FORMER SCOTT GALVANIZING PROPERTY
GROUNDWATER ASSESSMENT PLAN

1520 NW Leary Way
Seattle Washington 98107

Prepared for:
Mr. Todd Sims
Light Space Shadow Leary, LLC
1037 NE 65th Street #80172
Seattle, Washington 98115

Prepared by:
GO Spectrum NW, LLC.
14777 NE 40th Street, Suite 301
Bellevue, Washington 98007

December 28, 2018

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1 INTRODUCTION

This Groundwater Assessment Plan was prepared for Mr. Todd Sims to document field procedures for the installation of two new ground water monitoring wells and sampling of these two wells, as well as sampling of three existing onsite wells on his Seattle, Washington property. The Former Scott Galvanizing Parcel (Site) is located at 1520 NW Leary Way in Seattle, Washington 98107 (Figure 1).

1.1 1INVOLVED PARTIES

The proposed Ground Water Assessment will be conducted for Mr. Todd Sims, the owner of the Site. ESN NW Laboratory (ESN) of Lacey, Washington will provide drilling and analytical services for this project. ESN is an Washington State Department of Ecology (Ecology) accredited analytical laboratory, Certification Number C574-18.

1.2 GROUNDWATER ASSESSMENT PLAN ORGANIZATION

This Groundwater Assessment Plan begins with summary of an earlier Site ground water investigation, a discussion proposed monitoring well installation methodology, sampling procedures, and analytical protocol follow in subsequent sections. three figures follow the main text. Figure 1 is the Site Location Map and Figure 2 the Site Plot Plan. Figure 3 is a copy of the Ground Water Sampling Log. Appendix A provides the *Standard Operating Procedure For Metals Analysis* that will be used by ESN for the ground water sample analyses.

1.3 PURPOSE

The proposed ground water sampling project will be executed to determine current ground water quality conditions at the Site and to determine if the ground water plume has exceeded the Site south boundary.

2 PRIOR SITE GROUND WATER ASSESSMENT

In October 2015, GO Spectrum NW, LLC (Spectrum) conducted a Ground Water Assessment of an industrial property known as the Former Scott Galvanizing Parcel (Goff 2015).

2.1 SITE DESCRIPTION

The Site is a King County parcel encompassing a total of 18,000 square feet (0.43-acre) with a gentle northeast to southwest slope. The Site is a fully developed industrial property with an 18,000-square foot single-story industrial building. The industrial building is wood frame, with cinder block, wood, and corrugated steel exteriors and gabled roof. The Site features frontages on NW Leary Way and NW 49th Street.

The former galvanizing plant has two distinct areas. The Upper Plant area covers the north half of the property building and has a concrete floor. Most recently the west half of this portion of the building was used to store acid and raw zinc. Sanborn historical map review indicated that a foundry was once located in the east half of this portion of the property building.

The Lower Plant area was the location within the property building where the galvanizing operations took place. At the time of the Ground Water Assessment the flooring in this portion of the property building was a combination of concrete pad surrounding the dip tanks mixed with portions of flooring consisting of dirt. This portion of the property had five dip

tanks and each of these tanks has secondary containment consisting of four large concrete vaults with steel grading. The dip tanks were removed from the Site in 2017. The flooring in this portion of the Site is now a concrete pad (Figure 2).

2.2 GROUND WATER SAMPLING

Spectrum supervised the installation of four sample borings that were sampled for soils. The four borings were then finished as ground water monitoring wells. The soil boring/well locations were dispersed to characterize subsurface conditions at the Former Scott Galvanizing property. More specifically:

- Monitoring well GLC-MW1 was placed on the northwest portion of the Upper Plant, north portion of the property building to test ground water beneath the acid storage and raw zinc storage areas for arsenic, cadmium, chromium, mercury lead, and zinc.
- Monitoring well GLC-MW2 was placed on the northeast part of the Upper Plant, north portion of the property building to test ground water beneath the former foundry for arsenic, cadmium, chromium, mercury lead, and zinc.
- Monitoring wells GLC-MW3 and GLC-MW4 were placed on the Lower Plant, south portion of the property building to test the ground water beneath the pickle and zinc dip tank areas for arsenic, cadmium, chromium, mercury lead, and zinc.

Spectrum submitted four ground water samples for Washington State Model Toxics Control Act (MTCA) Metals analysis. The MTCA Metals are arsenic, cadmium, chromium, mercury, and lead. In addition, the four ground water samples were also tested for zinc content.

2.3 GROUND WATER ANALYTICAL RESULTS

Arsenic, cadmium, and zinc were detected in the ground water samples. Arsenic was detected in samples GLC-MW3-01 and GLC-MW4-01 in concentrations of 11 micrograms per liter (µg/L) and 5.6 µg/L, respectively. Cadmium was detected in the ground water sample GLC-MW3-01 in a concentration of 9.6 µg/L. Zinc was detected in the four ground water samples in concentrations ranging from 750 µg/L in sample GLC-MW4-01 to 50,000 µg/L in sample GLC-MW3-01. Analytical results indicate that no chromium, lead, or mercury were detected in the ground water samples from subject property (Table 1).

2.4 REGULATORY REVIEW

The ground water sample MTCA Metals analytical results were compared to the MTCA Method A Cleanup Levels for Ground Water. Zinc analytical results were compared to MTCA Method B Ground Water Cleanup Levels (MTCA Method B; CLARC Master Table Cleanup Level Ground Water Non-cancer).

The MTCA Method A Ground Water Cleanup Level for arsenic is 5 µg/L. Arsenic was detected in samples GLC-MW3-01 and GLC-MW4-01 in concentrations of 11 µg/L and 5.6 µg/L, respectively. Both analytical results exceed the MTCA Method A Ground Water Cleanup Level for arsenic.

The MTCA Method A Ground Water Cleanup Level for cadmium is 5 µg/L. Cadmium was detected in the ground water sample GLC-MW3-01 in a concentration of 9.6 µg/L. Sample GLC-MW3-01 analytical results exceed the MTCA Method A Ground Water Cleanup Level for cadmium.

The MTCA Method B Ground Water Cleanup Level for zinc is 4,800 µg/L. Zinc was detected in ground water sample GLC-MW3-01 in a concentration of 50,000 µg/L. Zinc was also detected in ground water sample GLC-MW2-01 in a concentration of 6,000 µg/L. Both samples analytical results exceeded the MTCA Method B Ground Water Cleanup Level for zinc. No other ground water sample collected from the subject property exceeded the MTCA Method B Ground Water Cleanup Level for zinc.

2.5 GROUND WATER ASSESSMENT CONCLUSIONS

The results of the Ground Water Assessment confirmed that arsenic, cadmium, and zinc in concentrations exceeding the MTCA Methods A and B Ground Water Cleanup Levels are present in ground water underlying the Lower Plant portion of the Site. Spectrum believes that the metals contamination of the Site ground water is limited to the Lower Plant of the Site.

3 SITE INFORMATION

3.1 GEOLOGY

The dominant geological feature of the landscape in this portion of King County is Vashon till (Pleistocene). The Vashon till is made up of predominantly fine-grained deposits consisting of unsorted and unstratified glacial sediments from clay to boulder in size that vary in compaction and composition throughout the Puget Sound. The Vashon till is made up of both subglacial and ablation components. The subglacial consists of unsorted gravel in a matrix of sandy silt and clay, commonly called hardpan. The ablation is till, brown sandy and gravelly soil accompanied by a few boulders (Jones 1998).

3.2 SUBSURFACE CONDITIONS

Based on an earlier Ground Water Assessment, Spectrum anticipates that the subsurface on the south side of Site building will be a mix of fill and native material of the following composition:

- From the surface to approximately three feet below ground surface (BGS), the expected material will be reddish to tan coarse sand with silty gray sand stringers, plant material, and black pebbles (Fill - GM). This material was free of staining and odors;
- Below the Fill, we anticipate that there will be a hard-dark silty sand, silt, and gravel (Till - SM) to 24.4 feet BGS.

3.3 GROUND WATER

Previous Site work showed that wet soils were generally encountered at depths ranging from 10 to 11 feet BGS within the Site subsurface. The static water levels in the Site monitoring wells ranged from 9.2 feet BGS in monitoring well GLC-MW1 to 12.1 feet BGS in monitoring well GLC-MW4 (Figure 2).

4 GROUNDWATER ASSESSMENT FIELD ACTIVITIES

The Groundwater Assessment field activities will consist of the installation of two ground water monitoring wells. Other activities include new well development and sampling. In addition, the four existing wells will also be sampled.

4.1 WELL INSTALLATION

Spectrum will supervise the installation of two ground water monitoring wells at the Site.

4.2 PROPOSED WELL LOCATIONS

Based on previous work at this property, Spectrum has interpreted the local ground water flow direction to be northeast to southwest. The proposed locations for the two new wells are on the median between the Site south sidewalk and Leary Way. The wells will be placed southeast and southwest of the south projection of the GLC-MW3 location (Figure 2).

4.3 WELL DRILLING

Drillers will install two ground water monitoring wells using hollow stem auger drilling methodology. The well borings will be drilled to a depth of 20 feet BGS.

4.4 WELL CONSTRUCTION

The wells will be 2" diameter PVC with the upper ten feet consisting of blank casing and the lower ten feet will be slotted (0.01") screen with bottom cap. The annular space from the base of the screen to two feet above the screen will be filled with Colorado sand. The annular space above the sand to two feet BGS will be completed with a Bentonite slurry. The upper two feet of casing will be incased in concrete.

The wells will have flush surface monuments with metal covers.

4.5 WELL LOGS

Spectrum will prepare well logs for the two Site wells. The well logs will provide as-built information for the wells.

4.6 WELL DEVELOPMENT

The wells will be developed the same day they are installed. Spectrum will develop the wells with a combination of pressure air and a submersible pump. The well water will be drummed on-site to await analytical results to determine appropriate disposal methods.

4.7 WELL SAMPLING

The six, onsite ground water monitoring wells will be sampled utilizing the following methods:

- Initially a survey of depth to ground water will be taken to determine initial distance to the water table. Following the establishment of static water levels, the water level measurements will be used to calculate existing well volumes.
- Once the well volumes are determined, the individual wells will be purged using a dedicated bailer. Following the removal of three well volumes, an aliquot of water will be collected and tested for pH, conductivity, and turbidity using field instrumentation.
- When three aliquots measurements confirm that the sample parameters are consistent, a sample will be collected. Purge water will be collected and stored on-site for characterization prior to disposal.

4.8 SAMPLE HANDLING AND SHIPPING

Spectrum field personnel will check all sample jars for completeness and cap tightness. The sealed sample containers will be placed upright in a cooler and chilled with Blue Ice. All samples collected will be delivered under chain-of-custody to the laboratory for analysis.

4.9 SAMPLING DOCUMENTATION

Spectrum will document all field activities associated with the Groundwater Assessment. Documentation will include a comprehensive discussion of field observations, including field parameters measurements, and any problems encountered.

All samples will be documented using the Spectrum Groundwater Sampling Log (Figure 3).

All water sample containers will be labeled with the following information:

- Project identification number;
- Sample date;
- Sampler's name; and
- Sample identification number.

In addition, the sample chain-of-custody forms will be completed with Spectrum project identification number, the sampler's name, date, and sample identification codes, Number of containers, and date and time the sample was collected. The chain-of-custody form will be included with samples transported to the analytical laboratory.

4.10 DECONTAMINATION PROCEDURES

All non-disposable sampling equipment was decontaminated prior to and after each sampling operation. The specific steps used for decontamination of the equipment are:

- Rinse and pre-clean equipment in potable water;
- Wash and scrub equipment with non-phosphate based detergent and potable water;
- Rinse with potable water;
- Rinse in deionized water; and
- Air-dry and store in clean plastic bags (or visqueen sheet) between samplings.

4.11 ANALYTICAL PROTOCOL

The proposed number of samples and analyses are presented below:

- Spectrum will collect one soil sample, from one of the well borings and analyze it for zinc using EPA Test Method 620 Series and Washington State MTCA metals (arsenic, cadmium, chromium, mercury, and lead) using EPA Test Method 620 Series. This sample will be used to characterize the auger spoils for appropriate disposal.

- Spectrum will collect two ground water samples and test them for zinc using EPA Test Method 620 Series.

- Spectrum will collect two ground water samples and test them for Washington State MTCA metals using EPA Test Method 620 Series.

Ground water samples will be submitted to ESN for analysis. No field duplicates will be collected. ESN's *Standard Operating Procedure for Metals Analysis* is presented in

Appendix A. The *Standard Operating Procedure for Metals Analysis* documents ESN's quality assurance procedures.

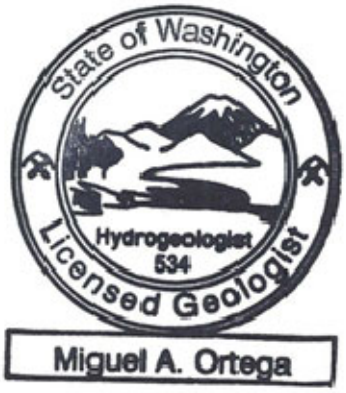
5 REFERENCES

Goff 2015. GO Spectrum NW; "Goff Land Company Former Scott Galvanizing Parcel Ground Water Assessment Final Report"; October 29, 2015.

Jones, M. A.; "Surficial Hydrogeologic Units of the Puget Sound Aquifer System, Washington"; United States Geological Survey Professional Paper 1424-C; 1998.

6 SIGNATURE

This Ground Water Assessment Plan was prepared by the undersigned.



December 28, 2018

Miguel A. Ortega
Washington Licensed Geologist (Hydrogeologist #534)

Date

FIGURES

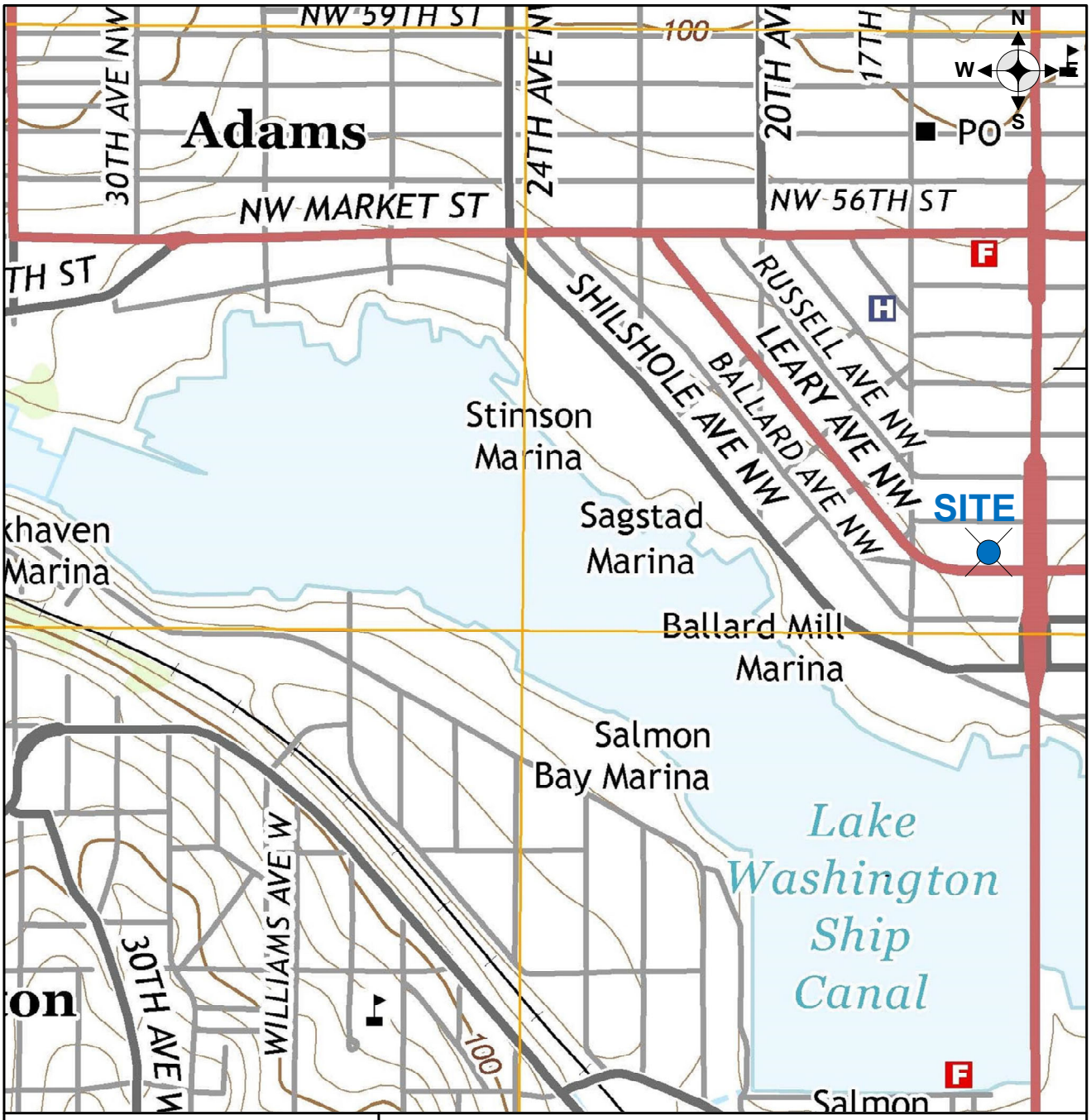


FIGURE 1

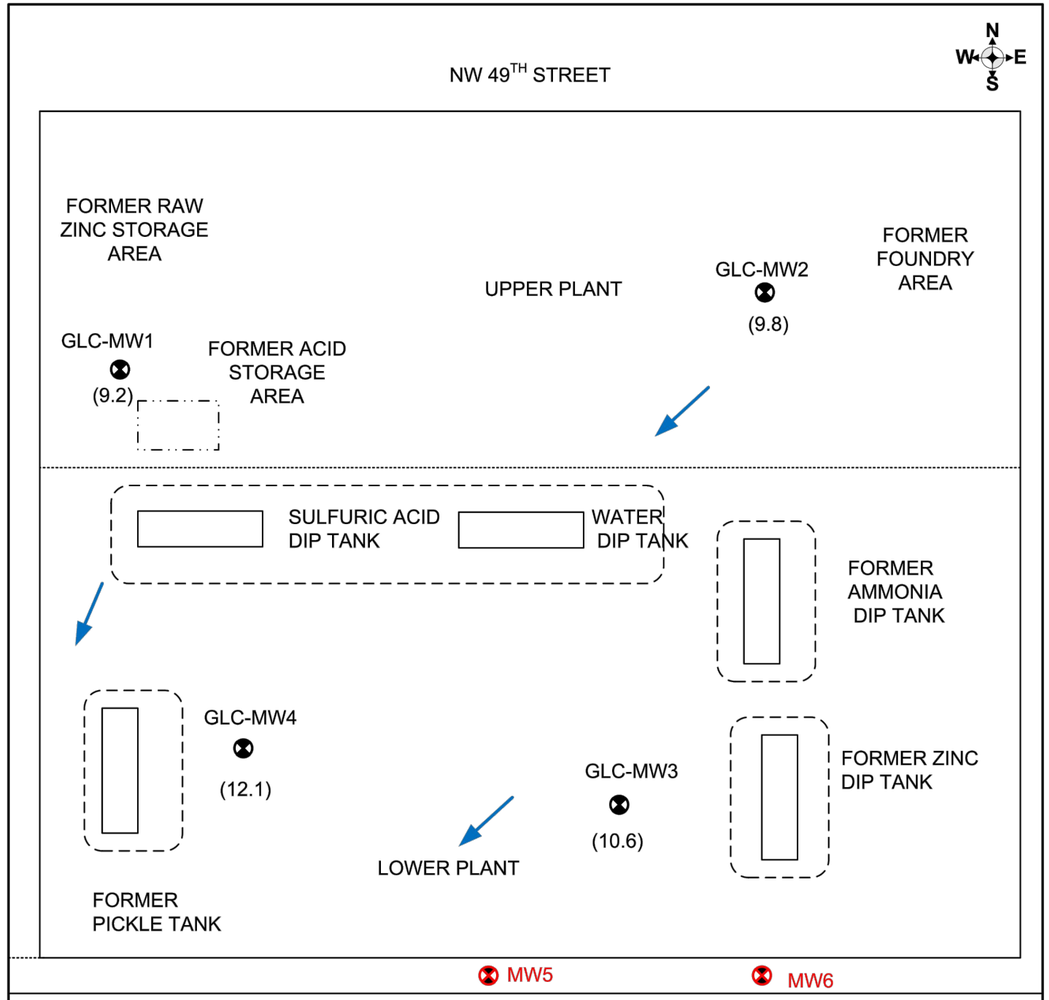
LIGHT SPACE SHADOW LEARY, LLC
FORMER SCOTT GALVANIZING PARCEL
GROUND WATER ASSESSMENT
1520 NW LEARY WAY
SEATTLE, WASHINGTON 98107

SITE LOCATION

Shilshole Bay Washington
USGS 7.5 Minute Quadrangle
2014

GO Spectrum NW, LLC

December 2018



EXPLANATION

INTERPRETED GW FLOW DIRECTION

PROPOSED MONITORING WELL LOCATION

(13.2) DEPTH TO WATER IN FEET BELOW GROUND SURFACE WITH SURFACE ELEVATION ADJUSTMENT

FORMER TANK WITH SECONDARY CONTAINMENT

0 10 Ft.

DRAWING SCALE

FIGURE 2

LIGHT SPACE SHADOW LEARY, LLC
FORMER SCOTT GALVANIZING PARCEL
GROUND WATER ASSESSMENT
1520 NW LEARY WAY
SEATTLE, WASHINGTON 98107

SITE PLOT PLAN

GO Spectrum NW, LLC	**December 2018**

GO Spectrum NORTHWEST

SCALE: 1"=10'

LIGHT SPACE SHADOW LEARY, LLC
GROUND WATER ASSESSMENT

DECEMBER 2018

GO SPECTRUM NW, LLC

FIGURE 3: GROUND WATER SAMPLING LOG

DATE _____

WELL ID. _____

CLIENT _____

LOCATION _____

FIELD CONDITIONS _____

SAMPLER _____

SITE CONDITIONS _____

WELL DIAMETER _____

DEPTH TO WATER(Feet) _____ TOTAL WELL DEPTH (Feet) _____

REFERENCE POINT _____ REFERENCE POINT ELEV. _____

PURGE METHOD _____

VOLUME PURGED _____

FIELD INSTRUMENTATION _____

TIME	VOLUME	TEMP.	pH	SPECIFIC CONDUCTANCE	NOTES

SAMPLE ID. _____ SAMPLING TIME _____

SAMPLING METHOD _____

COMMENTS _____

TABLES

TABLE 1: GROUND WATER ANALYTICAL RESULTS METALS[1] (OCTOBER 2015)

Sample	Source Location	Arsenic[2]	Cadmium[2]	Chromium[2]	Mecury[2]	Lead[2]	Zinc[2]
GLC-MW1-01	Monitoring well GLC-MW1, Upper Plant area, 22 feet east and 34 feet north of the building midpoint.	ND	ND	ND	ND	ND	1,700
GLC-MW2-01	Monitoring well GLC-MW2, Upper Plant area, located 65 feet south and 80 feet west of the northeast corner of the building.	ND	3.2	ND	ND	ND[3]	**6,000**[4]
GLC-MW3-01	Monitoring well GLC-MW3, Lower Plant area, 21 feet north and 12 feet west of the southwest corner of the zinc dip tank.	**11**	**9.6**	ND	ND	ND	**50,000**
GLC-MW4-01	Monitoring well GLC-MW4, Lower Plant area, five feet south and 15 feet east of the midpoint of the east side of the sulfuric acid dip tank.	**5.6**	ND	ND	ND	ND	750
[5]Washington Model Toxics Control Act (MTCA) Method A Cleanup Levels Ground Water.		5	5	50	2	15	---
[6]MTCA Method B CLARC Master Table Cleanup Levels Ground Water Non-cancer		---	---	---	---	---	4,800

EXPLANATION

[1]Total Metals in Water by EPA-6020 Method; [2]Analytical values reported in micrograms per liters (µg/L); [3]Not Detected, Below Test Method Reporting Limits – arsenic (2.0 µg/L), cadmium (2.0 µg/L), chromium (10 µg/L), mercury (1.0 µg/L), lead (2.0 µg/L), and zinc (2.0 µg/L); [4]Bold- signifies exceedance of regulatory cleanup level; [5]MTCA - Washington Model Toxics Control Act (MTCA) Method A Ground Water Cleanup Levels (WAC 173-340-900); [6]MTCA Method B CLARC Master Table Cleanup Levels Ground Water Non-cancer.

APPENDIX A: LABORATORY QA/QC PROCEDURES FOR METALS ANALYSIS