SOIL SAMPLING AND CAP INSPECTION REPORT
LEGION MEMORIAL GOLF COURSE
EVERETT, WASHINGTON

HWA Project No. 2009-047

Prepared for
City of Everett

September 8, 2009

HWA GEOSCIENCES INC.

- *Geotechnical Engineering*
- *Hydrogeology*
- *Geoenvironmental Services*
- *Inspection & Testing*

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES (FOLLOWING TEXT)

APPENDICES

SOIL SAMPLING AND CAP INSPECTION REPORT
LEGION MEMORIAL GOLF COURSE
EVERETT, WASHINGTON

1.0 INTRODUCTION

This report describes HWA GeoSciences Inc. (HWA's) evaluation of shallow native and emplaced cap soils conducted for City of Everett at the Legion Memorial Golf Course in Everett, Washington.

1.1 SITE LOCATION AND DESCRIPTION

The approximately 145 acre public golf course (comprised of a clubhouse, parking lot and an 18 hole golf range), is located within the Everett Smelter cleanup site, south of West Marine View Drive in north Everett. Figure 1 shows the subject property vicinity. Other property descriptions include:

- T&R: SW ¼ Section 8 Township 29N Range 5E
- Tax Parcel #29050800300100

The property is bordered on the north by West Marine View Drive; on the east and west by residential housing; and on the south by the Everett Community College Campus.

The area around the site is relatively flat, with gentle slopes to the south (towards Everett Community College) and north (towards West Marine View Drive). The nearest surface water body (excluding the man-made ponds on-site) is the Snohomish River, located 250 feet north of the north property line.

1.2 AUTHORIZATION / SCOPE OF WORK

HWA's work for this project was authorized under a contract with the City of Everett dated April 6, 2009.

The scope of work for the soil sampling study is summarized below:

1) Review available data
2) Prepare project sampling and analysis plan (SAP), and health and safety plan (HASP)
3) Collect samples at selected locations and depths; inspect cap thickness at selected locations
4) Submit samples for laboratory analysis
5) Prepare report

1.3 BACKGROUND

The City of Everett planned and performed an independent cleanup at Legion Memorial Golf Course from 1996-1998 in consultation with the Washington State Department of Ecology (Ecology) (City of Everett/Hydrometrics, 1997; Ecology 1997; Hydrometrics, 1998). At the same time, Ecology and the City were cooperating on an Integrated Final Cleanup Action Plan/Final Environmental Impact Statement for the Everett Smelter Site Upland Area ("FCAP") (Ecology 1999/2003).

The remedial action at the golf course was intended to be consistent with the cleanup plan for the Everett Smelter Site Upland Area, a larger site within which the golf course is located, as noted in the above reports. As noted in the FCAP, the golf course cleanup action plan was premised on the institutional use of the property as a golf course and not as residential or unrestricted land use.

The remedial action at the golf course had several elements, including:

- Capping all principal areas of play (i.e., tees, greens, and fairways) with a minimum four-inch clean sand cap covered with clean turf, except for Hole 12, which was to be periodically topdressed.
- Installing drain tile with collector lines to drainage ponds to capture surface water infiltration over most of the course and to discharge into the City's secondary treatment plant.
- Paving the parking area near the clubhouse and related buildings.
- Implementing institutional controls, including pond sampling, operation and maintenance program, and deed restriction to assure effectiveness of the remedy.

The cleanup plan anticipated that fairways, greens and tees would be capped with 4 to 6 inches of clean imported sand overlain by topsoil and sod. Excavated soils with arsenic concentrations exceeding MTCA Method A cleanup levels were incorporated into the landscaping under berms in "rough" areas of the golf course (outside of greens and tees). Utility trenches were backfilled with clean material. During implementation, the City decided that the fairway at Hole 12 would be top-dressed with sand periodically rather than capped.

Pre-remediation soil sampling results were documented in both the Everett Smelter Site Remedial Investigation (Hydrometrics, 1995; also summarized in the FCAP) and in the City's cleanup plan to Ecology, which included additional sampling at the Golf Course (City of Everett/Hydrometrics, 1997). These reports contained figures with isopleths indicating arsenic concentrations (shown at the less-than-20 and greater than 20, 50, 100, 150, and 200 mg/kg intervals) and depth (shown at 0-6, 6-12, 12-18, and greater-than-18 inch intervals). Generally, the southern portion of the course had arsenic concentrations

in soils that are close to or below the 20 mg/kg cleanup level at any depth. The northern portion of the course generally had higher concentrations, generally in 50-100 mg/kg range, with some areas on the eastern boundary closer to the former smelter in the 100-200 kg/mg range or higher, at various depths.

The City submitted a cleanup report to Ecology in December 1998 (Hydrometrics, 1998). The cleanup report describes and shows the location of the remedial work. As-built sampling of the cap was not performed at that time, as it did not appear to be necessary. The cleanup report provided as-built drawings and confirmed that the remedy was implemented as described in the cleanup report.

The City established institutional controls as part of the cleanup, to assure the effectiveness of the remedy, including: (1) five years of post-remediation pond monitoring (the results did not indicate contaminants of concern)(City of Everett, 1999b, 1999c, 2000, 2001, 2002); (2) a Golf Course Operation and Maintenance (O&M) Manual (City of Everett, 1999); and (3) a restrictive covenant (see Appendix A to this report).

In terms of the MTCA process, the City and Ecology consulted under the independent cleanup program prior to the remedial work at the golf course and cooperated in the development of the FCAP. Ecology indicated that capping and institutional controls were expected to be consistent with the FCAP, and the FCAP subsequently selected capping and institutional controls at the principal remedy for the levels of arsenic found in soils at Legion Memorial Golf Course (Ecology, 1997; Ecology, 1999/2003). Ecology indicated it would review the remedial soil data and institutional controls. The City entered the voluntary cleanup program in December 1998 (VCP #NWO185), which was terminated and re-instated under a new VCP application in December 2008. Ecology also advised the City that the independent remedial action could be reviewed as a property within the Everett Smelter Site.

In summary, an RI/FS/CAP have been prepared and approved by Ecology for the Everett Smelter Site Upland Area under the MTCA formal program, and an RI/FS/CAP, cleanup report, and institutional controls for Legion Memorial Golf Course have been prepared by the City under the voluntary cleanup program. This report updates these earlier studies by providing data on as-built conditions approximately ten years after implementation of the remedy, for the reasons noted below.

1.4 OBJECTIVES

The soil sampling and cap inspection described herein were designed to: 1) update and verify as-built conditions in order to confirm cap integrity and continued protection of human health and the environment, 2) assist the City in effective implementation of the Golf Course O&M Manual and institutional controls, and 3) provide information to assist

in considering appropriate MTCA procedural options relating to the property and to this type of institutional commercial recreational use under the FCAP.

As a result of Ecology technical assistance in reviewing the remedial work, the City determined that as-built sampling would be appropriate to supplement the original cleanup report and verify the integrity of the cap. In particular, the sampling would provide as-built data on:

- Whether the cap had compressed or cap thickness remained adequate after 10 years of play on the course; and
- Whether the cap contained arsenic above cleanup levels as a result of original installation, bioturbation (e.g., soil mixing by worms or other biota) or other factors over time.

The sampling scope included documentation of the existing fairway sand cap thickness and soil sampling for arsenic beneath selected fairway areas. Sixteen golf course fairways were investigated with at least one boring. Two fairways (Holes 4 and 16) were not investigated because soil arsenic concentrations beneath these two fairways are less than cleanup levels established in the FCAP. Cap thickness was measured in fairway areas where the sand cap is located over soils with an arsenic concentration greater than 20 mg/kg but less than 50 mg/kg at depths greater than 6 inches from pre-existing ground surface. Soil and sand cap material was sampled for arsenic in fairway areas where soil arsenic concentrations are reported to be greater than 50 mg/kg between a depth of 6 and 24 inches below the pre-existing ground surface.

The rationale for sampling for arsenic in areas where residual soils were reported to be greater than 50 mg/kg was to provide a screening analysis regarding cap quality. If arsenic concentrations above the 20 mg/kg cleanup level were found in cap material, the locations would more likely to occur on portions of the golf course with higher residual soil concentrations underneath the cap. Low or non-detect concentrations would indicate that quality of the cap has remained protective.

Figure 2 shows the sampling locations and the pre-remedial arsenic concentration contours for 0 to 6 inch depths (prior to cap) measured in 1998 (Hydrometrics, 1998). As explained in the Results section, these concentration contours are no longer at the 0-6 inch depth but are now located 5 to 8 inches below ground surface (bgs) in the capped areas of the golf course.

At Ecology's recommendation, samples from the bottom of the pond on the northern portion of the course (Pond 6, where the previous conformational monitoring was performed) were also taken for informational purposes as an indicator of whether arsenic

at levels of concern were accumulating from stormwater infiltration through residual soils containing arsenic beneath the cap.

Because this report addresses cap integrity of the remedy, the documentation of the City's periodic inspection of the impervious area (paving around the clubhouse and parking lot) is attached as Appendix B to provide a comprehensive supplement.

2.0 SAMPLE LOCATIONS AND METHODS

HWA conducted the exploration program on May 6 and 7, 2009 and June 23, 2009. HWA employed a manual hand auger and coring device to log and measure the soil profile at 27 locations, and collected soil samples for laboratory analysis. Appendix C contains the Sampling and Analysis Plan which describes the investigation methods used.

Figure 2 shows the boring locations superimposed on a site plan with arsenic concentration contours for 6 to 12 inch depths (prior to cap emplacement) measured in 1998. Two types of locations are depicted:

- Cap inspection borings (9 borings, denoted by the letter "C" on Figure 2)
- Analytical sample borings (15 borings, denoted by the letter "A" on Figure 2).

Cap inspection borings were located in fairway areas where a sand cap is located over soils with an arsenic concentration greater than 20 mg/kg but less than 50 mg/kg at depths greater than 6 inches from pre-existing ground surface (before cap placement). The purpose of cap inspection borings was to document the cap thickness in these areas, therefore soils were not analyzed for arsenic at these locations. Cap inspection borings were excavated to a depth of 12 inches.

Analytical sample borings were located in areas where arsenic concentrations are greater than 50 mg/kg at depths greater than 6 inches from pre-existing ground surface. The purpose of analytical sample borings was to document both the cap thickness and the current arsenic concentrations in cap material and underlying soils to depths up to 24 inches below existing ground surface (the depth of the pre-remedial RI data, taking into account the additional depth resulting from the remedial cap). The depth of these borings and samples submitted for analysis varied based on previous soil sample investigation results. Analytical samples were composited over the sampling depth range indicated. Analytical sample borings were also advanced on the fairway and tees of golf course Hole 12. According to documentation, Hole 12 fairways were not renovated with a sand cap and have been periodically top-dressed with sand, as noted in the cleanup report and Golf Course O&M Manual.

At each sampling interval, HWA logged the soil samples and obtained and recorded pertinent information including soil sample depths and stratigraphy (i.e., sand cap thickness).

After completion of the initial borings, an apparently anomalous result was obtained at LM-A-7 on the Hole 18 fairway, where the cap depth was reported to be four inches.

Although this meets the minimum cap thickness in the cleanup action plan, it was less than all of the other samples. Three supplemental borings were performed in the vicinity of LMA-7, which found the cap thickness to range from six to nine inches in depth. LMA-7 on Tables 1 and 2 therefore show the average depth of these four samples, and an explanatory note with these supplemental results is provided on Table 2.

With regard to the pond sampling, HWA observed Lake 6 (pond) sediment to be approximately 1.5 feet thick about 6 feet off shore. The thickness quickly tapered toward the center-line of the man-made pond (approximately 40 feet from the shore). HWA made multiple attempts to sample sediments near the pond center line. HWA observed pond sediment to be insufficient for sampling gear to collect. HWA personnel moved closer to shore in 5 foot lengths from the center line. When personnel were approximately 10 feet from the shore, the sediment thickness was appropriate for sampling. The two samples were collected below 3.25 to 3.45 feet of water.

HWA delivered samples to the City of Everett Environmental Laboratory within 24 hours of sampling and employed full chain-of-custody procedures to allow tracking and handling of the samples. 50 soil samples, 9 QA/QC samples, and 2 sediment samples were collected. The general rationale for soil chemical analysis was to sample sand cap material at each of the 15 analytical sample borings. The cap was sampled at each analytical soil boring location to determine if mixing of sand cap material with underlying arsenic impacted soil had occurred (e.g., due to bioturbation or other action by plants, burrowing animals, or human activity). Underlying soil was excluded from the sand cap material sample. It was assumed that areas with the greatest soil arsenic concentrations are also areas with the greatest potential for elevated arsenic concentrations in the cap material. Additional soil samples were collected from those 6-inch intervals below the cap with soil arsenic concentrations greater than 50 mg/kg based on previous investigation findings.

2.1 Decontamination Methods

To prevent potential cross-contamination of samples, HWA maintained appropriate decontamination procedures. Between sampling intervals in each boring, field staff washed all sampling devices in a detergent solution, rinsed with deionized water, and rinsed again with deionized water. Decontamination fluids were collected and disposed in the golf course sanitary sewer system.

3.0 SAMPLE ANALYSES

Soil samples were submitted to Everett Environmental Laboratory (EEL) for the following analysis:

- Total arsenic by EPA Method #6020 ICP-MS (inductively-coupled plasma - mass spectrometry)

HWA assigned the analytical testing based upon pre-existing conditions discussed in Section 2.1. Appendix D contains the laboratory reports and chain-of-custody forms.

3.1 Quality Control Review

HWA reviewed quality control results of the analytical data. Check standards, spike samples, standard reference materials, method blanks, and laboratory duplicates were all within control limits. Laboratory method blank analyses were all below detection limits. A field rinsate blank of sampling equipment did not contain arsenic above laboratory reporting limits. Field duplicates had relative percent differences (RPDs) ranging from 2.5 to 45.5, with 7 of 8 duplicate RPDs below 26%, which is considered acceptable for soil duplicates.

City of Everett Environmental Laboratory did not flag any other results with qualifiers which would indicate that a given result was suspect. The analyses of the soil samples collected on May 6 and 7, 2009 were determined to be acceptable for their intended use.

4.0 RESULTS

4.1 CAP INSPECTION RESULTS

A summary of all borings, including the cap inspection borings, is presented in Table 1.

As previously noted HWA employed a manual hand auger and coring device to log and measure the soil profile at these locations. The exploration borings were, nominally, 6 to 8 inches in diameter. The depth of the cap inspection explorations was limited to 12 inches. The depth of the analytical explorations was governed by previous sampling results.

The first layer observed during the exploration was typically the sod, organic topsoil, and root mat. This layer was comprised of dark brown sandy silt with abundant organic material, including roots and decomposing leaf litter. The second layer encountered in the majority of exploration locations was the cap. The cap was comprised of clean, gray, fine to medium sand. The underlying soils differed across the subject site. They ranged from dark brown, olive brown, yellow brown, to reddish brown sandy silt with occasional gravel and decomposing organic material.

HWA observed Lake 6 (pond) sediment to be approximately 1.5 feet thick about 6 feet off shore. Two samples were collected below 3.25 to 3.45 feet of water.

Table 1
Legion Memorial Golf Course
Soil Profiles

Exploration Identification	Total Depth (inches bgs)	Top Layer Range (inches bgs)	Top Layer Description	Cap Range (inches bgs)	Cap Description	Bottom Layer Range (inches bgs)	Bottom Layer Description
LM-A-1	24	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-8	Gray, fine to medium SAND, moist.	8-24	Dark brown, sandy SILT, moist. Trace oxidation staining. Trace gravels.
LM-A-2	24	0-2	Dark brown sandy SILT with grass and grass roots, moist.	NA	No Cap	2-24	Dark brown to yellow sandy SILT with gravel and cobbles, moist. Trace oxidation staining.
LM-A-3	24	0-1	Dark brown sandy SILT with grass and grass roots, moist.	NA	No Cap	1-24	Dark brown to light yellow brown, sandy SILT, moist. Trace gravels.
LM-A-4	24	0-1	Dark brown sandy SILT with grass and grass roots, moist.	NA	No Cap	1-24	Dark brown to dark yellow brown, sandy SILT, moist. Trace gravels.
LM-A-5	24	0-1	Dark brown sandy SILT with grass and grass roots, moist.	NA	No Cap	1-24	Dark brown to dark yellow brown, sandy SILT, moist. Trace gravels.
LM-A-6	18	0-1	Dark brown sandy SILT with grass and grass roots, moist.	1-7	Gray, fine to medium SAND, moist.	7-18	Yellow brown, sandy SILT, moist. Trace gravel.
LM-A-7	18	0-1	Dark brown sandy SILT with grass and grass roots, moist.	1-6	Gray, fine to medium SAND, moist.	6-18	Dark brown to dark yellow brown, sandy SILT with gravel and cobbles, moist.
LM-A-8	12	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-6	Gray, fine to medium SAND, moist. Ground water seep at bottom of cap layer.	6-12	Dark brown, sandy SILT, moist. Trace gravels. Trace decomposing wood.
LM-A-9	18	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-8	Gray, fine to medium SAND, moist. Ground water seep at bottom of cap layer.	8-18	Dark brown to brown, sandy SILT, moist. Trace gravels. Trace decomposing wood.
LM-A-10	12	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-6	Gray, fine to medium SAND, moist.	6-12	Dark brown to dark yellow brown, sandy SILT, moist. Trace gravels.
LM-A-11	18	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-8	Gray, fine to medium SAND, moist.	8-18	Dark brown to dark yellow brown, sandy SILT, moist. Trace gravels.
LM-A-12	24	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-6	Gray, fine to medium SAND, moist.	6-24	Dark brown to dark yellow brown, sandy SILT, moist. Trace gravels.
LM-A-13	18	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-6	Gray, fine to medium SAND, moist.	6-18	Dark brown to dark yellow brown, sandy SILT, moist. Trace gravels.
LM-A-14	24	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-5	Gray, fine to medium SAND, moist.	5-24	Dark brown to olive brown, sandy SILT with gravel and cobbles, moist. Some oxidation staining.
LM-A-15	18	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-8	Gray, fine to medium SAND, moist.	8-18	Dark brown to dark yellow brown, sandy SILT, moist. Trace gravels.
LM-A-POND-N	12	0-12	Gray to olive gray, sandy SILT, wet. Abundant decaying organic material.	NA	No Cap	NA	NA
LM-A-POND-S	12	0-12	Gray to olive gray, sandy SILT, wet. Abundant decaying organic material.	NA	No Cap	NA	NA
LM-C-1	8	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-4.5	Gray, fine to medium SAND, moist.	4.5-8	1.5 inches of pea gravel. Then red brown, sandy SILT, moist. Trace organic material.
LM-C-2	7	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-6	Gray, fine to medium SAND, moist.	6-7	Olive brown, sandy SILT, moist.
LM-C-3	9	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-7	Gray, fine to medium SAND, moist. Ground water seep at bottom of cap layer.	7-9	Red brown, sandy SILT, moist.
LM-C-4	7	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-5.5	Gray, fine to medium SAND, moist.	5.5-7	Dark olive gray, sandy SILT, moist.
LM-C-5	9	0-2.5	Dark brown sandy SILT with grass and grass roots, moist.	2.5-7	Gray, fine to medium SAND, moist.	7-9	Olive gray, sandy SILT, moist. Oxidation mottling.
LM-C-6	9	0-1.5	Dark brown sandy SILT with grass and grass roots, moist.	1.5-7.5	Gray, fine to medium SAND, moist. Ground water seep at bottom of cap layer.	7.5-9	Gray, silty SAND, moist. Yellow staining. Some gravel. Some organic material. Ground water seepage at bottom of exploration.
LM-C-7	10	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-8.5	Gray, fine to medium SAND, moist.	8.5-10	Olive gray, sandy SILT, moist. Oxidation mottling. Trace gravel.
LM-C-8	9	0-2	Dark brown sandy SILT with grass and grass roots, moist.	2-7.5	Gray, fine to medium SAND, moist.	7.5-9	Red brown, sandy SILT, moist. Trace gravel.
LM-C-9	8	0-2.5	Dark brown sandy SILT with grass and grass roots, moist.	2.5-7	Gray, fine to medium SAND, moist. Ground water seep at bottom of cap layer.	7-8	Gray, sandy SILT, moist.

4.2 Analytical Results

Soil analytical results are summarized in Tables 2, 3, 4, and 5. Pond sediment analytical results are summarized below.

Sample	Arsenic (mg/kg)
LMA-Pond N	1.94
LMA-Pond S	3.63

Table 2
Legion Memorial Golf Course
Soil Arsenic Results- Cap and Underlying Soils
(all values in mg/kg; samples composited in depth ranges shown)

			CAP	Underlying Soils (noncontact soils)		
CURRENT DEPTH: Sample Depth (inches below existing ground surface)			1-9[1]	6-12	12-18	18-24
PRE-REMEDIATION:[2] Sample Depth (inches below cap - corresponds to 1998 pre-cap data)			NA	0-6	6-12	12-18
Sample Location	Golf Hole No.	Cap depth[3]	mg/kg	mg/kg	mg/kg	mg/kg
LMA-1	12	8	2.44	**84.9**	**41.1**	**21.9**
LMA-6	13	7	2.96	**114**	**29.5**	2.27
LMA-7	18	6[4]	2.27	**70.6**	**117**	
LMA-8	9	6	2.47	**23.2**		
LMA-9	8	8	2.00	**23.1**	15.8	
LMA-10	7	6	2.15	**55**		
LMA-11	11	8	1.94	**74.1**	**80.2**	
LMA-12	10	6	2.08	5.52	3.17	2.83
LMA-13	10	6	2.61	**46.4**	**78.7**	
LMA-14	11	5	2.80	**23.7**	8.06	6.93
LMA-15	11	8	2.30	**36.4**	15.4	
FCAP CUL AVG[5]				20	20	20
FCAP Perf MAX[5]				40	40	40
FCAP RL AVG[5]				NA	60	60
FCAP RL MAX[5]				NA	150	150

Notes:

Blank - not analyzed (see text)

Bold– Analyte exceeds MTCA Method A Soil cleanup level for Arsenic of 20 mg/kg

CUL - cleanup level

Perf - performance standard

RL - remediation level

1. Depending on cap thickness and total cap depth (including turf layer) at each sampling location. The cap is below a clean turf layer of 1 to 2.5 inches thick. Soil from the cap interval was composited at each location. Cap thickness in all samples (analytical and inspection borings) ranged from 3 to 6.5 inches with an average thickness of 5.6 inches. Total cap depth including the turf layer ranged from 4 to 9 inches for all borings. In all 24 soil samples, the deeper portion of the clean cap is inaccessible soil.
2. Shown for comparability with the pre-remedial Hydrometrics data and isopleths in the Everett Smelter Site RI documents and Legion Memorial Golf Course cleanup plan and cleanup report.
3. Total cap depth including sod, topsoil, and sand.
4. This value reflects an average cap thickness measured at four borings at this location (cap thickness = 4, 5, 7, and 9 inches).
5. See Table 3 footnote #2

Table 3
Legion Memorial Golf Course
Soil Arsenic Results on Uncapped Areas of Hole 12
(all values in mg/kg; samples composited in depth ranges shown)

			noncontact soils		
CURRENT DEPTH: Sample Depth (inches below existing ground surface)		**1-6[1]**	**6-12**	**12-18**	**18-24**
PRE-REMEDIATION:[2] Sample Depth (corresponds to 1998 pre-cap data)		**1-6**	**6-12**	**12-18**	**18-24**
Sample Location	**Golf Hole No.**	mg/kg	mg/kg	mg/kg	mg/kg
LMA-2	12	**164**	**187**	**27.6**	6.25
LMA-3	12	**89.4**	**50**	7.18	7.41
LMA-4	12	**110**	**193**	**74.6**	**29.9**
LMA-5	12	**641**	**111**	18.5	16.8
FCAP CUL AVG[2]		20	20	20	20
FCAP Perf MAX[2]		40	40	40	40
FCAP RL AVG[2]		NA	NA	60	60
FCAP RL MAX[2]		NA	NA	150	150

Notes:

Blank - not analyzed

Bold– Analyte exceeds MTCA Method A Soil cleanup level for Arsenic of 20 mg/kg

Bold Shaded – Analyte exceeds FCAP maximum performance standard concentration or maximum remediation level concentration; FCAP allows containment of these soils (see note 4 below and FCAP Figure 6-7 included in this report).

CUL - cleanup level

Perf - performance standard

RL - remediation level

1. Partially accessible soils. The turf layer samples average approximately 1 inch thick on Hole 12. The soil in the approximate lower half of the 0-6 inch interval is not accessible to the public (see discussion in Section 1.3 of this report).
2. Provided for comparison to unrestricted residential uses and cleanup standards. FCAP Figure 6-7 Selected Remediation Levels in the Upland Area of the Everett Smelter Site for residential and unrestricted land use shown for comparison purposes, as unrestricted residential activities do not occur on Legion Memorial Golf Course, and institutional controls are in place for landscaping, utility, and other maintenance activities by City crews (see Section 1.3 of this report).

   The note on Figure 6-7 for unrestricted land use showing typical homeowner uses states: "Exceedances of Remediation Level of Other Performance Standard requires accessible

soil in that depth interval be excavated and disposed of in the Consolidation Facility or off-site. Soil with arsenic concentrations between the cleanup level and remediation level in depth intervals below 12 inches must be contained or removed. Institutional controls and monitoring must continue so long as cleanup levels are exceeded within any depth interval." The term "noncontact soil" is used on these tables, because the public will not come into contact with these soils, as the term "nonaccessible soils" is technically defined in the FCAP as soils covered by permanent structures, asphalt and concrete paving. The FCAP also allows unpaved soils to remain in place for unrestricted land use in a number of circumstances based on property-specific cleanup plans (FCAP, Section 6.2).

Table 4
Legion Memorial Golf Course
Soil Arsenic Results – Comparison of Post and Pre Cap Results
(all values in mg/kg; samples composited in depth ranges shown)

Sample Location	2009 6-12" now 0-6" then	0-6" pre-cap isopleth	2009 12-18" now 6-12" then	6-12" pre-cap isopleth	2009 18-24" now 12-18" then	12-18" pre-cap Isopleths**
LMA-1 Hole 12	**84.9**	>50-100	**41.1**	>150	**21.9**	>20
LMA-6 Hole 13	**114**	>200	**29.5**	>50 - >200	2.27	>20
LMA-7 Hole 18	**70.6**	>50	**117**	>100		>20/50
LMA-8 Hole 9	**23.2**	>50		>50		<20
LMA-9 Hole 8*	**23.1**	>100	15.8	>50 - >200		>20/50
LMA-10 Hole 7	**55**	>50		>50		<20
LMA-11 Hole 11*	**74.1**	>50/100	**80.2**	>150		>50/150
LMA-12 Hole 10*	5.52	>50	3.17	>50	2.83	>150
LMA-13 Hole 10	**46.4**	>20/50	**78.7**	>50		>20/50
LMA-14 Hole 11	**23.7**	>50	8.06	>50	6.93	>50/150
LMA-15 Hole 11*	**36.4**	>50	15.4	>50/100		>50/200

Notes:
Blank - not analyzed (see text)
Bold – Analyte exceeds MTCA Method A Soil cleanup level for Arsenic of 20 mg/kg
Boxed – Analyte is similar to pre-cap isopleth
Shaded – Analyte is less than pre-cap isopleths (both are shaded)

* Although each of these holes is generally within the >50 mg/kg pre-cap isopleths, these specific sampling locations were selected to sample at "hot spots" per the pre-cap isopleths. Of these, only LMA-11 appeared to replicate an elevated arsenic concentration. The lack of correlation with the elevated pre-cap isopleths likely reflects variability of concentrations within the isopleths, which were derived based on highest concentration data points.

** Pre-cap isopleths were <20 mg/kg for all sampling locations greater than 18 inches (pre-cap depth) except for LMA-11 and LMA-15 (Hole 11) and LMA-13 (Hole 10) (>20-50 mg/kg isopleth), and LMA-12 (Hole 10) and LMA-14 (Hole 11) (>50-100 mg/kg isopleth). None of these five sampling locations had results above the pre-cap isopleths in any depth interval.

5.0 DISCUSSION

5.1 SUMMARY

The results of this study indicate the following:

Physical Cap Integrity

- Measured thicknesses of the sand cap ranged from 4 to 9 inches, with an average thickness (where present, i.e., excluding Hole 12) of 5.6 inches (Table 1). These values are consistent with the Independent Remedial Action Report, and indicate the cap was placed as planned, and has not been measurably compressed, altered or compromised over time.
- Measured total cap depth including turf layer ranged from 5-9 inches (excluding Hole 12), which confirms a protective layer in capped areas on top of residual soils (Table 1).
- The cap integrity remains in place in the clubhouse and parking lot impervious area (Appendix B).
- Other than grounds keeping work, including excavation for plantings, utilities, and similar activities, which are managed under the Golf Course O&M Manual and restrictive covenant requirements, soils with arsenic concentrations above 20 ppm in capped areas remain inaccessible to the public (Table 2).

Soil Sampling Results

- Analytical results are relatively consistent or less than previously established (prior to cap placement) arsenic concentrations and depths at the site. The concentrations of arsenic in all 24 samples collected under the cap were consistent with or lower than the pre-remedial sampling results. No results were higher than previously reported. Fifteen sampling locations (62%) had arsenic concentrations lower than the previously reported concentration contours (see Table 4).
- Analytical results of cap soils indicate arsenic concentrations ranging from 1.94 to 2.96 mg/kg, with an average of 2.4 mg/kg, indicating little or no mixing with underlying soils has occurred (Table 2). These values are well below the background soil arsenic concentrations state-wide and in the Puget Sound region of 7 mg/kg (Ecology, 1994). These low detected concentrations might be due to 1) minor cross contamination during sampling, 2) arsenic contained in the in original sand cap material, or 3) some degree of mixing with underlying soils during placement. Based on: 1) the relatively uniform distribution of

concentrations (i.e., the low standard of deviation of 0.34 mg/kg), and 2) no significant correlation of arsenic in cap material to concentrations in underlying soils, mixing does not appear to be the likely explanation, as this would likely have resulted in higher concentrations in some samples. There is no documentation that samples of the imported cap sand, topsoil, or sod were tested, however, the presence of arsenic in soils at concentrations below Puget Sound background would be expected.

- Analytical results of soils at Hole 12 indicate elevated arsenic concentrations present near the surface (one inch depth) (Table 3). These results are consistent with prior pre-remedial testing at the golf course and adjacent residential area. The degree of topdressing to date has not resulted in the attainment of the minimum cap thickness in the Legion Memorial Golf Course cleanup action plan.
- Measured arsenic concentrations, before and after cap placement, indicate compliance with unrestricted land use performance standards in the FCAP at most depth intervals, with the exception of Hole 12 ((at the 0-6 inch and 6 to 12-inch (current depth) intervals) and some other locations at the 6-12 inch noncontact soil depth interval. Figure 6-7 of the FCAP, *Selected Remediation Levels in the Upland Area of the Everett Smelter Site* (included after Figure 2 of this report) shows performance standards (average and maximum cleanup and remediation levels). The FCAP performance standards and associated depths are based on typical residential activities with potential to disturb soils (e.g., kids, pets, gardening, excavations, etc.). These activities do not occur at the golf course, which has different site uses likely to disturb soils (e.g., golfing, maintenance, landscaping, etc). All maintenance and landscaping activities are institutionally controlled under the restrictive covenant and Golf Course O&M Manual. Potentially soil-disturbing golfing activities are very limited in nature (e.g., divots) and not anticipated to result in soil disturbance of more than 1 to 3 inches at worst case.
- Other than grounds keeping work, including excavation for plantings, utilities, and similar activities, which are managed under the Golf Course Maintenance Program in the O&M Manual and restrictive covenant requirements, soils with arsenic concentrations above 20 ppm in capped areas remain inaccessible to the public (Table 2).
- Pond sediments sampled contained low arsenic concentrations (1.94 and 3.63 mg/kg). Pond 6 is located on the northern portion of the golf course in the and drains areas within the greater-than-50 mg/kg arsenic contours. The results indicate little or no arsenic is being mobilized or deposited in the storm water system as a result of surface water infiltration through residual soils. The results are consistent with the five years of surface water quality monitoring in Pond 6 (City of Everett, 1999-2002).

- The City had commissioned a water quality study for irrigation purposes of two groundwater wells on Legion Memorial Golf Course, located near Hole 14 (in the greater than 20 mg/kg contour and close to the greater than 50 mg/kg contour), completed at approximately 130-200 feet bgs. Water quality was reported to be good in both wells, and results did not indicate elevated concentrations of arsenic (Robinson Noble Saltbush, 2005). These results are consistent with the surface water and pond sediment results described above, and indicate arsenic in shallow soils is not leaching or impacting deeper ground water.

5.2 RECOMMENDATIONS

We recommend the following, based on the results of the post-10 year as-built remedial action study:

- The study indicates that the cap integrity remains effective and has not appeared to change in the depth or arsenic concentrations over a decade of play on the golf course. The sampling also indicated residual soils contain concentrations above the cleanup level of 20 mg/kg, consistent with earlier sampling. Therefore, we recommend that the restrictive covenant remain in place and that the City continue to implement the institutional controls of the Golf Course Maintenance Program in the O&M Manual for City maintenance crews and any contractors performing work at Legion Memorial Golf Course.
- The study indicates that the topdressing program on Hole 12 has not yet been effective, and residual arsenic soil concentrations near the surface remains similar to the pre-remedial concentrations and the concentrations on adjacent residential properties. Therefore, we recommend that the City plan and implement supplemental remedial action on the uncapped portions of Hole 12. As capping is a selected remedy in the FCAP and in the Legion Memorial Golf Course cleanup action plan, Golf Course O&M Manual, and restrictive covenant, and has been demonstrated to be effective in this post-10 year study, we recommend a minimum six-inch cap from the mature tree line on the west side of the hole to the fence line on the north and east sides of the hole (except at the base of any mature trees).
- With regard to the method of capping, various methods are available, including one-time placement of a cap and as-built confirmation of cap thickness and quality to an accelerated periodic topdressing with compliance monitoring until the required thickness is attained. In consultation with Ecology, the City may wish to consider accelerated topdressing, as it has been shown effective in the Pacific Northwest (Sayre, 1992), would minimize disturbance and potential air deposition of the existing arsenic-contaminated soils, and might allow the hole to remain in play.

- In connection with this work, we recommend a drainage system be installed on Hole 12 if feasible to collect and direct stormwater to the City's wastewater treatment plant, as was done for the stormwater draining into Pond 6.

6.0 REFERENCES

Washington State Department of Ecology, November 19, 1999/2003, *Everett Smelter Site, Everett, Washington, Integrated Final Cleanup Action Plan and Final Environmental Impact Statement for the Upland Area, & Final Cleanup Action Plan Amendment/SEPA Addendum* dated March 18, 2003.

Ecology, Washington State Department of, 1994. *Natural Background Soil Metals Concentrations in Washington State*, Publication #94-115, October 1994.

Ecology, Washington State Department of, 1997, letter to Jay McGill of City of Everett, dated March 6, 1997.

Hydrometrics, 1995, *Remedial Investigation, Everett Smelter, Everett Washington,* (Site Upland Area) September 1995.

Hydrometrics, 1998. *East Marine View Drive Widening and Legion Memorial Golf Course Improvement Independent Remedial Action Report*, December, 1998.

Hydrometrics, 2000, Comprehensive Lowland Area Remedial Investigation Report, Everett Smelter Site, Everett, Washington, January, 2000.

City of Everett/Hydrometrics, 1997, *Independent Remedial Action Plan for American Legion Memorial Golf Course*, January, 1997.

City of Everett, 1997, *Determination of Non-Significance*, Legion Golf Course Renovation, SEPA #4-97, February 24, 1997.

City of Everett, 1999, *Golf Course Operation and Maintenance (O&M) Manual*, 1999.

City of Everett, 2002, Pond monitoring analytical results, 1999 , 2000, 2001, 2002.

City of Everett, 2008, Environmental Covenant for Legion Memorial Golf Course, recorded under Snohomish County recording no. 200812050469 (December 5, 2008).

Robinson Noble Saltbush, Inc., *Construction and Testing of American Legion Golf Course Wells 1 and 2,* prepared for the City of Everett, September 2005

7.0 LIMITATIONS

The conclusions expressed by HWA are based solely on material referenced in this report. Observations were made under the conditions stated. Within the limitations of scope, schedule and budget, HWA attempted to execute these services in accordance with generally accepted professional principles and practices in the area at the time the report was prepared. No warranty, expressed or implied, is made. Experience has shown that subsurface soil and ground water conditions can vary significantly over small distances. It is always possible that contamination may exist in areas that were not sampled. HWA's findings and conclusions must not be considered as scientific or engineering certainties, but rather as our professional opinion concerning the significance of the limited data gathered and interpreted during the course of the assessment.

This study and report have been prepared on behalf of City of Everett, for the specific application to the subject property. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

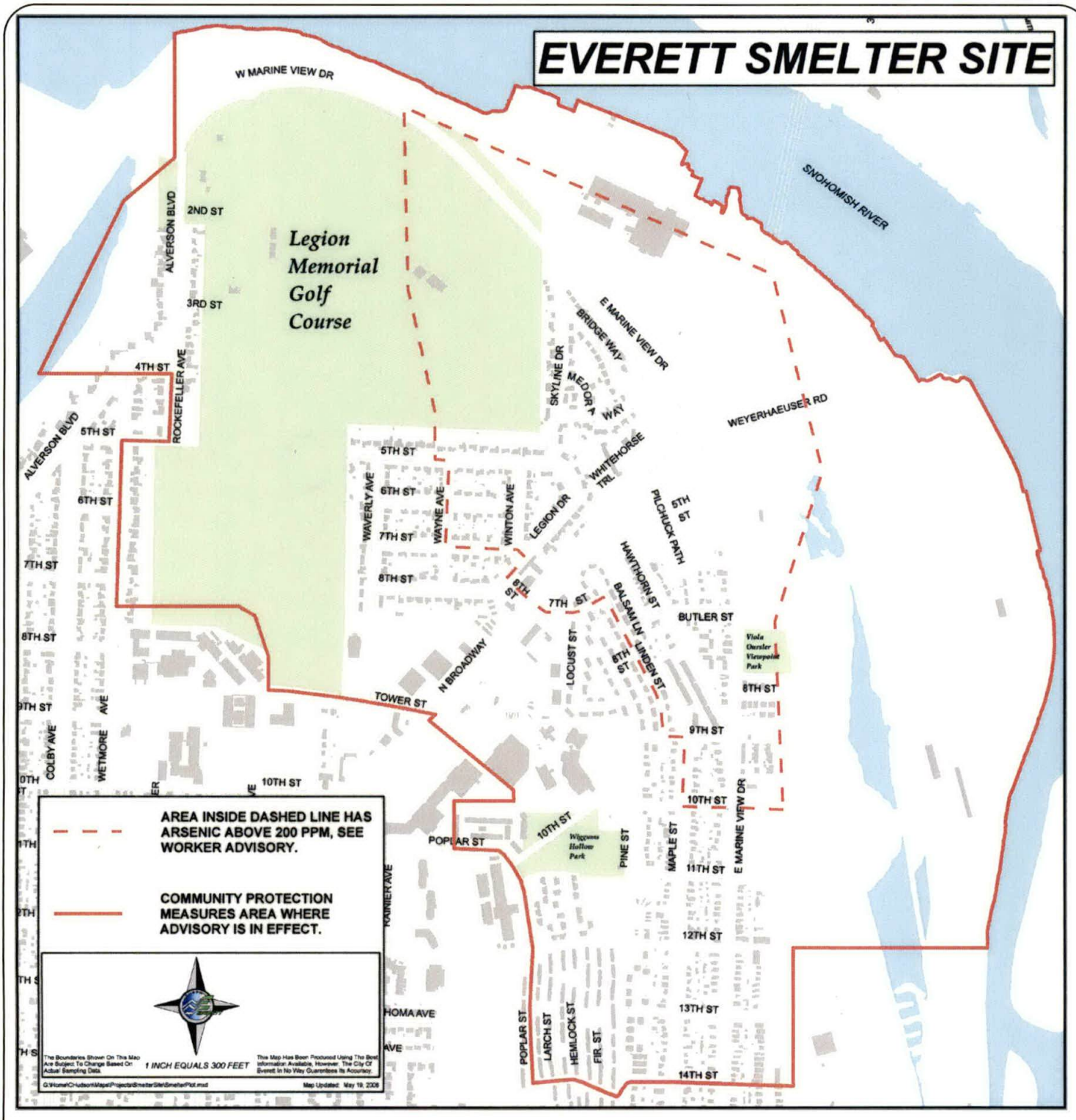
We appreciate the opportunity to provide professional services on this project. Please feel free to call us if you have any questions or need more information.

Sincerely,

HWA GEOSCIENCES INC.

Jeff Speck, LG
Geologist

Arnie Sugar, LG, LHG
President



VICINITY MAP

LEGION MEMORIAL GOLF COURSE
EVERETT, WASHINGTON

FIGURE NO. 1

PROJECT NO. 2009-047

HWA GEOSCIENCES INC.

NORTH

SCALE
(In Feet)
0 400

LM-A-11
LM-A-10
LM-A-13
LM-A-14
LM-A-12
LM-A-15
LM-A-9
LM-A-1
LM-C-1
LM-A-POND-N
LM-A-8
LM-A-2
LM-A-POND-S
LM-A-7
LM-A-3
LM-C-2
LM-C-3
LM-A-6
LM-A-4
LM-C-4
LM-A-5
LM-C-5
LAKE 5
LM-C-7
LM-C-6
LM-C-8
LM-C-9
LAKE 15

LEGEND

EAST MARINE VIEW DRIVE PROJECT BOUNDARY

LEGION MEMORIAL GOLF COURSE PROJECT BOUNDARY

<20 PPM ARSENIC ISO-CONCENTRATION CONTOUR

>20 PPM ARSENIC ISO-CONCENTRATION CONTOUR

>50 PPM ARSENIC ISO-CONCENTRATION CONTOUR

>100 PPM ARSENIC ISO-CONCENTRATION CONTOUR

>150 PPM ARSENIC ISO-CONCENTRATION CONTOUR

>200 PPM ARSENIC ISO-CONCENTRATION CONTOUR

NEW FAIRWAYS

Note: Contours reflect soil arsenic concentrations measured in 1998 at 0 to 6 inches depth, prior to cap placement and 2009 sampling

HWA 2009 hand boring

HWA 2009 sediment sample

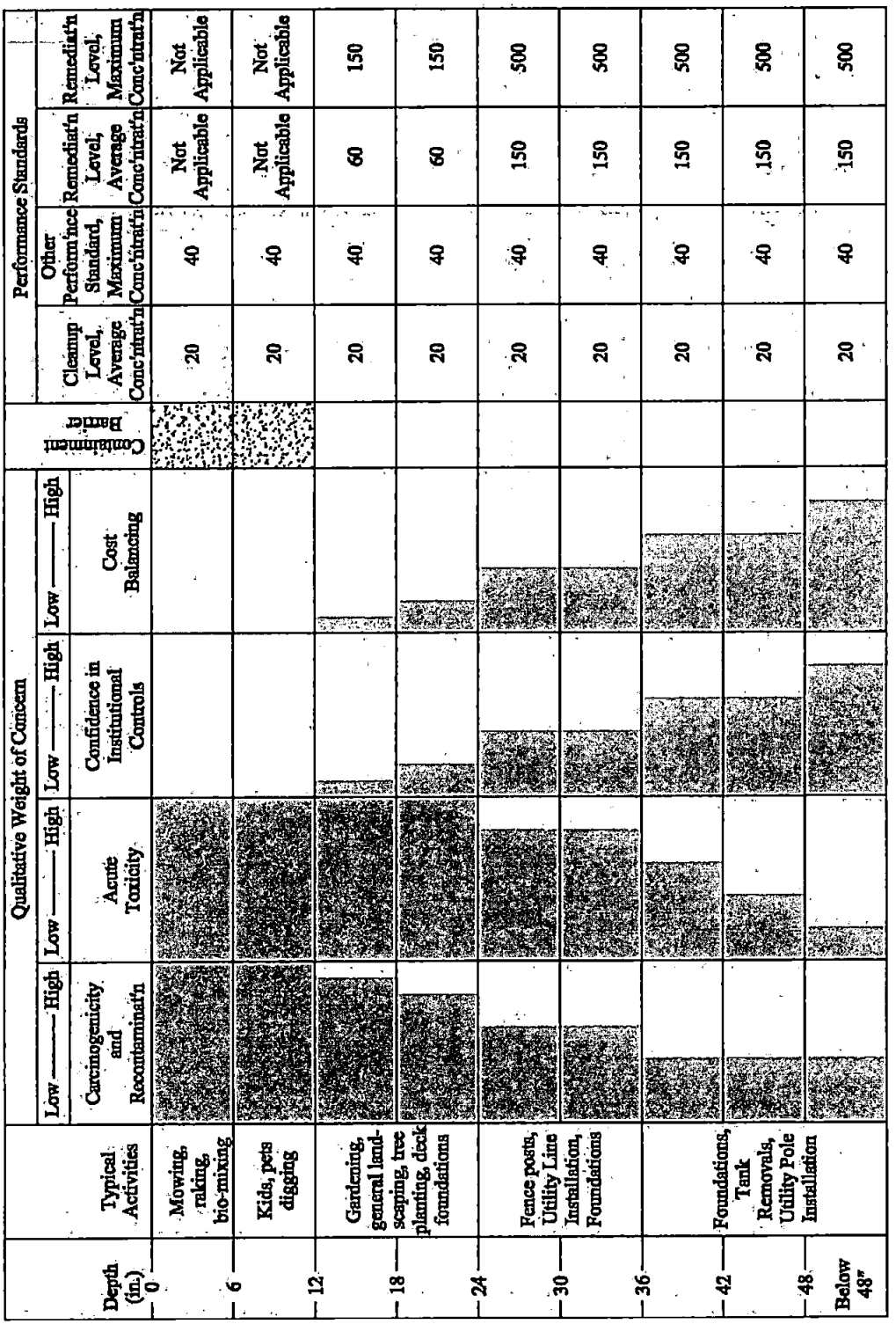
HWA GEOSCIENCES INC.

INVESTIGATION LOCATIONS

LEGION MEMORIAL GOLF COURSE
SOIL SAMPLING AND CAP INSPECTION
EVERETT, WA

FIGURE NO. **2**

PROJECT NO. 2009-047



Performance standards columns show arsenic concentration in mg/Kg and basis for comparison. Exceedances of Remediation Level or Other Performance Standard requires accessible soil in that depth interval be excavated and disposed of in the Consolidation Facility or off-site. Soil with arsenic concentrations between the cleanup level and the remediation level in depth intervals below 12 inches must be contained or removed. Institutional controls and monitoring must continue so long as cleanup levels are exceeded within any depth interval.

Figure 6-7: Selecting Remediation Levels in the Upland Area of the Everett Smelter Site.

APPENDIX A
O&M MANUAL /
RESTRICTIVE COVENANT

Legion Memorial Golf Course

Golf Course Maintenance Program

O&M Manual
for the
City of Everett Parks Department
Legion Memorial Golf Course

☞ see rear cover for a quick checklist and contact people ☜

QUICK CHECKLIST & CONTACT PEOPLE

Are you doing work where you could come into contact with soils containing arsenic, lead and cadmium above the state cleanup action level ("residual soils")?
Are you digging or doing utility work? Are you sending any soils or other materials off-site?

IF YOU ARE **NOT SURE:**

check with the Golf Course Superintendent
for more information refer to Screening Review Tab 2

IF **YES:**

- ☐ Have you had or do you need **training** and employee awareness?

← *refer to Training in Tab 3*

- ☐ How should you **deal with residual soils** during maintenance or construction?

← *refer to Work Site Measures on Tab 4*

- ☐ Are you using **contractors**? What must they do?

← *refer to Work by Contractors on Tab 5*

- ☐ How much **cover** must stay on the golf course, buildings, and paved areas, and what steps must be taken to keep it there?

← *refer to Cap Maintenance on Tab 6*

- ☐ How are the **ponds** monitored annually for five years (to 2003)?

← *refer to Pond Monitoring on Tab 7*

- ☐ How are future **substantial revisions or renovations** made to the course?

← *refer to Future Substantial Course Renovations in Tab 8*

If you are not sure what to do – or if you think there might be a problem – check with:

CONTACTS (in order):	name	phone	cell
Golf Course Superintendent	Dale Bowers	425.257.8584	425.210.3833
Parks Assistant Director	Lori Cummings	425.257.8353	425.870.5690
Golf Program Manager	Gary Sayre	425.257.8351	425.879.4970
City Parks Director	Paul Kaftanski	425.257.8335	
City Attorney contact	Jim Iles	425.257.8739	

CONTENTS

Legion Memorial Golf Course
Maintenance Program and O&M Manual

LEGION MEMORIAL GOLF COURSE
GOLF COURSE MAINTENANCE PROGRAM

INSTITUTIONAL CONTROLS, PROTECTIVE PROCEDURES, AND RELATED OPERATIONS & MAINTENANCE (O&M) MANUAL

INTRODUCTION

PURPOSE: The purpose of this program is to protect worker and public health and the environment by specifying the "institutional controls" for the Legion Memorial Golf Course, which is located within the Everett Smelter cleanup site. "Institutional controls" are protective measures that apply when certain soils are disturbed on the golf course property ("site" in this manual).

This program implements a "restrictive covenant" that has been placed on the site to identify institutional controls and to make sure these protective measures are carried out unless or until the restrictive covenant is terminated. This program may be modified as necessary, consistent with the restrictive covenant, to assure effective golf course maintenance and management while protecting employees, patrons, and adjacent residents from the health impacts of arsenic contaminated soil.

- **It is essential and required that all golf course managers and staff follow this program when conducting any activities that could result in contact with soils on the golf course.**

SITE: The 1998 major golf course renovation included measures to isolate soils on site having elevated levels of arsenic. Soils containing arsenic, lead and cadmium above the Washington State Department of Ecology (Ecology) cleanup action level emitted from the Everett Smelter remain on the site, under the rough and in certain fairways (Everett Smelter Site, Everett Washington, Integrated Cleanup Action Plan and Final Environmental Impact Statements for the Upland Area, Ecology 1999). The location of these soils is shown in Tab 2 of this program.

CAUTION: The City has placed a deed restriction on the Legion Golf Course that requires protective actions and restricts site alterations that would create a new exposure pathways without prior written approval from Ecology. See the Restrictive Covenant behind Tab 8A.

- **Golf course managers and staff must follow these requirements, including placing restrictions on leases and providing notices to Ecology for certain activities. The Parks Director or designee and City Attorney contact should be consulted first before executing leases or consulting with Ecology.**

SITE ACTIVITIES:

Golf Play The current and future expected primary use of the site is for golf and associated activities, including both recreational and tournament play, golf practice areas,

and operations and maintenance of the course, its infrastructure and supporting facilities. During play of golf, it is quite normal for the surface turf to be disturbed and to expose soil. Since the tees, fairways, and greens are capped with clean imported sand, no significant risk exposure to players is expected.

Limited Access

Legion Golf course is surrounded by a fence and separated from adjoining residences and play areas in Legion Park. The only public access is from East Marine View Drive, a major arterial. In addition, the game of golf is dangerous for trespassers because of the potential for injury from golf balls. The City has not experienced significant incidents of trespass or physical disturbance in either the daytime or nighttime from adjacent properties.

Operations

Golf operations include pro shop operations, parking, retail, restaurant and snack food services, cleaning and facility custodial, and golf management activities. These facilities are currently operated under contract.

Maintenance

Golf course maintenance is constantly evolving, attempting to keep pace with changing environmental, technology, building, and safety requirements. This includes activities such turf maintenance and repair, greens and tee maintenance and repair, golf course arborculture and floraculture, landscape maintenance and repair, and building maintenance and repair. This work would also include repair and/or extension of underground utilities such as water, power, irrigation, drainage, or communications. This also includes maintenance, repair and improvements to safety screening vegetation, screens, nets and other screening type fixtures. City of Everett employees and currently perform the bulk of all maintenance and repair. In some instances due to either size of complexity of the work, a contractor will be utilized for maintenance and repair work. The nature of the work described above could necessitate work with "residual soils."

NOTE: This program represents the City's best efforts to take responsible actions to protect public health and the environment based on available knowledge. Ecology has issued its final cleanup action plan for the Everett Smelter Site, which includes a number of implementing actions and plans for further definition of institutional controls for the site. Ecology's cleanup plan recognizes that the Legion Golf Course is different than other land uses in the area. Moreover, the responsibility for performing cleanup actions and implementing controls is not clear at this time as a result of a lawsuit between Asarco and Ecology. Therefore, this program may be revised when these issues are clarified.

➢ **FOR A CHECKLIST AND SUMMARY OF PROGRAM CONTENTS, SEE NEXT PAGE →**

➢ **FOR A QUICK CHECKLIST AND LIST OF CONTACT PEOPLE , SEE BACK COVER OF THIS MANUAL (the contact list is also included at the end of this tab).**

CONTACTS

If you are not sure what to do – or if you think there might be a problem – call:

CONTACTS	**name / email**	**phone**	**cell**
in the following order:			
Golf Course Superintendent	**Dale Bowers** dbowers@ci.everett.wa.us	425.257.8584	425.210.3833
Parks Asst. Director	**Lori Cummings** lcummings@ci.everett.wa.us	425.257.8353	425.870.5690
Golf Program Manager	**Gary Sayre** gsayre@ ci.everett.wa.us	425.257.8351	425.879.4970
City Parks Director	**Paul Kaftanski** pkaftanski@ci.everett.wa.us	425.257.8335	
City Attorney contact	**Jim Iles** jiles@ci.everett.wa.us	425.257.8739	

Screening Review

This section helps you figure out whether you could come into contact with soils containing arsenic, lead and cadmium above the state cleanup action level ("residual soils").

➢ If you could, you need to follow the procedures in Tabs 3 to 6, to protect you, other workers, the public and the environment.

Step 1: ACTIVITY screening section

Are you:

- planting or removing any trees or bushes in holes deeper than 6 inches?

- digging on any tees, fairways or greens deeper than the 4-to-6 inch layer of sand under the existing turf?

- digging in any areas of rough?

- digging any new utility trenches?

- digging under buildings, structures, or any paved areas (paths, roads, lots, etc.)?

- taking or sending any soils, rootballs, or other materials with dirt on them off the site?

If no to all of these questions, proceed with the job ☺

If not sure, check with the Superintendent 😐

If yes, go to next set of questions →

- If the activity could disturb "residual soils," you need to figure out if your work site has "residual soils."

Step 2: LOCATION screening section

There is a difference between the "upper" and "lower" portions of the course – roughly a line from the 15th tee to the pond at the 3rd and 5th holes. Other than the pond at the 6th and 8th greens, all of the upper course has "residual soils."

If you are working on holes 1, 6-14, and 18 or around the clubhouse area, for example, you are working in an area with "residual soils."

The following areas do not have "residual soils," at the surface or at depth:

all of Holes 4 and 16 (the two par 3s on the lower part of the course)

- Hole 2 – except for the first 150 yards
- Hole 3 – except for two small areas on the left side
- Hole 5 – except for some areas near the green

- Hole 15 – except for the first 150 yards
- Hole 17 – except for area around and under the green and about 150 yards of the fairway and rough that line up with the areas on Holes 2 and 15.

- the three ponds (Lake 5, 6, and 16)

These areas are shown on the quick summary map in Figure 1 in this Tab.

➢ **You need to match your activity (step 1) and your location (step 2) to figure out if your work could disturb "residual soils." If you are not sure, go to Step 3.**

Step 3: MAP screening section

There are 2 maps that show "residual soils." These maps are at the end of this section, just in front of Tab 3.

- The areas that have slanted lines on Figure 12 have "residual soils" in the top 6 inches.

- The areas that have slanted lines on Figure 13 have "residual soils" deeper than the top 6 inches.

All of the greens and fairways, except No. 12, have been "capped" with 4 to 6 inches of clean sand and turf. Aerating, topdressing, overseeding, and similar work on these areas do not require special procedures.

➢ BUT you must follow the protective measures in Tabs 3 through 6 if you are doing any work in areas of "residual soil" that are:

below this sand cap; or
which could mix the sand with the soil underneath.

➢ If you are not sure whether you are working in an area with "residual soil," check with the Superintendent. ☺ The Superintendent can check Figures 7, 8, 9, and 10 in Tab 8 of this Manual to determine more precisely the depth and levels where "residual soils" have been found.

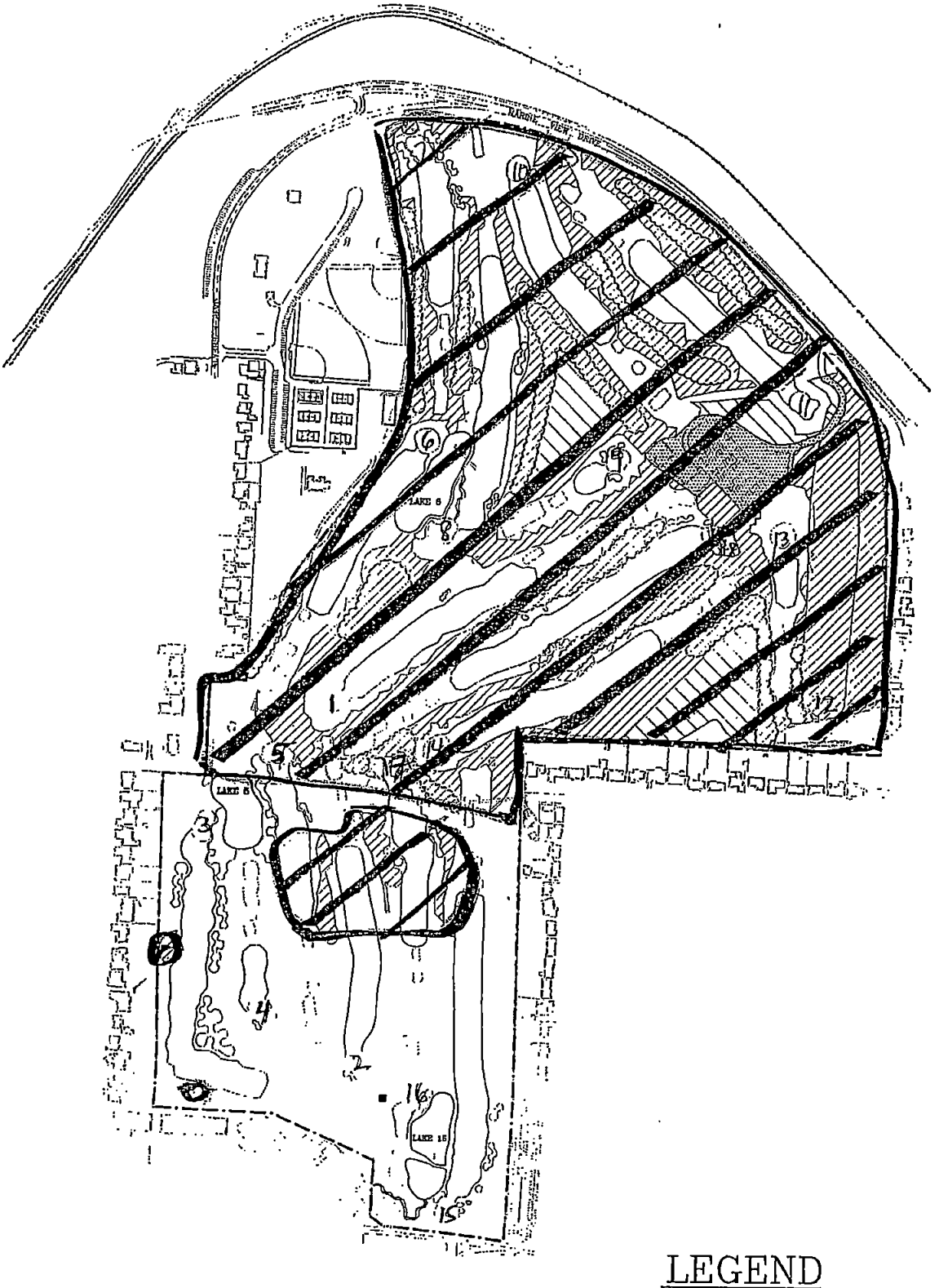
NOTE: Utility trenches were backfilled with clean material, so that maintenance of the utilities in the trench could occur without the need for protective measures. For a map of these utility trenches, see Figure 4 at the end of Tab 2.

QUICK REFERENCE MAP

areas of residual contamination at any depth

NORTH

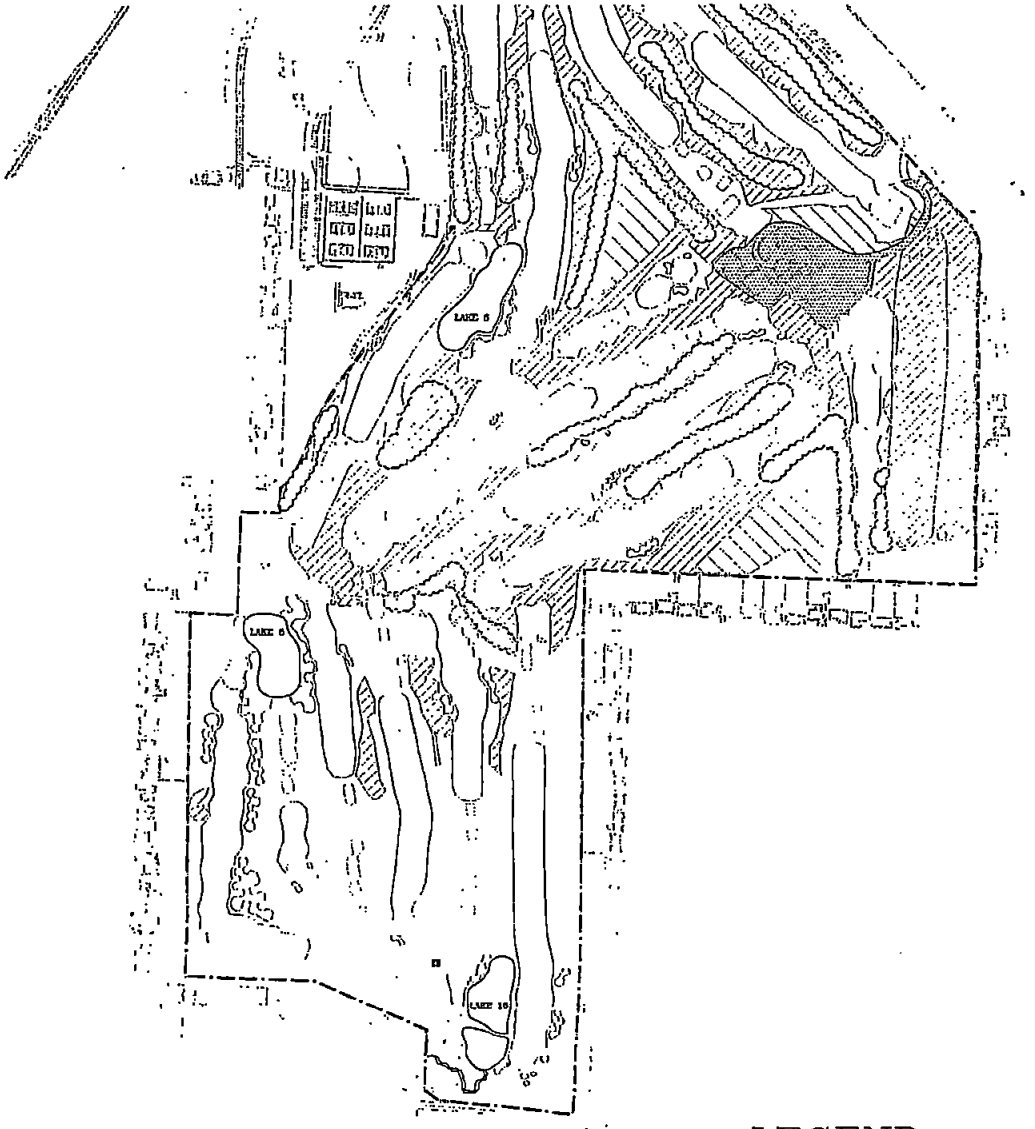
SCALE
0 (In Feet) 400



LEGEND

PROJECT BOUNDARY

AREA OF RESIDUAL CONTAMINATION (>20PPM) (at any depth)

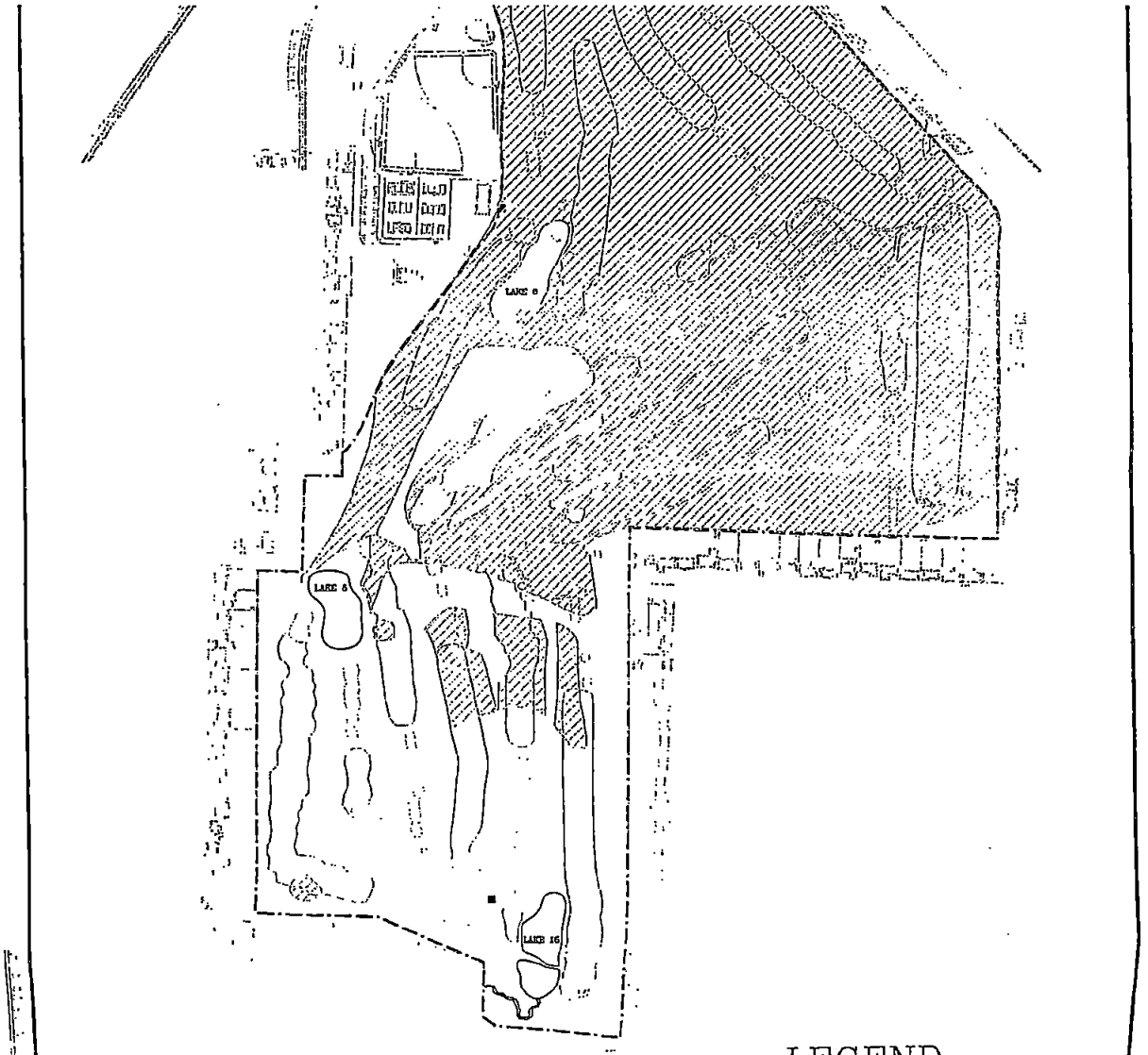


LEGEND

- PROJECT BOUNDARY
- AREA OF RESIDUAL CONTAMINATION (>20PPM)
- AREA NOT ON GOLF COURSE HOLES (>20PPM)
- AREA WITH SUBSTANTIAL STRUCTURES OR IMPERVIOUS SURFACE (>20PPM)
- AREA OF OLD ESTABLISHED VEGETATION (LARGE TREES, ETC.)

INDEPENDENT REMEDIAL ACTION REPORT FOR EAST MARINE VIEW DRIVE WIDENING AND LEGION MEMEORIAL GOLF COURSE IMPROVEMENT PROJECTS	AREA OF RESIDUAL CONTAMINATION FOR LEGION MEMORIAL GOLF COURSE (>20 PPM FOR 0-6 INCHES)	FIGURE 12

Hydrometrics, Inc. Consulting Scientists, Engineers and Contractors



LEGEND

PROJECT BOUNDARY

AREA OF RESIDUAL CONTAMINATION (>20PPM)

Consulting Scientific, Engineering and Economics

INDEPENDENT REMEDIAL ACTION REPORT FOR EAST MARINE VIEW DRIVE WIDENING AND LEGION MEMEORIAL GOLF COURSE IMPROVEMENT PROJECTS	AREA OF RESIDUAL CONTAMINATION FOR LEGION MEMORIAL GOLF COURSE (>20 PPM FOR >0 INCH DEPTH)	FIGURE 13

Training

This section helps you figure out whether you have been trained to handle "residual soils" – and helps golf course supervisors make sure training is conducted.

For Maintenance Crew and other workers who come into contact with soil:

➢ Have you had at least 4 hours of training about handling "residual soils"?

If no or you are not sure, check with your supervisor ☺

➢ Ask for training – or a reminder -- if you are not certain about:

- what protective clothing to wear and how to clean up
- how to pile and cover soil using plastic sheets
- how to mark work areas
- how to handle bushes and trees with soil on their roots
- who can answer your questions

For Supervisors:

➢ Have you provided initial training for new employees?

➢ Have you provided periodic training at shift briefings?

➢ Have you provided specific task training in advance?

Training program reminder checklist for supervisors

The Golf Course Superintendent and/or assigned supervisors should review the following to keep the training program current. A more specific description and basic training curriculum follows this checklist.

- ❑ **HAZMAT notification**

  check that records are maintained for each employee who could come into contact with "residual soils" including:

  - date of initial training;
  - employee name;
  - supervisor conducting the training; and
  - subject matter curricula, which may reference this maintenance program manual or specific tabs in the manual

- ❑ **INITIAL** – check that the information and training requirements in the attached curriculum have been met in the initial training

- ❑ **MONTHLY** – check that periodic training occurs at least monthly to reinforce the potential dangers of working with "residual soils." This may at regular shift briefings.

- ❑ **SPECIFIC** – check that task training is conducted in advance of work; this training may be combined with periodic training if it occurs on the same day as the work, or within the month since the last periodic training and before the work is done.

- ❑ **PROGRAM AND O&M MANUAL UPDATE** – check annually or when there are personnel changes that the contacts on the back cover of the O&M Manual are current and the program is up-to-date. Check the "Master O&M Manual" for the current version.

- ❑ **CONTACTS & RESPONSE** – check that enough copies of the Golf Course Maintenance Program O&M Manual are placed so they are readily available for quick reference to supervisors and crew.

INITIAL TRAINING TOPICS FOR STAFF WORKING IN CONTAMINATED SOIL

	TOPIC	General Description	Time Allotted (Min)
1.	Right To Know	Overview of Employees "Right-to-Know" concerning hazards faced on the job site. Explanations of the ASARCO smelter study area, hazard findings, and clean up plan.	25
2.	Labels and Packaging Information	What information can be found on containers of hazardous material and how to read and interpret this information	25
3.	Break		10
4.	Material Data Safety Sheets	Explanation of form and information found on the MSDS. Practical exercise in reading and interpreting MSDS common to the Golf course working environment.	50
5.	Break		10
6.	Physical Hazards of Chemicals	Explanation and discussion of the physical effects of arsenic, lead, and other chemical commonly found in the golf course operation.	30
7.	Personal Hygiene in Maintenance and golf course areas.	Explanation and discussion of personal hygiene both working in and departing areas with contaminated soil. Cleaning of mechanized equipment and hand tools used in the work site.	15
8.	Operation and Maintenance of Safety Equipment	Explanation and discussion of operations and maintenance of safety equipment available to golf course personnel, including personal protective equipment.	15
9.	Break		10
10.	Proper Handling of all Solid and Liquid Material	Explanation and discussion of safe material handling.	20
11.	Equipment Safety	Explanation and discussion of safe equipment operation for both operators and nearby personnel.	20

INITIAL TRAINING TOPICS FOR STAFF WORKING IN CONTAMINATED SOIL
(continued)

12.	Response to Emergencies and Emergency Procedures	Explanation and discussion immediate first aid, and accident / incident reporting requirements. Identification of emergency telephone numbers and hospital locations. Review of general safety precautions.	10
		Total Time (Hours)	4

Note: The appointed instructor shall develop a specific curriculum for the employee training requirement using this list as a basis. This list of basic topics and time allotted may be modified by the appointed instructor to incorporate new topics found to be important during future golf course operations or future requirements of the WAC provided the total training hours meets the minimum set by this O&M Manual.

A copy of WAC 296-62-05415 on employee information and training is behind Tab 8C.

Training for substantial renovations, including for regrading or renovation of Hole 12 or the rough on Hole 13, must follow a more extensive "Health and Safety Plan for Construction," which is included in Section 8 of this manual, behind Tab 8C.

Work Site Measures

This section lists the measures you must follow if you are doing work in areas where you could come into contact with "residual soils." These measures apply only in areas of "residual soils."

- **If you do not know if you are working in an area with residual soils, see Tab 2. If you have not received training on handling "residual soils," see Tab 3.**

- **Job supervisors:** verify that all staff working on the task have been informed of the potential for working with contaminated soil and have received the necessary training.

- CLOTHING, EATING, WASHING AND CLEAN UP

  The most important thing you can do is to <u>wash your hands</u> well with soap and water, so that you do not get the soil on your food and eat it (or on anything else you put in your mouth).

  <u>No smoking or eating</u> is allowed in a work area where you have come into contact with "residual soils." All eating and breaks must be taken in an area that is not where "residual soils" are exposed.

  <u>Scrape or rinse excess mud or soil off your boots – and equipment and vehicles – before</u> leaving the work area – so that the "residual soils" are not tracked to other areas.

  Keep dust to a minimum – from the work site, from equipment and vehicles, and from your clothes.

  Although not required for short-term routine maintenance activities, a dust mask is recommended when handling dry

"residual soils," unless they are so muddy and wet that there isn't dust. If you are not sure whether a dust mask or a half mask air purifying respirator is needed, check with your supervisor.

When a job is done (or daily, if the job is not done), wash equipment – including any plastic sheets that are not in continuous use for protective liners or covers – to limit the spread of any "residual soils."

Vehicles must be cleaned (inside and out) on a regular basis.

➢ MARKING WORK AREAS

Make sure that the work area is clearly marked 'out of play' and golfers shall be given a free drop outside the area as provided by the rules of golf.

A standard "ground under repair" sign or marking is not sufficient.

The sign or marker needs to convey that golfers *should not play* from the area (e.g., "you must take free drop; you may not play from this area").

➢ LOOSE SOIL AND SOIL PILES

If possible, work with "residual soils" shall be completed and be covered with clean material by the end of the day.

All "residual soils" that are excavated must be placed on plastic sheets to reduce the potential spreading of contaminated soil to the surrounding area – by wind, rain, or other forces.

If "residual soils" are to be left overnight, they shall be covered with securely anchored plastic.

Keeping the excavated area damp (not drenched) may be used in conjunction with other measures to minimize the potential for dust and air borne emissions.

For larger excavations, silt fence, straw bails, or other erosion control measures must be used to control potential runoff.

If "residual soils" are exposed or excavated from underneath structures or paved areas, the protective measures above must be used in handling the soils.

➢ HANDLING ROOT BALLS

Root balls from brushes or trees that have "residual soils" must be placed on plastic sheets and covered by to prevent air-borne dust or runoff from water – unless they are going to be immediately replanted and rain or wind will not cause dust of runoff in the meantime.

Any trees, shrubs, and bushes that are removed from their current locations will be cleaned of clinging soil to the extent practical and either: (1) relocated on site; (2) chipped or composted and recycled for reuse on site; or (3) if reuse is not practicable, either disposed of through the Everett Smelter Site soil disposal program, or tested for arsenic prior to disposal. If arsenic concentrations exceed 20 ppm for material to be taken off-site, the material must be disposed at a permitted facility.

"Residual soils" should be removed from any root balls on vegetation to be sent off site. The soil should be reburied at depth or disposed of through the Everett Smelter Site soil disposal program, depending on quantities. *See next paragraph →*

➢ SPECIAL SOIL MANAGEMENT AREA

All extra "residual soils" – which means any soil that is not replaced from where it was dug and capped after a job is done – must be taken to the Special Soil Area. It must not be spread on the ground.

A fenced "special soil area" has been set up on the property in an area that is out of play of the golf course.

After placing soil in the special soil area, re-cover the area with securely anchored plastic or other impermeable cover.

The location of the Special Soil Area (or Areas if more than one is used) must be noted on Figure 13 in Tab 2 of this O&M Manual. If a Special Soil Area is no longer in use, the year that area is closed should also be noted on Figure 13.

➢ UTILITY TRENCHES

New work and repairs on existing utility trenches must be backfilled with clean material (including less than 20 ppm arsenic).

If you have any question about whether an existing utility trench has clean material, refer to Figure 4 in Tab 2.

➢ TAKING SOILS OFF-SITE

If any soils are to be removed from the golf course property, they must follow the Everett Smelter Site final cleanup plan and its "institutional control" programs for "Small Quantity Soil Disposal Program" and "Large Project Soil Disposal and Management Program" (sections 6.7.5 and 6.7.6 of the final Ecology plan).

The Golf Course Superintendent's office should have a copy of the final Ecology Cleanup Action Plan for the Everett Smelter Site. If not, contact the Parks Dept. (Jay Magill) or Law Dept. (Mark Soine or Jim Iles) for a copy.

Make sure contractors are aware of these requirements (Tab 5).

➢ SUPERINTENDENT'S RESPONSIBILITIES

The Golf Course Superintendent shall be responsible for inspection of the work site to assure all appropriate protective measures are taken.

The Golf Course Superintendent or designee shall be responsible for:

- assuring that work area is properly secured overnight and only clean material is left exposed at the end of the task;
- periodically updating the work site measures in this program based on experience and applicable regulations, and maintaining current copies of this O&M Manual in the Superintendent's office and in the main maintenance shed; and
- maintaining current training records identified in Tab 3 and other records relating to the location or disposal of "residual soils."

The Golf Course Superintendent will serve as the Health and Safety Officer for the Legion Memorial Golf Course, unless she or he designates in writing another employee to serve this function.

Maintaining Capped Areas

This section explains the maintenance requirements for the following areas:

- Fairways, tees, and greens
- 12th Hole
- Other capped areas, facilities, and utilities
- Clubhouse, parking lots, and other golf course structures

➢ Fairways, Tees, and Greens

Must have not less than 4 inches of clean sand or soil (less than 20 ppm arsenic) below the turf on the surface at all times.

➢ 12th Hole

The 12th hole – tees, fairway, green, and rough where technically feasible – are to be periodically top-dressed to build up a layer of clean soil and turf between "residual soils" and the surface (until such time as the hole may be redesigned and reconstructed).

➢ Other Capped Areas (such as sand traps and ponds) and Utilities

Must be backfilled with clean material, whether installed by or for the golf course, or by other public or private utilities or facilities that may be allowed to cross the golf course. See Tab 4 for work site measures that apply to construction activities.

The drainage system will be maintained to route all collected water into the collector lines, surface drainage system, or

retention ponds as designed in the 1998 renovation, as shown on Figure 4 in Tab 2.

See Tab 6 for the pond monitoring program.

- Clubhouse, Parking Lots, and Other Golf Course Structures

Existing asphalt or concrete pavement will be periodically inspected visually to assess whether it continues to provide impervious surface for containment. If not, it will be repaired or removed and replaced.

If impervious areas or structures are repaired, removed or reconstructed, the work will be performed consistent with the work site measures in Tab 4 for handling any "residual soils" under the paving or structures and with any applicable provisions of the Everett Smelter Site cleanup action plan.

Pond Monitoring

This section describes the pond monitoring program.

CITY OF EVERETT
Environmental Quality
Standard Operating Procedure

Legion Memorial Golf Course – Remediation Confirmation Monitoring Plan

Purpose: To confirm the long-term effectiveness of the interim remedial action

Frequency: As proposed in the Independent Remedial Action Plan, monitoring will be conducted annually, in the month of December, for five years. Monitoring will be initiated in December 1998.

Sample Sites: Lake #5 (by Hole #5)
Lake #6 (closest to the Maintenance shop)
Lake #15 (split level pond at fence line of Everett Community College)

A. Parameters: **Arsenic, Cadmium, and Lead**

2. SAMPLING PROTOCOL

PERSONNEL:

One EQ staff member is required for sampling. One Legion Park staff member is required as escort on the golf course.

PROTECTIVE EQUIPMENT:

- Hard hat - required when working on the golf course.
- Protective outer clothing - coveralls, coat/rain gear if necessary.
- Latex gloves - 3 pairs minimum.

FIELD EQUIPMENT:

- Pole sampler for 500 mL oblong bottles.
- 6 acid washed 500 mL oblong plastic bottles.
- 3 acid washed 500 mL oblong plastic bottles filled with DI H_2O from the Metals Room. Label as Blank H_2O.
- 3 acid washed Gallon capacity HDPE containers.
- Field Sampling Log Book with pen
- "Sharpie" Markers or other for marking sample bottles

* Place all sampling bottles in plastic bags for transport to sampling locations.

SAMPLING PROCEDURE:

Remember - work carefully at all times to prevent contamination and provide a representative sample!

At each Site:

1. Mark the Site ID (Lake #), date/time, and sampler's initials on a clean acid-washed 500mL oblong plastic bottle labeled as the Field Blank and the composite sample container (acid-washed 1 gallon plastic).

2. Put on clean latex gloves.

3. Prepare the site field blank (see below).

4. Each sample is a composite of 5 sub-samples taken at the inlet, outlet and 3 locations spread around the perimeter.
   - Using the pole sampler fitted with a clean acid-washed 500 mL plastic bottle, fill the sample bottle. Take care not to disturb the bottom sediment.
   - Carefully pour the sub-sample into the labeled composite sample container (acid-washed 1 gallon plastic). Take care that the lid does not get contaminated.
   - Repeat 4 more times at each sub-sample location on the lake.

5. Note in the Field Sampling log book: Legion Golf Course, Site ID (Lake #), date/time, sampler's name, weather conditions, and any comments on the appearance of the ponds and/or sampling incidents.

6. Place sample containers in plastic bags for transport.

7. Take samples to Everett Environmental Laboratory located at the Water Pollution Control Facility.

At the Lab

1. Homogenize composite sample. Pour a split of the sample into a labeled one 500 mL acid washed HDPE bottle for metals analyses. Do this with each composite sample.
2. Fill out the Chain of Custody form provided by the lab. Write in all information (see attached example). ***Sample Site must be entered as Legion Golf Course.*** Report goes to Ed Phelps in Parks. Sign to relinquish the samples to the lab.

3. PREPARATION OF FIELD BLANK

1. Pour the contents (DI H_2O) of one of the bottles labeled "Blank H_2O" into the composite container marked for the site.
2. Place the lid on the composite container and shake/swirl the water to contact all inside surfaces.
3. Pour the water from the composite container to the clean bottle labeled "Field Blank" marked with site, date, and time.

Place the sample into a plastic

Substantial Revisions or Renovations & Related Resource Materials on Legion Golf Course

This section describes how any future substantial revisions or renovations of the golf course will be performed.

This section also includes resource materials from other reports that may be helpful or apply to this work. This information may also provide helpful background in managing some of the ongoing O&M on the golf course.

These resource materials include:

Tab 8A	Restrictive Covenant and Property Legal Description
Tab 8B	Construction Measures and SEPA MDNS for 1998 Course Renovation
Tab 8C	WAC 296-62-05415 and Site Health and Safety Plan for 1998. Course Renovation
Tab 8D	Arsenic Isocontours Prior to 1998 Course Renovation (superimposed on renovated course layout)

➢ SUBSTANTIAL REVISIONS OR RENOVATIONS

Any future redesign and reconfiguration of entire holes or overall renovation of the golf course that disturbs "residual soils" shall follow the work plan summarized on Table 2 (on the next page of this section) and the training and work site measures used for the 1988 golf course renovation.

A substantial revision or renovation refers to the redesign and reconstruction of one or more entire holes. It does not refer to adding, removing, modifying, or reshaping fairways, greens, berms, traps, ponds, landscaping, drainage, or elements of a particular hole, which are typical golf course maintenance activities.

- A description of the construction measures used in the 1988 renovation (excerpted from the *East Marine View Drive Widening and Legion Memorial Golf Course Improvements Independent Remedial Action Report,* Hydrometrics, Inc. 1998) and associated SEPA determination of nonsignificance is behind Tab 8B of this section. Construction measures may be modified per the scope of the renovation work being undertaken. The discussion on the East Marine View Drive project does not apply to this site.

- The site health and safety plan for the 1988 renovation is included behind Tab 8C of this section. This plan is appropriate for work on Holes 12 and 13, however, this plan may be more extensive than would be needed for other future golf course revisions or renovations (because the plan applied to the entire course). A modified plan may be prepared and used to fit the scope of more limited future renovation work.

  WAC 296-62-05415 (as of 1999) on employee information and training is also included for reference.

- Figures 7 through 10 behind Tab 8D show isocontours of arsenic levels found on the property prior to the 1988 course renovation. The data sets for these isocontours are in the 1988 independent remedial action report and in the *Independent Remedial Action Plan for American Legion Memorial Golf Course* (Hydrometrics, 1997). These figures provide information on arsenic levels in "residual soils" on the course. Note that in capped areas (tees, greens, fairways), the 1988 renovation changes the depth by 4-6 inches from the depth noted in the title blocks on these figures.

The Everett Smelter Site Final Cleanup Action Plan (Ecology 1999) and Hydrometrics reports (1998 and 1997) should be available in the Golf Course Superintendent's office, but if not, they are also available at the City Parks Dept., Planning Dept., or Law Dept. If you need further background information or reference documents, you may also contact Ken Weiner at Preston Gates Ellis LLP (206.623.7580), who assisted the City in the preparation of these documents and this manual.

TABLE 2
LEGION MEMORIAL GOLF COURSE
COMPLETED REMEDIAL WORK PLAN
TASK SCHEDULE

Task Completed	Date Task Completed	Comparison To Work Plan
• Conducted 24 safety training for workers coming in contact with soils and an additional 8 hours for supervisors.	• June, 1997	• Same
• *Drain tile trenches were excavated and backfilled with clean import material.	• June, 1998	• Same
• *Installed and routed drain tile to collector lines and drainage ponds to capture surface water infiltration and to discharge into the City's secondary treatment plant.	• June, 1998	• Same
• *Any trees, shrubs, and bushes that required removal were relocated on-site.	• Early 1999	• Same
• At least four inches of sand along with top soil and sod were added to the fairways, greens, and tees.	• June, 1998	• Fairway 12 will be top dressed periodically rather than being capped.
• Covered sample location S302 (identified in the work plan) near the main parking lot with asphalt while expanding the parking lot.	• September, 1997	• The area near sample location S201 (identified in the work plan) was not covered with asphalt because the City elected not to construct the trailer parking lot.
• Soils were not disposed off-site; therefore, waste categories were not an issue.	• NA	• NA
• *Conducted air quality monitoring.	• Three times in June, 1997; five times in July, 1997; five times in August, 1997; and once in September, 1997.	• Same
• Implemented institutional controls including a deed restriction.	• Fall/Winter, 1998	• Same
• The three drainage ponds will be sampled annually and analyzed for arsenic for the next five years.	• December, 1998 to December, 2002	• Same

* Added to work plan prior to commencement of work.

After Recording Return To:
City of Everett
Public Works Department
3200 Cedar Street
Everett, Washington 98201
Attn: Craig Fullrton

RESTRICTIVE COVENANT

GRANTOR: City of Everett

GRANTEE: City of Everett

Legal Description:
Abbreviated form:

A LINE OF DEMARCATION THROUGH A PORTION OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER AND GOVERNMENT LOT 4, SECTION 8, TOWNSHIP 29 NORTH, RANGE 5 EAST, W.M., SNOHOMISH COUNTY, WASHINGTON

Additional legal on page 4

Assessor's Tax Parcel ID No(s).:

Reference number(s) of Related Document(s): N/A

RESTRICTIVE COVENANT

City of Everett
Legion Memorial Golf Course
144 West Marine View Drive
Everett, WA 98201

This Declaration of Restrictive Covenant is made pursuant to RCW 70.105D.030(1)(f) and (g) and WAC 173-340-440 by the City of Everett ("City"), a municipal corporation, its successors and assigns. and, its successors and assigns.

An independent remedial action (hereafter "Remedial Action") occurred at the property that is the subject of this Restrictive Covenant. The Remedial Action conducted at the property is described in the following document: *East Marine View Drive Widening and Legion Memorial Golf Course Improvement Independent Remedial Action Report,* prepared for the City by Hydrometrics, Inc., dated December 1998. This document is on file at the Northwest Regional Office of the State of Washington Department of Ecology ("Ecology").

This Restrictive Covenant is required because the Remedial Action resulted in residual concentrations of arsenic which exceed the Model Toxics Control Act Method A residential cleanup level for soil established under WAC 173-340-740 ("contaminated soil").

The undersigned, the City of Everett is the fee owner of real property ("Property") in the County of Snohomish, State of Washington, that is subject to this Restrictive Covenant. The Property is legally described in Attachment A of this Restrictive Covenant and made a part hereof by reference.

The City makes the following declaration as to limitations and restrictions to which the Property may be put and specifies that such declarations shall constitute covenants to 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 the Property (hereafter "Owner").

Section 1. A portion of the Property contains contaminated soil located under the parking lot and clubhouse facilities. The Owner shall not alter, modify, or remove the existing structures in any manner that may result in the release or exposure to the environment of that contaminated soil or create a new exposure pathway without prior written approval from Ecology. The Owner may conduct parking lot and building maintenance or expansion that maintains or increases the containment function of the structures.

Section 2. The Owner shall not modify areas of the Property on which residual contaminated soil is located and capped by sand or turf, except as follows:

a. Any future redesign and reconfiguration of entire holes or overall renovation of the golf course that disturbs contaminated soil on the Property shall follow the work plan summarized on Table 2 of, and further described in, the *East Marine View Drive Widening and Legion Memorial Golf Course Improvements Independent Remedial Action Report.* The City may request Ecology's review and concurrence on changes, if any, in the work plan.

b. As part of normal operations, improvements, and maintenance of the golf facility, the Owner shall maintain and implement a set of protective procedures to be used in maintaining any areas of the Property where contaminated soil remains (hereafter "Golf Course Maintenance Program"). The golf course maintenance program shall include worker training, use of protective

clothing, isolation of temporarily stockpiled soils with a plastic barrier, backfilling of any new utility trenches with clean material, and proper management of any soils that require removal off-site.

c. The Golf Course Maintenance Program shall also include maintenance of the integrity of the capped areas, including: (i) the maintenance of not less than four inches of clean sand or soil on fairways, tees, and greens; (ii) turf and landscaping in areas of the rough that are not capped by sand or other features (e.g., impervious surfaces, ponds); (iii) the periodic topdressing and maintenance of turf on Fairway No. 12; and (iv) procedures for construction or maintenance of golf course or other utilities or facilities that may be located on or traverse the Property.

d. Except for the Golf Course Maintenance Program, any activity on the Property that may result in the release or exposure to the environment of the contaminated soil that was contained as part of the Remedial Action, or create a new exposure pathway, is prohibited. Some examples of activities include: drilling, digging, placement of any objects or use of any equipment which deforms or stresses the surface beyond its load bearing capability, piercing the surface with a rod, spike or similar item, bulldozing or earthwork.

Section 3. Any activity on the Property that may interfere with the integrity of the Remedial Action and continued protection of human health and the environment is prohibited.

Section 4. The Owner of the property must give thirty (30) day advance written notice to Ecology of the Owner's intent to convey any interest in the Property. No conveyance of title, easement, or other interest in the Property shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the Remedial Action. (Section 5 below governs leases.)

Section 5. The Owner must restrict leases for uses of the Property other than the clubhouse or pro shop, if any, to uses and activities consistent with the Restrictive Covenant and notify all lessees of the restrictions on the use of the Property.

Section 6. The Owner must notify and obtain approval from Ecology prior to any use of the Property that is inconsistent with the terms of this Restrictive Covenant. Ecology may approve any inconsistent use only after public notice and comment.

Section 7. The Owner shall allow authorized representatives of Ecology the right to enter the Property at reasonable times for the purpose of evaluating the Remedial Action; to take samples, to inspect remedial actions conducted at the property, and to inspect records that are related to the Remedial Action.

Section 8. The Owner of the Property reserves the right under WAC 173-340-440 to record an instrument that provides that this Restrictive 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, after public notice and opportunity for comment, concurs.

_____ _____

Edward D. Hansen, Mayor Date
CITY OF EVERETT

CITY OF EVERETT DEPARTMENT OF PARKS AND RECREATION

LEGAL DESCRIPTION
LINE OF DEMARCATION FOR LEGION GOLF COURSE CLEAN-UP ACTION PLAN

A LINE OF DEMARCATION THROUGH A PORTION OF THE NORTHWEST QUARTER OF THE SOUTHWEST QUARTER AND GOVERNMENT LOT 4, SECTION 8, TOWNSHIP 29 NORTH, RANGE 5 EAST, W.M., SNOHOMISH COUNTY, WASHINGTON, DESCRIBED AS FOLLOWS:

COMMENCING AT THE WEST QUARTER CORNER OF SAID SECTION;
THENCE S 0°52'16" W ALONG THE WEST LINE OF SAID SECTION 521.02 FEET TO THE WESTERLY PROLONGATION OF THE NORTH MARGIN OF 3RD STREET AS SHOWN ON THE PLAT OF EVERETT DIVISION "S", PER PLAT RECORDED IN VOLUME 6 OF PLATS, PAGE 39, RECORDS OF SAID COUNTY;
THENCE S 87°59'44" E ALONG SAID PROLONGATION AND MARGIN 310.64 FEET TO THE NORTHERLY PROLONGATION OF THE CENTERLINE OF THE ALLEY ABUTTING THE EAST LINE OF BLOCK 89 IN SAID PLAT;
THENCE S 2°00'16" W ALONG SAID PROLONGATION AND CENTERLINE 542.15 FEET TO THE TRUE POINT OF BEGINNING;
THENCE N 28°40'00" E 526.56 FEET;
THENCE N 38°28'00" E 271.62 FEET TO INTERSECT THE ARC OF A CURVE AT A POINT FROM WHICH THE CENTER LIES N 19°36'04" W 235.95 FEET DISTANT;
THENCE NORTHEASTERLY ALONG SAID CURVE TO THE LEFT THROUGH A CENTRAL ANGLE OF 45°19'21", AN ARC LENGTH OF 186.64 FEET;
THENCE N 2°41'46" E 159.00 FEET TO A 6 FOOT CHAIN LINK FENCE;
THENCE ALONG SAID FENCE BY THE FOLLOWING COURSES AND DISTANCES;
THENCE CONTINUING N 2°41'46" E 24.66 FEET;
THENCE N 7°21'14" E 175.42 FEET TO THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 700.00 FEET;
THENCE NORTHERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 8°55'03", AN ARC LENGTH OF 108.95 FEET TO A POINT OF TANGENCY;
THENCE N 1°33'49" W 80.62 FEET TO THE BEGINNING OF A CURVE TO THE LEFT HAVING A RADIUS OF 534.17 FEET;
THENCE NORTHERLY ALONG SAID CURVE THROUGH A CENTRAL ANGLE OF 12°20'21" AN ARC LENGTH OF 115.04 FEET TO A POINT OF TANGENCY;
THENCE N 13°54'10" W 148.44 FEET;
THENCE N 14°50'29" W 208.02 FEET;
THENCE N 15°49'36" W 118.73 FEET MORE OR LESS TO THE SOUTHERLY MARGIN OF ALVERSON BOULEVARD AND THE TERMINUS OF SAID FENCE AT IT'S INTERSECTION WITH A 4 FOOT CHAIN LINK FENCE ON SAID MARGIN.

12/16/99

OSTERGAARD-ROBINSON & ASSOCIATES, INC.
3630 COLBY AVENUE
EVERETT, WASHINGTON 98201
425/259-6445
C:/96146.LEG

- Soil contains arsenic concentrations below 760 ppm based on arsenic trioxide and lead concentrations below 10,000 ppm (state dangerous waste levels based on book designation, WAC 173-303-100 (5)(b)).

DESCRIPTION OF 1988 LEGION GOLF COURSE RENOVATION CONSTRUCTION

1.4 EXPLANATION OF REMEDIAL ACTIONS TAKEN AND RATIONALE FOR SELECTING THE REMEDIAL ACTION

A. Remedial Action Selected

The independent remedial action work plans identified remedial actions to be performed by the City based on available soil data and informal consultation with Ecology. A combination of remedial technologies were employed. These tasks are summarized in Tables 1 and 2 for East Marine View Drive and Legion Memorial Golf Course, respectively. In summary, the main remedial actions performed by the City involves:

- Reuse of soils with arsenic concentrations above 20 ppm in appropriate locations for backfill or subgrade bed at both project sites.
- Separation and reuse of glacial till excavated from the East Marine View Drive project site and tested for contamination.
- Off-site disposal at an approved facility for soil determined not to be suitable for reuse.
- The use of engineering controls by containing (i.e., capping) East Marine View Drive with asphalt or concrete for the main roadway and topsoil and sod or landscaping material for some of the right-of-way area.
- The use of engineering controls by containing (i.e., capping) the fairways, greens, and tees (except for fairway 12), at Legion Memorial Golf Course with a minimum of four to six inches of sand, topsoil, and sod.
- Backfilling utility trenches with clean material.
- Long-term monitoring and institutional controls (see Section 1.5).

Capping was determined appropriate for both projects due to the large volumes of problem waste that would be generated in a removal action that contain relatively low levels of hazardous substances (WAC 173-340-360 (9)(c)).

Most of the specific information regarding the performance of the remedial actions specified in the work plans are provided in Tables 1 and 2. The following subsections provide additional background or information on these tasks.

B. Reuse and Engineering Controls

The grading and remedial tasks for both projects involved excavation and reuse of as much soil with arsenic concentrations above 20 ppm as possible as backfill material for the construction project, which was then capped. This method is similar to the accepted reuse of petroleum-contaminated soil in appropriate locations. The rationale for reuse was that the soil did not pose a threat to human health or the environment at the concentrations identified if the soil remained isolated under the roadway or clean soil, turf, and landscaping that will be maintained by the City. On the Marine View Drive project, the soil was used for the subgrade bed of the road, and then paved. In addition, some soil was used to backfill the hillside along a narrow stretch adjacent to the road which was then landscaped (see Figure 11).

On the Legion Memorial Golf Course project, the surface soils that were graded or excavated (e.g., drainage ponds) were reused as subgrade for new elevated greens and tees, which were then capped with four to six inches of sand, followed by one to two inches of topsoil and sod. All sand traps are within the sand capped areas as well; they were constructed with four to six inches of clean granular subgrade (for drainage) and sand. Where grading did occur in the rough, soils that had been graded or excavated were used to form the base of mounds, berms, sandtraps, and similar elevated or topographic

features, followed by topsoil and sod for the mounds and berms and sand for the sandtraps. Where grading did not otherwise occur, soils in the rough were not disturbed.

In general, the entire course lying southwest of a line roughly drawn between the center of the 1st, 6th, and 14th fairways (the "lower" portion of the course) was regraded. Because of the mature trees on the northeast ("upper") portion of the course, the tees, fairways, and greens were the main areas regraded, rather than the rough. As noted on Table 1, the entire fairway 12 did not receive a sand cap (note that the tees and greens were rebuilt with sand caps). The City will regularly topdress this fairway with clean sand and soil in its golf course maintenance to maintain the protective layer, as part of institutional controls (see Section 1.5).

Figure 11 shows the approximate areas that contain residual soils with arsenic concentrations greater than 20 ppm for East Marine View Drive. Some areas that indicated arsenic concentrations greater than 20 ppm from pre-remedial sampling at any depth are shown as well as an area on the north side that used soils cut from the south side as fill (approximate Station 22 to Skyline). Also, two areas on the south side (approximate Station 17 to the golf course entrance and Skyline to the overpass ramp) had soil removed to depths below 7 feet which was well into the till. Therefore, based on sampling of till (see test pit results in Table 3), the City believes that these areas do not contain soil with arsenic concentrations greater than 20 ppm. Lastly, the southern landscaped portion of East Marine View Drive within the cloverleafs was not sampled; therefore, it is unknown if soil with arsenic concentrations greater than 20 ppm exist. However, no soils are exposed and any disturbed soils were capped by road or sidewalk construction. Figure 11 also shows that much of the East Marine View Drive area is paved.

Figures 12 and 13 show the approximate areas that contain residual soils with arsenic concentrations greater than 20 ppm for Legion Memorial Golf Course from the surface to a depth of six inches and greater than a depth of six inches, respectively. Figure 12 now illustrates that about two-thirds of Legion Memorial Golf Course does not have soil with arsenic concentrations greater than 20 ppm at the surface to a depth of six inches. Areas where arsenic concentrations are below 20 ppm are those where direct contact or exposure is most likely to occur. As shown in Figure 12, much of the remaining one-third is area that is not in play or covered with an impervious surface or structure (e.g. buildings, parking lot, peripheral areas). All peripheral areas not covered with a structure or impervious surface however, including those with arsenic concentrations above 20 ppm, are protected with a layer of turf.

Figure 13 shows the area that contains soil with arsenic concentrations greater than 20 ppm remaining at depth. Drainage ponds were excavated to depths of approximately six to 12 feet into glacial till. Therefore, the City believes that these areas do not contain soils with arsenic concentrations above 20 ppm. Areas identified in Figures 12 and 13 have been estimated based on pre-remedial sampling.

Other remedial actions that were conducted include the installation of a shallow groundwater interceptor trench (i.e., french drain) along a portion of East Marine View Drive (see Figure 4). Although groundwater was not encountered during construction activities, this action was taken in case a perched groundwater condition occurred seasonally near this portion of East Marine View Drive. At Legion Memorial Golf Course, the parking lot near the clubhouse was also expanded. This expansion capped an additional area with low permeability asphalt. Because the thickness of paving is less than six inches and the foundation of the clubhouse may contain soil with arsenic concentration above 20 ppm (e.g., crawl space), the paved parking and clubhouse area is included on Figure 12 even though the area is capped with an impervious surface.

C. Utility Trench Backfill

Utility trenches with clean import backfill were discussed in Section 1.0.2 A and are shown in Figure 4. Trenches were backfilled with clean import material to prevent future maintenance work workers from coming into contact with potentially contaminated soils and to avoid having to manage problem waste in the future. Excavated soils from the utility trenching at Legion Memorial Golf Course were used as subgrade backfill for landscaping along the fairways or as a base for berms. Excavated soil from the utility trenching at East Marine View Drive were managed off-site (see Section D below).

D. Separation, Reuse, and Off-Site Disposal

Because the majority of the work at Legion Memorial Golf Course involved increasing the surface elevation to improve drainage, off-site disposal of excavated soil was not necessary. All soils excavated during re-grading were used as subgrade backfill for landscaping at the fairways or were used as a base for berms.

For the East Marine View Drive project, some materials were disposed off-site. Trees, brush, and shrubs at East Marine View Drive were cut to the ground surface, chipped for hog fuel, and hauled to the Kimberly-Clark paper mill located adjacent to the Port of Everett's Baywood site. Due to Ecology's concern of conifer trees absorbing arsenic, a sample of a Douglas Fir was analyzed prior to chipping the material. Laboratory results indicated that arsenic was detected at a concentration of 5 ppm (see fir results in Table 3); therefore, this material was not classified as problem waste. In addition, soil was removed from stumps which were subsequently managed at Kimberly-Clark with the trees, brush, and shrubs.

The City originally intended to utilize all soil cut from the south side of the road that had arsenic concentrations greater than 20 ppm as fill on the north side. In addition to removing soil from the south side, the City also estimated that approximately 12,000 cubic yards of clean soil would result from the project and be available for reuse: 5,000 cubic yards at the City's old landfill and 7,000 cubic yards at the Port of Everett's Baywood site (see Attachment 2 of the City's January 24, 1997 letter to Ecology in Appendix B). The excavation to remove approximately 12,000 cubic yards of clean soil was needed for the following reasons:

- To complete the required grade.
- To allow space in the north side for most of the soil from the south side (fill) that had arsenic concentrations greater than 20 ppm.
- To allow sufficient space for import structural fill because the contractor determined that the topsoil cut from the south side along with the soil (fill and glacial till) present on the north side was not suitable as structural fill for the north side construction.

Upon completing the project, a total of approximately 17,700 cubic yards were excavated from the roadway (4,700 cubic yards from the south side and 13,000 cubic yards from the north side). To minimize off-site disposal of problem waste per the work plan, the City maximized as much natural glacial till in the project area with arsenic concentrations less than 20 ppm for excess material (see test pits results in Table 3) as possible. This action limited the volume of problem waste generated that required off-site disposal.

The 4,700 cubic yards cut from the south side consisted of fill, clean glacial till, and topsoil and was managed as follows:

- 2,000 cubic yards of fill with arsenic concentrations greater than 20 ppm was placed in the north side as subgrade backfill per the work plan.
- 1,000 cubic yards of clean glacial till was stockpiled at the Port of Everett's Baywood site for reuse with the material from the north side as described below.
- 1,700 cubic yards of topsoil with arsenic concentrations greater than 20 ppm was stockpiled and contained at the Port of Everett's Baywood site and managed as described below.

The 1,700 cubic yards of topsoil with arsenic concentrations greater than 20 ppm was classified as problem waste (see Section 1.6 B). This material was stockpiled at the Port of Everett's Baywood site (see topsoil stockpile in Figure 14) and temporarily contained by placing the material on plastic sheeting and covering it with polyethylene. The City negotiated with Asarco to use the material at the Tacoma Smelter Superfund Site as subgrade backfill for the Tacoma remediation. After Asarco received approval from EPA and Ecology (see Appendix B), the City hauled the material to the Tacoma Smelter in June, 1998. Copies of the scale tickets are included as Appendix C.

The 13,000 cubic yards cut from the north side consisted of clean glacial till and was stockpiled at the Port of Everett's Baywood Site (see till stockpile in Figure 14). As described above, the 1,000 cubic yards of till removed from the south side was stockpiled along with the 13,000 cubic yards of till from the north side resulting in a total of 14,000 cubic yards of clean glacial till. Approximately 4,000 cubic yards of this glacial till was subsequently hauled to the City's old landfill to be reused as intermediate cover while the remaining 10,000 cubic yards was left at the Port of Everett's Baywood site for reuse as fill by the Port (see Section 1.6 B and Figure 14).

Soil from the natural gas line trench excavated by Puget Sound Energy at East Marine View Drive was also disposed off-site. This trenching generated approximately 2,100 cubic yards of soil classified as problem waste. Asarco agreed to use the material generated by Puget Sound Energy at the Tacoma Smelter as subgrade backfill. The soils were hauled to the Tacoma Smelter in October, 1997.

1.5 INSTITUTIONAL CONTROLS

WAC 173-340-430 requires institutional controls to limit or prohibit activities that may interfere with the integrity of an interim action or cleanup action. Institutional control measures are required at sites that have residual concentrations of hazardous substances which exceed MTCA Method A residential soil cleanup levels.

The City will implement the following institutional controls for Legion Memorial Golf Course:

- The City has prepared a deed restriction which meets the requirements of WAC 197-11-440 (including review by the city planning department) to ensure notice, cap integrity, and proper management of soils during maintenance activities (see Appendix D).
- The City will provide periodic topdressing (every few years, or as needed) to fairway 12 consisting of sand, soil, and/or sod.
- The City will implement a set of protective procedures for golf course maintenance crews, including training and protective clothing. As a practical matter, these measures will generally apply to landscaping and minor course modifications in areas where contamination remains a depth (see Figure 13). Since the utility trenches were backfilled with clean material, work will not require protective measures.

Aside from standard street maintenance, the institutional control applicable to the East Marine View Drive project is the City's Right-Of-Way (ROW) Use Permit System, as noted in the independent remedial action plan, and consistent with WAC 173-340-440(4)(b). Under this permit system, any proposed excavation or disturbance of the site will require prior City approval. In addition, as noted above, utility trenches were backfilled with clean material to prevent exposure during maintenance activities.

Unlike Legion Memorial Golf Course, the East Marine View Drive project area comprises a small portion of the existing roads and streets within the Everett Smelter Site. Ecology has indicated that the CAP is not likely to require the re-excavation of the existing public roads in the area, which are already capped with impervious surfaces. Whatever institutional controls are ultimately determined to apply to the entire street system for the Everett Smelter Site would therefore apply to the East Marine View Drive project site as well.

1.6 SAMPLING AND ANALYSIS

WAC 173-340-410 contains requirements for compliance monitoring consisting of the following:

- Protection Monitoring - Confirm that human health and the environment are adequately protected during construction.
- Performance Monitoring - Confirm that the interim action has attained cleanup levels.
- Confirmational Monitoring - Confirm the long-term effectiveness of the interim action.

A. Protection Monitoring

The Health and Safety Plans contained in the independent remedial action work plans did not require air or personal monitoring due to the low arsenic concentrations at both sites. However, the City elected to perform personal and peripheral monitoring during dry periods of construction. Air monitoring results are listed in Tables 5 and 6 for East Marine View Drive and Legion Memorial Golf Course respectively. Laboratory reports and chain-of-custody forms are located in Appendix E. Results indicate that no personal samples exceeded Permissible Exposure Limits (PELs) for arsenic or lead. In addition, results indicate that no peripheral samples exceeded a trigger level established by the City that are lower than the PELs.

B. Performance Monitoring

Performance monitoring was not performed at either site because the remedial action involved capping of soils with relatively low levels of arsenic concentrations as described in Sections 1.1 and 1.4. However, the topsoil and till stockpiles at the Port of Everett's Baywood site were sampled to determine if the material was above the Method A residential soil cleanup level of 20 ppm for arsenic. The topsoil and till stockpile sampling locations are shown in Figure 14. Laboratory reports and chain-of-custody forms are included in Appendix E.

Table 7 lists results of the first sampling round of the topsoil and till stockpiles. Four grab samples were collected from the topsoil stockpile and results indicated that the material was classified as problem waste. Subsequently, as discussed in Section 1.4 B, the topsoil stockpile was hauled to the Tacoma Smelter.

Previous experience from the Everett Smelter Site and samples collected from test pits indicated the glacial till would have arsenic concentrations below the Method A residential soil cleanup level of 20 ppm. To confirm this, the till stockpile at the Port of Everett's Baywood site was segregated into six windrows (see Figure 14). Four samples were collected at varying depths within each windrow and composited. Results indicated

that the most eastern windrow (sixth) contained arsenic concentrations of 66 ppm which are above the Method A residential soil cleanup level of 20 ppm.

A second sampling round was therefore conducted for the most eastern windrow (sixth) of the till stockpile. This windrow was segregated into four subunits and four sample locations per subunit were composited at three depth intervals including 0-6, 6-12, and 12-18 inches. Results are listed in Table 8 and indicate that the area of elevated arsenic detected in the first sampling round was in the top six inches of the north subunit. Figure 14 shows that this area was immediately adjacent to the topsoil stockpile and likely included some topsoil. Subsequently, the City removed the top six inches of the north subunit of the till stockpile and hauled it to the Tacoma Smelter along with the topsoil stockpile.

In summary, performance monitoring indicated the remaining till stockpile is not classified as a problem waste and therefore can be used as non-structural fill by the City and the Port of Everett.

C. Confirmational Monitoring

Confirmational monitoring addresses the long-term effectiveness of the remedial action. In the independent remedial action work plan, the City proposed to sample the three drainage ponds annually for five years to confirm the effectiveness of the remedial actions.

The City will conduct the first annual sampling in December, 1998. Subsequent annual sampling will be conducted during the month of December in years 1999 through 2002. Analytical results for each annual sampling will be forwarded to Ecology upon receiving the laboratory report.

EAST MARINE VIEW DRIVE WIDENING
AND
LEGION MEMORIAL GOLF COURSE IMPROVEMENT

INDEPENDENT REMEDIAL ACTION REPORT

City of Everett Public Works and Parks and Recreation Departments
EVERETT, WASHINGTON

Prepared for:
Mr. Dave Davis, Public Works Department
and
Mr. Jay Magill, Parks and Recreation Department
City of Everett
Everett, Washington

Prepared By:
Hydrometrics, Inc.
5219 N. Shirley Street, Suite 100
Ruston, WA 98407

December 1998

PROPOSED MITIGATED
DETERMINATION OF NON-SIGNIFICANCE
SEPA #4-97
Legion Golf Course Renovation
February 24, 1997

DESCRIPTION OF PROPOSAL: The Parks Department proposes renovation of Legion Golf Course, including relocation of greens, landscaping, parking and drainage improvements (including biofiltration and routing to the City's secondary treatment plant). Approximately 160,000 cubic yards of clean sand and top soil fill will be needed to construct the project. The proposed improvements would implement the Legion Golf Course Master Plan, approved in 1992, and the Parks and Recreation Comprehensive Plan, amended in 1996.

The City, in conjunction with Hydrometrics Inc., has prepared an independent Remedial Action Plan which addresses the issues relating to the cleanup and disposal of arsenic-contaminated soils within the project area. The plan is available for public review at the offices of the Planning and Community Development Department at the address listed below. The cleanup work will not disturb soils on any residential properties. It also will not foreclose cleanup options or define the cleanup standards for the area near the former smelter or on adjacent residential neighborhoods. Those decisions will be made by the Department of Ecology in its final cleanup action plan for the Smelter Site, which is currently planned to be issued in the fall of 1997.

PROPONENT:	City of Everett Parks and Recreation Department Forest Park, 802 Mukilteo Blvd. Everett, WA 98205
PROPONENT'S REPRESENTATIVE:	Daryl Bertholet/Jay McGill
LOCATION:	144 West Marine View Drive
ZONING:	Park Zone
GENERAL PLAN:	Parks/Open Space
Lead Agency:	City of Everett Planning Department
Contact Person:	David Tyler Phone: 257-8731

The environmental impacts of this proposal are documented in the Environmental Checklist and other information on file with the City. The listed requirements are placed in response to our review of this information:

MITIGATION OF ADVERSE IMPACTS UNDER CITY CODES, SEPA OR OTHER LAWS

(Note: Generally existing City codes or other laws provide the basis for requiring mitigation measures. If SEPA authority is needed in order to require additional mitigation measures, the City's SEPA policies that provide the basis for the mitigation measures are also noted in parentheses.)

1. Grading, erosion control, irrigation and drainage improvements will be performed to City of Everett standards and specifications under a City grading permit, including: (a) grading and fill will not adversely affect the surrounding properties; (b) if archeological resources are uncovered during construction, construction shall stop until the Planning Department is notified (Kris Ravetz, 257-8731), and an appropriate plan is implemented (SEPA Earth, Land and Shoreline Use Policies)

2. Cleanup of arsenic-contaminated soils will be performed as an independent cleanup under the Model Toxics Control Act (MTCA) in consultation with the Washington State Department of Ecology (Ecology), as outlined in the Independent Remedial Action Plan (Hydrometrics 1996), which is summarized and incorporated by reference into the environmental checklist. If any problem waste is removed from the site, any treatment or disposal in Snohomish county will follow applicable rules of the Snohomish Health District, as noted in the cleanup plan. Following completion of the project, a final independent cleanup report will be submitted to Ecology. (SEPA Earth, Environmental Health Policies)

The lead agency for this proposal has determined that it does not have a probable significant adverse impact on the environment. An Environmental Impact Statement is not required under RCW 43.21C.030(2)(c). This determination assumes compliance with State law and City ordinances related to general environmental protection including but not limited to right-of-way improvement requirements, drainage, etc. This decision was made after review of a completed environmental checklist and other information on file with the lead agency. This information is available to the public on request. This Mitigated Determination of Non-Significance is specifically conditioned on compliance with the conditions attached hereto which are incorporated by reference as if fully set forth herein.

The lead agency will not act on this proposal for 15 calendar days from the date below. Comments must be submitted by March 11, 1997 or fourteen (14) calendar days after the date shown on the notarized copy of the notice of posting, whichever date is later.

Responsible Official: Paul A. Roberts

Title: Planning and Community Development Director

Address: 2930 Wetmore Avenue, Suite 100, Everett, WA 98201

Date: February 24, 1997

Signature: _____

You may appeal this determination to the City Clerk at City Hall, 3002 Wetmore Avenue no later than 14 calendar days from the date the MDNS becomes final (which is after the 15 calendar day comment period) by submitting a written statement requesting an appeal which sets forth

the name and address of the person aggrieved, an explanation of why the person is aggrieved, a clear and concise statement of the specific issues for the appeal on a form provided by the Planning Department, and a fee. You should be prepared to make specific factual objections. Appeal application packets are available from the Department of Planning/Community Development at 2930 Wetmore Avenue, Suite 100.

Contact David Tyler to read or ask about the procedures for SEPA appeals.

NOTE: A DNS may be withdrawn in the event of significant changes in the proposal, disclosure of new significant information, misrepresentation by the applicant, or failure to comply with the conditions upon which this Determination of Non-Significance is predicated.

INFORMATION FOR DEVELOPER:

The following information is provided for the developer's benefit. These are not SEPA conditions. All requirements are preliminary in nature, and are based upon the preliminary site plan and the ordinances in effect at time of submittal for SEPA review. **The proposal must comply with all ordinances in effect at the time a complete building permit application is filed, including those not specifically set forth herein.** (Exception: For vesting under the Zoning Code, please refer to Section 44 of the Zoning Code). Contact the Planning Department for information regarding appeals processes for the requirements listed in this document.

1. A Public Works permit is required for this project. Detailed drawings in accordance with City Design and Construction Standards shall be submitted to the Public Works Department showing site parking layout, landscaping, utilities, storm drainage, temporary construction erosion control, and all required improvements in the public right-of-way. Public Works Department approval of these drawings is required prior to any permits being issued.

2. If greater than 10,000 square feet of paved surface will be created by this project, water quality enhancement of stormwater runoff from the paved areas must occur prior to discharge of the stormwater from the site or to a stream or wetland.

   Stormwater detention/retention, quality protection, and enhancement requirements for this project shall be those requirements in effect at the time of application for Public Works permits. Three options for stormwater quality enhancement are presented in the current city standards. The least preferred option is allowed only if the first two options are infeasible in the opinion of the Public Works Department. The options for stormwater quality enhancement are, in order of preference:

   1) An infiltration basin designed and constructed according to city standards.

   2) A wetpond designed and constructed to city standards.

   3) A baffle-type oil/water separator followed by a vegetated swale, both designed and constructed according to city standards.

3. On-site detention is required per city standards, OR, in lieu of providing on-site detention, if the downstream stormwater systems have the capacity to handle the additional runoff, payment to City Drainage Fund #340 is allowed.

4. The restrooms must be designed to be handicapped accessible in accordance with the state building code.

5. City streets and alleys are to kept clear of dirt and debris at all times during construction. Dust suppression and street cleaning are required as directed by the Public Works Inspector.

(c) If the material safety data sheet is not provided with a shipment that has been labeled as a hazardous chemical, the distributor or employer shall obtain one from the chemical manufacturer or importer as soon as possible; and

(d) The chemical manufacturer or importer shall also provide distributors or employers with a material safety data sheet upon request.

(7)(a) Distributors shall ensure that material safety data sheets, and updated information, are provided to other distributors and employers with their initial shipment and with the first shipment after a material safety data sheet is updated;

(b) The distributor shall either provide material safety data sheets with the shipped containers, or send them to the other distributor or employer prior to or at the time of the shipment;

(c) Retail distributors selling hazardous chemicals to employers having a commercial account shall provide a material safety data sheet to such employers upon request, and shall post a sign or otherwise inform them that a material safety data sheet is available;

(d) Wholesale distributors selling hazardous chemicals to employers over-the-counter may also provide material safety data sheets upon request of the employer at the time of the over-the-counter purchase, and shall post a sign or otherwise inform such employers that a material safety data sheet is available;

(e) If an employer without a commercial account purchases a hazardous chemical from a retail distributor not required to have material safety data sheets on file (i.e., the retail distributor does not have a commercial account and does not use the materials), the retail distributor shall provide the employer, upon request, with the name, address, and telephone number of the chemical manufacturer, importer, or distributor from which a material safety data sheet can be obtained;

(f) Wholesale distributors shall also provide material safety data sheets to employers or other distributors upon request; and

(g) Chemical manufacturers, importers, and distributors need not provide material safety data sheets to retail distributors that have informed them that the retail distributor does not sell the product to commercial accounts or open the sealed container to use it in their own workplaces.

(8) The employer shall maintain in the workplace copies of the required material safety data sheets for each hazardous chemical, and shall ensure that they are readily accessible during each work shift to employees when they are in their work area(s). (Electronic access, microfiche, and other alternatives to maintaining paper copies of the material safety data sheets are permitted as long as no barriers to immediate employee access in each workplace are created by such options.)

(9) Where employees must travel between workplaces during a workshift, i.e., their work is carried out at more than one geographical location, the material safety data sheets may be kept at a central location at the primary workplace facility. In this situation, the employer shall ensure that employees can immediately obtain the required information in an emergency.

(10) Material safety data sheets may be kept in any form, including operating procedures, and may be designed to cover groups of hazardous chemicals in a work area where it may be more appropriate to address the hazards of a process rather than individual hazardous chemicals. However, the employer shall ensure that in all cases the required information is provided for each hazardous chemical, and is readily accessible during each work shift to employees when they are in their work area(s).

(11) Material safety data sheets shall also be made readily available, upon request, to designated representatives and to the director or his/her designee in accordance with the requirements of WAC 296-62-05209. NIOSH shall also be given access to material safety data sheets in the same manner.

(12) If a purchaser has not received a material safety data sheet within thirty calendar days after making a written request to the chemical manufacturer, importer, or distributor in accordance with WAC 296-62-05413(6), he/she may make a written request for assistance to the Department of Labor and Industries, Right-to-Know Program, P.O. Box 44610, Olympia, Washington 98504-4610. Such written request shall include:

(a) A copy of the purchaser's written request to the chemical manufacturer, importer, or distributor;

(b) The name of the product suspected of containing a hazardous chemical;

(c) The identification number of the product if available;

(d) A copy of the product label if available; and

(e) The name and address of the chemical manufacturer, importer, or distributor from whom the product was obtained.

Upon receipt of a written request for material safety data sheet, the department shall attempt to procure the material safety data sheet from the chemical manufacturer, importer or distributor and upon procurement, shall forward a copy of the material safety data sheet at no cost to the purchaser. In providing this service priority will be given to small employers.

[Statutory Authority: RCW 49.17.040, [49.17.]050 and [49.17.]060. 97-11-055, § 296-62-05413, filed 5/20/97, effective 8/1/97. Statutory Authority: RCW 49.17.010, [49.17].050 and [49.17].060. 95-22-015, § 296-62-05413, filed 10/20/95, effective 1/16/96. Statutory Authority: Chapter 49.17 RCW. 94-16-145, § 296-62-05413, filed 8/3/94, effective 9/12/94; 88-14-108 (Order 88-11), § 296-62-05413, filed 7/6/88. Statutory Authority: RCW 49.17.230, 49.70.180, 49.17.040, 49.17.050 and 49.17.240. 86-12-004 (Order 86-22), § 296-62-05413, filed 5/22/86. Statutory Authority: RCW 49.17.040 and 49.17.050. 85-10-004 (Order 85-09), § 296-62-05413, filed 4/19/85; 84-22-012 (Order 84-22), § 296-62-05413, filed 10/30/84; 84-13-001 (Order 84-14), § 296-62-05413, filed 6/7/84.]

WAC 296-62-05415 Employee information and training. (1) Employers shall provide employees with effective information and training on hazardous chemicals in their work area at the time of their initial assignment, and whenever a new physical or health hazard the employees have not previously been trained about is introduced into their work area. Such information and training shall be tailored to the types of hazards to which the employees will be exposed. Information and training may be designed to cover categories of hazards (e.g., flammability, carcinogenicity) or specific chemicals. Chemical-specific information must always be available through labels and material safety data sheets.

Note: See Appendix E for guidelines.

(2) Information. Employees shall be informed of:

(a) The requirements of this part;

(b) Any operations in their work area where hazardous chemicals are present; and

(c) The location and availability of the written hazard communication program, including the required list(s) of hazardous chemicals, and material safety data sheets required by this part.

Note: Laboratories are not required to have a written hazard communication program, but it is recommended.

(3) Training. Employee training shall include at least:

(a) Methods and observations that may be used to detect the presence or release of a hazardous chemical in the work area (such as monitoring conducted by the employer, continuous monitoring devices, visual appearance or odor of hazardous chemicals when being released, etc.);

(b) The physical and health hazards of the chemicals in the work area including the likely physical symptoms or effects of overexposure;

(c) The measures employees can take to protect themselves from these hazards, including specific procedures the employer has implemented to protect employees from exposure to hazardous chemicals, such as appropriate work practices, emergency procedures, and personal protective equipment to be used; and

(d) The details of the hazard communication program developed by the employer, including an explanation of the labeling system and the material safety data sheet, and how employees can obtain and use the appropriate hazard information.

(4) Upon receipt of a written or verbal request, the department shall prepare and make available (within available resources) to employers or the public a translation in Cambodian, Chinese, Korean, Spanish, or Vietnamese any of the following:

(a) An employer's written hazard communication program;

(b) A material safety data sheet; or

(c) Written materials prepared by the department to inform employees of their rights relating to hazard communication, WAC 296-62-054 through 296-62-05429.

Note: Written requests should be directed to the Department of Labor and Industries, Right-to-know Program, P.O. Box 44610, Olympia, Washington 98504-4610.

(5) An employer employing employees who have trouble communicating in English shall make reasonable efforts to post notices in the employees' native languages as provided by the department.

[Statutory Authority: Chapter 49.17 RCW. 94-16-145, § 296-62-05415, filed 8/3/94, effective 9/12/94. Statutory Authority: RCW 49.17.230, 49.70.180, 49.17.040, 49.17.050 and 49.17.240. 86-12-004 (Order 86-22), § 296-62-05415, filed 5/22/86. Statutory Authority: RCW 49.17.040 and 49.17.050. 84-13-001 (Order 84-14), § 296-62-05415, filed 6/7/84.]

WAC 296-62-05417 Trade secrets. (1) The chemical manufacturer, importer, or employer may withhold the specific chemical identity, including the chemical name and other specific identification of a hazardous chemical, from the material safety data sheet, provided that:

(a) The claim that the information withheld is a trade secret can be supported;

(b) Information contained in the material safety data sheet concerning the properties and effects of the hazardous chemical is disclosed;

(c) The material safety data sheet indicates that the specific chemical identity is being withheld as a trade secret; and

(d) The specific chemical identity is made available to health professionals, employees, and designated representatives, in accordance with the applicable provisions of this section.

(2) Where a treating physician or nurse determines that a medical emergency exists and the specific chemical identity of a hazardous chemical is necessary for emergency or first-aid treatment, the chemical manufacturer, importer, or employer shall immediately disclose the specific chemical identity of a trade secret chemical to that treating physician or nurse, regardless of the existence of a written statement of need or a confidentiality agreement. The chemical manufacturer, importer, or employer may require a written statement of need and confidentiality agreement, in accordance with the provisions of subsections (3) and (4) of this section, as soon as circumstances permit.

(3) In nonemergency situations, a chemical manufacturer, importer, or employer shall, upon request, disclose a specific chemical identity, otherwise permitted to be withheld under subsection (1) of this section, to a health professional (i.e. physician, registered nurse, industrial hygienist, toxicologist, epidemiologist or occupational health nurse) providing medical or other occupational health services to exposed employee(s), and to employees or designated representatives, if:

(a) The request is in writing;

(b) The request describes with reasonable detail one or more of the following occupational health needs for the information:

(i) To assess the hazards of the chemicals to which employees will be exposed;

(ii) To conduct or assess sampling of the workplace atmosphere to determine employee exposure levels;

(iii) To conduct preassignment or periodic medical surveillance of exposed employees;

(iv) To provide medical treatment to exposed employees;

(v) To select or assess appropriate personal protective equipment for exposed employees;

(vi) To design or assess engineering controls or other protective measures for exposed employees; and

(vii) To conduct studies to determine the health effects of exposure.

(c) The request explains in detail why the disclosure of the specific chemical identity is essential and that, in lieu thereof, the disclosure of the following information to the health professional, employee, or designated representatives, would not satisfy the purposes described in (b) of this subsection:

(i) The properties and effects of the chemical;

(ii) Measures for controlling workers' exposure to the chemical;

SITE HEALTH AND SAFETY PLAN

AMERICAN LEGION
MEMORIAL PARK AND GOLF COURSE
CONSTRUCTION

EVERETT, WASHINGTON

Prepared for:

City of Everett
Parks and Recreation Department
Everett, Washington

Prepared by:

Hydrometrics, Inc.
950 Pacific Ave, Suite 700
Tacoma, WA 98402

November, 1996

LIST OF APPENDICES

SITE HEALTH AND SAFETY PLAN

AMERICAN LEGION
MEMORIAL PARK AND GOLF COURSE
CONSTRUCTION

EVERETT, WASHINGTON

EMPLOYEE'S CONSENT AGREEMENT

I have reviewed the Site Health and Safety Plan for the American Legion Memorial Park and Golf Course Construction at Everett, Washington. I understand its purpose and consent to adhere to its policies, procedures and guidelines while an employee.

Employee Signature	Print Name	Date
Employee Signature	Print Name	Date
Employee Signature	Print Name	Date
Employee Signature	Print Name	Date
Employee Signature	Print Name	Date
Employee Signature	Print Name	Date

SITE HEALTH AND SAFETY PLAN

AMERICAN LEGION
MEMORIAL PARK AND GOLF COURSE
CONSTRUCTION

EVERETT, WASHINGTON

VISITOR OR OBSERVER CONSENT AGREEMENT

I have reviewed the Site Health and Safety Plan for the American Legion Memorial Park and Golf Course Construction at Everett, Washington. I understand its purpose and consent to adhere to its policies, procedures and guidelines as a visitor or observer on the site.

Signature	Date	Company
Signature	Date	Company
Signature	Date	Company
Signature	Date	Company
Signature	Date	Company

participating in the sampling activities. To help ensure safety compliance, all field participants and observers must read this plan and sign a certification stating that they agree to comply with the HSP.

The location of the site is shown in Appendix H. The Fire Protection Program is located in Appendix F.

1.2 FIELD ACTIVITIES

The scope of field activities focuses on soil sampling and movement operations. While the majority of activities involve recontouring the site, some soil may be removed. Much of this work will require the use of heavy equipment to aid in soil relocation. Other hand-operated tools and soil test apparatus may be used in this project. A distinction is made for the project between those soils containing arsenic and lead below the industrial cleanup standard and those above. Good practice dictates that all contractors comply with the policies and procedures contained in the Site Health and Safety Plan for the protection of their employees, however, employees working in areas below the industrial cleanup standard are not required to be trained under the Hazardous Waste Operations Standard.

1.3 KEY MANAGEMENT

Efficient on-site operation requires that key personnel be identified and that their roles, responsibilities and scope of authority be clearly defined.

Project Health & Safety Officer

The Project Health & Safety Officer will be named later. This position should not be confused with the Site Health & Safety Officer described following this section. The Project Health & Safety Officer is responsible for the contents of, distribution of, and modifications to this Health & Safety Plan. The Project Health & Safety Officer is responsible for reviewing the contractor Site Health & Safety Plans, for surveying work operations periodically and for notifying responsible site health & safety officers or other responsible individuals with oral notification of deviations from the HSP. Weekly progress meetings will be held between the contractor and client to report progress and address issues of concern. The Project Health & Safety Officer is responsible for providing direction to Site Safety Officer(s). Contractors will sign the consent form provided in the Health & Safety Plan, thereby agreeing to abide under its auspices.

⇒ Participating in the preparation of and implementing the Contractor Health & Safety Plan

⇒ Conducting periodic inspections to determine if the Contractor Health & Safety Plan is being adhered to

⇒ Knowing emergency procedures, evacuation routes, and the telephone numbers of the ambulance, local hospital, poison control center, fire department, and police department

⇒ Notifying, when necessary, local public emergency officials

⇒ Coordinating emergency medical care

The Project Health & Safety Officer reserves the authority to select protective clothing and health and safety monitoring equipment based on the guidelines contained in this Health & Safety Plan or to augment these plans as necessary. The Site Health & Safety Officer may stop work if any activity or condition threatens worker or public health or safety. The Site Health and Safety Officer will inform the Project Health & Safety Officer as soon as reasonably possible whenever there are questions regarding the safety of continued operations.

The Site Health & Safety Officer shall also be responsible for overseeing the decontamination of the contractor's personnel, equipment, and samples before their leaving the site. These responsibilities shall include:

⇒ Emergency decontamination of contaminated accident victims or the warning of emergency personnel should this activity be impossible due to increasing the severity of the injury to the victim

⇒ Setting up decontamination areas. Decontamination solutions will consist of tap water or water mixed with common detergents. Water use in decontamination will be minimized. Decontamination procedures are described in Section 6.2

⇒ Controlling the decontamination of all equipment, personnel, and supplies withdrawn from the contaminated areas

2.0 SITE CONTROL

The Golf Course Construction Project will take place in Everett, Washington. A map of the construction area is shown in Appendix G. The total site is made up of two areas. The first area comprises the total area known as the twelfth hole and the thirteenth hole. Work in this area will require full compliance with this Site Health and Safety Plan. Work in areas outside of the twelfth and thirteenth holes will be in areas that are not defined as a hazardous waste operation. Work in these areas is exempted from the Hazardous Waste Operations Standard as the concentrations of arsenic and lead are at or below industrial zone cleanup standards and the soil will not be removed. Work in the exempted area will require that employees be informed of the hazards of working in environments containing arsenic and lead, including sound hygiene practices. Work in the exempted area will follow the procedures under this plan but are exempt from the requirements of the Hazardous Waste Operations Standard. Contractors will be required to comply with all workplace standards applicable to the protection of employee safety.

Prior to initiation of construction activities, the site will be surveyed for natural gas, electrical, telephone, television cable, heating oil, water, sewer, and any other utility lines. Each area will also be surveyed for utility pole, structural, and overhead clearance hazards. The work crews will be made continually aware of these hazards for each area.

The work zones will be in the areas where actual soil sampling or remediation is in progress. Work rules require employees to stop work when non-employees enter their work zone. Soil sampling is a discrete process, providing little soil exposure. Exclusion and decontamination zones will not be required for this operation. Remediation of sites will require the use of exclusion zones to ensure nonessential personnel and the public are restricted from the site. The golf course itself is a closed facility, and the remediated areas and the entire course may be closed during this remediation, further restricting access. Work in the area of the twelfth and thirteenth holes will require exclusion and decontamination zones.

To reduce the public's exposure to site physical and chemical hazards, work zone access will be restricted to trained, authorized personnel with personal protective equipment. The work zone will be under the surveillance of the work crews. Unauthorized entry into the work zone will cause work to stop until the zone is cleared of the unauthorized personnel. If public

3.0 HAZARD EVALUATION

3.1 CHEMICAL SUBSTANCES OF CONCERN

The following substances are known or suspected to be present at elevated concentrations within the area of operations for the Golf Course Construction Project and may affect human health. Information concerning chemical, physical, and toxicological properties of arsenic, lead, and cadmium is contained in Appendices B, C, and D, respectively.

Substance Involved	Primary Hazard
Arsenic	Toxic on inhalation, ingestion; skin irritant; known human carcinogen for inhalation and ingestion.
Lead	Toxic on inhalation, ingestion.
Cadmium	Toxic on inhalation, ingestion; suspected human carcinogen through inhalation only.

Substantial experience in the sampling of this type and quantity of heavy metal concentration in soils and construction activities has confirmed the level of protection required for these operations as Level 'D'. The primary route of entry for this site is inhalation. As dust levels are minimized, exposure to heavy metals will be reduced.

A summary of the relevant standards and exposure guidelines for these substances is in Appendix A.

Noise - Heavy equipment and other power equipment can exceed the noise limits allowable for exposure under WISHA. A Hearing Conservation Program will be in place and may require the use of protective equipment for employees working with or around certain equipment.

Overexertion - Even though much of the total work will be accomplished with heavy equipment, some work will still require the use of human power. This can be a source of overexertion injuries. Employees must be aware of the weights involved when lifting and plan routes prior to moving equipment or materials. Employees must keep the weight carried centered within their bodies and be aware of their limitations. Communication is the key in the coordinated lifting and movement of equipment.

Explosion/Ignition Hazards - Underground utilities such as gas lines must be located and adequate plans made to avoid rupture. If it is suspected that a gas line has been hit, turn off equipment and evacuate the area, including residents. The gas utility must be called to repair the break.

Overhead Obstructions - Each work area will be surveyed prior to work beginning for hazards such as overhead obstructions which may contact equipment during operation or movement. Specific plans must be made for avoiding these hazards.

Struck By - Heavy equipment will be in continual use on the site. Care must be taken to give adequate space to this equipment. Communicate with the operator prior to entering the equipment's area of operations.

All field personnel must be continually aware of these hazards and take appropriate precautions as part of their daily activities.

Prior to startup of each sampling/remediation operation, any hazards discovered by surveying each area will be noted in a leader/crew meeting.

4.1 RESPIRATOR TRAINING

This project is not expected to require respiratory protection. Any affected field remedial action personnel will be provided half mask air purifying respirators and training for the equivalent 40 hour HAZWOPER level prior to initiating activities requiring respiratory protection. Workers will be administered a fit test and instruction on maintenance, fit, and precautions on at least an annual basis. Respirator-wearing personnel will receive training in the proper use of respirators including techniques used to determine good respirator fit.

The use of respirators will be consistent with a Respiratory Protection Program which must be in place prior to requiring employees to being exposed above the Permissible Exposure Limit.

4.2 HAZARD COMMUNICATION

A Hazard Communication Program is maintained to provide employees with the training in high hazard procedures and knowledge of hazards in the workplace required to protect their health. All employees have received training and the written program is available for review.

4.3 NOISE

Some remedial action personnel will be exposed in these operations to noise dose levels 85dB or greater. For those employees exposed, foam ear plugs or ear muffs will be available.

4.4 METALS-LEAD & ARSENIC

Sampling and remediation personnel will be trained in the hazards of exposure to lead and arsenic for the tasks they will perform. A comprehensive lead and arsenic training program designed to address the hazards of field remedial action will be administered upon initial site action. All personnel not having received arsenic and lead information training within one year of initial site entry will be required to attend such training prior to such entry into exclusion and/or decontamination zones.

The quantities of lead and arsenic are such that the risk to personnel is minimal as long as good hygiene practices are followed. Washing the face and hands at breaks and the end of the day, no smoking in the work area, and the wearing of protective outerwear will all serve to minimize employee exposures.

5.1.2 Site Standard Operating Procedures

Remediation operations shall be conducted in a manner to reduce the exposure of personnel and equipment and to eliminate the potential for airborne dispersion of dust. A safety meeting will be held at the start of field work. The meeting will focus on standard operating procedures associated with project tasks and equipment. A mandatory foreman-crew tailgate safety meeting will be held at the beginning of each workweek and documented consistent with WISHA requirements.

The following is a list of general site safety rules that will be enforced.

- Legible and understandable precautionary labels shall be prominently affixed to containers of raw materials, intermediates, products, by-products, mixtures, scrap, waste, debris and protective clothing.
- Protective equipment shall not be removed from the regulated area until it has been cleaned, stored, or properly packaged and labeled.
- Employees will not be allowed to exit the exclusion and/or decontamination zones until decontamination has taken place as per procedures listed in Section 6.2. EXCEPTION: Medical emergency, whereby the delay or the extra movement may endanger the employee, but medical response personnel must be made aware of the contact materials.
- Removal of materials from protective clothing or equipment by blowing, shaking, or any other means that may disperse materials into the air is prohibited.
- Eating, drinking, and smoking shall be restricted to the clean zone.
- All employees shall be required to clean their hands before eating, drinking, or smoking.
- No smoking or eating (including the chewing of tobacco, gum and/or sunflower seeds) is permitted in the sampling work areas.
- As appropriate, equipment on-site shall be bonded and grounded, spark proof, and explosion resistant.
- All personnel shall avoid contact with potentially contaminated substances. Walking through puddles or mud, kneeling on the ground, or leaning against soiled surfaces should be avoided whenever possible.
- Monitoring equipment shall not be placed on dusty surfaces.

5.1.2 Site Standard Operating Procedures (continued)

- Utility companies (or locating service) will be contacted prior to any excavating or drilling to ensure that no buried utilities are present.
- Dust will be kept at a minimum.
- All portable electrical equipment that is not double-insulated will be run through a portable ground-fault interrupter.
- For extended operations at zones distant from sanitary facilities, chemical toilets and hygienically-dispensed water will be provided at each work zone. The chemical toilet will be left at the work zone at night.

5.1.3 Lunches/Breaks

All eating must take place in an area specifically distinct from the work area. No food, with the exception of water, will be consumed unless personnel are in a designated "approved" zone. All breaks must also take place in an area specifically provided for that purpose. No eating, chewing, or smoking is to take place on the work site. Employees are to remove coveralls and wash hands and face before eating.

5.1.4 Heat Stress

Heat stress could potentially affect personnel conducting remediation activities. The potential for heat stress depends on the type of protective gear being worn, the ambient temperature, and the amount of activity. Work cycle lengths will be based initially on subjective input from personnel. Employees will report any cases of dizziness, excessive sweating, increased respiratory rate, or pulse and are to leave the work area immediately if these conditions are noted. Work cycle lengths will be reduced and a monitoring program will be initiated if the above symptoms are noted. Work cycles will be reduced if a pulse rate of greater than 110 is noticed at the beginning of the break. Personnel with elevated rates will not return to work until the pulse has lowered to their resting rate. First aid procedures will be used for heat related conditions, as necessary.

5.1.5 Cold Stress

During remediation activities, workers may also become exposed to cold temperatures when on site. Hypothermia can occur any month of the year in northern climates. Factors leading to hypothermia include ambient temperature, wind velocity, precipitation, exposure time, and type of protective gear being worn.

6.0 SAFETY PROCEDURES

6.1 MEDICAL SURVEILLANCE (TWELFTH & THIRTEENTH HOLES)

Construction personnel will participate in a medical surveillance program which includes baseline and routine annual follow-up physical examinations. The program is specifically designed for personnel working on the Golf Course Construction Project. Construction workers will also receive a medical examination at the termination of their employment, unless their annual exam has occurred within six months of termination. The program will end at the annual or the final examination at the end of this project.

Specific tests included in the baseline physical examinations are detailed in Appendix E.

6.2 DECONTAMINATION

Personnel

Decontamination procedures for personnel will be:

Remove gross contamination from clothing, boots, and gloves.
Wash boots
Remove coveralls, then boots, and then gloves.
Contain or dispose of gear

Equipment

All equipment entering an exclusion zone will require a preliminary decontamination before leaving the exclusion zone, even if that equipment is destined to another exclusion zone. Equipment loaded into another vehicle for work in another area may not require decontamination, but only to the extent that potential contamination of areas outside the exclusion zones is eliminated.

The decontamination process for equipment leaving an exclusion zone to travel to another exclusion zone on-site will be:

Remove gross contamination

At the conclusion of remediation operations, equipment decontamination will be:

Remove gross contamination
Wash equipment with water or soap and water

7.0 EMERGENCY RESPONSE

All accidents or potentially hazardous conditions will be handled in a manner to minimize the health risk to personnel. In the event that an accident or a hazardous condition develops, the following procedures will be followed:

1) First-aid or other appropriate actions will be administered by those closest to the accident/event. Those rendering assistance will not be placed in a situation of unacceptable risk.
2) All accidents/hazardous conditions will be reported to the Project Health & Safety Officer and to the Hydrometrics Project Manager. The Site Health & Safety Officer is responsible for conducting emergency response in an efficient, rapid, and safe manner.

The following equipment shall be on-site each day:

1) First-aid kit, WISHA acceptable (determined by the number of personnel on site)
2) Fire extinguisher, minimum 5A-20BC

The emergency route to local medical facilities is in Appendix J. An assessment of the emergency will be made by the site safety officer. First-aid will be administered to victims and, if necessary, an emergency response vehicle will be summoned. Any doubt as to the condition of the injured employee requires the employee to receive a Doctor's Permit to Return to Work prior to return to work.

Examples of site emergencies are: Injury to personnel, damage to utilities, damage to structures, injuries to bystanders.

7.1 NOTIFICATION

In the event that the Site Health & Safety Officer determines that a site emergency is not limited to a minor first-aid case, he will immediately notify any or all of the appropriate contacts listed in Appendix O. Communications will be provided by the use of cellular phones and/or radios.

8.0 SITE TASK/HAZARD ANALYSIS

The general project plan consists of sampling soils using a core sampling spoon and movement or removal of soil with heavy equipment or hand tools.

Specific tasks and hazards will include:

Environmental Technician	Involved in hand tool use and surveying duties. HAZARDS: Potential exposure to heavy metals; slips, trips, and falls; sharp and protruding objects; overexertion; noise; underground/aboveground utilities, struck by, burns, and overhead obstructions.
Equipment Operator	Involved in heavy equipment use and some hand tool use. HAZARDS: Potential exposure to heavy metals; slips, trips, and falls; sharp and protruding objects; overexertion; noise; underground/aboveground utilities, struck by, burns, and overhead obstructions.

See Section 3.2 for a description of physical hazards as they are presented to employees.

APPENDIX A

STANDARDS AND EXPOSURE GUIDE FOR CHEMICAL SUBSTANCES OF CONCERN

APPENDIX A

OCCUPATIONAL STANDARDS AND EXPOSURE GUIDELINES FOR CHEMICAL SUBSTANCES OF CONCERN

CAS No.	Substance	WISHA/ OSHA PEL	ACGIH TLV
7740-38-2	Arsenic and Compounds	10 $\mu g/M^3$ (1)	200 $\mu g/M^3$
		8-HR (2) TWA (3)	TLV-TWA (4)
7439-92-1	Lead, Inorganic Fumes and Dusts (as Pb)	50 $\mu g/M^3$	150 $\mu g/M^3$
		8-HR TWA	TLV-TWA
7440-43-9	Cadmium Dust	5 $\mu g/M^3$	5 $\mu g/M^3$
		8-HR TWA	TLV-TWA

NOTES:

(1)	$\mu g/M^3$	=	micrograms per cubic meter
(2)	HR	=	Hour
(3)	TWA	=	Time Weighted Average, 8 hour day
(4)	TLV-TWA	=	Threshold Limit Value, Time Weighted Average

APPENDIX B

ARSENIC HEALTH DATA

A. COMMENTS

The health hazard of inorganic arsenic is high.

B. WAYS IN WHICH THE CHEMICAL AFFECTS YOUR BODY

Exposure to airborne concentrations of inorganic arsenic may cause lung cancer, and can be a skin irritant. Inorganic arsenic may also affect your body if swallowed. One compound in particular, arsenic trichloride, is especially dangerous because it can be absorbed readily through the skin. Because inorganic arsenic is a poison, you should wash your hands thoroughly prior to eating or smoking.

The OSHA standard is based on minimizing risk of exposed workers dying of lung cancer from exposure to inorganic arsenic. It will also minimize skin cancer from such exposures.

NONCARCINOGENIC EFFECTS

The following three sections quoted from "Occupational Diseases: A Guide to Their Recognition", Revised Edition, June 1977, National Institute for Occupational Safety and Health is included to provide information on the nonneoplastic effects of exposure to inorganic arsenic. Such effects should not occur if the OSHA standards are followed.

A. LOCAL

Trivalent arsenic compounds are corrosive to the skin. Brief contact has no effect but prolonged contact results in a local hyperemia and later vesicular or pustular eruption. The moist mucous membranes are most sensitive to the irritant action. Conjunctiva, moist and macerated areas of skin, the eyelids, the angles of the ears, nose, mouth, and respiratory mucosa are also vulnerable to the irritant effects. The wrists are common sites of dermatitis, as are the genitalia if personal hygiene is poor. Perforations of the nasal septum may occur. Arsenic trioxide and pentoxide are capable of producing skin sensitization and contact dermatitis. Arsenic is also capable of producing keratoses, especially of the palms and soles.

Second Phase: The worker complains of conjunctivitis, a catarrhal state of the mucous membranes of the nose, larynx, and respiratory passage. Coryza, hoarseness, and mild tracheobronchitis may occur. Perforation of the nasal septum is common, and is probably the most typical lesion of the upper respiratory tract in occupational exposure to arsenic dust. Skin lesions, eczematoid and allergic in type, are common.

Third Phase: The worker complains of symptoms of peripheral neuritis, initially of hands and feet, which is essentially sensory. In more severe cases, motor paralyses occur; the first muscles affected are usually the toe extensors and the perinea. In only the most severe cases will paralysis of flexor muscles of the feet or of the extensor muscles of hands occur.

Liver damage from chronic arsenic poisoning is still debated, and as yet the question is unanswered. In cases of chronic and acute arsenic poisoning, toxic effects to the myocardium have been reported based on EKG changes. These findings, however, are now largely discounted and the EKG changes are ascribed to electrolyte disturbances concomitant with arsenic overexposure. Inhalation of arsenic trioxide and other inorganic arsenic dusts does not give rise to radiological evidence or pneumoconiosis. Arsenic does have a depressant effect upon the bone marrow, with disturbances of both erythropoiesis and myelopoiesis.

APPENDIX C

LEAD HEALTH DATA

A. WAYS IN WHICH LEAD ENTERS YOUR BODY

When absorbed into your body in certain doses, lead is a toxic substance. The object of the lead standard is to prevent absorption of harmful quantities of lead. The standard is intended to protect you not only from the immediate toxic effects of lead, but also from the serious toxic effects that may not become apparent until years of exposure have passed.

Lead can be absorbed into your body by inhalation (breathing) and ingestion (eating). Lead (except for certain organic lead compounds not covered by the standard, such as tetraethyl lead) is not absorbed through your skin. When lead is scattered in the air as dust, fume or mist it can be inhaled and absorbed through your lungs and upper respiratory tract. Inhalation of airborne lead is generally the most important source of occupational lead absorption. You can also absorb lead through your digestive system if lead gets into your mouth and is swallowed. If you handle food, cigarettes, chewing tobacco, or makeup which have lead on them or handle them with hands contaminated with lead, this will contribute to ingestion.

A significant portion of the lead that you inhale or ingest gets into your blood stream. Once in your blood stream, lead is circulated throughout your body and stored in various organs and body tissues. Some of this lead is quickly filtered out of your body and excreted, but some remains in the blood and other tissues. As exposure to lead continues, the amount stored in your body will increase if you are absorbing more lead than your body is excreting. Even though you may not be aware of any immediate symptoms of disease, this lead stored in your tissues can be slowly causing irreversible damage, first to individual cells, then to organs and whole body systems.

can alter the structure of sperm cells raising the risk of birth defects. There is evidence of miscarriage and stillbirth in women whose husbands were exposed to lead or who were exposed to lead themselves. Lead exposure also may result in decreased fertility, and abnormal menstrual cycles in women. The course of pregnancy may be adversely affected by exposure to lead since lead crosses the placental barrier and poses risks to developing fetuses. Children born of parents either one of whom were exposed to excess lead levels are more likely to have birth defects, mental retardation, behavioral disorders or die during the first year of childhood.

Overexposure to lead also disrupts the blood-forming system resulting in decreased hemoglobin (the substance in the blood that carries oxygen to the cells) and ultimately anemia. Anemia is characterized by weakness, pallor and fatigability as a result of decreased oxygen carrying capacity in the blood. The levels of lead anticipated in the removal activities are not expected to be near the levels which cause the preceding condition.

APPENDIX D

CADMIUM HEALTH EFFECTS

A. Routes of Entry

1. Inhalation

2. Ingestion

B. Acute Effects

1. Inhalation of large doses of cadmium can be fatal. Smaller doses can cause nausea, vomiting, and respiratory distress

2. Ingestion can also cause death. Smaller doses can lead to nausea, salivation, vomiting, diarrhea, and abdominal pain and discomfort. Cadmium is an oral poison, but the body's reaction to larger doses is very strong in vomiting and emetic action, rendering acute poisoning unlikely

C. Chronic Effects

1. Inhalation and ingestion of cadmium can have carcinogenic effects. Other long term effects are respiratory system and kidney damage

APPENDIX E

MEDICAL SURVEILLANCE PROGRAM
TWELFTH AND THIRTEENTH HOLES

Exposures for the project are expected to be below the action level for all elements of concern. Medical surveillance is not required for personnel under such conditions where inhalation is the main route of entry and exposures are below the action thresholds. However, for the protection of employees, remediation employees working in the area of the twelfth and thirteenth holes are required to participate in the Medical Surveillance Program. Each remediation employee must undergo the following initial examination:

A. History and physical examination (including):
   1) Medical and occupational history, including smoking history
   2) Vision testing with use of Titmus type instrumentation
   3) Blood pressure, pulse rate, oral temperature
   4) Height and weight
   5) Physician-administered physical examination, including nasal and skin examination as per Arsenic Standard requirements (WAC 296-62-07347)

B. Urine arsenic determination

C. Blood lead determination

At the conclusion of the project, employees will be retested for urine arsenic and blood lead and report any symptoms/conditions as the exit physical. These reports will be evaluated by the administering physician. Employees terminating their employment less than three months after the initial physical will not require an exit physical.

APPENDIX F

FIRE PROTECTION PLAN

This Fire Protection Plan shall be part of the Site Health and Safety Plan and is intended to make all on-site personnel aware of their roles in preventing and controlling fire within the remediation site during operations. It will also provide them with a list of emergency notification and response procedures that must be followed if a fire is discovered.

Reasonable efforts to mitigate fire danger shall be employed by all persons visiting or working on the site. The Project Health & Safety Officer shall enforce the provisions contained herein, and his judgment shall be final regarding compliance.

Specific precautions include the following:

1) All motor vehicles and sampling equipment on-site shall be provided with exhaust spark arrestors approved by the State Fire Marshal.
2) Smoking on-site is prohibited.
3) Welding equipment, grinders and open-flame devices shall not be used without a fire watch posted for a half hour beyond hot work.
4) Electrical equipment shall be maintained in good repair to prevent sparks.
5) All applicable portable extinguisher regulations shall be complied with.
6) All personnel on-site must be diligently observant for signs of fire or fire danger and report same to the Site Health & Safety Officer immediately.
7) All visitors must be escorted when on-site.
8) All Site Standard Operating Procedures as outlined in Section 5.1.2 shall be complied with.

APPENDIX G

SITE LOCATION MAP

APPENDIX H

HOSPITAL LOCATION MAP

APPENDIX I

INDUSTRIAL HYGIENE MONITORING PLAN

APPENDIX J

EMERGENCY NOTIFICATION CONTACTS AND PHONE NUMBERS

Project Notifications

City of Everett, Parks and Recreation Department

Jay Magill, Superintendent of Planning and Projects
(Office) (206) 259-0300

Hydrometrics, Inc.

Steve Thompson, Project Manager
(Office) (206) 572-5481

Ken Wilson, CSP, Health and Safety Officer
(Office) (206) 572-5481
(Mobile) (206) 660-4311

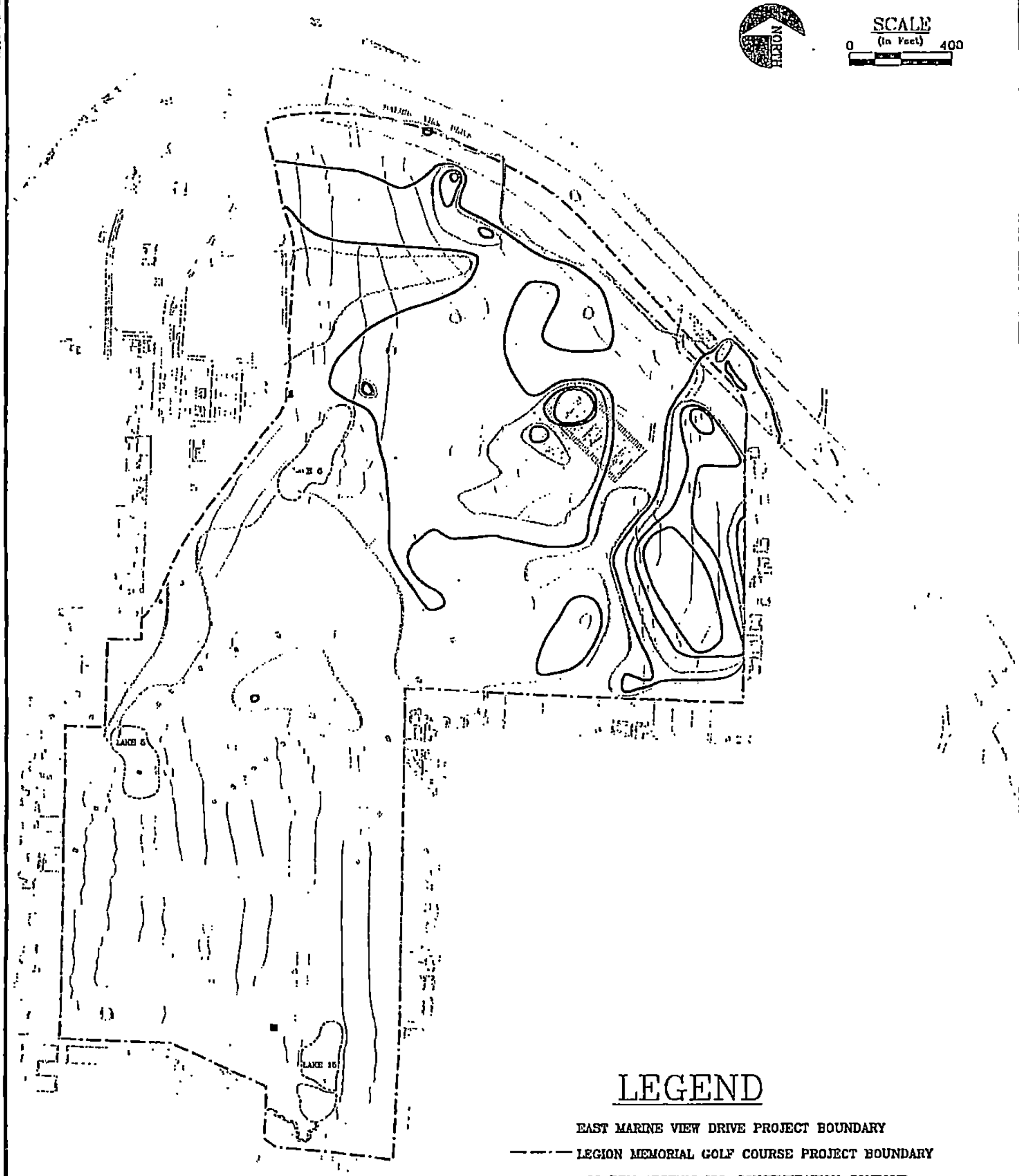
M.K. Botz, Corporate Officer
Montana Office
(Office) (406) 443-4150
(Home) (406) 933-5954

R.D. Braico, Corporate Officer
Montana Office
(Office) (406) 443-4150
(Home) (406) 442-0923

LEGEND

EAST MARINE VIEW DRIVE PROJECT BOUNDARY
LEGION MEMORIAL GOLF COURSE PROJECT BOUNDARY
<20 PPM ARSENIC ISO-CONCENTRATION CONTOUR
>20 PPM ARSENIC ISO-CONCENTRATION CONTOUR
>50 PPM ARSENIC ISO-CONCENTRATION CONTOUR
>100 PPM ARSENIC ISO-CONCENTRATION CONTOUR
>150 PPM ARSENIC ISO-CONCENTRATION CONTOUR
>200 PPM ARSENIC ISO-CONCENTRATION CONTOUR
NEW FAIRWAYS

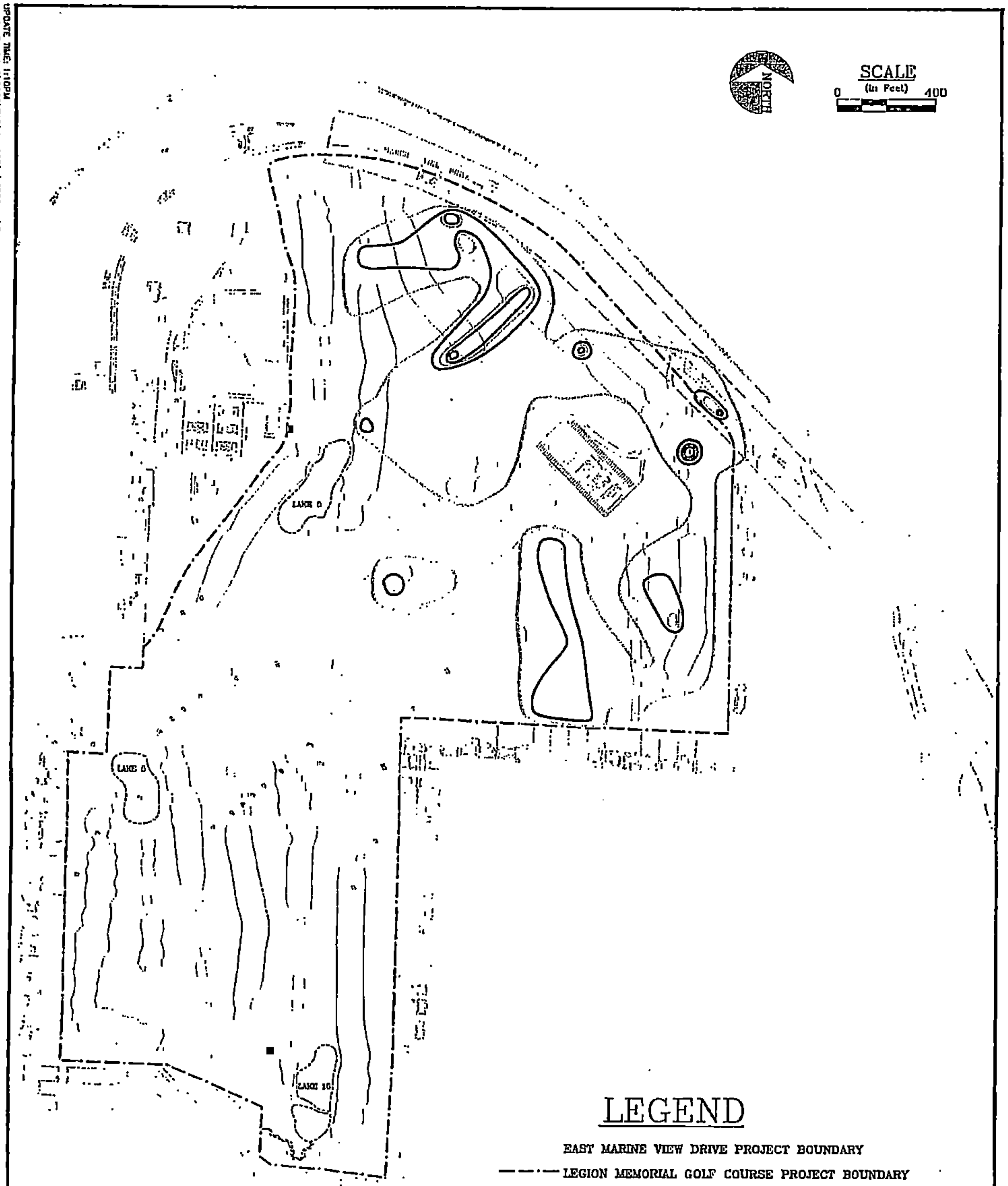
INDEPENDENT REMEDIAL ACTION REPORT FOR EAST MARINE VIEW DRIVE WIDENING AND LEGION MEMORIAL GOLF COURSE IMPROVEMENT PROJECTS	ARSENIC ISOCONTOURS OF 0-6 INCHES BASED ON PRE-REMEDIAL SAMPLING	FIGURE 7



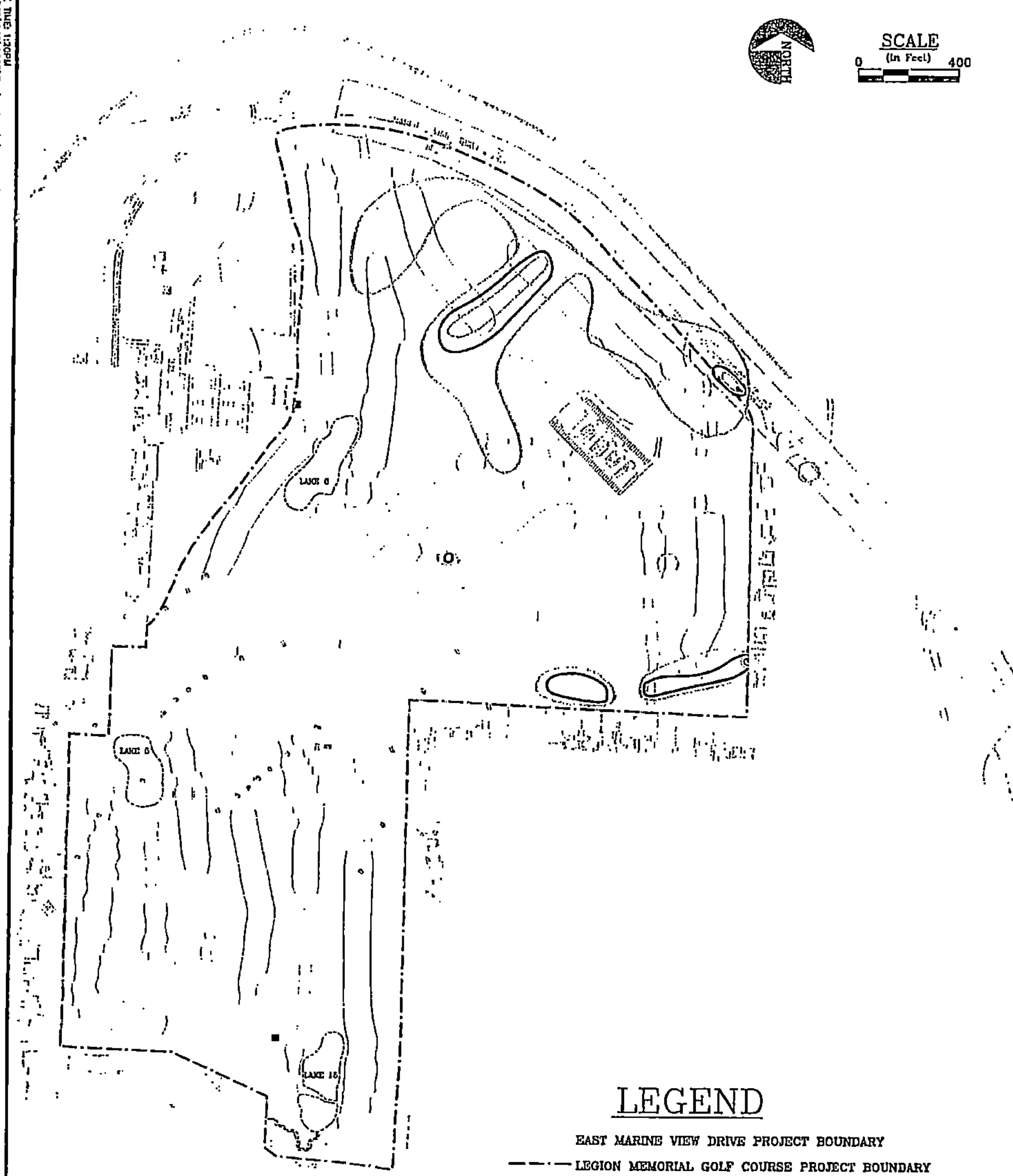
LEGEND

- EAST MARINE VIEW DRIVE PROJECT BOUNDARY
- LEGION MEMORIAL GOLF COURSE PROJECT BOUNDARY
- <20 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- >20 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- >50 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- >100 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- >150 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- >200 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- NEW FAIRWAYS

INDEPENDENT REMEDIAL ACTION REPORT FOR EAST MARINE VIEW DRIVE WIDENING AND LEGION MEMORIAL GOLF COURSE IMPROVEMENT PROJECTS	ARSENIC ISOCONTOURS OF 6-12 INCHES BASED ON PRE-REMEDIAL SAMPLING	FIGURE 8



INDEPENDENT REMEDIAL ACTION REPORT FOR EAST MARINE VIEW DRIVE WIDENING AND LEGION MEMORIAL GOLF COURSE IMPROVEMENT PROJECTS	ARSENIC ISOCONTOURS OF 12-18 INCHES BASED ON PRE-REMEDIAL SAMPLING	FIGURE 9



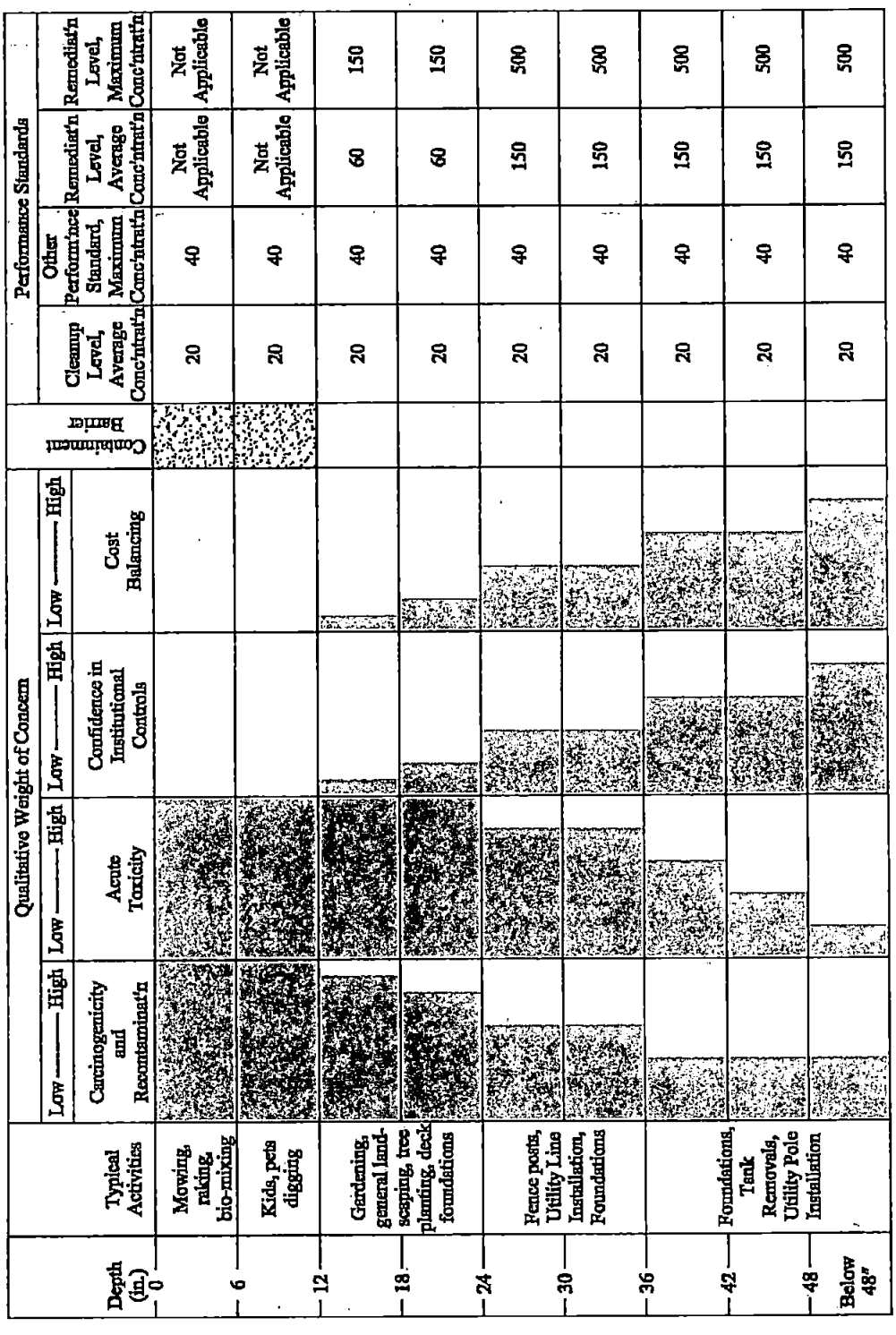
LEGEND

- EAST MARINE VIEW DRIVE PROJECT BOUNDARY
- LEGION MEMORIAL GOLF COURSE PROJECT BOUNDARY
- <20 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- >20 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- >50 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- >100 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- >150 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- >200 PPM ARSENIC ISO-CONCENTRATION CONTOUR
- NEW FAIRWAYS

INDEPENDENT REMEDIAL ACTION REPORT FOR EAST MARINE VIEW DRIVE WIDENING AND LEGION MEMORIAL GOLF COURSE IMPROVEMENT PROJECTS	ARSENIC ISOCONTOURS OF >18 INCHES BASED ON PRE-REMEDIAL SAMPLING	FIGURE 10

Consulting Scientists, Engineers and Contractors

UPDATE TIME: 1:20PM
000\0700\065\083\TAC\111598\STORAGE\70095T07.DWG



Performance standards columns show arsenic concentration in mg/Kg and basis for comparison. Exceedances of Remediation Level or Other Performance Standard requires accessible soil in that depth interval be excavated and disposed of in the Consolidation Facility or off-site. Soil with arsenic concentrations between the cleanup level and the remediation level in depth intervals below 12 inches must be contained or removed. Institutional controls and monitoring must continue so long as cleanup levels are exceeded within any depth interval.

Figure 6-7: Selecting Remediation Levels in the Upland Area of the Everett Smelter Site.

APPENDIX B
CITY PAVEMENT
INSPECTION MEMORANDUM

Engineering & Public Services

MEMORANDUM

TO: Paul Kaftanski, Parks

cc: Mike Palacios, Real Property

FROM: Ryan Sass, City Engineer RLS

DATE: 15 September 2009

SUBJECT: Pavement Inspection at Legion Memorial Golf Course

Paul,

We have inspected the condition of the asphalt and concrete pavement surfaces at Legion Memorial Golf Course in the parking lot and the areas around the Club House. The surfaces are in generally good condition and provide cover and containment over underlying soils.

The streets division has scheduled a minor repair near a catch basin in the access road as a preventative maintenance measure prior to any underlying soils being exposed. If you have any questions, please call.

Ryan

APPENDIX C

SAMPLING AND ANALYSIS PLAN

SOIL SAMPLING AND CAP INSPECTION
LEGION MEMORIAL GOLF COURSE

EVERETT, WASHINGTON
SAMPLING AND ANALYSIS PLAN

Project No. 2009-047

April 20, 2009

Prepared For

City of Everett

HWA GEOSCIENCES INC.

TABLE OF CONTENTS

SOIL SAMPLING AND CAP INSPECTION PLAN
LEGION MEMORIAL GOLF COURSE

EVERETT, WASHINGTON
SAMPLING AND ANALYSIS PLAN

1.0 INTRODUCTION

This Sampling and Analysis plan provides the scope and rationale for HWA GeoSciences Inc. (HWA's) field sampling efforts associated with the as-built cap integrity soil sampling study conducted for City of Everett at the Legion Memorial Golf Course in Everett, Washington.

HWA prepared this plan in accordance with our understanding of the project, and Chapter 173-340-820 WAC in the Washington State Model Toxics Control Act (MTCA) Cleanup Regulations. The body of this plan outlines our field sampling and laboratory analytical methods.

1.1 BACKGROUND AND PURPOSE OF WORK

The City Everett planned and performed an independent cleanup at Legion Memorial Golf Course from 1996-1998 in consultation with the Department of Ecology (Ecology). The remedial action was intended to be consistent with the cleanup plan for the Everett Smelter Site Upland Area, a larger site within which the golf course is located. At the same time, Ecology and the City were cooperating on an Integrated Final Cleanup Action Plan/Final Environmental Impact Statement for the Everett Smelter Site Upland Area ("FCAP"). The City submitted a cleanup report to Ecology in December 1998. The City established institutional controls as part of the cleanup, including five years of post-remediation pond monitoring (the results did not indicate contaminants of concern) and a Golf Course Operation and Maintenance (O&M) Manual and restrictive covenant to assure the effectiveness of the remedy.

The work will update and verify as-built conditions in order to confirm cap integrity and continued protection of human health and the environment, assist the City in effective implementation of the Golf Course O&M Manual and institutional controls, and provide information to assist in considering appropriate MTCA procedural options relating to the property and to this type of institutional commercial recreational use under the FCAP.

The sampling scope includes documentation of the existing fairway sand cap thickness and soil sampling for arsenic beneath selected fairway areas. 16 golf course fairways will be investigated with at least one boring. Two fairways (Holes 4 and 16) will not be investigated because soil arsenic concentrations beneath these two fairways are less than cleanup levels established in the FCAP. Cap thickness will be measured in fairway areas where the sand cap is located over soils with an arsenic concentration greater than 20

parts per million (ppm) but less than 50 ppm at depths greater than 6 inches from pre-existing ground surface. Soil and sand cap material will be sampled for arsenic in fairway areas where soil arsenic concentrations are reported to be greater than 50 ppm between a depth of 6 and 24 inches below the pre-existing ground surface.

1.2 PROJECT ORGANIZATION

Personnel involved with this project and roles are listed below:

Cliff Baines, HWA project manager (425) 774-0106, cell (206) 794-3127
Jeff Speck, HWA (425) 774-0106, cell (206) 794-3128
Michael Palacios, Real Property Manager - City of Everett (425) 257-8938
Ken Weiner, K&L Gates/City of Everett Special City Attorney (206) 370-8000
Dale Bowers, Golf Course Superintendent (425) 257-8584
Gary Sayre, Golf Program Manager (425) 257-8351
Chris Merwede, City of Everett Environmental Laboratory (425) 257-7865

1.3 PROJECT SCHEDULE

A proposed project schedule is shown below, assuming no delays due to site access issues:

Week	0	1	2	3	4	5	6	7	8
Notice to Proceed	x	.	.	.	.	.	.	.	.
Work plans	xxxxxx		.	.	.	.	.	.	.
Site reconnaissance	.	x	.	.	.	.	.	.	.
Soil Sampling	.	xx	.	.	.	.	.	.	.
Laboratory analysis	.	.	xxxxxxxxxxxxxxxxxx				.	.	.

1.4 SITE LOCATION

The approximately 145 acre public golf course (comprised of a clubhouse, parking lot and an 18 hole golf range), is located within the Everett Smelter cleanup site, south of West Maine View Drive in north Everett. Figure 1 shows the site vicinity.

2.0 SAMPLING

The scope of work for the soil sampling study is summarized below:

1) Review available data
2) Prepare project sampling and analysis plan (SAP), and health and safety plan (HASP)
3) Collect samples at selected locations and depths; inspect cap thickness at selected locations
4) Submit samples for laboratory analysis

5) Prepare assessment report

Planned site sampling is described in the following sections

2.1 SOIL SAMPLING

HWA will employ a manual hand auger or slide-hammer soil coring device to log and measure the soil profile at up to 24 locations, and to collect selected soil samples for laboratory analysis. Boring locations are shown on the Figure 2. Two types of locations are depicted:

- Cap inspection borings (9 borings, denoted by the letter "C" on Figure 2)
- Analytical sample borings (15 borings, denoted by the letter "A" on Figure 2).

Cap inspection borings are located in fairway areas where a sand cap is located over soils with an arsenic concentration greater than 20 ppm but less than 50 ppm at depths greater than 6 inches from pre-existing ground surface. The purpose of cap inspection borings is to document the cap thickness in these areas, therefore soils will not be analyzed for arsenic at these locations. Cap inspection borings will be excavated to a depth of 12 inches.

Analytical sample borings are located in areas where arsenic concentrations are greater than 50 ppm at depths greater than 6 inches from pre-existing ground surface. The purpose of analytical sample borings is to document current arsenic concentrations in cap material and underlying soils to depths up to 24 inches below existing ground surface. Analytical sample borings will also be advanced on the fairway and tees of golf course Hole 12. According to documentation, Hole 12 fairways were not renovated with a sand cap and have been periodically top-dressed, as noted in the cleanup report and Golf Course O&M Manual. Soil samples will be collected from analytical sample borings; the depth of these borings will vary based on previous soil sample investigation results.

At each sampling interval, HWA will log the soil samples and obtain and record pertinent information including soil sample depths and stratigraphy (i.e., sand cap thickness).

HWA will deliver samples to the City of Everett Environmental Laboratory within 24 hours of sampling and will employ full chain-of-custody procedures to allow tracking and handling of the samples. 49 parent soil samples, 8 QA/QC samples, and 2 sediment samples will be collected. The general rationale for soil chemical analysis is to sample sand cap material at each of the 15 proposed analytical sample borings. The cap will be sampled at each analytical soil boring location to document the amount of mixing of sand cap material with underlying arsenic impacted soil. Underlying soil will be excluded from the sand cap material sample as much as possible. It is anticipated that areas with the greatest soil arsenic concentrations are also areas with the greatest potential for elevated arsenic concentrations in the cap material. Additional soil samples will be collected from those 6-inch intervals below the cap with soil arsenic concentrations greater than 50 ppm based on previous investigation findings. The deepest soil sample to

be collected for chemical analysis at each location is denoted on the sample location map by a number posted next to the boring location symbol. For example, the number 12 posted next to a location means a chemical soil sample will be collected from the cap material, and from the 6 to 12 inch depth interval. The number 18 posted next to a location means a chemical soil sample will be collected from the cap material, and from the 6 to 12 and 12 to 18 inch depth intervals. At hole 12, soil samples will be collected from all 6 inch intervals between 0 and 24 inches deep.

2.2 SOIL ANALYSIS

Soil samples will be submitted to the analytical laboratory for the following analyses:

- Inductively-coupled plasma – mass spectrometry (ICP-MS) for Arsenic - EPA Method #6020 (arsenic)

HWA will assign the analytical testing based pre-existing conditions discussed in Section 2.1.

The sample bottle requirements are as follows:

Bottle Type	Method	Holding Time
4 oz. Glass	Arsenic EPA #6020	14 days

After collection, the samples will be labeled, chilled in a cooler to 4°C, and shipped to Everett Environmental Laboratory (EEL) for analysis. The laboratory's standard turnaround time will be requested for the analyses

2.3 QUALITY ASSURANCE/QUALITY CONTROL

Samples will be collected and analyzed with sufficient quality assurance/quality control (QA/QC) to ensure representative and reliable results. The overall QA objective for this investigation is to ensure that all laboratory and field data on which decisions are based are technically sound, statistically valid, and properly documented. There are two parts to the QA/QC program for this project: field and laboratory.

Field QA/QC includes proper documentation of field activities and sampling/handling procedures, as described in Section 2.5. Field QA/QC samples will consist of the following:

- Three Duplicate Samples

Duplicates are used to confirm analytical results from a given sample point. One duplicate sample will be collected for every twenty parent samples collected. Duplicate

samples are collected in the field using a matching set of laboratory-supplied bottles and sampling from the selected boring, as requested. Each duplicate should be sampled by alternating between the regular and the duplicate sample bottles. The location where the duplicate is collected must be identified on the field sampling data sheet or indicated in the field log book. All duplicates shall be blind-labeled (i.e., the boring designation is not listed on the sample bottle or Chain-of-Custody form). Once a duplicate is collected, it is handled and shipped in the same manner as the rest of the samples. Duplicate results will be reported in the laboratory results as separate samples, using the designation DUP-(#).

- Five Equipment Blanks

Equipment blanks are used to detect residue from decontaminated equipment. One equipment blank will be collected for every ten parent samples collected. Equipment blanks will be reported in the laboratory results as separate samples. Equipment blanks will be collected by pouring distilled water over the decontaminated sampling tool and collecting the water in the sample container.

Laboratory QA/QC analyses provide information about accuracy, precision, and detection limits. Method-specific QA/QC samples may include the following, depending on the analysis:

- Method blanks
- Duplicates
- Instrument calibration verification standards
- Laboratory control samples
- Surrogate spiked samples
- Performance evaluation QC check samples

2.3.1 Data Evaluation

Data evaluation will include checking holding times, method blank results, surrogate recovery results, field and laboratory duplicate results, completeness, detection limits, laboratory control sample results, and Chain-of-Custody forms.

2.4 EQUIPMENT DECONTAMINATION

To prevent potential cross-contamination of samples, HWA will maintain appropriate decontamination procedures. Between sampling intervals in each boring, field staff will wash all sampling devices in a detergent solution, rinse with tap water, rinse again with deionized water, and a final rinse with nitric acid. Decontamination fluids will be collected and disposed in the golf course sanitary sewer system.

2.5 FIELD DOCUMENTATION AND CHAIN-OF-CUSTODY

The following sections describe the recording system for documenting all site field activities, and the sample chain-of-custody program.

2.5.1 Field Log Book

An accurate chronological recording of all field activities is vital to the documentation of any environmental investigation. To accomplish this, field team members will maintain field log books providing a daily record of significant events, observations, deviations from the sampling plan and measurements collected during the field activities.

2.5.2 Sample Identification

Following sample collection, field personnel will affix labels to each sample container. Samplers will use waterproof ink, plastic bags, or clear tape to ensure labels remain legible even when wet. Samplers will record the following information on the labels:

- Project name and number
- Sample identification number
- Date and time of collection
- Required test methods
- Name of sample collector

2.5.3 Chain-Of-Custody Record

The objective of the chain-of-custody program is to allow the tracking of possession and handling of individual samples from the time of field collection through laboratory analysis. Once a sample is collected, it becomes part of the chain-of-custody process. A sample is "in custody" when (1) it is in someone's possession, (2) it is within visual proximity of that person, (3) it is in that person's possession, but locked up and sealed (e.g., during transport), or (4) it is in a designated secure sample storage area. Sampling staff will complete a chain-of-custody record which will accompany each batch of samples. The record will contain the following information:

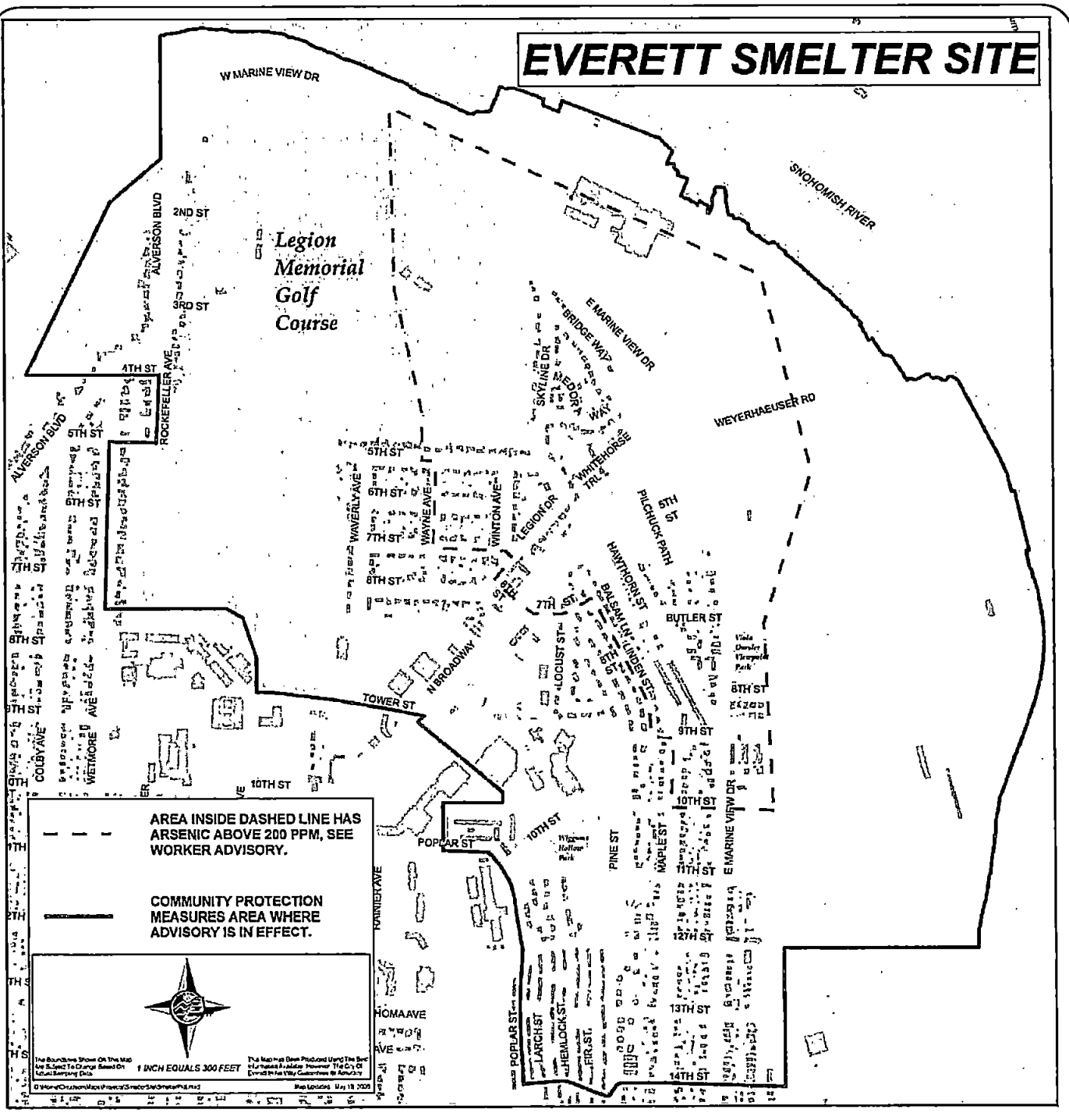
- Project name and number
- Names of sampling team members
- Requested testing program
- Required turnaround time
- Sample number
- Date and time collected
- Sample type
- Number of containers
- Special Instructions
- Signatures of persons involved in the chain of possession

When sample custody is transferred to another individual, the samples must be relinquished by the present custodian and received by the new custodian. This will be recorded at the bottom of the chain-of-custody report where the persons involved will sign, date and note the time of transfer.

Sampling team members will keep sample coolers in locked vehicles while not in active use or visual range. If couriers are used to transport samples, chain of custody seals will be affixed to sample coolers.

3.0 HEALTH AND SAFETY

HWA personnel conducting this field program are required to follow the health and safety protocol presented in the HWA site specific Health and Safety Plan. Subcontractors and other authorized visitors to the site are responsible for their own health and safety. The Health and Safety Plan will be made available to subcontractors and other site visitors who request it. Health and Safety precautions will be communicated to subcontractors by HWA personnel in site safety briefings at the beginning of each field day. To acknowledge review and comprehension of this plan, HWA personnel must sign the appropriate section included in the back of the document.



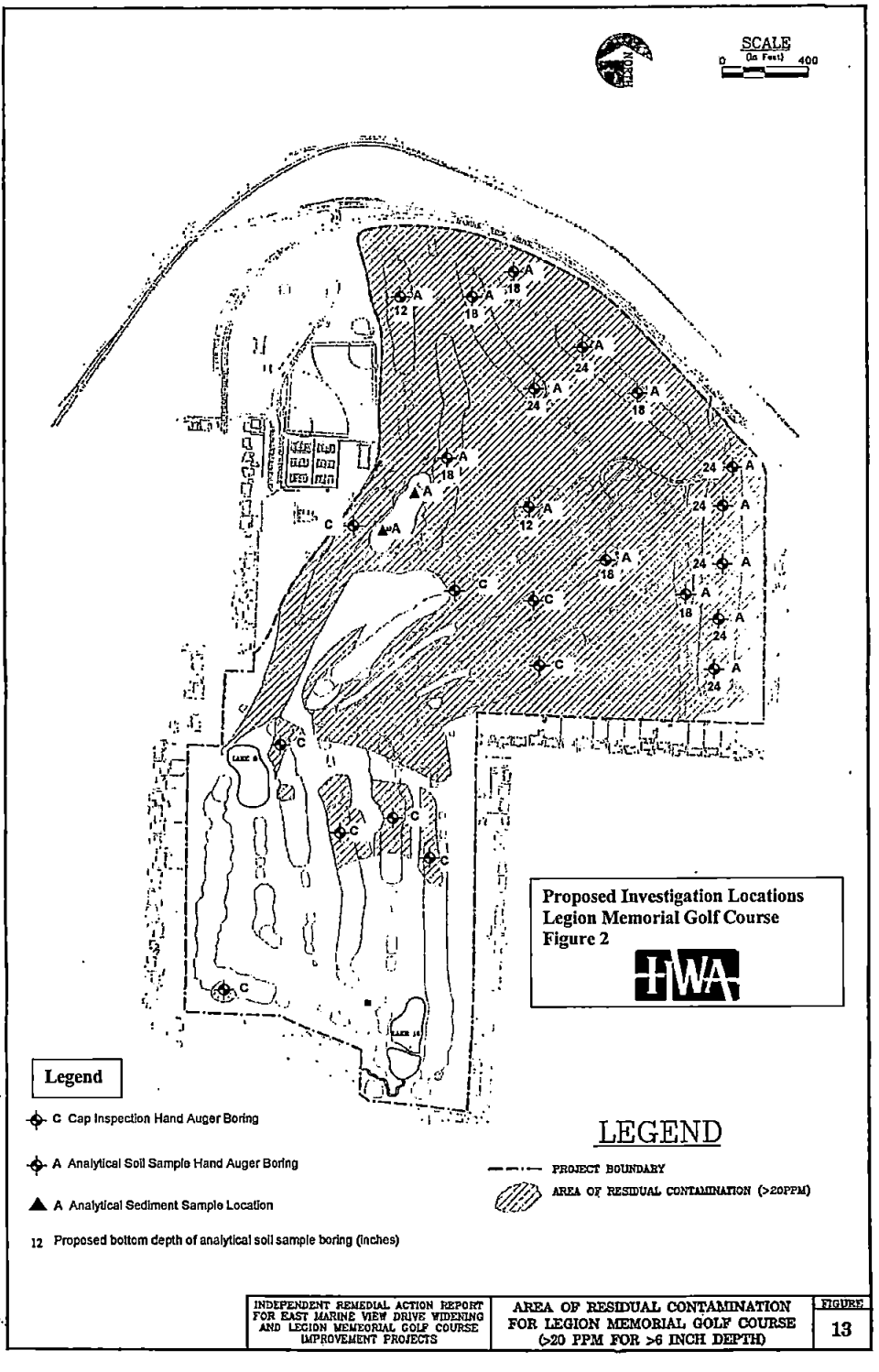
VICINITY MAP

LEGION MEMORIAL GOLF COURSE
EVERETT, WASHINGTON

FIGURE NO. 1

PROJECT NO. 2009-047

HWA GEOSCIENCES INC.


SCALE
0 (In Feet) 400
Proposed Investigation Locations
Legion Memorial Golf Course
Figure 2
HWA
Legend
C Cap Inspection Hand Auger Boring
A Analytical Soil Sample Hand Auger Boring
A Analytical Sediment Sample Location
12 Proposed bottom depth of analytical soil sample boring (inches)
LEGEND
PROJECT BOUNDARY
AREA OF RESIDUAL CONTAMINATION (>20PPM)
INDEPENDENT REMEDIAL ACTION REPORT FOR EAST MARINE VIEW DRIVE WIDENING AND LEGION MEMORIAL GOLF COURSE IMPROVEMENT PROJECTS
AREA OF RESIDUAL CONTAMINATION FOR LEGION MEMORIAL GOLF COURSE (>20 PPM FOR >6 INCH DEPTH)
FIGURE
13

APPENDIX A

CHAIN OF CUSTODY FORM

HWA GEOSCIENCES INC.
19730 64th Ave. W., Suite 200, Lynnwood, WA 98036 (425)774-0106
4500 Kruse Way, Suite 300, Lake Oswego, OR 97035 (503)675-2424

Chain of Custody and Laboratory Analysis Request

DATE: _____

PAGE: _____ of _____

PROJECT NAME: _____ #: _____

SITE CODE: _____

SAMPLERS NAME: _____ PHONE: _____

SAMPLERS SIGNATURE: _____

HWA CONTACT: _____ PHONE: _____

HWA SAMPLE ID	DATE	TIME	MATRIX	LAB ID	# OF BOTTLE	ANALYSIS REQUESTED	REMARKS

PRINT NAME	SIGNATURE	COMPANY	DATE	TIME	REMARKS
Relinquished by:					
Received by:					
Relinquished by:					
Received by:					

DISTRIBUTION: WHITE - Return to HWA; YELLOW - Retain by Lab; PINK - Retain by Sampler

APPENDIX D
ANALYTICAL LABORATORY REPORTS

CITY OF EVERETT
ENVIRONMENTAL LABORATORY

PROJECT #
00030389

Client:	HWA	Date Received:	05/08/2009
Program:	HWA	Data Release:	CK
Contact:	CLIFF BAINES	Date Reported:	06/05/2009

Department	Analysis	Units	DL	Method	PQL	BC07761 LM-A-1-CAR 05/06/2009	BC07762 LM-A-1-8 05/06/2009	BC07763 LM-A-1-12 05/06/2009	BC07764 LM-A-1-18 05/06/2009
METALS	Arsenic (mg/kg)	mg/kg	0.280	6020	0.1120	2.44			
			0.293	6020	0.1172		84.9		
			0.320	6020	0.1280				21.9
			0.331	6020	0.1324			41.1	

Department	Analysis	Units	DL	Method	PQL	BC07765 LM-A-2-2 05/06/2009	BC07766 LM-A-2-6 05/06/2009	BC07767 LM-A-2-12 05/06/2009	BC07768 LM-A-2-18 05/06/2009
METALS	Arsenic (mg/kg)	mg/kg	0.292	6020	0.1168				6.25
			0.302	6020	0.1208	164			
			0.307	6020	0.1228			27.6	
			0.316	6020	0.1264		187		

Department	Analysis	Units	DL	Method	PQL	BC07769 LM-A-3-1 05/06/2009	BC07770 LM-A-3-6 05/06/2009	BC07771 LM-A-3-12 05/06/2009	BC07772 LM-A-3-18 05/06/2009
METALS	Arsenic (mg/kg)	mg/kg	0.306	6020	0.1224				7.41
			0.323	6020	0.1292			7.18	
			0.337	6020	0.1348		50.0		
			0.342	6020	0.1368	89.4			

Department	Analysis	Units	DL	Method	PQL	BC07773 LM-A-4-1 05/06/2009	BC07774 LM-A-4-6 05/06/2009	BC07775 LM-A-4-12 05/06/2009	BC07776 LM-A-4-18 05/06/2009
METALS	Arsenic (mg/kg)	mg/kg	0.321	6020	0.1284	110			
			0.330	6020	0.1320		193		
			0.359	6020	0.1436			74.6	
			0.374	6020	0.1496				29.9

Department	Analysis	Units	DL	Method	PQL	BC07777 LM-A-5-1 05/06/2009	BC07778 LM-A-5-6 05/06/2009	BC07779 LM-A-5-12 05/06/2009	BC07780 LM-A-5-18 05/06/2009
METALS	Arsenic (mg/kg)	mg/kg	0.323	6020	0.1292				16.8
			0.333	6020	0.1332	641			
			0.341	6020	0.1364			18.5	
			0.347	6020	0.1388		111		

DATA REPORTING QUALIFIES

DL = Detection Limit
PQL = Practical Quantitation Limit (= 4xDL)
J = Analyte concentration less than PQL
SA = See Attached
ND = No Data

When Dissolved Metals > Total Metals note possible filtering process contamination
P/A (used for Total Coliform results) P= Coliforms present, A = Coliforms absent
Y/N (used for E. Coli Results) Y= E. Coli present, N=E. Coli absent
E = Estimated Value. Count from plates not within ideal range.

CITY OF EVERETT
ENVIRONMENTAL LABORATORY

PROJECT #
00030389

Client:	HWA	Date Received:	05/08/2009
Program:	HWA	Data Release:	CK
Contact:	CLIFF BAINES	Date Reported:	06/05/2009

Department	Analysis	Units	DL	Method	PQL	BC07781 LM-A-6-CAP 05/06/2009	BC07782 LM-A-6-6 05/06/2009	BC07783 LM-A-6-12 05/06/2009	BC07784 LM-A-7-CAP 05/06/2009
METALS	Arsenic (mg/kg)	mg/kg	0.278	6020	0.1112	2.96			
			0.284	6020	0.1136				2.27
			0.307	6020	0.1228		114		
			0.311	6020	0.1244			29.5	

Department	Analysis	Units	DL	Method	PQL	BC07785 LM-A-7-6 05/06/2009	BC07786 LM-A-7-12 05/06/2009	BC07787 LM-A-8-CAP 05/07/2009	BC07788 LM-A-8-6 05/07/2009
METALS	Arsenic (mg/kg)	mg/kg	0.267	6020	0.1068			2.47	
			0.295	6020	0.1180				23.2
			0.310	6020	0.1240		117		
			0.311	6020	0.1244	70.6			

Department	Analysis	Units	DL	Method	PQL	BC07789 LM-A-9-CAP 05/07/2009	BC07790 LM-A-9-8 05/07/2009	BC07791 LM-A-9-12 05/07/2009	BC07792 DUP-1-A 05/07/2009
METALS	Arsenic (mg/kg)	mg/kg	0.279	6020	0.1116				2.25
			0.284	6020	0.1136	2.00			
			0.312	6020	0.1248		23.1		
			0.315	6020	0.1260			15.8	

Department	Analysis	Units	DL	Method	PQL	BC07793 DUP-1-B 05/07/2009	BC07794 DUP-1-C 05/07/2009	BC07795 LM-A-10-CAP 05/07/2009	BC07796 LM-A-10-6 05/07/2009
METALS	Arsenic (mg/kg)	mg/kg	0.289	6020	0.1156			2.15	
			0.297	6020	0.1188	20.3			
			0.309	6020	0.1236		13.2		
			0.314	6020	0.1256				55.0

Department	Analysis	Units	DL	Method	PQL	BC07797 DUP-2-A 05/07/2009	BC07798 DUP-2-B 05/07/2009	BC07799 LM-A-11-CAP 05/07/2009	BC07800 LM-A-11-8 05/07/2009
METALS	Arsenic (mg/kg)	mg/kg	0.271	6020	0.1084	2.42			
			0.277	6020	0.1108			1.94	
			0.301	6020	0.1204		34.6		
			0.324	6020	0.1296				74.1

DATA REPORTING QUALIFIES

DL = Detection Limit
PQL = Practical Quantitation Limit (= 4xDL)
J = Analyte concentration less than PQL
SA = See Attached
ND = No Data

When Dissolved Metals > Total Metals note possible filtering process contamination
P/A (used for Total Coliform results) P= Coliforms present, A = Coliforms absent
Y/N (used for E. Coli Results) Y= E. Coli present, N=E. Coli absent
E = Estimated Value. Count from plates not within ideal range.

CITY OF EVERETT
ENVIRONMENTAL LABORATORY

PROJECT #
00030389

Client:	HWA	Date Received:	05/08/2009
Program:	HWA	Data Release:	CK
Contact:	CLIFF BAINES	Date Reported:	06/05/2009

Department	Analysis	Units	DL	Method	PQL	BC07801 LM-A-11-12 05/07/2009	BC07802 DUP-3-A 05/07/2009	BC07803 DUP-3-B 05/07/2009	BC07804 DUP-3-C 05/07/2009
METALS	Arsenic (mg/kg)	mg/kg	0.286	6020	0.1144		2.52		
			0.343	6020	0.1372	80.2		85.4	
			0.347	6020	0.1388				78.2

Department	Analysis	Units	DL	Method	PQL	BC07805 LM-A-POND-N 05/07/2009	BC07806 LM-A-POND-S 05/07/2009	BC07807 LM-A-12-CAP 05/07/2009	BC07808 LM-A-12-6 05/07/2009
METALS	Arsenic (mg/kg)	mg/kg	0.261	6020	0.1044			2.08	
			0.287	6020	0.1148				5.52
			0.300	6020	0.1200		3.63		
			0.326	6020	0.1304	1.94			

Department	Analysis	Units	DL	Method	PQL	BC07809 LM-A-12-12 05/07/2009	BC07810 LM-A-12-18 05/07/2009	BC07811 LM-A-13-CAP 05/07/2009	BC07812 LM-A-13-6 05/07/2009
METALS	Arsenic (mg/kg)	mg/kg	0.287	6020	0.1148		2.83		
			0.291	6020	0.1164			2.61	
			0.299	6020	0.1196	3.17			
			0.308	6020	0.1232				46.4

Department	Analysis	Units	DL	Method	PQL	BC07813 LM-A-13-12 05/07/2009	BC07814 LM-A-14-CAP 05/07/2009	BC07815 LM-A-14-6 05/07/2009	BC07816 LM-A-14-12 05/07/2009
METALS	Arsenic (mg/kg)	mg/kg	0.277	6020	0.1108		2.80		
			0.314	6020	0.1256				8.06
			0.317	6020	0.1268			23.7	
			0.320	6020	0.1280	78.7			

Department	Analysis	Units	DL	Method	PQL	BC07817 LM-A-14-18 05/07/2009	BC07818 LM-A-15-CAP 05/07/2009	BC07819 LM-A-15-6 05/07/2009	BC07820 LM-A-15-12 05/07/2009
METALS	Arsenic (mg/kg)	mg/kg	0.259	6020	0.1036		2.30		
			0.303	6020	0.1212				15.4
			0.308	6020	0.1232			36.4	
			0.316	6020	0.1264	6.93			

DATA REPORTING QUALIFIES

DL = Detection Limit
PQL = Practical Quantitation Limit (= 4xDL)
J = Analyte concentration less than PQL
SA = See Attached
ND = No Data

When Dissolved Metals > Total Metals note possible filtering process contamination
P/A (used for Total Coliform results) P= Coliforms present, A = Coliforms absent
Y/N (used for E. Coli Results) Y= E. Coli present, N=E. Coli absent
E = Estimated Value. Count from plates not within ideal range.

CITY OF EVERETT
ENVIRONMENTAL LABORATORY

PROJECT #
00030389

Client:	HWA	Date Received:	05/08/2009
Program:	HWA	Data Release:	CK
Contact:	CLIFF BAINES	Date Reported:	06/05/2009

Department	Analysis	Units	DL	Method	PQL	BC07821 LM-A-RINSATE 05/07/2009
METALS	Arsenic	µg/L	0.5	200.8/6020	2.0	**< 0.5**

DATA REPORTING QUALIFIES

DL = Detection Limit
PQL = Practical Quantitation Limit (= 4xDL)
J = Analyte concentration less than PQL
SA = See Attached
ND = No Data

When Dissolved Metals > Total Metals note possible filtering process contamination
P/A (used for Total Coliform results) P= Coliforms present, A = Coliforms absent
Y/N (used for E. Coli Results) Y= E. Coli present, N=E. Coli absent
E = Estimated Value. Count from plates not within ideal range.

06/17/2009

Everett Environmental Lab
QA/QC Report

$ICPMS-SO-10102 BC07761

	Orig	MB	Check	CK TV	CK % Rec	SRM	SRM TV	SRM % Rec
Arsenic		<0.50				58.46	58.98	99.10
Arsenic (mg/kg)	2.44		130.8	163.0	80.30			

$ICPMS-SO-10103 BC07771

	Orig
Arsenic (mg/kg)	7.18

$ICPMS-SO-10104 BC07784

	Orig	MB	Check	CK TV	CK % Rec	SRM	SRM TV	SRM % Rec
Arsenic		<0.50				58.45	58.98	99.10
Arsenic (mg/kg)	2.27		135.0	163.0	82.80			

$ICPMS-SO-10105 BC07791

	Orig
Arsenic (mg/kg)	15.80

Everett Environmental Lab
QA/QC Report

$ICPMS-SO-10106 BC07807

	Orig	MB	Check	CK TV	CK % Rec	SRM	SRM TV	SRM % Rec
Arsenic		<0.50				59.13	58.98	100.0
Arsenic (mg/kg)	2.08		135.8	163.0	83.30			

$ICPMS-SO-10107 BC07811

	Orig
Arsenic (mg/kg)	2.61

$ICPMS-T-10244 BC07821

	Orig	Dup	% RPD	Spike	Spk Amt	Spk % Rec	MB	Check	CK TV	CK % Rec	SRM	SRM TV	SRM % Rec
Arsenic	<0.50	<0.50	0.00	49.87	50.00	99.60	<0.50	47.66	50.00	95.30	59.13	58.98	100.0