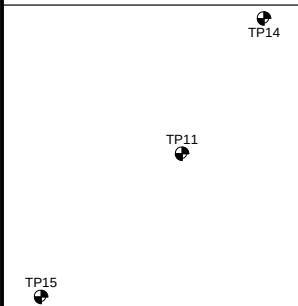
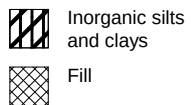


EVREN Northwest GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: 1"=50'	DRAWN BY/APPROVED BY P. TRONE /L. GREEN	DATE DRAWN 5/28/2014
Troh Landfill		
PROJECT NO. 351-14002-01		FIGURE NUMBER C-1

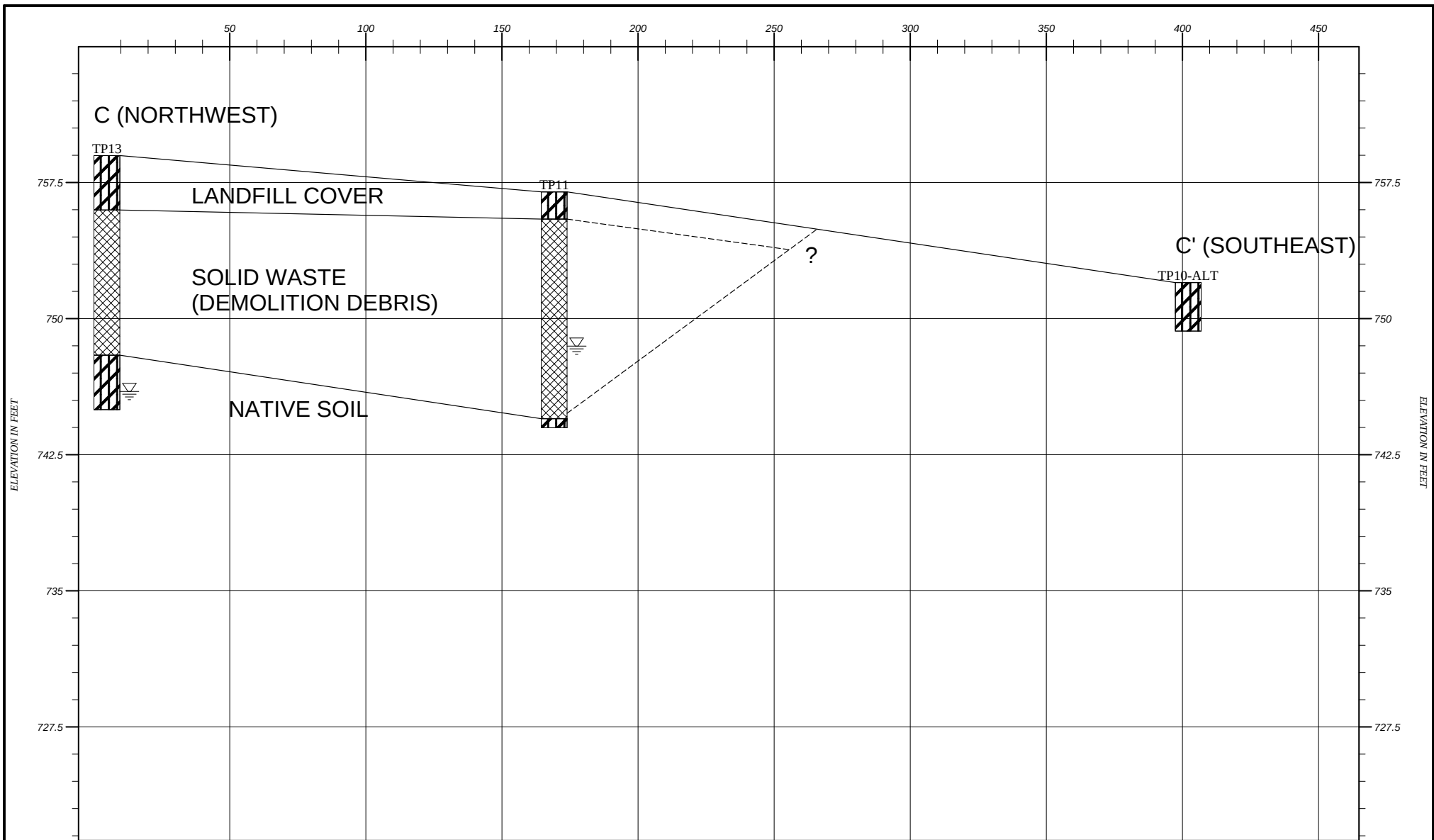


Plan View

Strata symbols



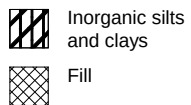
EVREN Northwest GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: 1"=70'	DRAWN BY/APPROVED BY P. TRONE/L. GREEN	DATE DRAWN 5/28/2014
Troh Landfill		
PROJECT NO.	351-14002-01	FIGURE NUMBER C-2



Plan View



Strata symbols



EVREN Northwest GENERALIZED SOIL PROFILE		
HORIZONTAL SCALE: 1"=50'	DRAWN BY/APPROVED BY	DATE DRAWN
VERTICAL SCALE: 1"=7.5'	P. TRONE / L. GREEN	5/28/2014
Troh Landfill		
PROJECT NO.	351-14002-01	FIGURE NUMBER C-3