FINAL Periodic Review
Sunnydell Dryke Shooting Range

292 Dryke Road, Sequim, Clallam County, WA 98382
Facility Site ID: 1283666, Cleanup Site ID: 3572

Toxics Cleanup Program, Southwest Region

Washington State Department of Ecology
Lacey, Washington

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Document Information

This document is available on the Department of Ecology's Sunnydell Dryke Shooting Range cleanup site page.[1]

Related Information

- Facility Site ID: 1283666
- Cleanup Site ID: 3572

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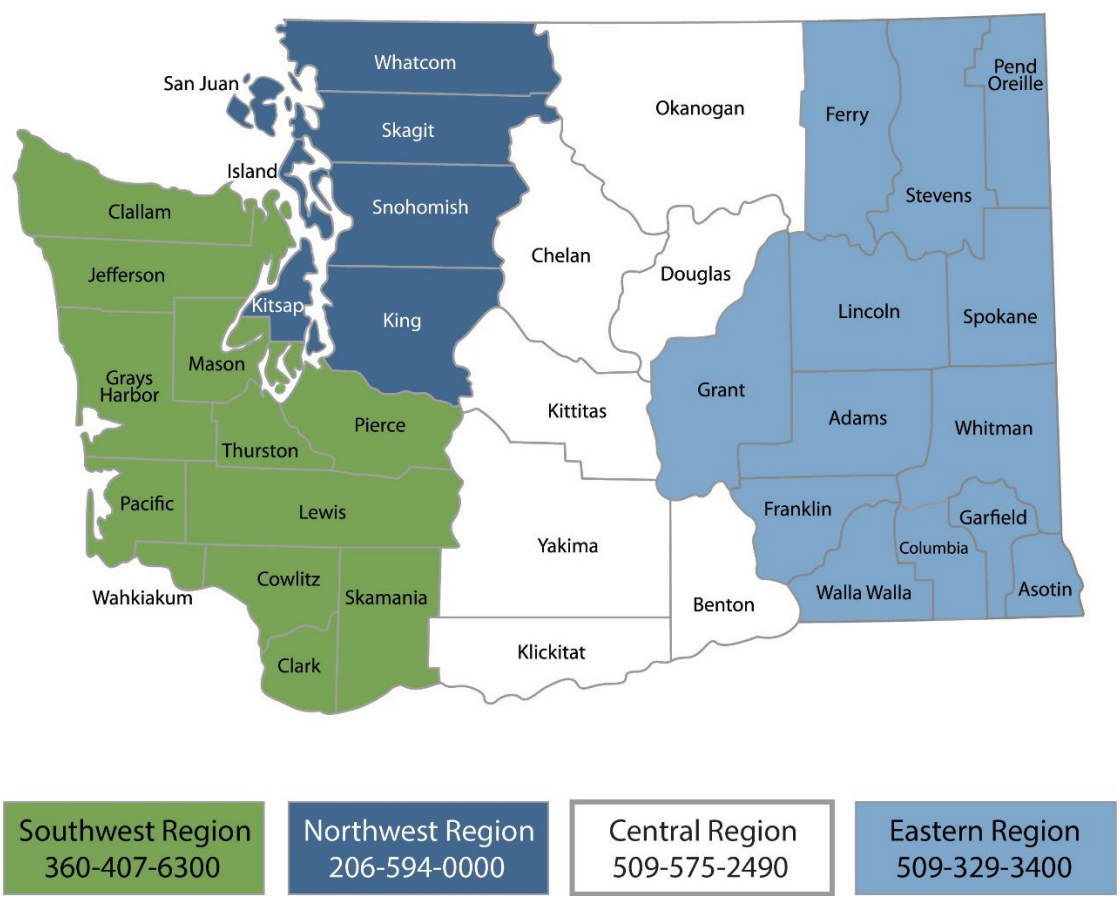
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[1] https://apps.ecology.wa.gov/cleanupsearch/site/3572
[2] https://ecology.wa.gov/About-us/Who-we-are/Our-Programs/Toxics-Cleanup
[3] https://ecology.wa.gov/About-us/Accountability-transparency/Our-website/Accessibility

Department of Ecology's Regional Offices

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Northwest	Island, King, Kitsap, San Juan, Skagit, Snohomish, Whatcom	PO Box 330316 Shoreline, WA 98133	206-594-0000
Central	Benton, Chelan, Douglas, Kittitas, Klickitat, Okanogan, Yakima	1250 W Alder St Union Gap, WA 98903	509-575-2490
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Headquarters	Across Washington	PO Box 46700 Olympia, WA 98504	360-407-6000

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Introduction

The Washington State Department of Ecology (Ecology) reviewed post-cleanup site conditions and monitoring data to ensure human health and the environment are being protected at the Sunnydell Dryke Shooting Range cleanup site (Site). Site cleanup was implemented under the Model Toxics Control Act (MTCA) regulations, Chapter 173-340 Washington Administrative Code (WAC).

Cleanup activities at this Site were completed under an agreed order. The cleanup consisted of relocating select soils and sediments contaminated with lead and polycyclic aromatic hydrocarbons (PAHs) to active shooting areas of the Site, establishing best management practices (BMPs) to contain and reduce contamination from ongoing shooting range use, and placing an environmental covenant (Covenant) on the property to protect the remedy and limit property uses to those consistent with Site conditions. Residual concentrations of lead and PAHs that exceed MTCA cleanup levels remain on the property. The MTCA cleanup levels for soil and groundwater are established under WAC 173-340-740[4] and WAC 173-340-720,[5] respectively. The cleanup level for total PAHs in sediment is the freshwater sediment quality value (SQV) established in Ecology Publication No. 11-09-054 "Development of Benthic SQVs for Freshwater Sediments in Washington, Oregon, and Idaho," dated November 2011. The cleanup levels for lead and benzo(a)pyrene total toxicity equivalent concentration (bTEQ) in sediment are the same as those established for soil. The cleanup levels for surface water are established under WAC 173-201A[6]. Cleanup levels for soil, sediment, groundwater, and surface water are listed in Table 1.

Ecology determined institutional controls in the form of a Covenant would be required as part of the cleanup action for the Site. WAC 173-340-420(2)[7] requires Ecology to conduct a periodic review of certain sites every five years. For this Site, a periodic review is required because the department approved cleanup actions under an agreed order and institutional controls are required as part of the cleanup action.

When evaluating whether human health and the environment are being protected, Ecology must consider the following factors (WAC 173-340-420(4)):

a) The effectiveness of ongoing or completed cleanup actions, including the effectiveness of engineered controls and institutional controls in limiting exposure to hazardous substances remaining at the site;

b) New scientific information for individual hazardous substances or mixtures present at the site;

c) New applicable state and federal laws for hazardous substances present at the site;

[4] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-740
[5] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-720
[6] https://app.leg.wa.gov/WAC/default.aspx?cite=173-201A
[7] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-420

d) Current and projected site and resource uses;

e) The availability and practicability of more permanent remedies; and

f) The availability of improved analytical techniques to evaluate compliance with cleanup levels.

Summary of Site Conditions

Site description and history

The Site is located at 292 Dryke Road near Sequim, Clallam County, Washington and consists of one parcel (#043017428020) encompassing 29.92 acres (Figure 1, Appendix A). The Site is an active shooting range within a rural area with a wooded area to the north, Robin Hill Farm County Park to the east, Dryke Road and residential properties to the south, and residential properties to the west.

The Site consists of a clubhouse, gun repair shop, residence, four active shooting range management areas, and two ponds. The active shooting range management areas and ponds are depicted in Figure 1 in Appendix B. Based on discussions with the property owner during the Site visit on June 11, 2024, the shooting range has an average of 15 shooters per week (60 shooters per month). The active shooting areas include multiple sporting clay shotgun shooting stations. There is also one handgun range which is seldom used.

According to the 2012 Remedial Investigation and Feasibility Study (RI/FS) by LaManna Geoscience Inc. (LGI), the Site was forested in 1937 with no ponds present. In 1946, the Site was logged for second growth timber. The Site was forested again in 1956, and the Upper Pond was present. The Site was used to raise chickens, goats, horses, and ducks prior to its use as a shooting range.

From 1960 to 1967, Chuck Dryke, former owner of the Site, trained dogs and operated a dog kennel on the Site. The northern portion of the Site, near the current Lower Pond, was used for hunting. In 1967, Chuck Dryke opened the Sunnydell Gun Club. The Site has been used as an active shooting range and dog training facility since that time.

The Site originally consisted of two parcels encompassing approximately 39 acres. However, the property was split into two lots in 2013, and the Site now occupies one lot encompassing 29.92 acres. According to LGI (2012), Chuck Dryke's ownership of the Site was passed to his daughter, Ellen Dryke, following his death in 2012. The Site is currently owned by Ellen Dryke TTE.

Site investigations

On June 22, 2004, Ecology received a complaint from an adjacent property owner to the Site concerning pond water from the Site draining to and accumulating on their property, and impacting trees on their land (ESA Associates, Inc. [ESA Associates] 2010). In September of that

same year, the Clallam County Department of Health and Human Services conducted an initial investigation including collection of composite sediment samples and discrete surface water samples from the Upper and Lower Ponds for lead analysis. Results showed that lead was present in the Upper Pond sediments at a concentration of 77,800 milligrams per kilogram (mg/kg), exceeding the MTCA Method A cleanup level of 250 mg/kg for soil. Lead reclamation was conducted in August 2013 and included removal of lead from sediment and soil in the Upper Pond area. Lead was also present in surface water in the Upper Pond at 30 micrograms per liter (µg/L) and in the Lower Pond at 10 µg/L, above the chronic water quality criteria for lead in surface water. The Site was placed on Ecology's Confirmed and Suspected Contaminated Sites List in November 2004.

In 2005, Clallam County Department of Health and Human Services collected soil samples from the Rabbit Run, Bird Box, and Weeping Willow areas of the Site for lead and PAH analyses (LGI 2012). Locations of these areas are depicted in Figure 1 in Appendix B. Lead and bTEQ were detected in the Rabbit Run area at concentrations of 618 and 9.66 mg/kg, respectively, exceeding their respective cleanup levels. In the Weeping Willow area, the concentration of bTEQ in one sample exceeded the cleanup level at 261.50 mg/kg; however, the lead concentration was below the cleanup level. Results in the Bird Box area were below cleanup levels for lead and bTEQ.

In 2005, Clallam County Department of Health and Human Services also collected sediment samples at four locations along the water line of the Upper Pond and analyzed these samples for lead (LGI 2012). Lead was detected at concentrations above the freshwater sediment criteria at two locations at 46,200 and 5,210 mg/kg. The Clallam County Department of Health and Human Services conducted a Site Hazard Assessment in 2005, ranking the Site as a priority ranking #1, subsequently placing the Site on the Hazardous Sites List (now referred to as the Contaminated Sites List) in 2006 (ESA Associates 2010).

In January 2009, the Clallam County Department of Health and Human Services conducted an initial investigation of the adjoining parcel located north of the Site. The results indicated that lead was present in surface water at concentrations ranging from 14.6 to 101 µg/L, exceeding the chronic water quality criteria. Sediment samples collected from the adjoining property contained lead at concentrations below the MTCA Method A cleanup level for soil.

In August 2009, the owners of the Site at that time, Chuck Dryke and Rosemary Knotek, entered into Agreed Order No. DE 6551 with Ecology. The agreed order required the property owners to conduct a RI/FS.

In 2010, ESA Associates conducted a Site characterization study at the Site in support of the RI/FS. The study included collection of 102 soil, sediment, and surface water samples from the Site and from the adjacent property. The areas of concern on the Site included in the study were the Upper Pond, Lower Pond, Rabbit Run, and Weeping Willow areas. Figures 3 through 11 in Appendix B depict the sample locations and analytical results for each of these areas.

In November 2010, LGI installed monitoring wells at the Site and collected water level readings and groundwater samples. Results for groundwater samples collected from three wells (MW-1,

-2, and -5) showed neither lead nor PAHs were detected in any sample. Locations of these wells are depicted in Figure 12 in Appendix B. Results are summarized in Tables 2 through 5. LGI also collected limited soil samples from select boring locations and surface water samples from the Upper Pond, Lower Pond, and West Creek. Samples were analyzed for lead. Lead was detected in one soil sample collected from the soil boring for MW-5 at 12 mg/kg at 1-foot bgs (see Figure 11, Appendix B). Surface water sample results for lead were as follows in November 2010: 1.9 µg/L in the Upper Pond, non-detect in the Lower Pond, and 1.3 µg/L in the West Creek.

In June 2011, LGI collected water level readings, groundwater samples, soil samples from the adjacent property at the same approximate locations as ESA Associates collected in 2010 (see Figure 11, Appendix B), and surface water samples from the Upper Pond, Lower Pond, and West Creek. Soil and surface water samples were analyzed for lead and groundwater samples were analyzed for lead and PAHs. Results for groundwater samples collected from three wells (MW-1, -2, and -5) showed neither lead nor PAHs were detected in any sample (see Tables 2 through 5). According to the sampling and analysis plan (LGI 2011), MW-3, located between the two ponds, was not to be sampled because the purpose of this well is for determining groundwater flow direction and gradient, not quality. Results for lead in surface water samples were as follows: 11.2 µg/L in the Upper Pond, non-detect in the Lower Pond, and 1.64 µg/L in the West Creek.

As noted in the 2012 RI/FS by LGI, the use of the Site as a shooting range has resulted in lead shot, lead bullets, and fragments of clay targets (made from pitch) being deposited on the ground surface and in the ponds. Results of the various investigations that have been conducted at the Site have identified concentrations of lead and PAHs in areas where shooting occurs on the Site.

In October 2013, a single surface water sample was collected from the Upper Pond and analyzed for lead. Total lead was detected at a concentration of 38 µg/L, while dissolved lead was detected at a concentration of 7.5 µg/L.

Cleanup actions

In 2013, a Cleanup Action Plan (CAP) was issued by Ecology describing the proposed remedial action for the Site. The property owner, Ellen Dryke, entered into Agreed Order No. DE 9510 with Ecology on June 27, 2013.

The CAP divided the Site into three Management Areas based on historical Site use: Active Shooting Ranges, Lower Pond, and Non-Shooting Management Areas. The selected alternative included implementing BMPs, institutional controls, and relocating select soils and sediments to active shooting areas of the Site (described below) (Ecology 2013a).

Lead-contaminated soil and sediment from the Lower Pond Area was excavated in 2013 (see Figure 13, Appendix B) (Colligan 2016). Sampling conducted in November 2014 around the berm area on the western portion of the Lower Pond Area found three areas with lead concentrations exceeding cleanup levels. In August 2015, approximately 50 cubic yards of soil and sediment from these three areas was excavated and transported to the berm at the Quail

Run shooting area (see Figure 14, Appendix B) (Colligan 2016). Confirmation sampling conducted following excavation found lead concentrations above cleanup levels in one of the three areas. Additional excavation of 20 cubic yards of soil occurred in July 2016 (see Figure 14, Appendix B). Excavated soil was again transported to the berm at the Quail Run shooting area (Colligan 2016).

The following BMPs were implemented for each Management Area:

Active Shooting Range Management Areas

- The four Active Shooting Range Management Areas are to be operated in accordance with the following BMPs:
    - Lead reclamation will be conducted in a manner that does not spread contaminants of concern (COCs) (shot, target fragments, post-reclamation soil, muddy water, etc.) beyond the area that is undergoing reclamation. Boundary limits will be established for lead reclamation operations to prevent releases onto Non-Shooting Areas.
    - Recovered lead shot destined for recycling will be temporarily stored on-site in sealed containers that are not subject to rainfall infiltration and rodent damage.
    - Movement of soil within Active Shooting Areas will be minimized to limit potential environmental impacts.
    - Records should be kept of lead shot reclamation and the tonnage of reclaimed lead received by recyclers or reused for on-site reloading. These records will demonstrate that recycling has been taking place.
    - Soil from Active Shooting Ranges (including waste soil from lead recovery operations) will not be deposited in Non-Shooting Areas.
    - Biodegradable targets are preferred over targets made with pitch and will be used if economically and practically feasible.
    - Target fragments and debris recovered during reclamation will be sent off-site as solid waste.
    - Shooting platforms and target launchers will be positioned to keep shot falling within the already established boundaries of the Active Shooting Ranges.
    - Shot size will be restricted to #8 or smaller to limit the shot fall areas. Signs will be placed in all shooting ranges to notify shooters of this restriction in shot size.
    - Post-reclamation areas of bare soil will be planted with vegetation, mulched, or covered to prevent erosion and direct contact with potentially contaminated soil. Vegetation should be properly chosen because excessive vegetation may hinder reclamation efforts and vegetation typically must be removed prior to reclamation. Children will not be allowed to play with or sit on the ground (i.e., the soil), sediment, or water in Active Shooting Ranges.

- Livestock will not be allowed to graze on plants growing in Active Shooting Ranges.
- Hunting will not be allowed. This restriction will prevent the spread of shot or bullets beyond the boundaries of the Active Shooting Ranges. Killing of nuisance animals will be allowed if done lawfully.
- Compliance monitoring will consist of record keeping. Records will be kept of soil excavations, soil fills, lead reclamation, and target composition.

Lower Pond Management Area

- At the Lower Pond Area, the following specific mitigation and BMPs are to be implemented:
  - Soil and sediment from two locations at the Lower Pond contains lead and PAHs that exceed cleanup levels. The soil and sediment at the Lower Pond will be remediated by excavating the upper 1-foot and relocating this material to the soil berm at the Rabbit Run and/or one of the other Active Shooting Ranges. It is estimated that 20 cubic yards of material will be removed from the Lower Pond. *– This work was completed in 2013 as part of the cleanup action noted above (see Figure 13, Appendix B).*
  - Confirmation soil and sediment sampling will ensure that lead and PAH cleanup levels have been met in the Lower Pond excavation areas. The soil and sediment remaining after the excavation is complete, where located above the water level, will be allowed to vegetate to prevent erosion. *– Confirmation sample locations and additional excavation areas part of the cleanup action noted above are depicted in Figure 14, Appendix B.*
  - Target practice and hunting will not be allowed. These restrictions will prevent further addition of shot or bullets onto shallow soil surfaces. Killing of nuisance animals will be allowed if done lawfully and in active shooting range management areas.
  - Adults and children will not be allowed to play or sit on the ground (soil), sediment, or water in the Lower Pond Area until after the hot spots are remediated.
  - Surface water runoff to adjoining properties will be controlled by maintaining the soil berm along the northern property line.
  - Records will be kept of soil excavations, soil fills, and lead reclamation.

Non-Shooting Management Areas

- Non-Shooting Areas are to be operated with the following BMPs:
  - Soil from the Active Shooting Ranges and the Lower Pond Area will not be brought onto Non-Shooting Areas.

- Lead reclamation activity (i.e., processing contaminated soil or sediment) will not take place on Non-Shooting Areas. Potentially contaminated soil or sediment will not be transported across the Non-Shooting Areas unless the soil, and any entrained water, is contained.
- Target practice and hunting will not take place on Non-Shooting Areas. This will prevent the deposition of lead shot and target fragments in an area not suspected of shooting operations.

Lead reclamation was completed in August 2013 and included removal of lead from the following areas: Fur and Feather soil, Upper Pond sediment, Upper Pond soil, Quail Shoot soil, and Pent House soil. These areas are shown on Figure 2 in Appendix B. A total of 108.57 tons of lead shot was reclaimed from the upper 3 to 6 inches of soil (Colligan 2017). Ecology issued a "Satisfaction of Agreed Order No. 9510 and No Further Action" letter in June 2017.

Groundwater and surface water monitoring

Per the Remedial Action Work Plan (Colligan 2013), a surface water sample was to be collected from the Upper Pond within 30 days following the lead recycling effort to verify that this effort had not impacted water quality in the pond. The Upper Pond was sampled in November 2016 following termination of lead reclamation activities in the pond. The result for lead was 3.9 µg/L, slightly above the cleanup level of 2.3 µg/L. However, in the CAP under Section 10.2, "Compliance with Cleanup Standards," compliance standards do not apply to the Upper Pond as it is an Active Shooting Area where BMPs and institutional controls protect human health and the environment (Ecology 2013a).

Groundwater monitoring was also to be performed at the four existing groundwater monitoring wells (MW-1, MW-2, MW-3, and MW-5) at least once between each periodic review. It should be noted that there is no monitoring well MW-4. Samples are to be analyzed for lead with a brief sampling memo submitted to Ecology following each sampling event. The first post-cleanup groundwater sampling event occurred in September 2014. During this event, lead was detected in one well, MW-1, at a concentration of 13 µg/L below the cleanup level of 15 µg/L. Results for the other three monitoring wells were non-detect for lead.

During the May 2024 sampling event, lead was detected in only one (MW-1) of the three monitoring wells sampled at a concentration of 0.634 µg/L, well below the cleanup level of 15 µg/L. Monitoring well MW-3 was not sampled during the 2024 event, as this well could not be located.

Results of groundwater sampling conducted in 2010 and 2011, prior to cleanup activities, were non-detect for both lead and PAHs. Results for lead and PAHs in groundwater between 2010 and 2024 are in Tables 2 through 5.

Cleanup standards

Cleanup standards include cleanup levels, the location where these cleanup levels must be met (point of compliance), and any other regulatory requirements that apply to the Site. WAC 173-340-704[8] states MTCA Method A may be used to establish cleanup levels at sites that have few hazardous substances, are undergoing a routine cleanup action, and where numerical standards are available for all indicator hazardous substances in the media for which the Method A cleanup level is being used. Method B may be used at any site and is the most common method for setting cleanup levels when sites are contaminated with substances not listed under Method A. Method C cleanup levels may be used to set soil and air cleanup levels at industrial sites.

WAC 173-340-900[9], Table 749-2 "Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure" for unrestricted land use were determined to be appropriate cleanup levels for lead in soil and sediment.

MTCA Method A cleanup levels for unrestricted land use for benzo(a)pyrene were determined to be appropriate for bTEQ in soil, sediment, and groundwater. MTCA Method A cleanup level was determined to also be appropriate for lead in groundwater.

Freshwater SQVs established in Ecology Publication No. 11-09-054 titled "Development of Benthic SQVs for Freshwater Sediments in Washington, Oregon, and Idaho", November 2011, were determined to be appropriate cleanup levels for total PAHs in sediment.

Water Quality Standards for Surface Waters of the State of Washington, WAC 173-201A, at the time of the 2013 CAP, were determined to be appropriate cleanup levels for lead in surface water. Cleanup levels for soil, sediment, groundwater, and surface water are listed in Table 1.

The point of compliance is the area where the cleanup levels must be attained. For soil, the point of compliance is throughout the Site for protection of groundwater and from the ground surface to a depth of 15 feet for soil for protection of human health based on direct contact exposure.

The point of compliance for groundwater is throughout the Site from the upper most level of the saturated zone extending vertically to the lowest depth which could potentially be affected by the Site.

[8] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-704
[9] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-900

Environmental Covenant

Ecology determined that institutional controls would be required as part of the cleanup action to document the remaining contamination, protect the cleanup action, and protect human health and the environment. On October 28, 2013, institutional controls in the form of a Covenant[10] were recorded for the Site.

The Covenant recorded for the Site imposes the following limitations:

1. If the use of Lot 2 of Sunnydell Large Lot Subdivision, recorded January 23, 2013 in Volume 2 of Large Lot Subdivisions, page 43, records of Clallam County, Washington changes, additional investigation and/or cleanup will be necessary.

2. The owner of the property must give thirty (30) days advance written notice to Ecology of the owner's intent to convey any interest in the property.

3. The owner of the property reserves the right under WAC 173-340-440[11] to record an instrument that provides that this Covenant shall no longer limit use of the property or be of any further force or effect. However, such an instrument may be recorded only if Ecology concurs.

Periodic Review

Effectiveness of completed cleanup actions

During the Site visit Ecology conducted on June 13, 2024, Ecology found no indications that land use had changed since the Covenant was recorded in 2013. BMPs, as outlined above, appear to be ongoing with the exception noted below. The Site is currently operating as a shooting range. A photo log is in Appendix C.

Direct contact

The cleanup actions were intended to reduce exposure to contaminated soil and sediment at the Site. Exposure pathways to contaminated soils and sediments by ingestion and direct contact were reduced by excavation of lead-contaminated soil between 2013 and 2016 in the Lower Pond Area and by lead shot reclamation in 2013 in the active shooting areas. In addition, ongoing BMPs reduce exposure pathways to contaminated soils and sediments by maintaining proper management controls and mitigating buildup of lead and PAHs. According to an email received from the shooting range manager on May 31, 2024, lead reclamation has not been conducted since the 2013 event as there has not been enough business to require lead

[10] https://apps.ecology.wa.gov/cleanupsearch/document/23248
[11] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-440

recovery services and it is not financially feasible at this time. However, target fragments are regularly collected and properly disposed of. It is Ecology's opinion that lead reclamation is not being conducted often enough to meet the intentions of the BMPs established in the 2013 CAP for the Active Shooting Range Management Areas. If lead reclamation is not conducted at the Site, spent lead bullets and shots may be subject to Washington's Dangerous Waste Regulations under Chapter 173-303 WAC[12]. Whereas recycled lead is considered scrap metal and is excluded from these regulations. To reduce contamination from ongoing shooting range use, Ecology requests that a lead management plan be prepared to address lead management at the Site and ensure lead recycling is conducted on a regular basis. This plan should be prepared in coordination with Ecology.

As per the Remedial Action Work Plan (Colligan 2013), groundwater monitoring is to be performed at the four existing groundwater monitoring wells at least once between each periodic review. Samples are to be analyzed for lead only with a brief sampling memo submitted to Ecology following each sampling event. The first post-cleanup groundwater sampling event occurred in 2014, and the most recent sampling event occurred in 2024. Results of both these events found lead to only be detected in one monitoring well, MW-1, at concentrations below the cleanup level. Results for all other wells were non-detect. Analytical results for groundwater sampling conducted between 2010 and 2024 are in Tables 2 through 5.

According to the 2013 CAP, groundwater flow is generally to the north and appears to be hydrologically connected to the Upper Pond, Lower Pond, Middle Pond, and West Creek. Drinking water wells within the vicinity of the Site draw water from a deeper regional aquifer that does not appear to be hydrologically connected with the aquifer at the Site.

Protection of groundwater

Soils and sediments with lead and PAHs at concentrations exceeding MTCA Method A cleanup levels remain at the Site in the Active Shooting Range Management Areas (see Figure 1, Appendix B); however, contaminated soil and sediment was moved from the Lower Pond Area, lead reclamation of several areas was conducted, and BMPs are in place to maintain proper management controls and mitigate buildup of lead and PAHs. Figures 3 through 10 in Appendix B depict concentrations of lead and PAHs in soil and sediment measured in 2010.

Groundwater is monitored at least once between each periodic review to ensure groundwater is not impacted by contaminants in soils and sediments.

Institutional controls

Institutional controls in the form of a Covenant were implemented at the Site in 2013. The Covenant remains active and discoverable through the Clallam County Auditor. Ecology found no evidence a new instrument has been recorded that limits the effectiveness or applicability of the Covenant. This Covenant prohibits activities that will result in the release of contaminants

[12] https://app.leg.wa.gov/WAC/default.aspx?cite=173-303

contained as part of the cleanup action and prohibits any use of the property that is inconsistent with the Covenant, unless approved by Ecology in advance. This Covenant ensures the long-term integrity of the cleanup action will be protected.

New scientific information for individual hazardous substances or mixtures present at the Site

There is no new relevant scientific information for the hazardous substances remaining at the Site.

New applicable state and federal laws for hazardous substances present at the Site

The cleanup at the Site was governed by Chapter 173-340 WAC (2013 ed.). WAC 173-340-702(12)(c)[13] [2023 ed.] provides that,

> "A release cleaned up under the cleanup levels determined in (a) or (b) of this subsection shall not be subject to further cleanup action due solely to subsequent amendments to the provisions in this chapter on cleanup levels or subsequent availability of more sensitive analytical methods, unless the department determines, on a case-by-case basis, that the previous cleanup action is no longer sufficiently protective of human health and the environment."

The current water quality standard for lead in surface water under WAC 173-201A has increased from 2.3 µg/L to 2.5 µg/L since the 2013 CAP. This change in the original standard has not resulted in the need for additional remedial actions at the Site.

Current and projected Site and resource uses

The Site is used as a shooting range. There have been no changes in current or projected future Site or resource uses. The current Site use is not likely to have a negative impact on the protectiveness of the cleanup action.

[13] https://app.leg.wa.gov/WAC/default.aspx?cite=173-340-702

Availability and practicability of more permanent remedies

The remedy implemented included excavation of lead-contaminated soil and sediment from the Lower Pond Area, lead reclamation in the active shooting areas, and implementation of BMPs. The remedy continues to be protective of human health and the environment. While more permanent remedies may be available, they are still not practicable at this Site, because it is an active shooting range.

Availability of improved analytical techniques to evaluate compliance with cleanup levels

The analytical methods used at the time of the cleanup action were capable of detection below the selected MTCA cleanup levels. The presence of improved analytical techniques would not affect decisions or recommendations made for the Site.

Conclusions

- The cleanup actions completed at the Site appear to be protective of human health and the environment.
- Soil and sediment cleanup levels have not been met at the Site within the Active Shooting Range Management Areas. However, per Section 10.2 of the CAP, compliance standards do not apply to the Active Shooting Areas where BMPs and institutional controls protect human health and the environment. BMPs are being implemented at the Site to maintain proper management controls and mitigate buildup of lead and PAHs. BMPs should continue to be implemented at the Site to reduce exposure pathways to contaminated soils and sediments.
- Lead reclamation is one of the BMPs for the Active Shooting Range Management Areas. However, lead reclamation has not been conducted at the Site since 2013. It is Ecology's opinion that lead reclamation is not being conducted often enough to meet the intentions of the BMPs established in the CAP. Therefore, to reduce contamination from ongoing shooting range use, Ecology requests that a lead management plan be prepared to address lead management at the Site and ensure lead recycling is conducted on a regular basis. The first draft of this plan was provided to Ecology on April 3, 2025 for review. Ecology issued comments on the plan on July 2, 2025. A final version of the plan, incorporating Ecology's comments, is due within 30 days of comment receipt.
- Groundwater monitoring is required at least once between each periodic review. Results of groundwater monitoring since 2010 indicates that COCs are below the cleanup levels. Groundwater monitoring of the four existing wells (MW-1, -2, -3, and -5) on the Site is recommended to continue at the frequency required in the CAP. Per a phone call with the shooting range manager on December 19, 2024, it was noted that MW-3 no longer exists. If MW-3 cannot be located during the next sampling event,

Ecology requests that this be documented in the report to Ecology. Ecology will also attempt to locate this well during the site visit for the next periodic review.

- Biodegradable targets are not currently used at the Site, but it is recommended that these be used if economically and practically feasible. If these cannot be used, target fragments should continue to be collected regularly and disposed of off-Site to ensure that they do not contribute additional contamination to the Site. Ecology recommends that the feasibility of biodegradable target use at the Site be re-evaluated every five years as the availability and composition of these types of targets may change over time.
- The Covenant for the property is in place and is effective in protecting human health and the environment from exposure to hazardous substances and the integrity of the cleanup action.

Based on this periodic review, Ecology has determined the requirements of the Covenant are being followed. No additional cleanup actions are required by the property owner at this time, aside from development of a lead management plan as stated above. The property owner is responsible for continuing to implement BMPs at the Site and continuing groundwater monitoring as noted in the bullets above.

Next review

Ecology will schedule the next review for the Site five years from the date of this periodic review. If additional cleanup actions or institutional controls are required, the next periodic review will be scheduled five years after those activities are completed.

References

Colligan, Tom. 2013. Remedial Action Work Plan, Sunnydell Dryke Shooting Range, 292 Dryke Road, Sequim, Clallam County, Washington, 98382. September. 19.

Colligan, Tom. 2016. Completion Report for Additional Soil Removal in the Lower Pond Area of Sunnydell Shooting Range, Sequim, WA. October 4.

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ESA Associates, Inc. (ESA Associates). 2010. Site Characterization, Sunnydell Dryke Shooting Range, 292 Dryke Road, Sequim, WA 98382. August 18.

LaManna Geosciences Inc. (LGI). 2011. Sampling and Analysis Plan, June 2011 Ground-Water and Soil Investigation, Sunnydell Dryke Shooting Range, Sequim, Clallam County, Washington. June 5.

LGI. 2012. Remedial Investigation and Feasibility Study Report, Sunnydell Dryke Shooting Range, 292 Dryke Road, Sequim, Clallam County, Washington 98382. June 22.

Washington Department of Ecology (Ecology). 2013a. Cleanup Action Plan, Sunnydell Dryke Shooting Range, Clallam County, Washington. June.

Ecology. 2013b. Environmental Covenant, Recording #2013-1301898. October 28.

Ecology. 2017. Satisfaction of Agreed Order No. 9510 and No Further Action at the following Site: Site Name: Sunnydell Dryke Shooting Range, Site Address: 292 Dryke Road, Cleanup Site Number: 3572, Facility/Site No.: 1283666. June 13.

Ecology. 2024. Site visit. June 11.

Tables

Table 1. Cleanup levels for soil, sediment, groundwater, and surface water established in the Cleanup Action Plan.

Contaminant	Soil cleanup level (mg/kg)	Sediment cleanup level (mg/kg)	Groundwater cleanup level (µg/L)	Surface water cleanup level (µg/L)
Lead	220[1]	220[1]	15[4]	2.3[5]
Total PAHs	--	17[3]	--	--
bTEQ	0.1[2]	0.1[2]	0.1[2]	--

Notes:

[1] From WAC 173-340-900, Table 749-2 "Priority Contaminants of Ecological Concern for Sites that Qualify for the Simplified Terrestrial Ecological Evaluation Procedure" for soil under the unrestricted land use scenario.

[2] MTCA Method A cleanup level for benzo(a)pyrene.

[3] Freshwater SQVs established in Ecology Publication No. 11-09-054 titled "Development of Benthic SQVs for Freshwater Sediments in Washington, Oregon, and Idaho", November 2011.

[4] MTCA Method A cleanup level.

[5] Water Quality Standards for Surface Waters of the State of Washington, WAC 173-201A, at the time of the 2013 CAP.

-- = not established
µg/L = micrograms per liter
bTEQ = benzo(a)pyrene total toxicity equivalent concentration
CAP = Cleanup Action Plan
mg/kg = milligrams per kilogram
MTCA = Model Toxics Control Act
PAH = polycyclic aromatic hydrocarbon
SQV = sediment quality value
TPH = total petroleum hydrocarbons
WAC = Washington Administrative Code

Table 2. Groundwater contaminant concentrations at monitoring well MW-1.

Date	Lead[1] (µg/L)	bTEQ (µg/L)
11/2010	1.0 U	ND
6/2011	1.0 U	ND
9/15/2014	13	--
5/20/2024	0.634 J+	--

Notes:

[1] Groundwater samples collected in 2010, 2011, and 2014 for lead analysis only were field filtered.

-- = not analyzed
µg/L = microgram per liter
bTEQ = benzo(a)pyrene total toxicity equivalent concentration
J+ = the result is an estimated quantity, but the result may be biased high
MW = monitoring well
ND = PAHs were not detected and a bTEQ concentration was not calculated
PAH = polycyclic aromatic hydrocarbon
U = not detected at or above the reporting limit

Table 3. Groundwater contaminant concentrations at monitoring well MW-2.

Date	Lead[1] (µg/L)	bTEQ (µg/L)
11/2010	1.0 U	ND
6/2011	1.0 U	ND
9/15/2014	1.0 U	--
5/20/2024	0.300 U	--

Notes:

[1] Groundwater samples collected in 2010, 2011, and 2014 for lead analysis only were field filtered.

-- = not analyzed
µg/L = microgram per liter
bTEQ = benzo(a)pyrene total toxicity equivalent concentration
MW = monitoring well
ND = PAHs were not detected and a bTEQ concentration was not calculated
PAH = polycyclic aromatic hydrocarbon
U = not detected at or above the reporting limit

Table 4. Groundwater contaminant concentrations at monitoring well MW-3.

Date	Lead[1] (µg/L)
9/15/2014	1.0 U

Notes:
[1] Groundwater sample collected in 2014 was field filtered.

µg/L = microgram per liter
MW = monitoring well
U = not detected at or above the reporting limit

Table 5. Groundwater contaminant concentrations at monitoring well MW-5.

Date	Lead[1] (µg/L)	bTEQ (µg/L)
11/2010	1.0 U	ND
6/2011	1.0 U	ND
9/15/2014	1.0 U	--
5/20/2024	0.300 U	--

Notes:

[1] Groundwater samples collected in 2010, 2011, and 2014 for lead analysis only were field filtered.

-- = not analyzed
µg/L = microgram per liter
bTEQ = benzo(a)pyrene total toxicity equivalent concentration
MW = monitoring well
ND = PAHs were not detected and a bTEQ concentration was not calculated
PAH = polycyclic aromatic hydrocarbon
U = not detected at or above the reporting limit

Appendix A. Vicinity Map



Figure 1: Site vicinity map (LaManna Geosciences Inc. [LGI] 2012). The approximate location of the Site is depicted by the red dot.

Appendix B. Site Plan

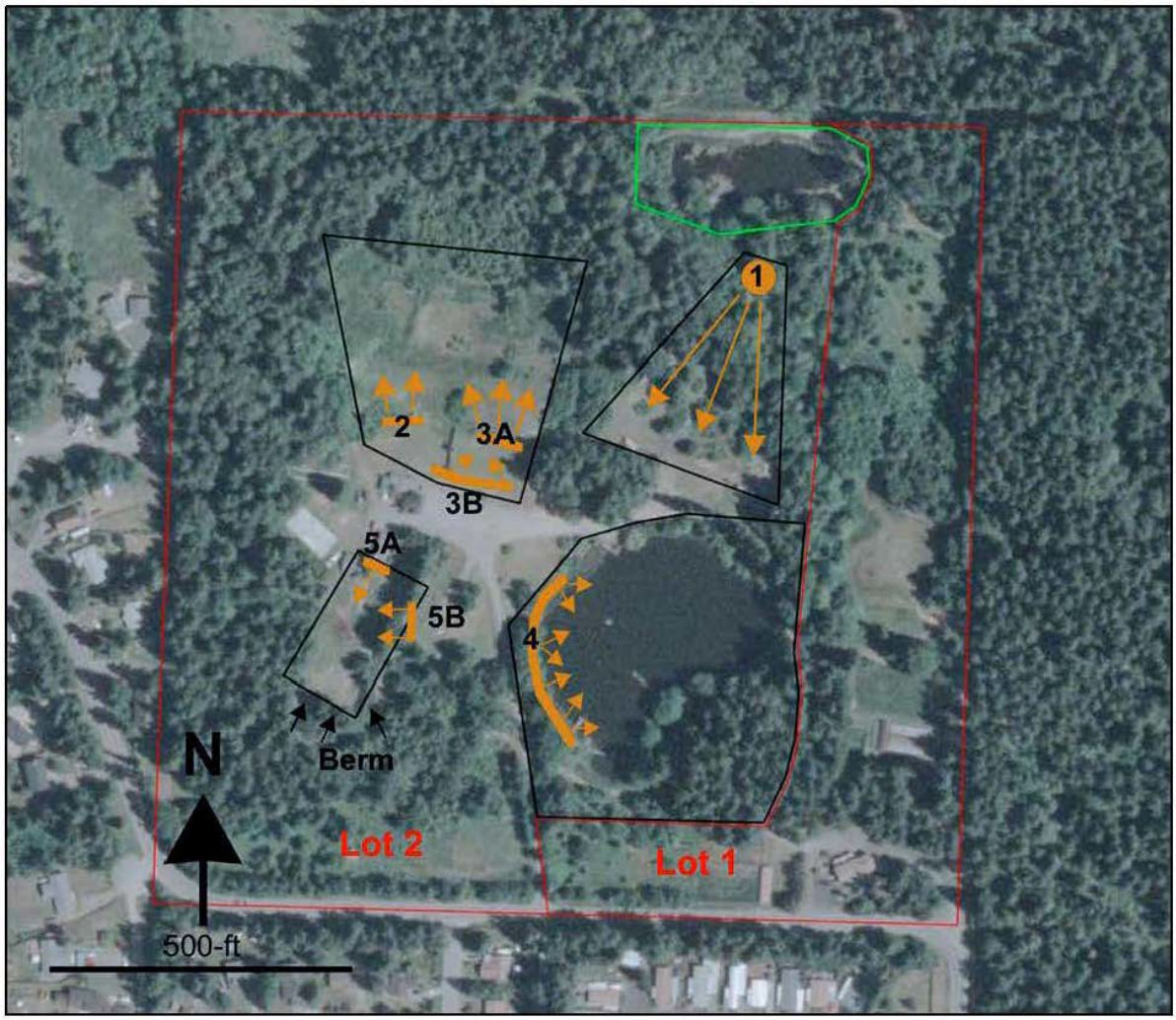
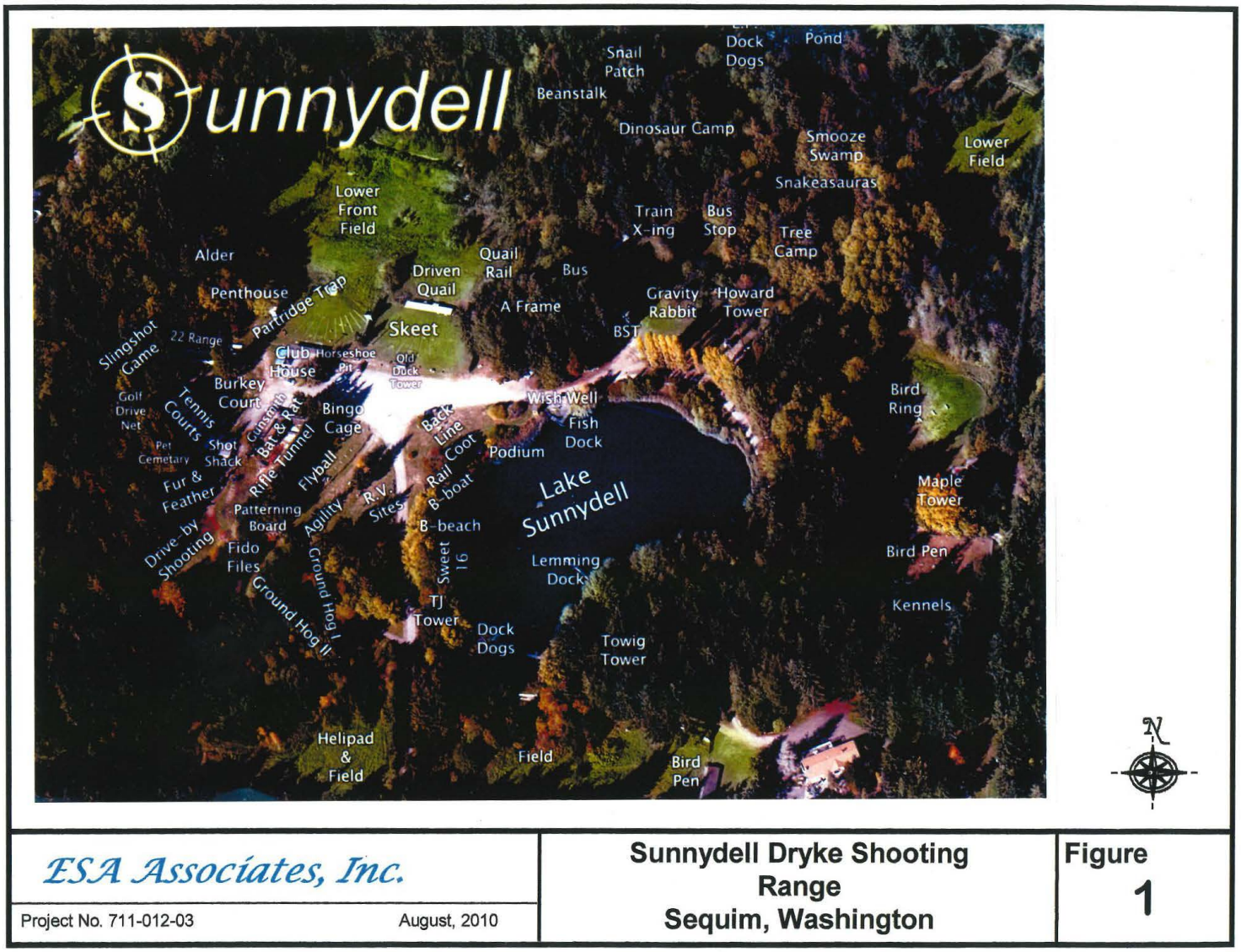


Figure 1: Current Site layout (Washington State Department of Ecology [Ecology] 2013a) showing the Active Shooting Range Management Areas (black polygons); shooting locations (1 [Bus Stop], 2 [Pent House/Bird Box/Weeping Willow], 3A and 3B [Quail], 4 [Upper Pond], 5A and 5B [Rabbit Run]); shooting directions (orange arrows); Lower Pond Management Area (green polygon); and Lots 1 and 2 (red polygons).



ESA Associates, Inc.	Sunnydell Dryke Shooting Range Sequim, Washington	Figure 1
Project No. 711-012-03 August, 2010		

Figure 2: Historic Site layout showing all areas of the Site (ESA Associates, Inc. [ESA Associates] 2010).

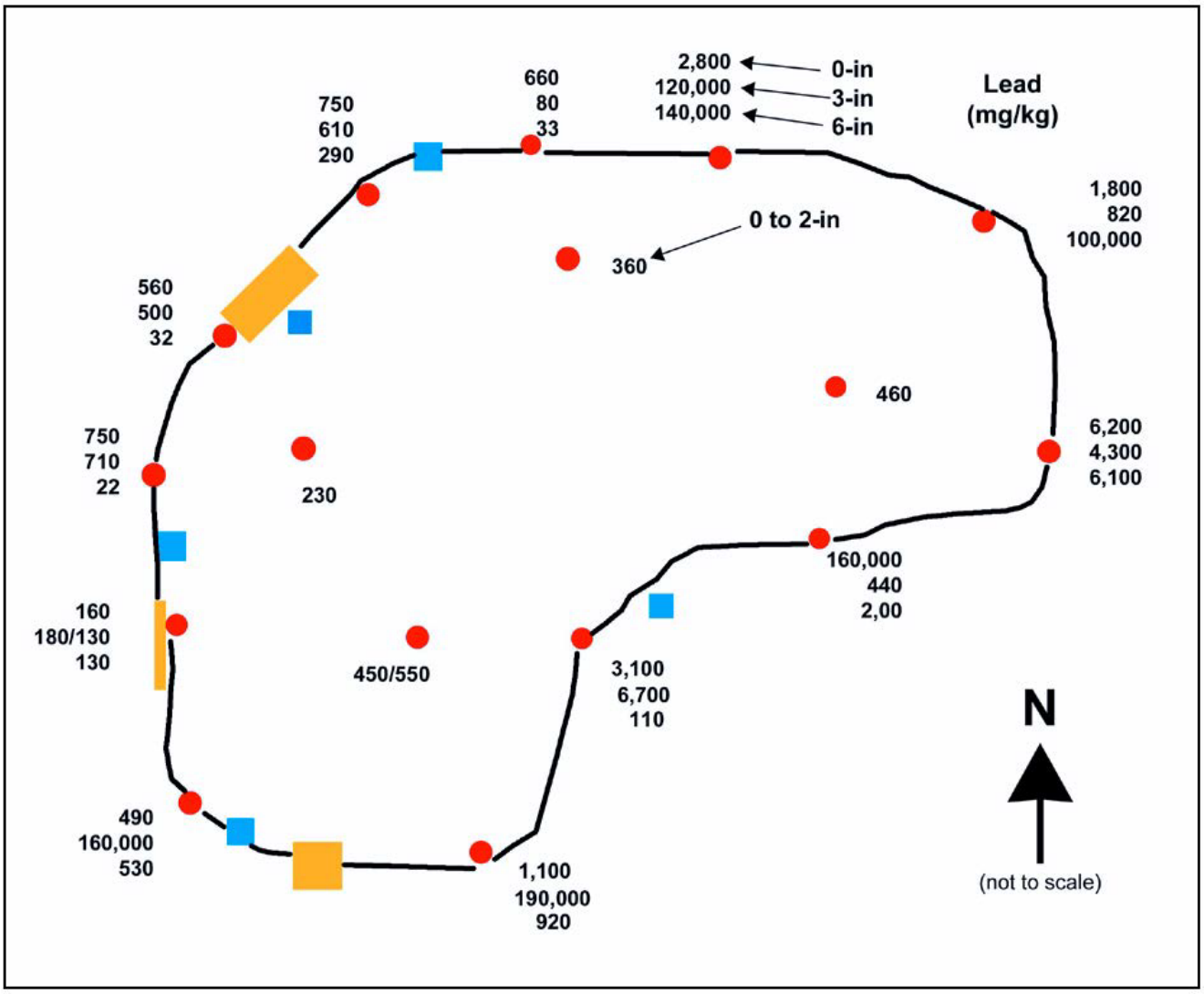


Figure 3: Lead concentrations (in milligrams per kilogram [mg/kg]) in sediment in the Upper Pond from July 2010 (LaManna Geosciences Inc. [LGI] 2012). Sample locations are shown as red circles, target release stations are blue squares, and shooting stations are yellow rectangles. Sediment samples were collected along the perimeter of the pond at depths of 0-, 3-, and 6-inches. Samples in the interior of the pond were collected from the top 2-inches of sediment.

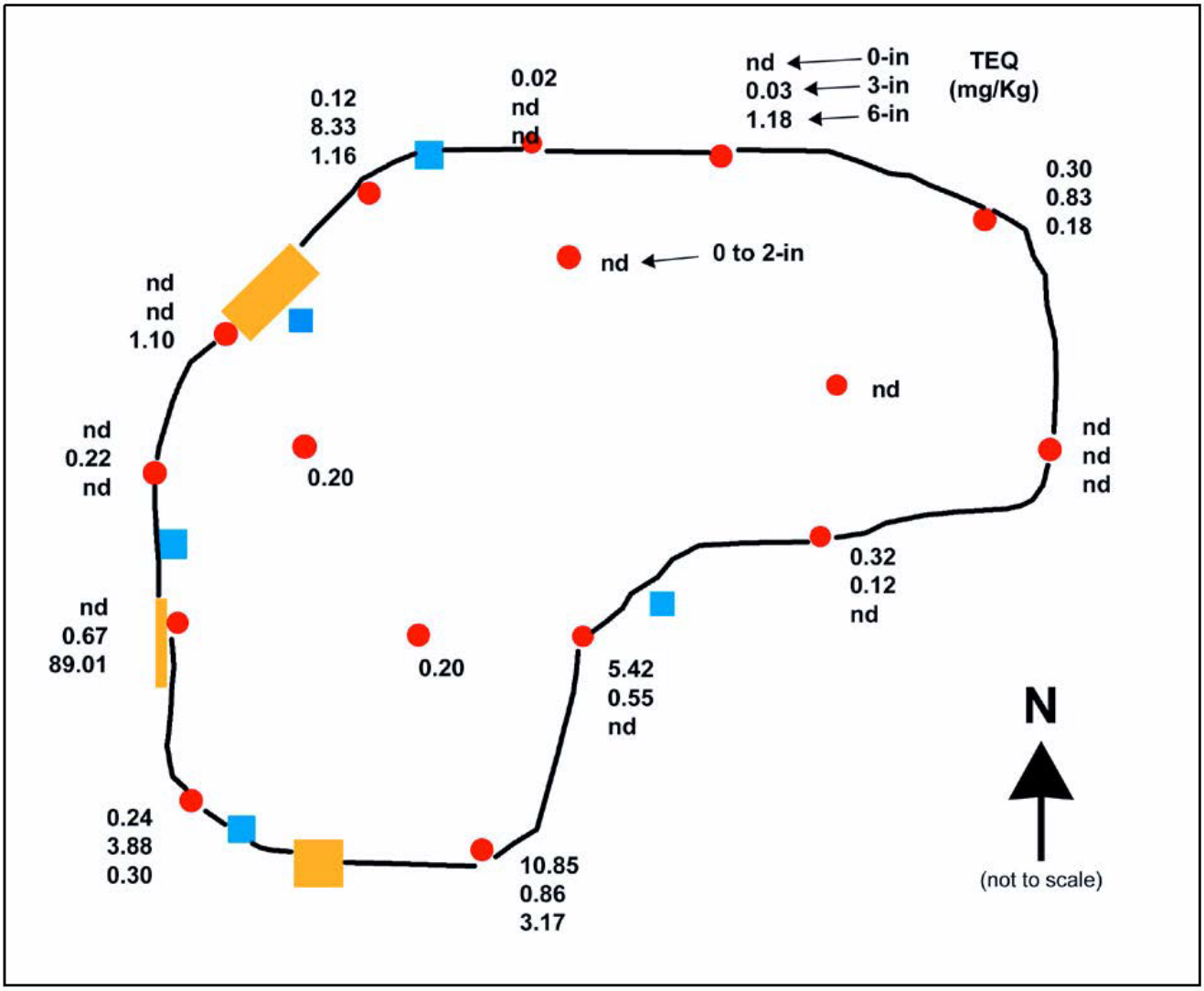


Figure 4: Benzo(a)pyrene total toxicity equivalent concentrations (bTEQ) (in mg/kg) in sediment in the Upper Pond from July 2010 (LGI 2012). Sample locations are shown as red circles, target release stations are blue squares, and shooting stations are yellow rectangles. Sediment samples were collected along the perimeter of the pond at depths of 0-, 3-, and 6-inches. Samples in the interior of the pond were collected from the top 2-inches of sediment.

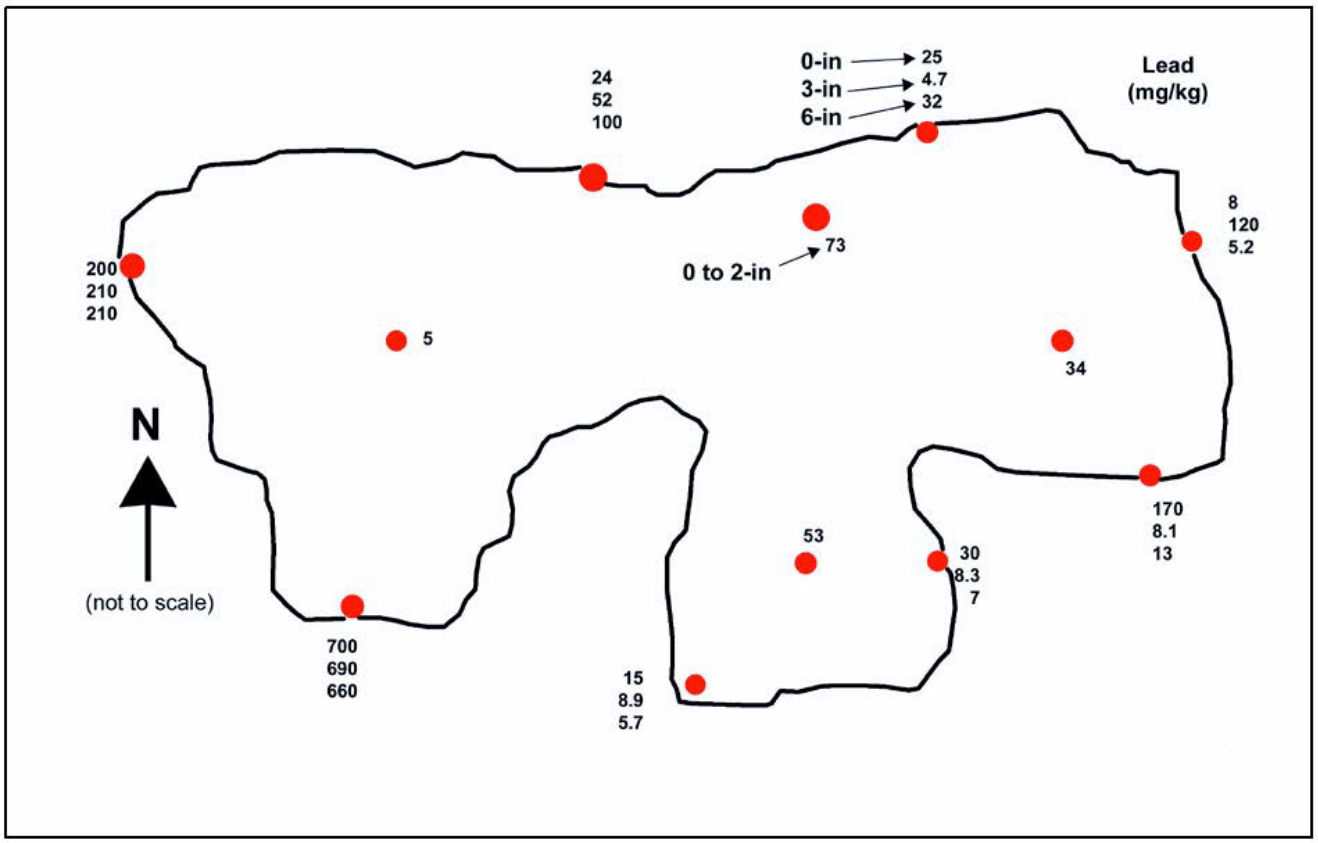


Figure 5: Lead concentrations (in mg/kg) in sediment in the Lower Pond from July 2010 (LGI 2012). Sediment samples were collected along the perimeter of the pond at depths of 0-, 3-, and 6-inches. Samples in the interior of the pond were collected from the top 2-inches of sediment.

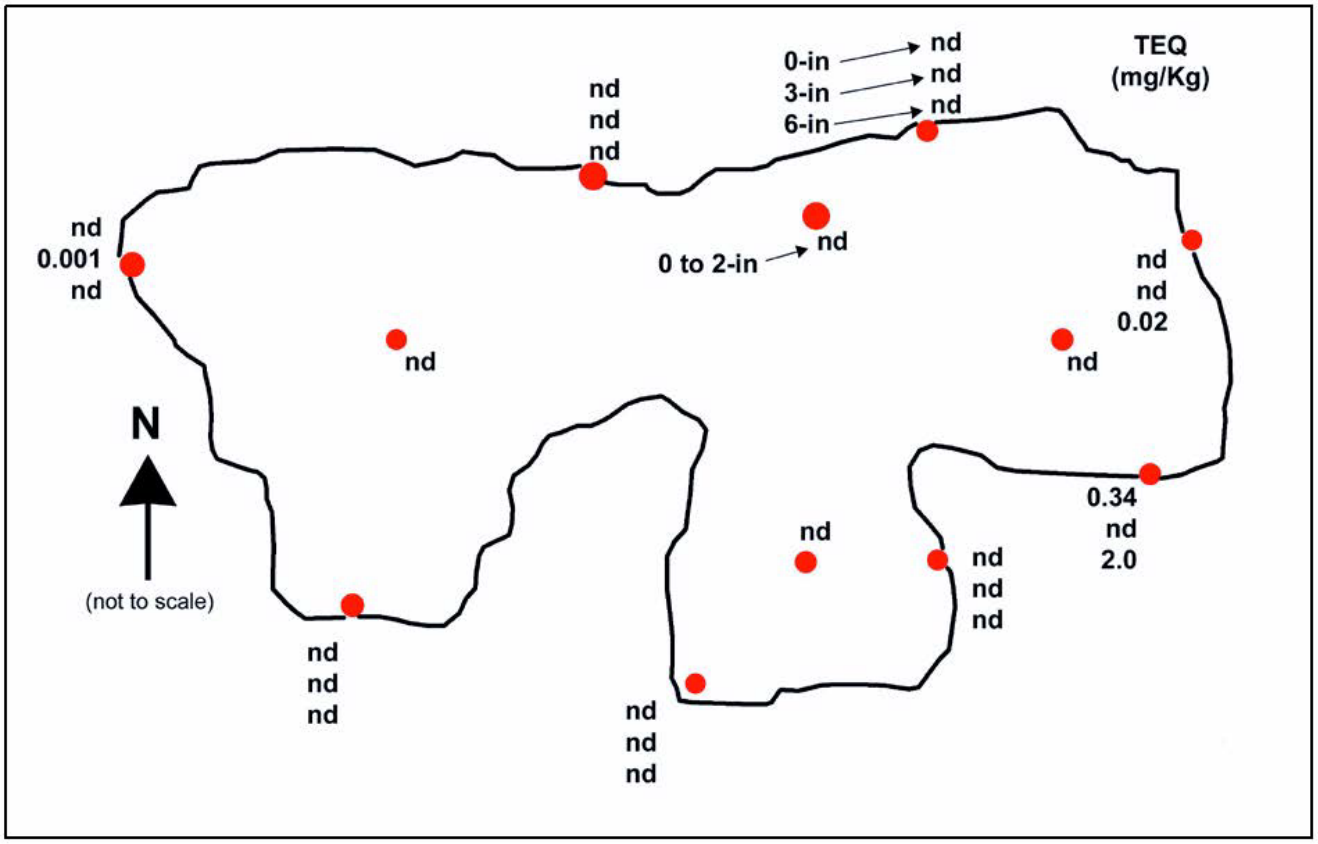


Figure 6: Concentrations on bTEQ (in mg/kg) in sediment in the Lower Pond from July 2010 (LGI 2012). Sediment samples were collected along the perimeter of the pond at depths of 0-, 3-, and 6-inches. Samples in the interior of the pond were collected from the top 2-inches of sediment.

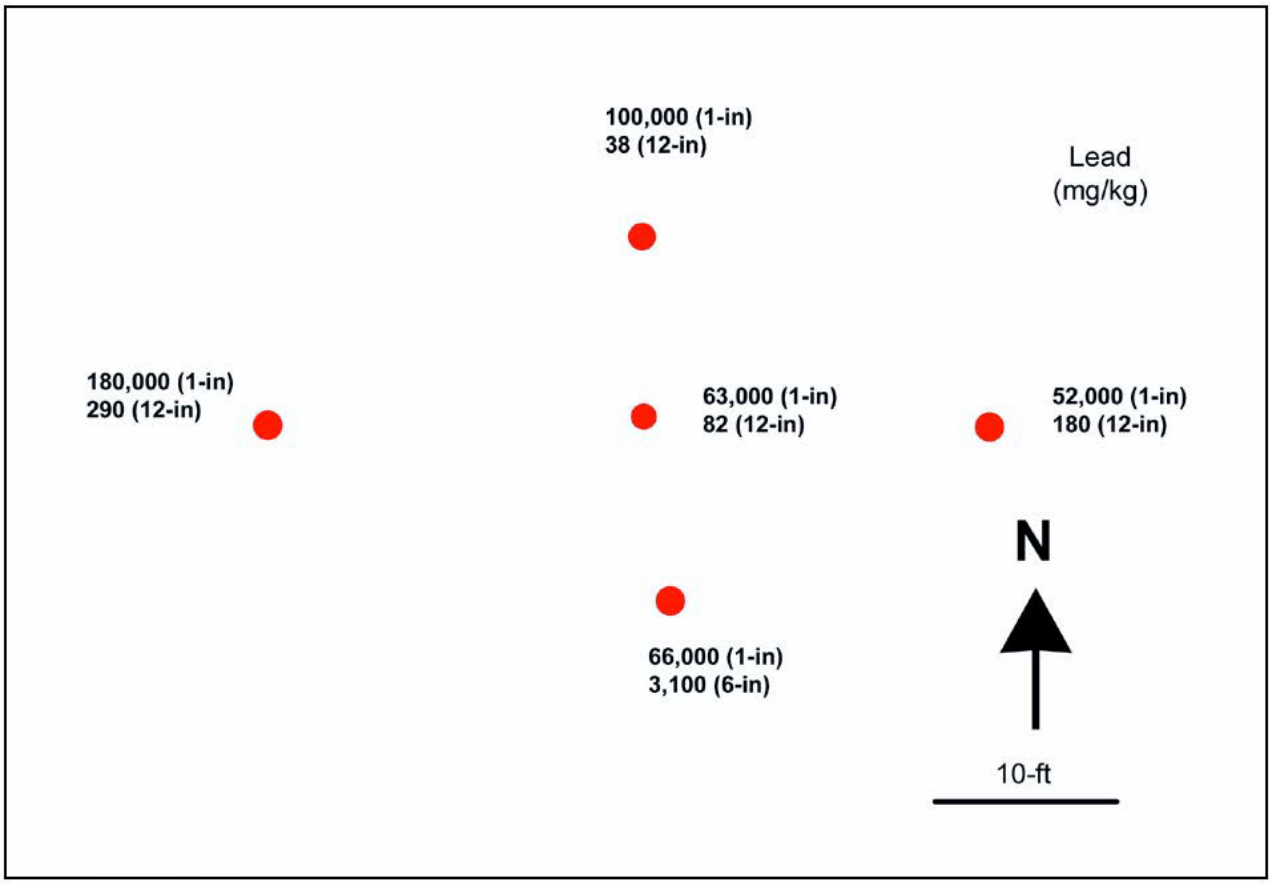


Figure 7: Lead concentrations (in mg/kg) in soil in the Rabbit Run area from July 2010 (LGI 2012). Soil samples were collected at two depths as indicated in parentheses. This figure is based on Figure 5 in ESA Associates' 2010 report, which does not show where these samples were collected relative to Site features.

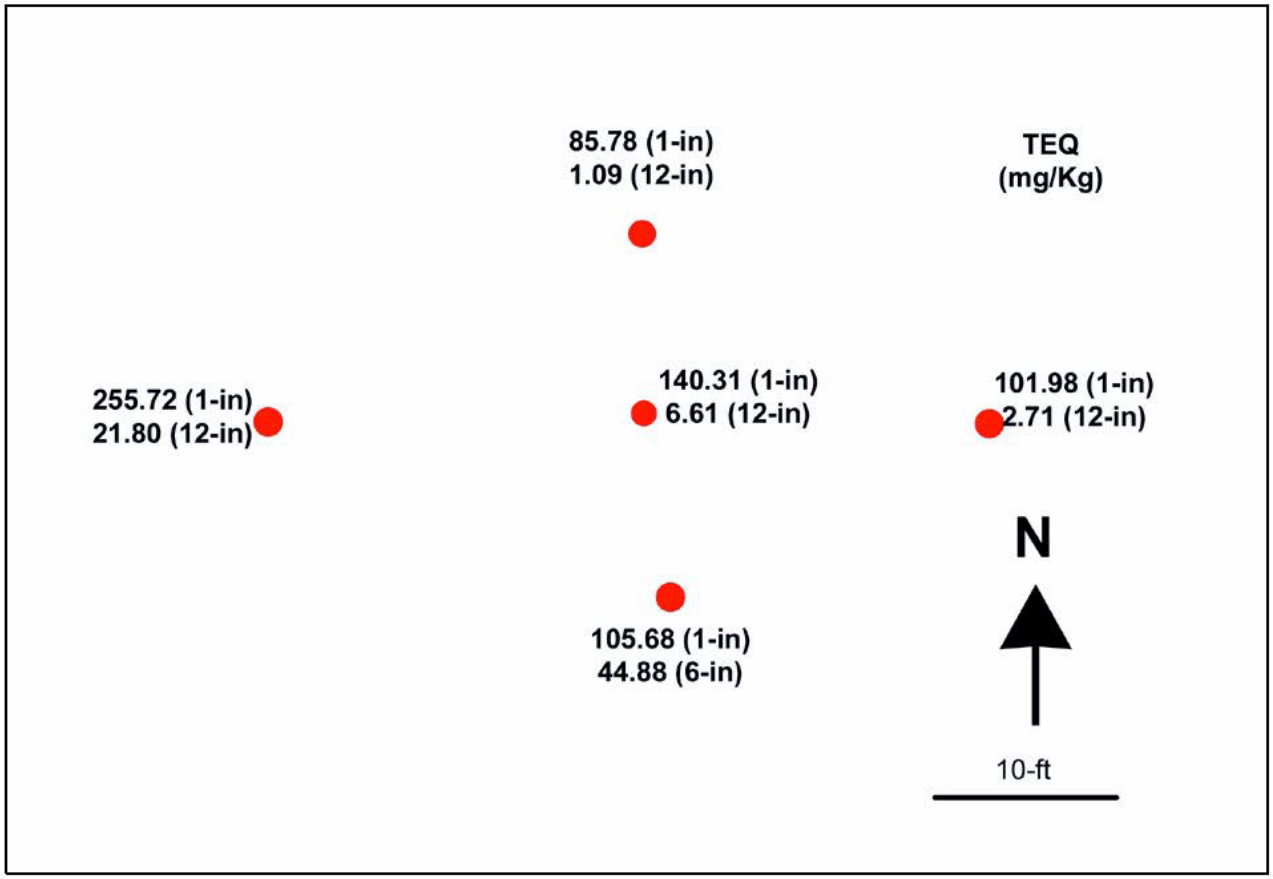


Figure 8: Concentrations of bTEQ (in mg/kg) in soil in the Rabbit Run area from July 2010 (LGI 2012). Soil samples were collected at two depths as indicated in parentheses. This figure is based on Figure 5 in ESA Associates' 2010 report, which does not show where these samples were collected relative to Site features.

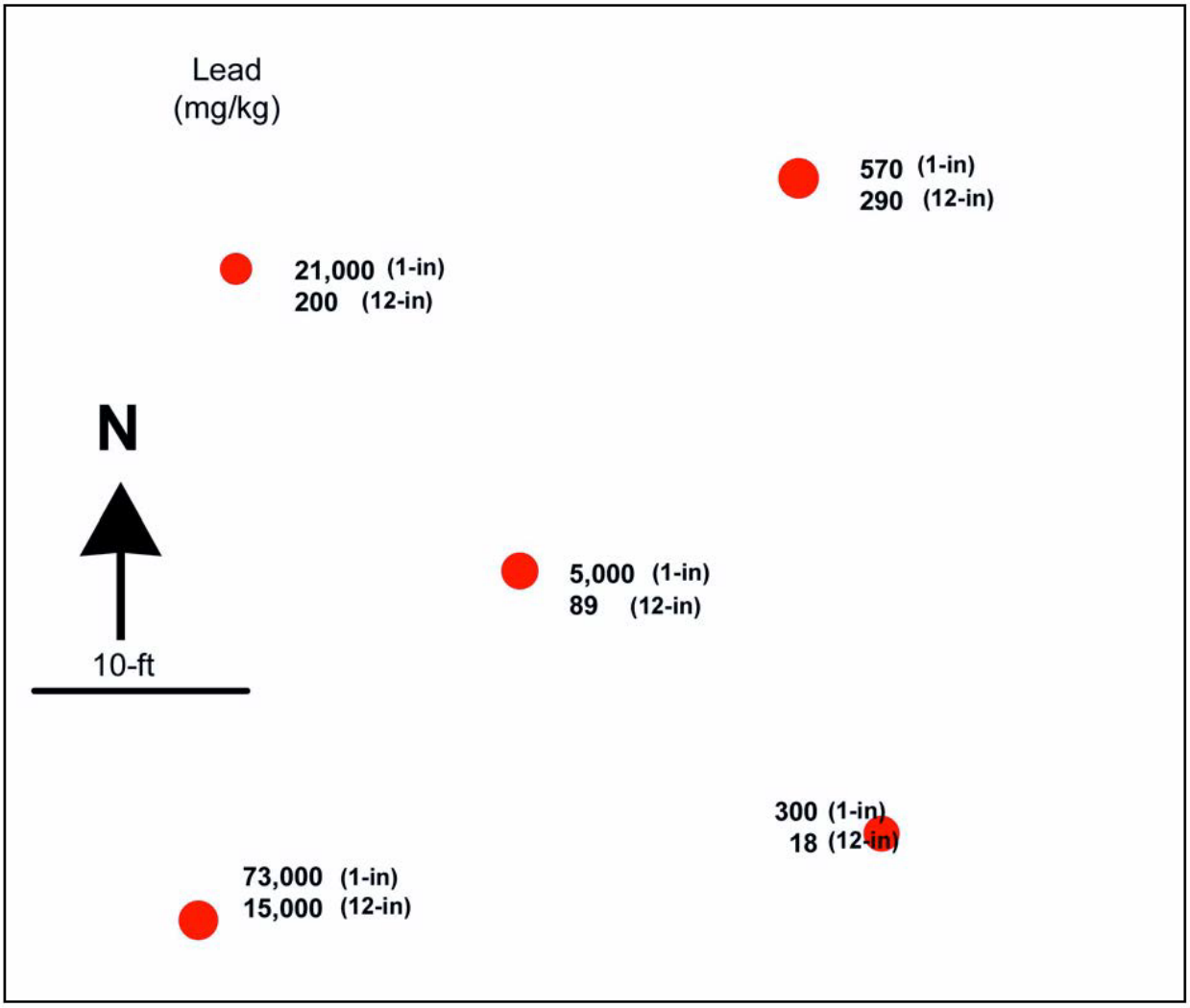


Figure 9: Lead concentrations (in mg/kg) in soil in the Weeping Willow area from July 2010 (LGI 2012). Soil samples were collected at two depths as indicated in parentheses. This figure is based on Figure 6 in ESA Associates' 2010 report, which does not show where these samples were collected relative to Site features.

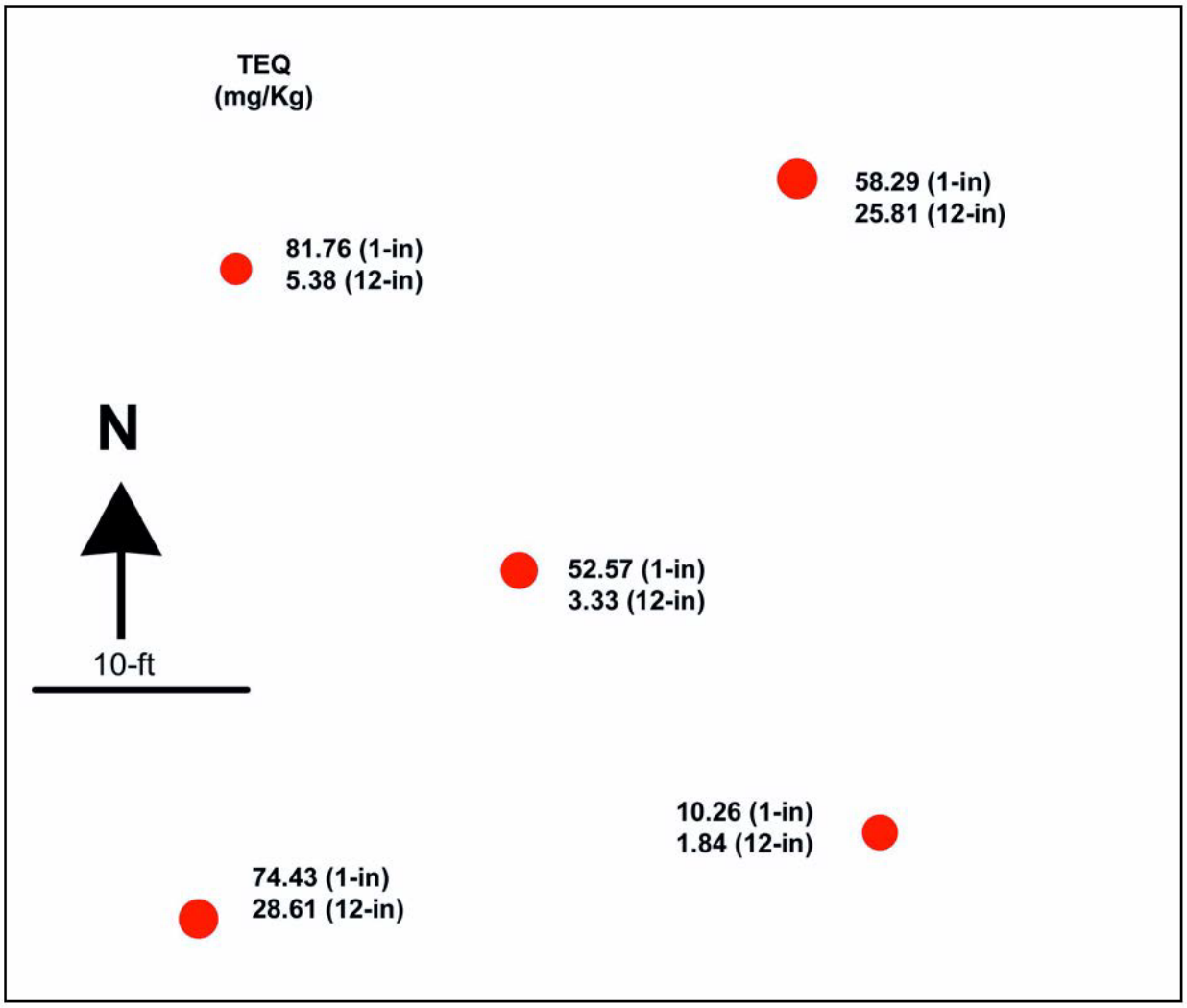


Figure 10: Concentrations of bTEQ (in mg/kg) in soil in the Weeping Willow area from July 2010 (LGI 2012). Soil samples were collected at two depths as indicated in parentheses. This figure is based on Figure 6 in ESA Associates' 2010 report, which does not show where these samples were collected relative to Site features.

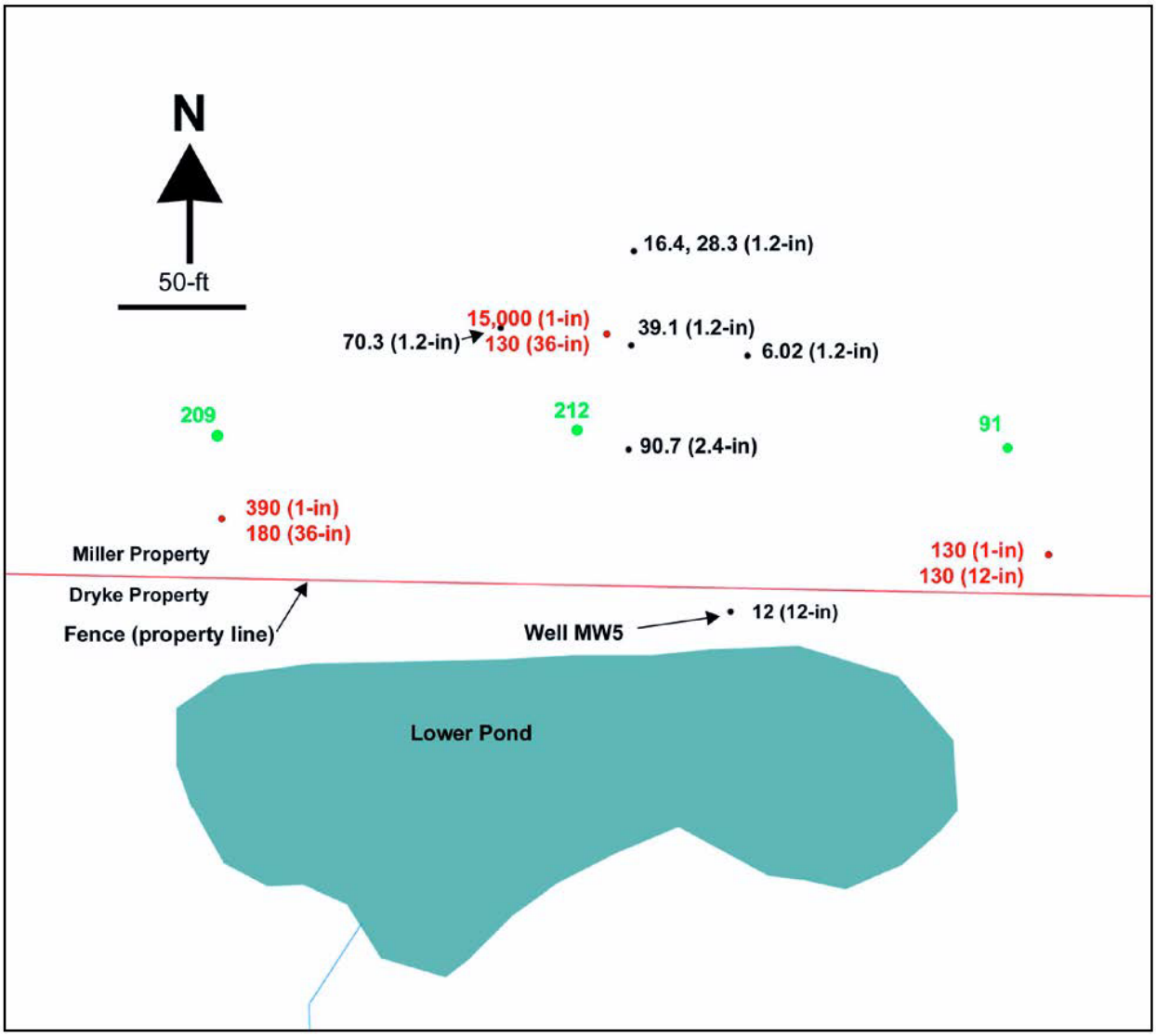


Figure 11: Lead concentrations (in mg/kg) in soil from samples collected on or near the adjacent Miller property (LGI 2012). Soil samples were collected at depths as indicated in parentheses. The sample locations shown in green are samples collected by Clallam County Department of Health and Human Services (CCHHS) and are likely surface grab samples collected less than 3-inches deep. LGI estimated these locations and ESA Associates' samples (shown in red) from unscaled drawings. LGI samples are shown in black.

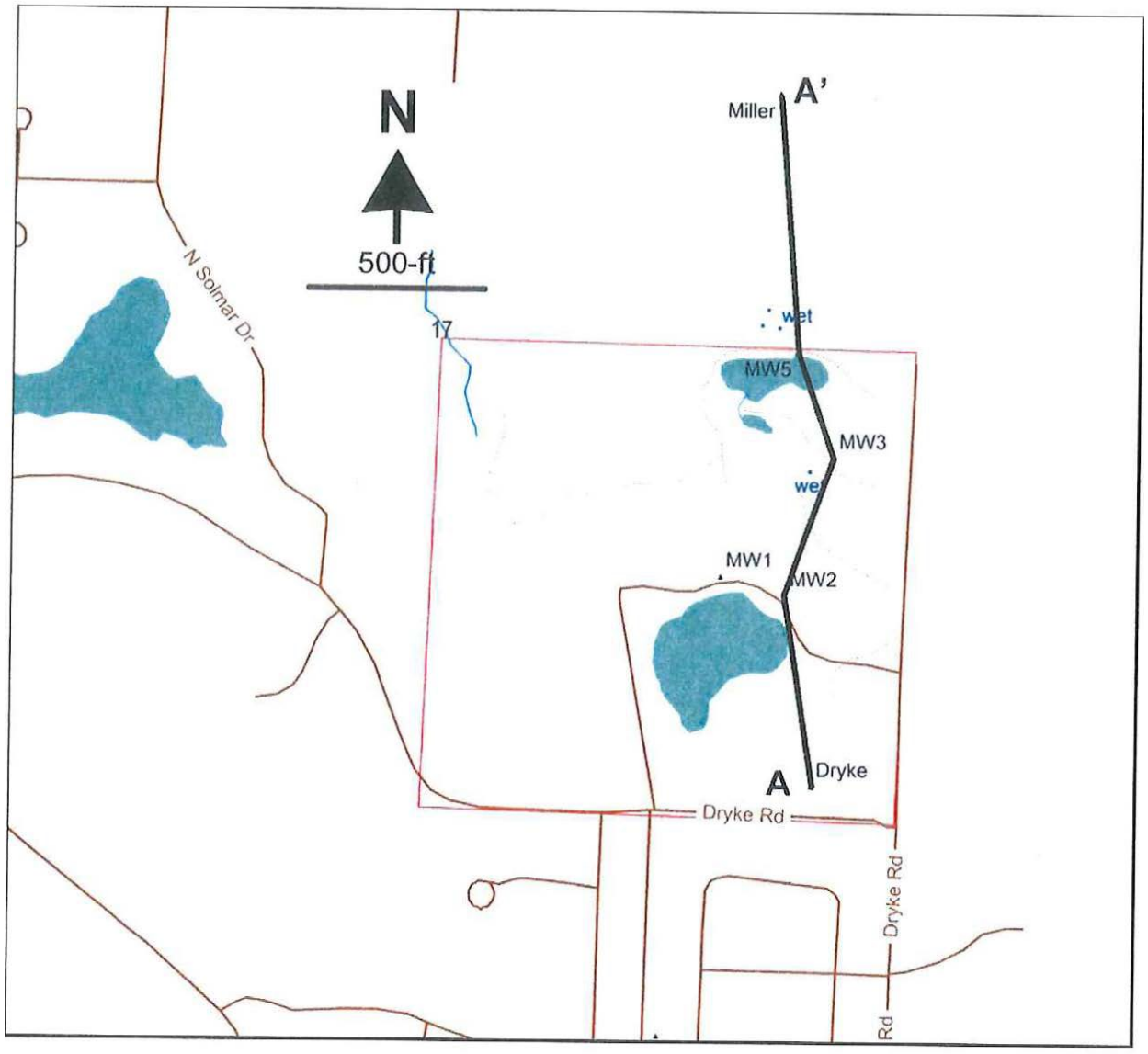


Figure 12: Monitoring well locations (Colligan 2013).

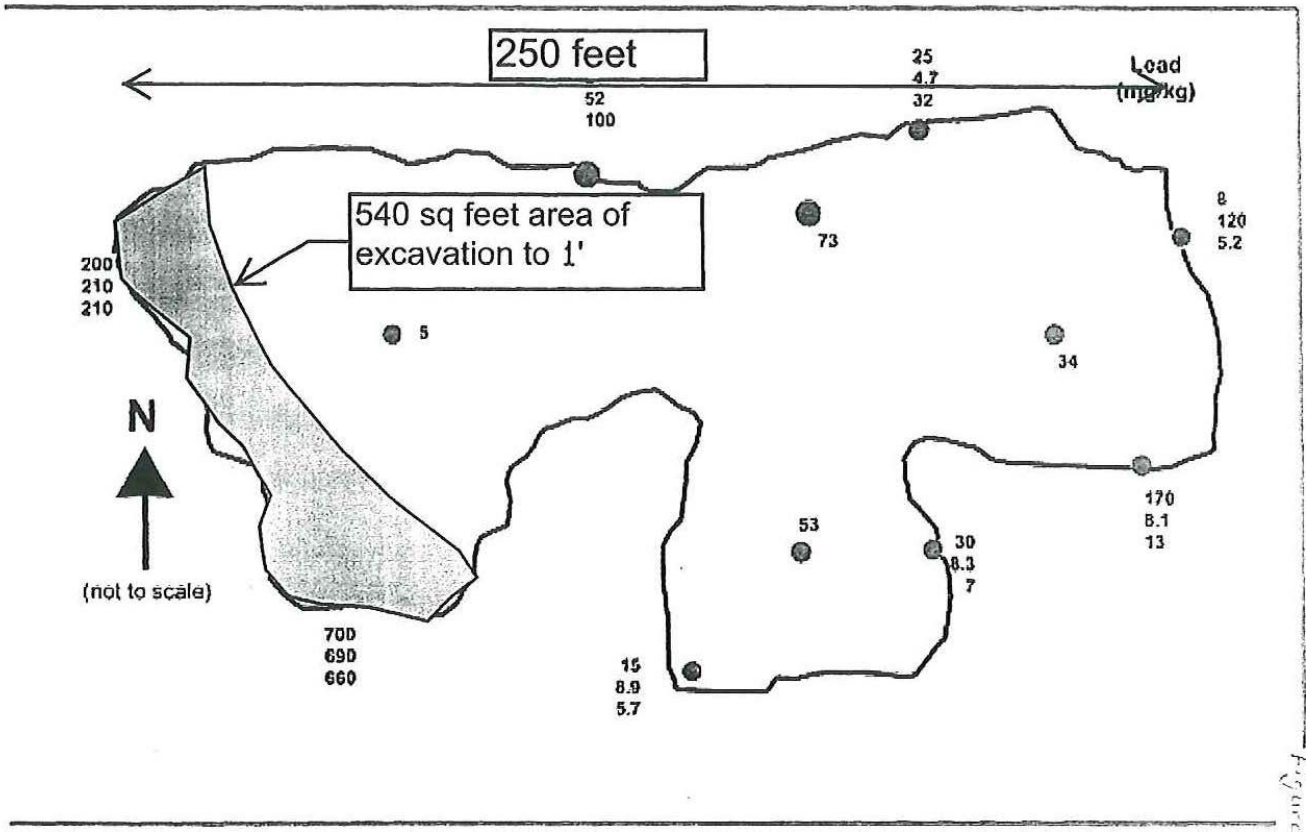


Figure 13: Extent of soil excavation area excavated in 2013 in the Lower Pond Area (Colligan 2013).

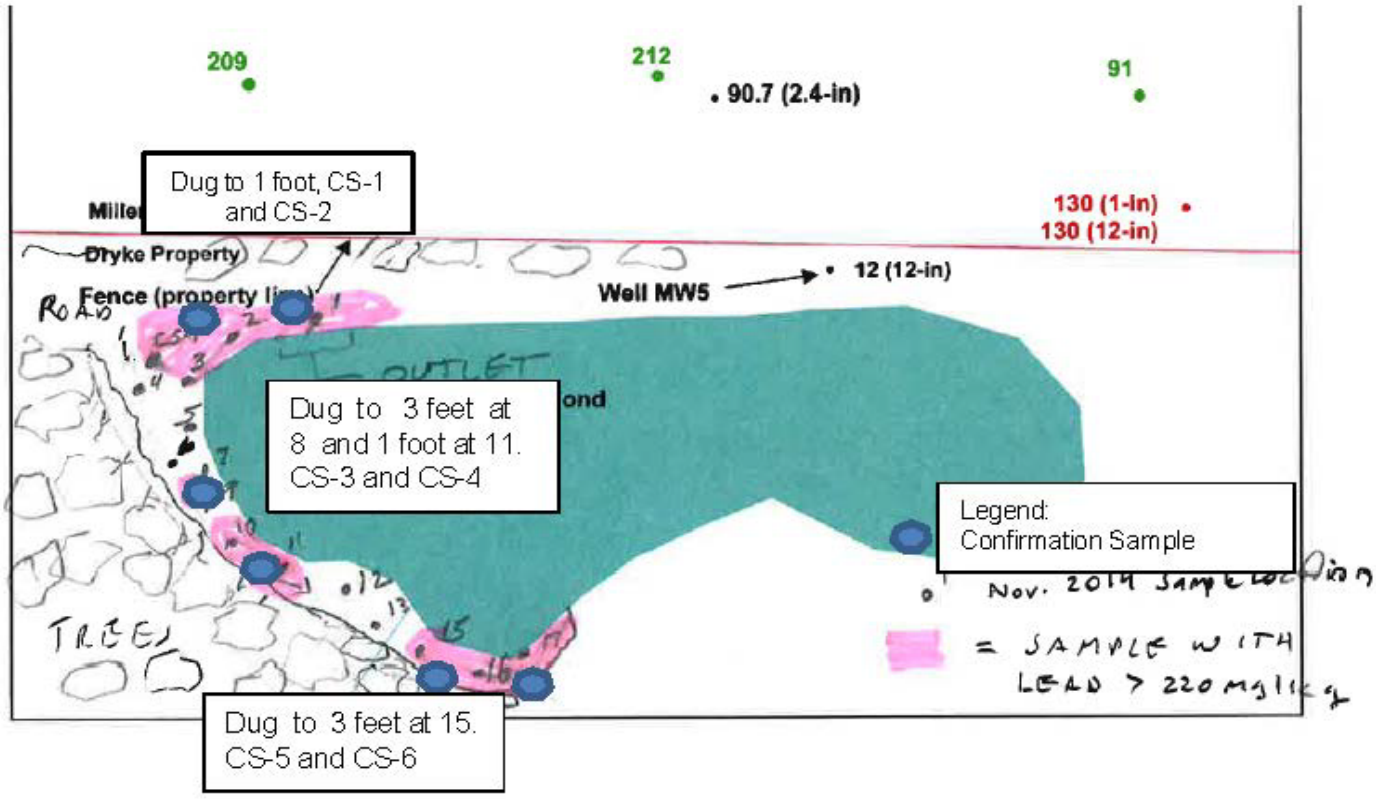


Figure 14: Soil excavation areas and confirmation sampling locations in the Lower Pond Area between 2014 and 2016 (Colligan 2016).

Appendix C. Photo Log

Photo 1 (facing southeast): View of entrance to the Sunnydell Shooting Grounds.



Photo 2 (facing west): View of the clubhouse located on the Site.



Photo 3 (facing south): View of shooting location 5A (Rabbit Run) within an Active Shooting Range Management Area.



Photo 4 (facing west): Target throwers for shooting locations 5A and 5B (Rabbit Run).



Photo 5 (facing southwest): View of the berm for shooting location 5A and 5B (Rabbit Run) within an Active Shooting Range Management Area.



Photo 6 (facing north): Shooting location 2 (Pent House/Bird Box/Weeping Willow) within an Active Shooting Range Management Area.



Photo 7 (facing northwest): View of a target thrower for shooting location 2 (Pent House/Bird Box/Weeping Willow).



Photo 8 (facing southwest): View of a rabbit target thrower for shooting location 2 (Pent House/Bird Box/Weeping Willow).



Photo 9 (facing not applicable [NA]): View of broken targets near shooting location 2 (Pent House/Bird Box/Weeping Willow).



Photo 10 (facing northeast): View from shooting location 3A (Quail) within an Active Shooting Range Management Area.



Photo 11 (facing southwest): View of target throwers at shooting location 3A (Quail) within an Active Shooting Range Management.



Photo 12 (facing north): View of the berm area for shooting locations 3A and 3B (Quail).



Photo 13 (facing east): View of shooting location 1 (Bus Stop), south of the Lower Pond Area.



Photo 14 (facing southeast): View of a target thrower for shooting location 1 (Bus Stop) within an Active Shooting Range Management Area.



Photo 15 (facing southwest): View of the berm area at shooting location 1 (Bus Stop) within an Active Shooting Range Management.



Photo 16 (facing east): View of shooting location 4 over the Upper Pond.



Photo 17 (facing south): View of a target thrower for shooting location 4 over the Upper Pond.



Photo 18 (facing northeast): View of another target thrower for shooting location 4 over the Upper Pond.

