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**SUNNYDELL DRYKE SHOOTING RANGE  
292 DRYKE ROAD  
SEQUIM, CLALLAM COUNTY, WASHINGTON, 98382**

## **Remedial Action Work Plan**

**Prepared for**  
Washington State Department of Ecology

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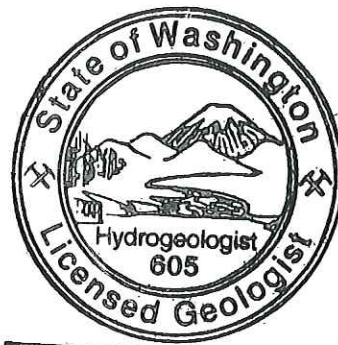
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## List of Abbreviations and Acronyms

|         |  |
|---------|--|
| bgs     | Below ground surface                         |
| BMPs    | Best Management Practices                    |
| cPAH    | Carcinogenic polycyclic aromatic hydrocarbon |
| Ecology | Washington State Department of Ecology       |
| HASP    | Health and Safety Plan                       |
| MTCA    | Model Toxics Control Act                     |
| ppm     | Parts per million                            |
| RAWP    | Remedial Action Work Plan                    |

THIS REPORT HAS BEEN PREPARED BY A STATE OF WASHINGTON LICENSED  
HYDROGEOLOGIST



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## 1.0 Introduction

The purpose of this report is to present the plan for remedial actions at the Sunnydell Dryke Shooting Range in accordance with the requirements of the Cleanup Action Plan for this site issued by the Washington State Department of Ecology in June of 2013.

### BACKGROUND

The Sunnydell Dryke Shooting Range opened in 1967 in Sequim, Washington (Figure 1) and has been used as an active shooting range and dog training facility to the present day. The original property occupies approximately 39 acres of wooded and open areas and contains three ponds, a creek, a main residence, a second residence, and some small structures (i.e., Club House, kennels, gun repair shop) associated with the shooting range. The Site is surrounded by single family dwellings with variable lot sizes, including a trailer park that lies on the other side of Dryke Road to the south and upgradient from the Site (Figure 2).

Environmental samples collected by Clallam County Health and Human Services in 2004 indicated the presence of lead in sediment and surface water at the Site. The owners of this Site signed an agreed order with Ecology in August 2009 requiring them to conduct a Remedial Investigation/Feasibility Study (RI/FS). That work has been completed and the Cleanup Action Plan developed to address the contamination found. The cleanup plan divides the Site into several Management Areas based on historical site use. Those areas include 1) the Active Shooting Ranges, 2) the Lower Pond Area, and 3) the remaining parts of the site that are non-shooting Areas (see Figure 3).

As part of the cleanup plan, shooting will be restricted to the currently active shooting areas; in other words no expansion of the current shooting areas will be allowed. The active shooting areas will operate under Best Management Practices (BMPs) defined in this document, institutional controls will be applied to the Site, reclamation of lead will occur in active shooting areas and removal of contaminated soils in an inactive shooting area will occur, as will monitoring of surface and ground water. The cleanup action recognizes the recontamination of soil will occur in active shooting areas in the future, with levels controlled by periodic lead reclamation efforts. BMPs will not allow human contact with lead nor will lead migrate out of Active Shooting Range areas. The following sections contain details of the cleanup actions that will be implemented under this plan.



## 2.0 Best Management Practices

The four Active Shooting Range Management Areas (Upper Pond, Rabbit Run, Skeet Field/Penthouse and the Duck Tower) will be operated in accordance with the following BMPs:

- Lead reclamation will be conducted in a manner that does not spread 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, including photographs, will be kept of lead shot reclamation efforts including the tonnage of reclaimed lead recovered 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 remain as currently positioned so as to keep shot falling within the already established boundaries of the Active Shooting Ranges
- Shot size will be restricted to #7.5 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 human 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.

The following BMPs apply to the Lower Pond Management Area, which is an inactive shooting area but active dog training area:

- 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 a way that prevents shot and bullets from falling on neighboring properties..
- 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.

The following BMPs apply to the Non-Shooting Management Areas:

- 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.



## **3.0 Lower Pond Sediment Excavation**

### **BACKGROUND**

The Lower Pond Area is shown on Figure 2. It was formerly used for duck hunting and occasional target practice. One section of the pond contains lead above the cleanup level of 220 parts per million. The following specific mitigation and BMPs will be implemented:

- Soil (and/or pond sediment) from two sampling locations along the western shoreline of the Lower Pond contains lead and PAHs that exceed CULs (see Figure 4). The soil at the Lower Pond will be remediated by excavating the upper 1-foot of soil in this area and relocating this soil 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 soil will be removed from the lower pond (see Figure 5).
- Confirmation sampling will ensure that lead and PAH cleanup levels have been met in the Lower Pond excavation areas. The soil remaining after the excavation will be allowed to vegetate to prevent erosion.

### **SOIL/SEDIMENT REMOVAL**

The upper one foot of soil/sediment within the shaded area of Figure 4 will be excavated using a backhoe from the shore that will reach out and pull back the upper foot of sediment. The sediment will be placed in a pile on shore and allowed to drain and consolidate before being loaded in a truck and moved to fill the berm at the Rabbit Run. The truck bed shall be plastic-lined to prevent spillage if the soil is still free-draining at the time of transport.

### **SAMPLING FOLLOWING EXCAVATION**

Two samples of sediment will be collected following the completion of removal activities. These samples will be collected in the approximate locations along the bank of the pond where prior sampling indicated exceedences of the cleanup level. The samples will be collected by shovel by digging into the upper 3" of remaining soil in 5 locations within a 10 square foot area and compositing a fraction of each "aliquot" in a stainless steel bowl. Samples will be analyzed for lead and carcinogenic polycyclic aromatic hydrocarbons using the same laboratory and reporting limits as was done for the RI report (i.e., the reporting limits will be less than the cleanup levels). Flags will be set in the ground to identify the location of the samples in case results indicate exceedence of the cleanup levels, in which additional over-excavation will need to occur in that area. Ecology will be notified one week or so before the additional excavation occurs. A second set of sediment samples will then be obtained and analyzed to ensure cleanup levels have been achieved following the additional excavation.



## **4.0 Lead Recycling**

### **METHOD FOR DRY LAND**

Lead shot will be mined in all of the active shooting areas identified on Figure 3. A designated site will be constructed to facilitate the equipment required to separate the lead shot from the soil. The active shooting areas will have one foot of soil removed by a front end loader and transferred to the designated reclamation site. Utilizing two conventional power screen plants, the first being a horizontal vibrating screen plant, the initial soil is screened using varying sizes of screen to separate out large rocks and debris. The soil is then transferred by conveyor belt to a rotating cylindrical cone screen that separates the denser lead shot from the soil and transferred by conveyor belt into plastic containers. A front end loader then returns the soil that has been harvested of lead shot to the active shooting area where it is spread out to match grade.

### **METHOD FOR UPPER POND**

A commercial gold dredge will be used to harvest lead shot from the pond. The dredge utilizes a combination of a motor driven auger, which extends from a ten-inch suction tube, and suction that aspirates the mud from the pond bottom. The material is transferred to the designated upland reclamation area adjacent to the pond. Then the soil will be reclaimed the same way as the dry land soil. The excess dredge water will be returned via piping to the pond along with the excess mud following the removal of the lead shot.

### **METHOD FOR CLAY TARGET REMOVAL**

Clay targets and spent hulls will be periodically removed using a frontend loader and an excavator. Broken targets and hulls will be loaded into a dump truck and transferred to a solid waste facility.

## 5.0 Groundwater and Surface Water Monitoring

Within 30 days following the termination of the Sunnydell Upper Pond lead recycling effort, a filtered surface water sample will be collected from the Pond to verify that lead recycling efforts have not impacted water quality in the pond. The sample will be collected by dipping an 8-oz polyethylene bottle with the cap removed below the surface of the pond and slowly allowing it to fill to 7/8 full. Then the sample will be chilled and shipped to the laboratory where it will be filtered prior to analysis.

The existing four ground water monitoring wells (shown on Figure 5) will be sampled for lead at least once between each 5-year Ecology review, with the first effort to occur in 2014. Samples shall be collected using a peristaltic pump and samples shall not be filtered. The samples shall be analyzed for total lead using the same laboratory and reporting limits as was done in the RI.

A brief sampling memo will be transmitted to Ecology following each sampling event.

## 6.0 Institutional Controls

Ellen Dryke, the current owner of the original 38.89 acre property, subdivided it into two properties in 2013, Lot 1 (9.03 Acres) and Lot 2 (29.86 Acres). Lot 1 will be excluded from the BMPs and the Institutional Controls because it was never part of the shooting range, and contains the main residence and the dog kennel. An environmental covenant will be recorded and attached to the deed for the parcel identified as Lot 2. The covenant will alert future owners that this part (Lot 2) of the original 38.89 acre property was used as a commercial target range and potential contamination from lead shot and target fragments may be present in soil or sediment. The environmental covenant will run with the land, as provided by law and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in Lot 2 as long as the use of the property remains as a shooting range. If the use of Lot 2 changes, additional investigation and/or cleanup will be necessary.

## 7.0 Schedule

An environmental covenant will be drafted by PLP for review by Ecology within 30 days following finalization of this work plan. Ecology will have 30 days to review environmental covenant. The environmental covenant will be recorded at Clallam County and a copy provided to Ecology.

Cleanup activities for the Site soil will commence 30 days after the Remedial Action Work Plan is finalized.

A Remedial Action Report will be provided to Ecology 30 days following receipt of laboratory data from the soil excavation and will include activities performed as described in the Remedial Action Work Plan.



## Figures

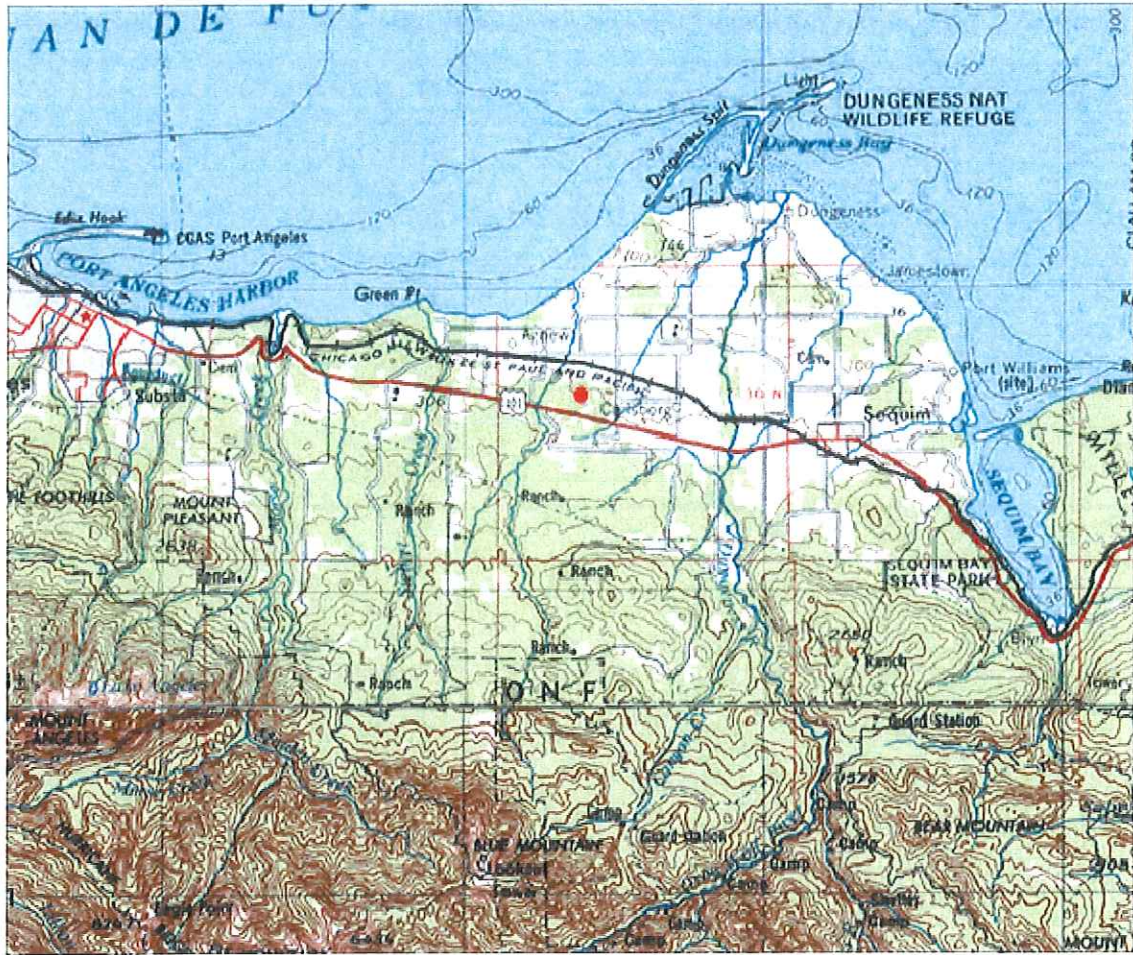


Figure 1. Map showing the approximate location of the Site (red circle) relative to the town of Sequim, Washington. The project is located in Clallam County, Washington. The blue area in the northern portion of this map is the Strait of Juan De Fuca.





Figure 2. 2009 orthophoto showing locations of the Upper Pond (UP), Lower Pond (LP), Middle Pond (MP), Rabbit Run (RR), Weeping Willow (WW), West Creek (WC), and selected improvements. The approximate site property lines are shown in red. The highest density developments are located to the south and west of the Site.





Figure 3. Map showing locations of proposed Active Shooting Range Management Areas (4 black polygons); shooting locations (1, 2, 3A, 3B, 4, 5A, 5B); shooting directions (orange arrows); Lower Pond Management Area (green polygon), and Lots 1 and 2 (red polygons). There are berms located at the south and southeast sides of Management Area 5. These berms prevent stray shot and bullets. The area outside of the black and green polygons in Lot 2 comprise the Non-Shooting Management Areas. The text describes BMPs and an institutional control for these management areas. Lot 1 will be managed separately and is excluded from these BMPs and institutional control.



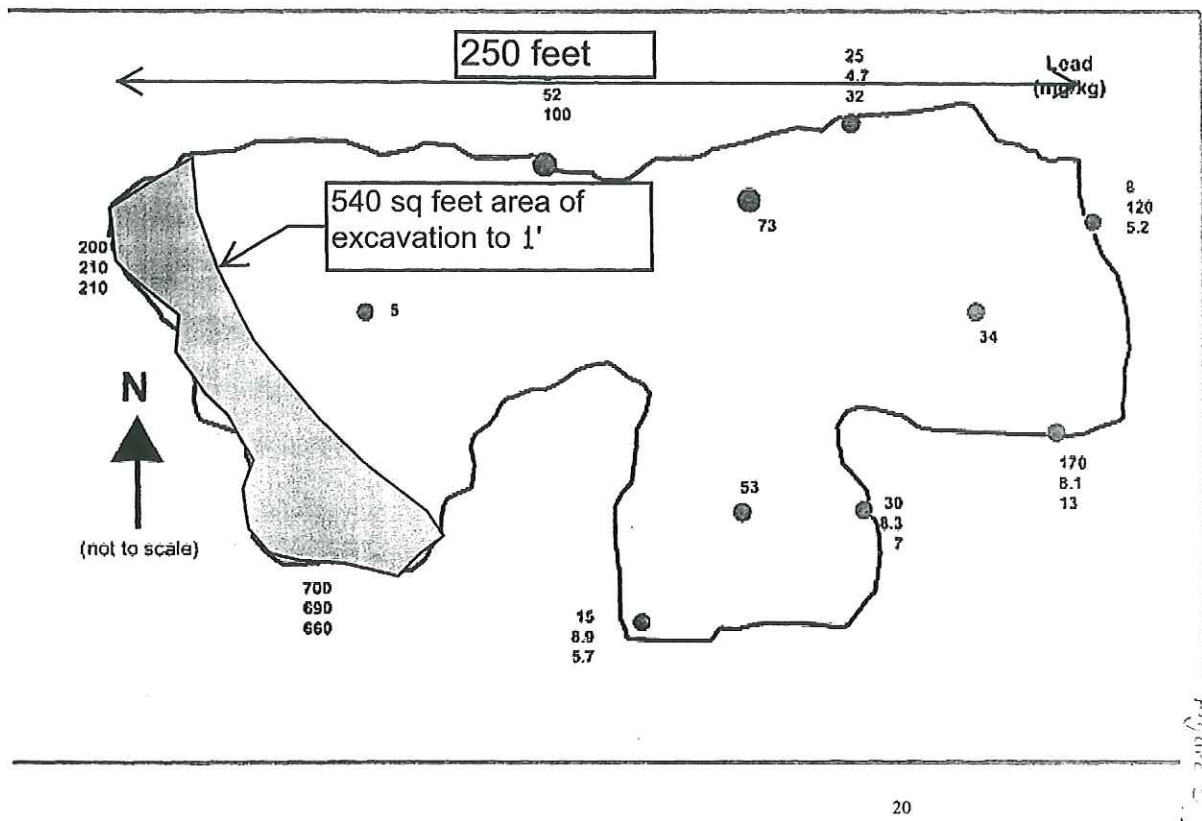


Figure 4. Map showing extent of area in lower pond to be excavated. Sediment is to be removed from the upper foot and places in the Rabbit Run shooting area for eventual lead recycling.

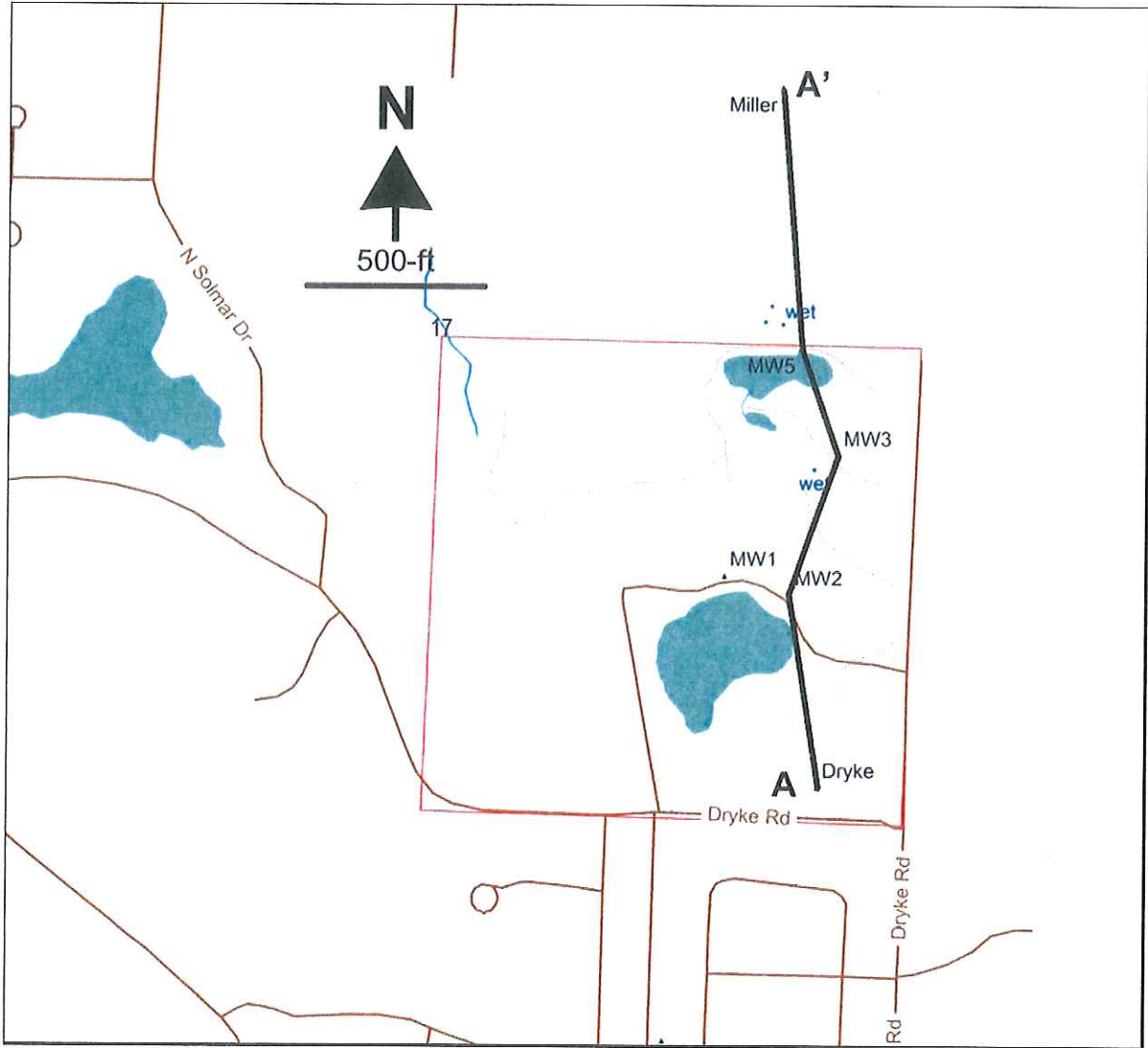


Figure 5. Location of Site Monitoring wells MW1, MW2, MW3, and MW5.