



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

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October 7, 2019

Mark Larsen
Anchor QEA
1119 Pacific Ave., Suite 1600
Tacoma, WA 98402

Re: No Further Action at the following Site:

- **Site Name:** Sudden Valley Resort
- **Site Address:** 2650 Lake Louise Road, Bellingham, WA 98229
- **Facility/Site No.:** 47652753
- **VCP Project No.:** NW2897
- **LUST No.:** 3929 – Sudden Valley Area Z

Dear Mr. Larsen:

The Washington State Department of Ecology (Ecology) received your request for an opinion on your independent cleanup of the Sudden Valley Resort facility (Site). This letter provides our opinion. We are providing this opinion under the authority of the Model Toxics Control Act (MTCA), Chapter 70.105D RCW.

Issue Presented and Opinion

Is further remedial action necessary to clean up contamination at the Site?

NO. Ecology has determined that no further remedial action is necessary to clean up contamination at the Site.

This opinion is based on an analysis of whether the remedial action meets the substantive requirements of MTCA, Chapter 70.105D RCW, and its implementing regulations, Chapter 173-340 WAC (collectively “substantive requirements of MTCA”). The analysis is provided below.

Description of the Site

This opinion applies only to the Site described below. The Site is defined by the nature and extent of contamination associated with the following releases:

- Gasoline-, diesel- and oil-range petroleum hydrocarbons into the soil.

- Diesel-range petroleum hydrocarbons into the ground water.

Enclosure A includes a detailed description and diagram of the Site, as currently known to Ecology.

Please note a parcel of real property can be affected by multiple sites. At this time, we have no information that the parcel(s) associated with this Site are affected by other sites.

Basis for the Opinion

This opinion is based on the information contained in the following documents:

1. John A. Pinner & Associates, *Sudden Valley 2145 Lake Whatcom Blvd, Bellingham, Washington, Multiple Underground Storage Tank Removal*, November 6, 1992.
2. John A. Pinner & Associates, *Final Report, Treatment Bed Area Z, Sudden Valley, Washington*, July 16, 1993.
3. GeoEngineers, Memorandum – *Environmental Drilling and Sampling Results for Area Z*, September 14, 1999.
4. GeoEngineers, *Report of Remedial Excavation Activities, Area Z, Sudden Valley Community Association, Bellingham, Washington*, May 23, 2000.
5. GeoEngineers, *Report of Environmental Services, Monitoring Well Replacement and Ground Water Sampling, Area Z, Bellingham, Washington*, December 27, 2000.
6. GeoEngineers, *February and May 2001 Ground Water Sampling, Area Z, Bellingham, Washington*, June 4, 2001.
7. GeoEngineers, *February 2002 Ground Water Sampling, Sudden Valley Community Association, Area Z, Bellingham, Washington*, February 26, 2002.
8. GeoEngineers, *Report of Environmental Services, Area Z Soil Stockpile Sampling*, May 14, 2014.
9. Department of Ecology, *Further Action Opinion Letter, Sudden Valley Resort, VCP NW2897*, September 2, 2014.

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10. Anchor QEA, *Data Report and Cleanup Action Plan, Sudden Valley Area Z Remediation*, June, 2018.
11. Department of Ecology, *No Further Action Likely Opinion Letter, Sudden Valley Resort, VCP NW2897*, August 20, 2018.
12. Anchor QEA, *Sudden Valley Area Z Remediation Cleanup Completion Report*, January, 2019.

The reports listed above will be kept in the Central Files of the Northwest Regional Office of Ecology (NWRO) for review by appointment only. You can make an appointment by completing a Request for Public Record form (<https://www.ecology.wa.gov/About-us/Accountability-transparency/Public-records-requests>) and emailing it to PublicRecordsOfficer@ecy.wa.gov, or contacting the Public Records Officer at 360-407-6040. A number of these documents are accessible in electronic form from the Site web page (<https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=6154>).

This opinion is void if any of the information contained in those documents is materially false or misleading.

Analysis of the Cleanup

Ecology has concluded that **no further remedial action** is necessary to clean up contamination at the Site. That conclusion is based on the following analysis:

1. Characterization of the Site.

Ecology has determined your characterization of the Site is sufficient to establish cleanup standards and select a cleanup action. The Site is described above and in **Enclosure A**.

2. Establishment of cleanup standards.

Ecology has determined the cleanup levels and points of compliance you established for the Site meet the substantive requirements of MTCA.

Soil:

The Site is located in a residential/recreational development in rural Whatcom County. Soil cleanup levels suitable for unrestricted land uses are therefore applicable to this Site.

MTCA Method A cleanup levels for unrestricted land uses were selected. Method A cleanup levels for soil were established based on direct contact and the protection of ground water.

The following potential exposure/risk pathways were appropriate to consider:

- Human health protection from direct soil contact pathway exposure
- Human health protection from soil-to-groundwater pathway exposure
- Human health protection from soil-to-air pathway exposure
- Human health protection from soil-to-surface water pathway exposure
- Terrestrial ecological protection

Soil cleanup levels protective of terrestrial ecological receptors are not applicable for this Site, based on the exclusion relating to proximity of undeveloped land. There are less than 1.5 contiguous acres of undeveloped land on or within 500 feet of any part of the Site. In accordance with WAC 173-340-7491(1)(c)(i), the site qualifies for an exclusion from Terrestrial Ecological Evaluation (TEE) as documented in Appendix C of the Remediation Completion Report (Anchor, 2019).

The point of compliance for soil under these conditions is throughout the Site.

Ground Water:

Ground water cleanup levels protective of ground water as a drinking water source are appropriate for this Site. MTCA Method A was selected for the establishment of cleanup levels for the Site which is protective of this use.

The standard point of compliance for ground water is throughout the Site, from the uppermost level of the saturated zone extending vertically to the lowest most depth which could potentially be affected by the Site.

3. Selection of cleanup action.

Ecology has determined the cleanup action you selected for the Site meets the substantive requirements of MTCA.

The selected cleanup action for soil consisted of contaminated soil excavation, on-Site soil treatment by land farming, natural attenuation, and collecting and analyzing an appropriate number of soil samples, to demonstrate that the resulting data complies with the MTCA Method A soil cleanup levels.

The selected cleanup action for ground water consisted of natural attenuation. Four consecutive quarters of groundwater monitoring was conducted and the data collected from location MW-4 were used to determine compliance with MTCA Method A cleanup levels. Ground water samples were collected using standard low-flow sampling techniques.

Ground water sample analyses was conducted using method NWTPH-Dx, both with and without silica gel cleanup. The complete data set (2017 analyses plus the last four consecutive quarters of additional data) were used to evaluate the contribution of biogenic hydrocarbons to the observed petroleum concentrations following the requirements of the June 2016 "*Guidance for Remediation of Petroleum Contaminated Sites*," as discussed in detail in Site Description, Enclosure A to this letter.

4. **Cleanup.**

Ecology has determined the cleanup you performed meets the cleanup standards established for the Site. The selected cleanup for soil was excavation and removal to a permitted disposal facility, ex-situ biotreatment and natural attenuation. The selected cleanup for ground water was natural attenuation.

Test pits were sampled by Anchor QEA within the soil stockpile and adjacent areas in August 2017. This testing was performed to assess whether additional biotreatment was necessary to comply with MTCA Method A soil cleanup levels. Soils were analyzed for petroleum concentrations, including Northwest Total Petroleum Hydrocarbon-diesel range (NWTPH-d) analyses performed with and without silica gel cleanup. Consistent with current Ecology guidance for the NWTPH-d analyses, the results of tests performed using silica gel cleanup were used to assess compliance with MTCA Method A soil cleanup levels. None of the petroleum concentrations measured using silica gel cleanup during the 2017 test pit survey exceeded the MTCA Method A cleanup level.

Supplemental ground water testing was also performed in the stockpile and former source areas. Ground water testing was performed in the soil stockpile area to verify that soil treatment operations did not impact ground water quality in this area. Ground water testing was also performed in the former source removal area along Bear Creek, downgradient of the former soil removal area. That testing was performed using both the existing monitoring well (MW-4) and two temporary soil borings located east and west of MW-4. Diesel- and oil-range petroleum hydrocarbons were well below MTCA Method A ground water cleanup levels in water samples collected from each of the temporary soil borings.

Groundwater testing data from four consecutive quarters of monitoring have confirmed that ground water at MW-4 complies with applicable MTCA cleanup levels for ground water. This demonstration was the final cleanup work required under the Data Report and Cleanup Plan submitted to Ecology under the Voluntary Cleanup Program. Previous data collected from the stockpile area also indicates that soils and ground water in this area comply with applicable MTCA Method A cleanup levels. Cleanup actions at Sudden Valley's Area Z are complete and no further remedial actions are required.

Listing of the Site

Based on this opinion, Ecology will initiate the process of removing the Site from our lists of hazardous waste sites, including:

- Hazardous Sites List.
- Confirmed and Suspected Contaminated Sites List.
- Leaking Underground Storage Tank List.

That process includes public notice and opportunity to comment. Based on the comments received, Ecology will either remove the Site from the applicable lists or withdraw this opinion.

Limitations of the Opinion

1. Opinion does not settle liability with the state.

Liable persons are strictly liable, jointly and severally, for all remedial action costs and for all natural resource damages resulting from the release or releases of hazardous substances at the Site. This opinion **does not**:

- Resolve or alter a person's liability to the state.
- Protect liable persons from contribution claims by third parties.

To settle liability with the state and obtain protection from contribution claims, a person must enter into a consent decree with Ecology under RCW 70.105D.040(4).

2. Opinion does not constitute a determination of substantial equivalence.

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To recover remedial action costs from other liable persons under MTCA, one must demonstrate that the action is the substantial equivalent of an Ecology-conducted or Ecology-supervised action. This opinion does not determine whether the action you performed is substantially equivalent. Courts make that determination. *See* RCW 70.105D.080 and WAC 173-340-545.

3. State is immune from liability.

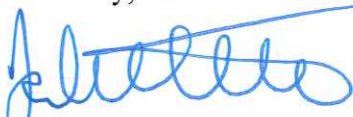
The state, Ecology, and its officers and employees are immune from all liability, and no cause of action of any nature may arise from any act or omission in providing this opinion. *See* RCW 70.105D.030(1)(i).

Termination of Agreement

Thank you for cleaning up the Site under the Voluntary Cleanup Program (VCP). This opinion terminates the VCP Agreement governing this project (#NW2897).

For more information about the VCP and the cleanup process, please visit our web site: www.ecy.wa.gov/programs/tcp/vcp/vcpmain.htm. If you have any questions about this opinion or the termination of the Agreement, please contact me by phone at (360) 255-4381 or e-mail at jgue461@ecy.wa.gov.

Sincerely,



John Guenther, LHG
NWRO Toxics Cleanup Program

Enclosure: A – Description and Diagrams of the Site

cc: Mitch Waterman, Sudden Valley Community Association
 Sonia Fernandez, NWRO VCP Coordinator, Ecology
 Dolores Mitchell, VCP Financial Manager, Ecology (without enclosures)]

Enclosure A

Description and Diagram of the Site

Site Description

This section provides Ecology's understanding and interpretation of Site conditions, and is the basis for the opinions expressed in the body of the letter.

Site Definition

The Site is defined by the nature and extent of gasoline-, diesel- and oil-range petroleum hydrocarbons into the soil and diesel-range petroleum hydrocarbons into the ground water at 2650 Lake Louise Road, Bellingham, Washington. The Site is located within a Property known as Sudden Valley Resort Area Z.

Area/Property Description

The Property (Area Z) is a developed maintenance and service area consisting of gravel surfaced roads and parking areas, a couple of maintenance shop buildings, boat storage, slash piles and an underground sewer lift station. The Property is identified as Whatcom County Tax Parcel 3704073823790000.

Property History and Current Use

The Property was undeveloped and forested until sometime during the 1970s when it was developed as part of the Sudden Valley residential and recreational community. Current use consists of materials storage, equipment maintenance and an underground sewer lift station. The Property is zoned "Rural" according to the Whatcom County Title 20 Zoning Designation map dated 2013.

Contaminant Source and History

The source of gasoline-range petroleum hydrocarbon contamination in soil is from four former gasoline underground storage tanks (USTs). The source of diesel- and oil-range petroleum hydrocarbon contamination in soil and ground water is from a former aboveground storage tank that was located near Bear Creek (Anchor, 2018).

Physiographic Setting

The Site is located within the northern portion of the Puget Sound Lowland Physiographic Province, a north-south trending structural and topographic depression bordered on its west side by the Puget Sound and San Juan Islands and to the east by the Cascade Mountain foothills. The San Juan Islands form the division between the Puget Sound Lowland and the Strait of Georgia in British Columbia. The Puget Sound Lowland is underlain by Tertiary volcanic and sedimentary bedrock, and has been filled to the present day land surface with Pleistocene glacial and non-glacial sediments.

Repeated advances and retreats of the continental glaciers that flowed through the area out of Canada more than 10,000 years ago created the low undulating plains that are characteristic of the Puget Sound Lowland. Current land surfaces reflect the most recent changes that are directly related to glacial events, including the regionally expansive Fraser River Delta, occurring between 13,000 and 20,000 years ago.

Ecological Setting

The ecological setting is forested residential development with two creeks (Beaver and Austin) within relatively close proximity to the Site. Beaver Creek is located approximately 200 feet to the northeast of the soil stockpile and adjacent to a former aboveground storage tank. Austin Creek is located approximately 400 feet to the southeast of the soil stockpile. Lake Louise Road bounds the western Site boundary.

Geology

According to a U.S. Geologic Survey (USGS) geologic map for the project area, "Geologic Map of Western Whatcom County, Washington" by Don J. Easterbrook, 1976, the Site lies within an area underlain by bedrock of the Chuckanut Formation. However, based on previous exploration and excavation activities, the subsurface in Area Z consists of modified ground (historical fill) over alluvium from the nearby Beaver and Austin Creeks, glacial deposits, and then bedrock.

According to the "Soil Survey of Whatcom County Area, Washington," United States Department of Agriculture Soil Conservation Service (SCS), 1992, the Site lies within an area mapped as Sehome loam, described as gravelly loam underlain by dense glacial till at depth. Permeability is moderate in the upper part of the Sehome soil and very slow in the dense glacial till.

Ground Water

The nearest drinking water well is located at 2097 Lake Whatcom Boulevard, approximately 1.7 miles northeast of the Site, according to Ecology's Washington State Well Log Viewer online mapping application.

Depth to ground water in monitoring well MW-4, the only existing monitoring well on the Property, has ranged from 9.16 to 12.75 feet bgs (historic and 2017 data). In 2017, four ground water samples were collected from four temporary soil borings (SB-109, SB-110, SB-11 and SB-112) and depth to ground water was measured at 15.0, 15.0, 15.0 and 13.5 feet bgs, respectively. The ground water flow direction and hydraulic gradient has not been determined, but is presumed to be eastward toward Beaver Creek.

Surface Water

Natural surface water features proximal to the Property include Beaver Creek, Austin Creek, Lake Louise and Lake Whatcom. Beaver Creek is located approximately 200 feet to the northeast, Austin Creek is located approximately 400 feet to the southeast, Lake Louise is located approximately 2,000 feet to the east and Lake Whatcom is located approximately 1 mile east of the Site.

Water Use/Water Supply

Potable water is supplied to the Sudden Valley Resort and surrounding community via a water intake located in Lake Whatcom that is owned, operated and maintained by the Lake Whatcom Water and Sewer District.

Release and Extent of Contamination – Soil

Diesel- and oil-range petroleum hydrocarbon contaminated soil was encountered during geotechnical work associated with the expansion of a proposed sewer lift station at Area Z in 1999. Approximately 2,500 cubic yards of diesel- and oil-range petroleum hydrocarbon contaminated soil were excavated as part of the development of the new sewer lift station in 2000. It is not clear if this soil was mixed with gasoline-range petroleum hydrocarbon contaminated soil generated from the removal of the four USTs in 1992 and stockpiled at Area Z.

In 2014, a total of ten test pits (TP-1 through TP-10) were completed in the soil stockpile and one soil sample was collected from each test pit. Each test pit was completed to a depth ranging from 5 to 10 feet below the ground surface bgs. Subsurface conditions encountered in each of the test pits consisted of fill soil comprised of brown and gray silty sand with varying gravel content.

Buried visqueen plastic sheeting, assumed to be from the cover of the original stockpile, was observed at approximately 3 feet bgs in some areas – indicating that clean fill may have been placed on the stockpile. The soils above the visqueen did not exhibit evidence of petroleum contamination by field screening. The gray-colored soils below the visqueen intermittently exhibited visual field screening evidence of petroleum contamination.

Occasional wood, concrete rubble, cobbles and asphalt concrete fragments were encountered in several test pits. Significant amounts of asphalt concrete fragments were encountered in test pit TP-5 at approximately 3 to 5 feet bgs. Shallow perched groundwater seepage was also encountered approximately 5 feet and 4 feet bgs in test pits TP-3 and TP-5, respectively. Petroleum sheen was not observed on the groundwater seepage. The bottom of the stockpile and condition of the visqueen liner below the stockpile was not identified. The sources of the wood, concrete rubble, cobbles and asphalt concrete fragments were not reported.

Oil-range petroleum hydrocarbon contamination was detected in two soil samples (TP-11 and TP-12) collected near the community garden area in 2014. No potential source for this oil-range petroleum hydrocarbon contamination has been reported.

Additional soil quality investigation work was conducted in 2017. Current environmental conditions within the former soil stockpile area indicate compliance with applicable MTCA Method A soil cleanup levels. Results of soil testing confirmed that the stockpiled soil has been successfully treated to below applicable cleanup levels for human health and groundwater quality

protection (i.e., below MTCA Method A cleanup levels of 2,000 mg/kg), as measured using appropriate testing procedures (NWTPH-dx with silica gel cleanup). Results of paired analyses demonstrate that both the current data collected by Anchor QEA and the data collected by GeoEngineers in 2014 comply with MTCA Method A cleanup levels.

The potential for treated soils in the stockpile area to adversely impact the most sensitive terrestrial ecological receptors (in this case earthworms) was directly assessed using soil toxicity bioassays. That testing also included a sample collected near the community garden. No toxicity to earthworms was detected in any of the test samples, confirming that current conditions are protective of ecological receptors.

Release and Extent of Contamination – Ground Water

Ground water contamination beneath the Site has been characterized. Three ground water monitoring wells (MW-1 through MW-3) were completed on the Property in 1999. Monitoring wells MW-1 and MW-2 were removed during remediation activities at a later unknown date. Monitoring well MW-3 was covered or destroyed and has not been re-located. No ground water data from monitoring well's MW-1, MW-2 or MW-3 have been reported.

A fourth ground water monitoring well (MW-4) was completed to 20 feet bgs on the Property in 2000. Ground water samples were collected from monitoring well MW-4 on six occasions: in August and November 2000; February, May and August 2001; and in February 2002. Diesel-range petroleum hydrocarbons were detected in each of the MW-4 ground water samples ranging from 1,400 to 16,000 micrograms per liter ($\mu\text{g/L}$). The MTCA Method A groundwater cleanup level for diesel-range petroleum hydrocarbons is 500 $\mu\text{g/L}$.

Five ground water samples were collected in 2017, one each from MW-4 and four temporary soil borings, and analyzed for diesel- and oil-range petroleum hydrocarbons and BETX. The combined diesel- and oil-range petroleum hydrocarbons detected in the sample collected from MW-4 was 650 $\mu\text{g/L}$, slightly above the MTCA Method A ground water cleanup level of 500 $\mu\text{g/L}$. The analytical results for the other four ground water samples were either non-detect or below the MTCA Method A ground water cleanup levels. Well MW-4 was also sampled in March 2018.

All of the ground water samples were analyzed with and without silica gel cleanup, and the chromatograms for all of the analyses were presented. Petroleum concentrations (measured without silica gel cleanup) have decreased dramatically since the source removal was performed in 2000. Reported diesel/oil concentrations have decreased as follows: 19.1 mg/L in 2000, 1.7 mg/L in 2001, 0.65 mg/L in 2017, and <0.15 mg/L in 2018. Results are consistent with natural attenuation of residual hydrocarbon concentrations following source removal.

The existing monitoring well (MW-4) is located immediately in the presumed hydraulically downgradient location of the source removal area. The four temporary soil borings completed in 2017 were advanced to the east and west of this location. No exceedances of MTCA Method A cleanup levels were detected in ground water samples collected from these borings. This result was consistent both with and without the use of silica gel cleanup.

Prior to the current remedial investigation, petroleum testing was performed at Area Z without the use of silica gel cleanup. Results of paired analyses of petroleum performed with and without silica gel cleanup were evaluated quantitatively, showing that silica gel cleanup removed the majority of the measured hydrocarbons. Results in samples analyzed with silica gel cleanup comply with MTCA Method A cleanup levels (at reporting limits of 100 µg/L for diesel-range and 200 µg/L for oil range hydrocarbons).

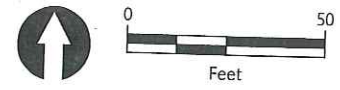
Chromatograms were also analyzed for chemical signatures. Results demonstrated the presence of biogenic organic compounds. These observations are consistent with observations from boring logs that showed organic matter (roots, plant matter) in saturated zone soils. Taken together, these factors indicate that the petroleum concentration measurements performed without silica gel cleanup may be biased high and may not be representative of true petroleum concentrations in MW-4 groundwater.

In order to accept ground water samples subjected to silica gel cleanup, the following section on page 99 of the “*Guidance for Remediation of Petroleum Contaminated Sites*” (Ecology Publication No. 10-09-057, Revised June 2016) must be followed:

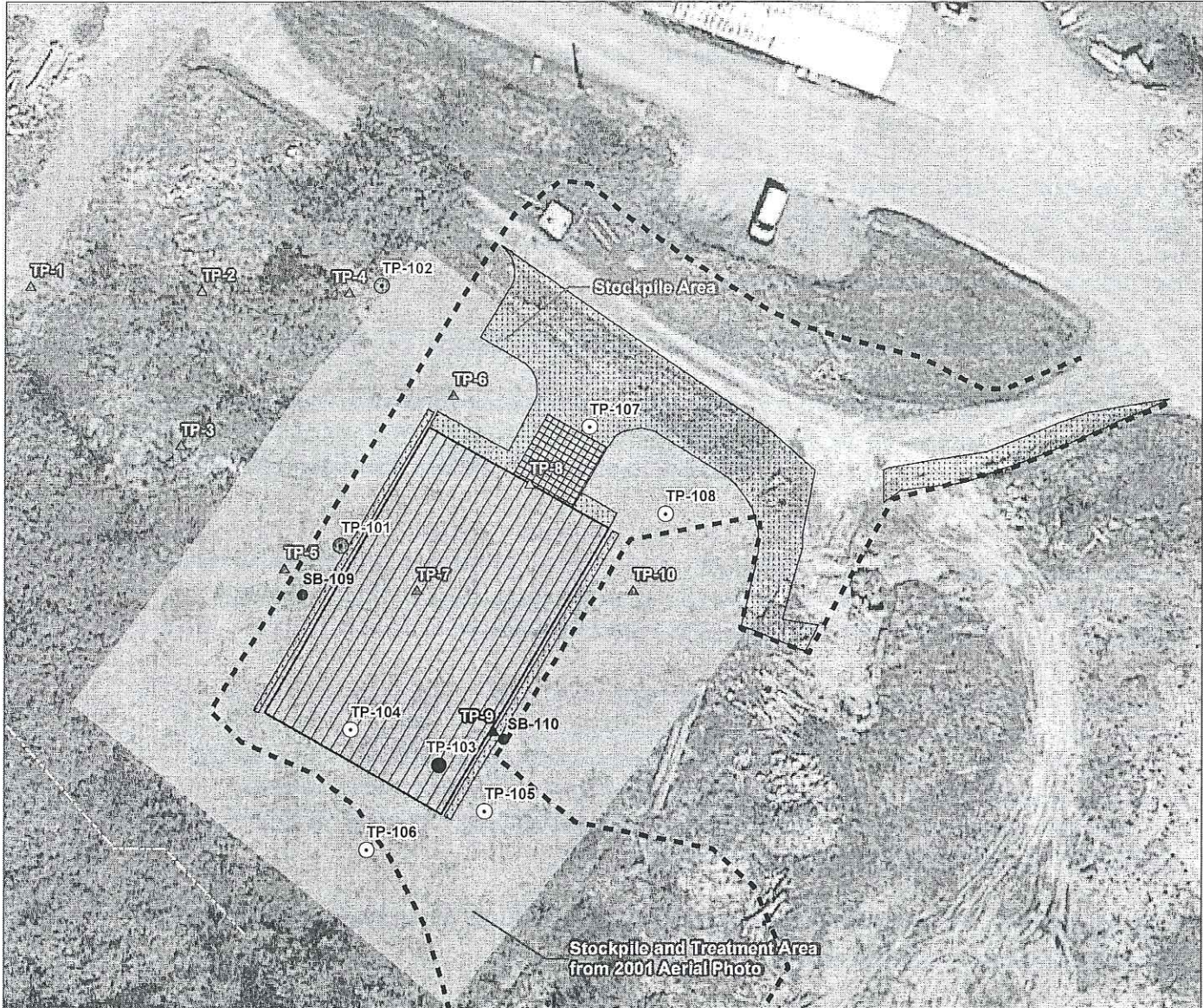
However, most groundwater does not contain significant levels of naturally occurring organic matter. For this reason, silica gel cleanup should not be used for NWTPH-Dx analyses of groundwater samples unless uncontaminated background samples indicate that naturally occurring organic matter is a significant component of the TPH being detected in the groundwater samples.²³ If silica gel cleanup is used, groundwater samples should be split and analyzed both with and without silica gel cleanup.

²³ *Determined by analyzing clean background samples to obtain an estimate of the naturally occurring organics contribution to the TPH totals.*

Four consecutive quarters of ground water sampling was conducted at ground water monitoring well MW-4 between March and November, 2018. The analytical results for all four quarters were below the MTCA Method A cleanup levels for ground water.



Site Diagram



- ▲ <1,000 mg/kg TPH
- ▲ 1,000 mg/kg – 2,000 mg/kg TPH
- ▲ >2,000 mg/kg TPH²

Site Features

- Sanitary Sewer
- Stream

Historical Site Features

- [Hatched Box] Historical Treatment Area

Proposed Feature

- [Cross-hatched Box] Concrete
- [Dotted Box] Gravel
- [Diagonal Hatched Box] Maintenance Building
- - - Proposed Clear Limits/
Disturbance Area

LEGEND:

2017 Site Investigation¹

Actual Soil Boring

- Groundwater Testing Location

Test Pit Location

- No TPH Results
- ⊕ <1,000 mg/kg TPH
- <2,000 mg/kg TPH

2014 Site Investigation Features²

Test Pit Location

NOTES:

1. 2017 testing data were analyzed using silica gel cleanup to differentiate between petroleum and non-petroleum organic matter.
2. 2014 test data were analyzed without using silica gel cleanup. Testing adjacent locations during 2017 confirmed that petrol concentrations were reduced by an average of 53% when silica gel cleanup was used.
3. Proposed features digitized from "Sudden Valley Community Association, Sheet C3.1, Barn 6 Storage Replacement at Area 'Z' Site Plan" (Wilson Engineering 2018).