

Mr. Andy Smith  
Site Manager  
Washington State Department of Ecology  
PO Box 47600  
Olympia, Washington 98504-7600

**2016 Annual Report , Cascade Timber #1 (aka, "McFarland, WA") Site,  
Tacoma, Washington**

Dear Mr. Smith:

Date August 31, 2016

Ramboll Environ US Corporation (Ramboll Environ), formerly known as ENVIRON International Corporation, on behalf of the Asarco Multi-State Environmental Custodial Trust, is pleased to present the results of recent field activities conducted at the Cascade Timber #1 Site, located at 2502 Marine View Drive, Tacoma, Washington ("Site"). Ramboll Environ's recent activities included purging and sampling of four existing groundwater monitoring wells (MCW-1 through MCW-4), and inspection of the on-Site waste containment cell and associated Site improvements (e.g., fencing, gates), in accordance with the scope of work outlined in Ramboll Environ's work plan dated April 13, 2011, which was approved via email by the Washington State Department of Ecology (Ecology) on April 19, 2011. This letter provides a summary of the above mentioned tasks.

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**Ground Water Monitoring Activities**

On May 20, 2016, Ramboll Environ conducted groundwater sampling activities. Upon arrival at the Site, Ramboll Environ field personnel removed the well caps to allow the monitoring wells to equilibrate with atmospheric pressure for approximately 30 minutes. Water levels were then measured to the nearest 0.01 feet (relative to the top-of-casing) using an electric water level indicator. Groundwater level measurements and well construction information are summarized in Table 1.

After measuring the water level at each well, groundwater purging and sampling was conducted using a peristaltic pump, and new ¼-inch tubing employing "low-flow" techniques. Groundwater was purged at a rate ranging from approximately 0.05 to 0.1 liter per minute (L/min). During purging, the groundwater level was monitored, adjusting the purge rate, as necessary, to limit the drawdown to less than approximately 0.33 feet. After purging at least one tubing volume, groundwater parameters including temperature, pH, conductivity, turbidity, dissolved oxygen (DO), and oxidation-reduction potential (ORP) were monitored using an in-line flow-through cell. Parameter readings were recorded every 3 to 5 minutes on field purge logs, until

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parameter measurements indicated that groundwater conditions had stabilized. Generally, the criterion for achieving stabilization is three consecutive readings of each of parameters described above within 10% of each other. Purge logs are included in Attachment A.

Upon achieving stabilization, groundwater samples were collected into laboratory prepared bottles. After collection, the groundwater samples were labelled, recorded on a chain-of-custody, and stored in a cooler with ice pending delivery to Test America Incorporated (TAI), a Washington-certified analytical laboratory in Fife, Washington. Purged water was contained in Department of Transportation (DOT)-approved 55-gallon steel drums, and stored at the Site pending disposal. Based on the analytical results from Ramboll Environ's prior groundwater monitoring events, the purged water stored at the Site can be managed as non-regulated waste.

### **Laboratory Analysis**

Groundwater samples obtained from wells MCW-1 through MCW-4 were analyzed for the following constituents:

- Total and dissolved metals (arsenic, copper, lead, and zinc) by United States Environmental Protection Agency (USEPA) Method 200 series;
- Total hardness by USEPA Method SM2340B;
- Total alkalinity, bicarbonate, and carbonate by USEPA Method SM2320B;
- Total chloride and sulfate by USEPA Method 300;
- Total calcium, magnesium, sodium, and potassium by USEPA Method 200 series.

One blind duplicate sample (all analyses) was included in the analytical program for this monitoring event (collected from MCW-2). Because the groundwater sampling method did not include the use of any reusable equipment (only new, disposable sampling equipment was used), equipment rinsate blank samples were not collected as part of the groundwater sampling program.

### **Groundwater Monitoring Results**

In the May 2016 monitoring event, groundwater depths ranged from approximately 8.65 feet (MCW-2) to 12.83 feet (MCW-1) below the respective top-of-casing pipes. Based on these measurements and the top-of-casing elevations (surveyed in December 2012), groundwater elevations beneath the Site ranged from approximately 12.00 to 13.73 feet above mean sea level (amsl; Table 1)<sup>1</sup>. The groundwater elevations suggest that shallow groundwater flow beneath the Site is towards the southwest (towards the Hylebos Waterway). This flow direction differs from the previous several monitoring events conducted by Ramboll Environ from 2011 through 2015, when the flow direction was predominantly to the southeast beneath the northern portion of the Site, with a northeasterly component of flow in the vicinity of MCW-1.

However, as noted in previous groundwater monitoring reports, groundwater flow directions beneath the Site have exhibited some variability over time; groundwater flow directions measured in the late 1990s were to the southwest, similar to the recent monitoring event.

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<sup>1</sup> In 2012, the top-of-casing values used to calculate groundwater elevations in the wells were obtained from the document titled *Final Engineering Report for Cascade Timber No. 1 Remediation*, prepared by Hydrometrics, Inc. (Hydrometrics) in April 1995. Table 1 has been updated with recent survey information, obtained on December 11, 2012.

## Groundwater Analytical Results

The results of laboratory analyses are summarized in Table 2. The results of this sampling event are similar to the results from Ramboll Environ's previous sampling events conducted from 2011 through 2015. For analytes where Model Toxics Control Act (MTCA) cleanup levels have been established (arsenic, copper, lead, and zinc), concentrations were below respective MTCA Method A or Method B values, with the exception of total and dissolved arsenic. Total arsenic was detected at concentrations of 0.0052 milligrams per liter (mg/L; MCW-1) and 0.016 mg/L (MCW-3), which exceed the MTCA Method A value (0.005 mg/L). A similar concentration for dissolved arsenic was identified in the groundwater sample from MCW-4 (0.0055 mg/L). Similar concentrations have been observed at MCW-4 since 2011 (ranging from 0.0023 mg/L to 0.0071 mg/L).

While MTCA has not established cleanup levels for general groundwater parameters (e.g., hardness, alkalinity, chloride, sulfate, calcium, etc.), based on a review of previous analytical results (including sampling conducted at the Site in 2000 by Hydrometrics, and Ramboll Environ's previous sampling), the results from this sampling event are similar to past results for these general groundwater quality parameters. Laboratory results from Ramboll Environ's monitoring event are included in Attachment B.

## Operations and Maintenance (O&M) Inspection

Ramboll Environ personnel inspected the containment cell and general Site improvements (monitoring wells, vent pipes, drainage channels, fences, etc.) to evaluate their condition, and to identify items requiring repair (e.g., damaged wells, clogged drains, damaged gates or fences). Routine grounds-keeping tasks (e.g., litter pickup, vegetation control, maintaining signage) were also performed as necessary. The O&M inspection was documented by Ramboll Environ personnel on field logs and photographs, as appropriate. Site inspection field notes are included in Attachment C, and select photographs are included in Attachment D.

The monitoring wells were inspected and found to be in good condition. Three wells are completed with aboveground monuments (MCW-1, MCW-3, and MCW-4) and one well (MCW-2) is completed with a flush-mount vault. Each of the wells were locked, contained well caps, and the concrete surrounding the well casings was observed to be in good condition, free of significant cracks. However, the rubber seal beneath the well cover on MCW-2 was observed to be degraded.

The perimeter fence was inspected, and was noted to be in good condition with the exception of a damaged hinge on the southern fence gate. Appropriate signage was observed in place.

Ramboll Environ personnel visually inspected the surface of the containment cell. Vegetation was observed on the surface, consisting of a variety of grasses and young blackberry plants. The two "gas vent boots" protruding from the center of the containment cell were appeared to be unobstructed, and in good condition. The "cleanout boots," located in the northeastern and northwestern corners of the containment cell were visually inspected and were found to be unobstructed and in good condition. The "cell drain boot," located in the southeast corner of the containment cell was also visually inspected, and found to be in good condition, although the paint coating appeared to be chipping off in some areas.

In addition, Ramboll Environ noted a large Scotch broom shrub along the base of the southeastern side of the containment cell that appears to have grown into the southeastern side of the containment cell at the ground surface.

## Closure

Based on the results of eight consecutive sampling events conducted by Ramboll Environ from 2011 to 2016, with the exception of arsenic, concentrations of analyzed constituents in groundwater have been below MTCA Method A or B cleanup levels for those analytes which cleanup levels have been established (i.e., arsenic, copper, lead, and zinc). Exceedances of MTCA Method A cleanup levels for arsenic were identified in MCW-1, MCW-3 and MCW-4, at concentrations that marginally exceeded the cleanup level (0.0050 mg/L). Given that recurring exceedances are limited to one well (MCW-4), and the Site and adjacent properties are currently used for industrial purposes with no current or likely future use of groundwater for drinking water purposes, additional evaluation of the minor arsenic exceedances is not recommended at this time. Furthermore, based on the consistent results obtained during monitoring events conducted from 2011 to 2016, Ramboll Environ recommends continuing the annual monitoring and sampling program for the Site.

As part of the next facility inspection (fall 2016), Ramboll Environ will remove the Scotch broom observed along the base of the southeastern side of the containment cell be removed, and the rubber seal on MCW-2 will be replaced.

If you have any questions or comments regarding the items presented in this letter, please contact me at 360-597-7066, or [drowe@environcorp.com](mailto:drowe@environcorp.com).

Sincerely,



**Devon Rowe, LG, LHG**

Project Manager

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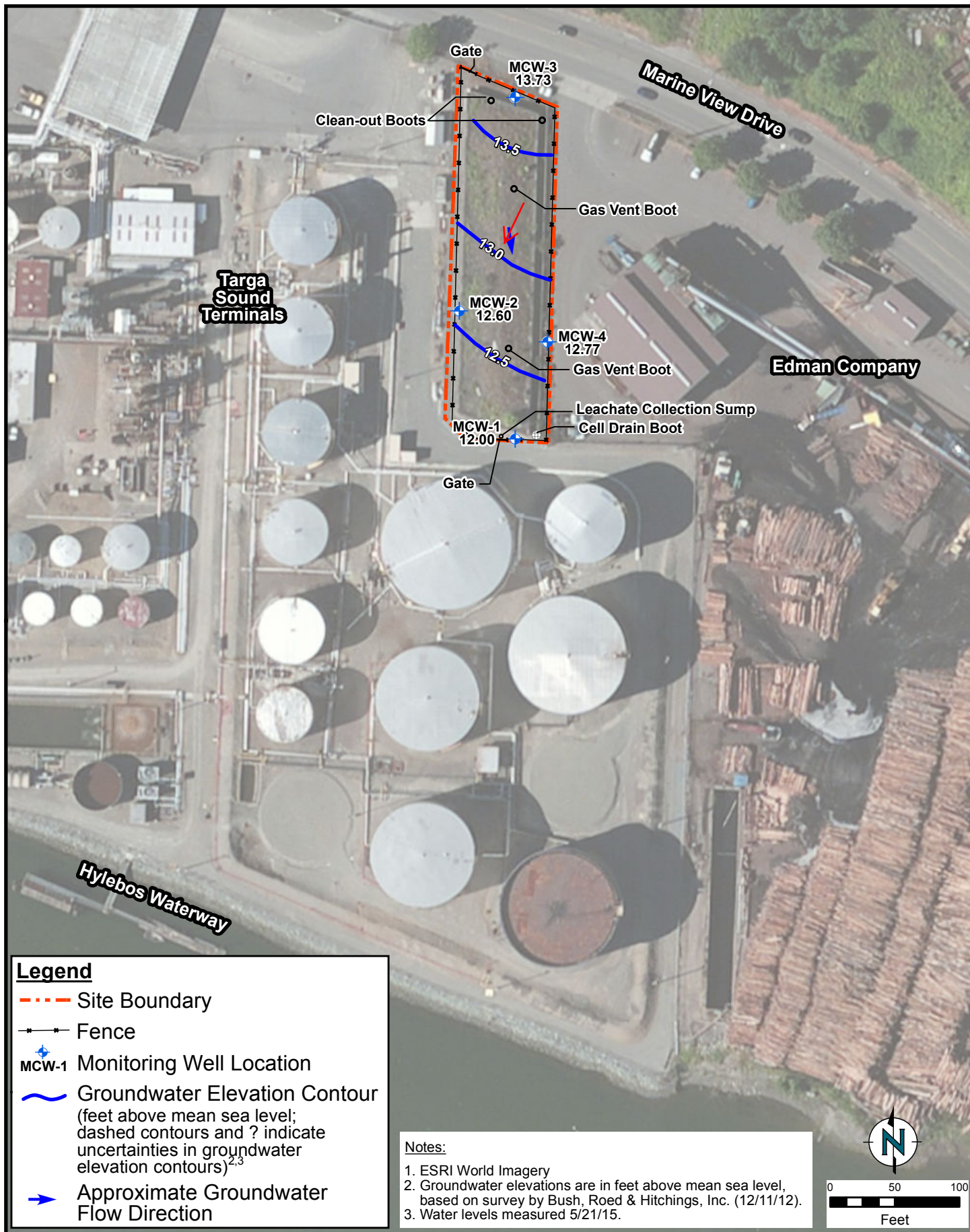
[drowe@environcorp.com](mailto:drowe@environcorp.com)

cc: Asarco Multi-State Environmental Custodial Trust  
David Heidlauf, Ramboll Environ

Attachments: Figure 1 – Groundwater Elevation and Site Map  
Table 1 – Groundwater Elevation Measurements (2011-2016)  
Table 2 – Summary of Groundwater Analytical Results  
Attachment A – Purge Logs  
Attachment B – Laboratory Data  
Attachment C – Field Inspection Notes  
Attachment D – Site Photographs

**Figure**





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## Tables

**Table 1: Groundwater Elevation Measurements (2011 - 2016)**

Cascade Timber No.1 ("McFarland, WA") Site  
 2502 Marine View Drive, Tacoma, Washington

Well Number <sup>1</sup>	Casing Diameter (inches)	Total Depth (feet)	Screen Interval (feet below ground surface)	Top of Casing Elevation <sup>2</sup>	Measurement Date	Depth to Water (feet below top of casing)	Elevation (ft)
MCW-1	2	19	10-15	24.83	5/18/11	12.14	12.69
					12/6/11	12.19	12.64
					6/7/12	12.29	12.54
					12/11/12	11.34	13.49
					6/6/13	12.18	12.65
					1/14/14	11.73	13.10
					5/21/15	12.18	12.65
					5/20/16	12.83	12.00
MCW-2	2	16	10-15	21.25	5/18/11	8.51	12.74
					12/6/11	8.98	12.27
					6/7/12	8.61	12.64
					12/11/12	8.03	13.22
					6/6/13	8.66	12.59
					1/14/14	8.56	12.69
					5/21/15	8.50	12.75
					5/20/16	8.65	12.60
MCW-3	2	14	9-14	24.95	5/18/11	10.69	14.26
					12/6/11	11.07	13.88
					6/7/12	10.65	14.30
					12/11/12	10.04	14.91
					6/6/13	10.54	14.41
					1/14/14	10.62	14.33
					5/21/15	10.43	14.52
					5/20/16	11.22	13.73
MCW-4	2	18	12-17	25.15	5/18/11	12.71	12.44
					12/6/11	13.55	11.60
					6/7/12	13.22	11.93
					12/11/12	12.57	12.58
					6/6/13	13.12	12.03
					1/14/14	12.96	12.19
					5/21/15	12.82	12.33
					5/20/16	12.38	12.77

**Notes**

<sup>1</sup> MCW-1, MCW-2, MCW-3, MCW-4 constructed on August 31, 1994.

<sup>2</sup> Elevations obtained from Bush, Roed and Hitchings (resurveyed on 12/11/12).



Table 2: Summary of Groundwater Analytical Results  
Cascade Timber No.1 ("McFarland, WA") Site  
2502 Marine View Drive, Tacoma, Washington

		MTCA Method A/B <sup>1</sup>	MCW-1							
			05/18/2011	12/06/2011	06/07/ 2012	12/11/2012	6/6/2013	1/14/2014	5/21/2015	5/20/2016
		mg/l	mg/l							
Arsenic	Total	0.005/ 0.0048	< 0.001	<0.001	0.0027	<0.001	0.0037	<0.001	0.0017 J	0.0052
	Dissolved		< 0.001	<0.001	0.0026	<0.001	0.0038	<0.001	0.0014 J	0.0027
Copper	Total	0.64	< 0.002	0.0065 JB	0.001	0.0027	0.00046	0.00069 J	< 0.0030	0.0065
	Dissolved		< 0.002	0.0096 JB	0.00056 J	0.0020	0.00071 J	0.00098 J	< 0.0030	0.0013 J B
Lead	Total	0.015	< 0.001	0.00005 J	0.00079	0.00026 J	0.00013 J	0.00036 J	0.00028 J	0.00065
	Dissolved		< 0.001	<0.0004	0.000064 J	0.000098 J	0.000082 J	0.00025 J	< 0.00017	0.000049 J
Zinc	Total	4.8	< 0.01	<0.0014	0.0054	0.0020	<0.0014	< 0.004	< 0.0095	0.0065 J
	Dissolved		< 0.01	0.0018	0.0016	0.0028	0.0068	0.0028 J	< 0.0095	0.0042 J
Calcium	Total	--	11.4	18	14	14 B	15 B	17	12	8.6
Magnesium	Total	--	3.19	5.3	4.6	4.1	5.0	5.1 J	< 15	3.1 J
Potassium	Total	--	2.28	2.9 J	1.9 J	2.4 J	2.0 J	2.5 J	1.9 J	1.7 J
Sodium	Total	--	15.2	18 B	14	14	14	15	14	13
Hardness	Total	--	41.5	71	52	49	69	68	39	70
Hydroxide Alkalinity	Total	--	< 5.0	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<4.0
Carbonate Alkalinity	Total	--	< 5.0	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<4.0
Bicarbonate Alkalinity	Total	--	60.2	66	70	61	89	81	69	65
Chloride	Total	--	1.8	1.8	3.6	2.01	1.5 B	1.7	0.78 J	1.3
Sulfate	Total	--	6.67	11	6.5	11.3	5.3	8.8	3.9	3.4
TPH-Gx	--	1	NA	< 0.094	NA	NA	NA	NA	NA	NA
TPH-Dx	--	0.5	NA	< 0.24	NA	NA	NA	NA	NA	NA
TPH-Oil	--	0.5	NA	< 0.47	NA	NA	NA	NA	NA	NA

Notes

- <sup>1</sup> MTCA - Model Toxics Control Act Cleanup Regulation Standard
- mg/l                    milligrams per liter
- dup                    duplicate
- criteria not established
- TPH-Gx                gasoline range petroleum hydrocarbons
- TPH-Dx                diesel range petroleum hydrocarbons (>C12-C24)
- TPH-Oil                motor oil range petroleum hydrocarbons
- Bold values and cells shaded grey represent an exceedance of the MTCA Method A/B criteria.
- NA                    not analyzed
- J                    Result is less than the RL but greater than or equal to the method detection limit and the concentration is an approximate value.
- B                    Compound was found in the blank and sample
- <                    Concentration was below reporting limit

Table 2: Summary of Groundwater Analytical Results  
Cascade Timber No.1 ("McFarland, WA") Site  
2502 Marine View Drive, Tacoma, Washington

		MTCA Method A/B¹	MCW-2													
			05/18/2011	05/18/2011 (dup)	12/06/2011	12/6/2011 (dup)	6/7/2012	6/7/2012 (dup)	12/11/2012	12/11/2012 (dup)	6/6/2013	6/6/2013 (dup)	1/14/2014	5/21/2015	5/20/2016	5/20/2016 (dup)
			mg/l	mg/l												
Arsenic	Total	0.005/ 0.0048	0.00138	<0.001	0.0026	0.0019	<0.001	<0.001	0.0013	0.0014	<0.001	<0.001	0.0013	< 0.0014	0.00088 J	0.00084 J
	Dissolved		0.00116	<0.001	0.0018	0.0017	<0.001	<0.001	0.00096 J	<0.0010	<0.001	0.0012	< 0.0014	0.0013	0.0015	
Copper	Total	0.64	< 0.002	< 0.002	0.00022 J	0.0021 J	<0.001	0.0003 J	0.00056 J	0.00052 J	0.00013 J	<0.001	<0.001	< 0.0030	<0.0020	<0.0020
	Dissolved		< 0.002	< 0.002	0.00011 J	0.0032 J	0.00027 J	0.00018 J	0.00026 J	0.00070 J	0.00011 J	<0.001	0.00037 J	< 0.0030	0.0021 B	0.0015 J B
Lead	Total	0.015	< 0.001	< 0.001	0.00004 J	0.00004 J	<0.0004	0.000052 J	0.00020 J	0.00016 J	0.0012	0.000057 J	0.00016 J	< 0.00017	0.000058 J	0.000042 J
	Dissolved		< 0.001	< 0.001	<0.0004	<0.0004	<0.0004	<0.0004	<0.00040	0.000073 J	<0.0004	<0.0004	0.00030 J	< 0.00017	0.00011 J	0.00014 J
Zinc	Total	4.8	< 0.01	< 0.01	0.0013 J	0.0013 J	0.00092 J	<0.0014	0.0015	0.0019	<0.0014	<0.0014	<0.004	< 0.0095	0.0019 J	<0.0070
	Dissolved		<0.01	0.0101	0.0014	0.0015	<0.0014	0.00091 J	<0.0014	0.0030	0.0015	<0.0014	<0.004	< 0.0095	0.0033 J	0.0023 J
Calcium	Total	--	24.4	25.6	26	26	26	26	30 B	28 B	26 B	25 B	27	29	24	25
Magnesium	Total	--	10.1	10.6	13	13	10	10	12	12	10	10	12	< 15	11	10
Potassium	Total	--	4.43	4.84	4	4.2	4.8	4.8	6.2	5.7	5.4	5.2	4.9	5.1	5.0	5.1
Sodium	Total	--	10.5	11	12 B	12 B	11	11	12	11	12	11	11	12	11	11
Hardness	Total	--	103	107	140	150	130	130	150	150	110 B	110 B	120	120	120	150
Hydroxide Alkalinity	Total	--	< 5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<4.0	<4.0
Carbonate Alkalinity	Total	--	< 5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	< 5.0	<4.0	<4.0
Bicarbonate Alkalinity	Total	--	128	127	140	140	130	130	140	140	140	140	140	140	130	130
Chloride	Total	--	5.52	5.49	9.6	8.7	6	6.1	9.06	8.77	7.0 B	8.1 B	6.4	6.0	5.9	5.8
Sulfate	Total	--	< 1.0	<1.0	<1.2	<1.2	<1.2	<1.2	0.77	<0.5	<1.0	<1.0	<1.2	< 0.40	<0.50	<0.50
TPH-Gx	--	1	NA	NA	< 0.094	< 0.094	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH-Dx	--	0.5	NA	NA	< 0.24	< 0.24	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
TPH-Oil	--	0.5	NA	NA	< 0.47	< 0.47	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

**Notes**  
<sup>1</sup> MTCA - Model Toxics Control Act Cleanup Regulation Standard  
mg/l            milligrams per liter  
dup            duplicate  
--              criteria not established  
TPH-Gx       gasoline range petroleum hydrocarbons  
TPH-Dx       diesel range petroleum hydrocarbons (>C12-C24)  
TPH-Oil       motor oil range petroleum hydrocarbons  
Bold values and cells shaded grey represent an exceedance of the MTCA Method A/B criteria.  
NA             not analyzed  
J               Result is less than the RL but greater than or equal to the method detection limit and the concentration is an approximate value.  
B               Compound was found in the blank and sample  
<               Concentration was below reporting limit

Table 2: Summary of Groundwater Analytical Results  
Cascade Timber No.1 ("McFarland, WA") Site  
2502 Marine View Drive, Tacoma, Washington

		MTCA Method A/B <sup>1</sup>	MCW-3								
			5/18/2011	12/6/2011	6/7/2012	12/11/2012	6/6/2013	1/14/2014	1/14/2014 (dup)	5/21/2015	5/20/2016
		mg/l	mg/l								
Arsenic	Total	0.005/ 0.0048	0.00189	0.0083	0.0025	0.0020	0.0028	0.0018	0.0017	0.0028 J	0.016
	Dissolved		0.00197	0.0017	0.0022	0.0018	0.0023	0.0017	0.0017	0.0020 J	0.0038
Copper	Total	0.64	< 0.002	0.00034 J	0.00056 J	0.00043 J	0.00068 J	<0.001	<0.001	< 0.0030	0.00062 J
	Dissolved		< 0.002	0.00025 J	0.00023 J	0.00022 J	0.00016 J	0.00047 J	<0.001	< 0.0030	0.0016 JB
Lead	Total	0.015	< 0.001	0.00021 J	0.00017 J	0.00018 J	0.00052	0.000068 J	0.000085 J	< 0.00017	0.00035 J
	Dissolved		< 0.001	<0.004	0.000043 J	0.000091 J	<0.0004	0.00008 J	0.000065 J	< 0.00017	0.000034 J
Zinc	Total	4.8	< 0.01	0.0011 J	<0.0014	0.0011 J	0.0011 J	<0.004	<0.004	< 0.0095	0.0079
	Dissolved		< 0.01	0.0017	<0.0014	0.0023	0.0010 J	0.0029J	<0.004	< 0.0095	0.0078
Calcium	Total	--	24.1	24	20	22 B	17 B	20	21	22	23
Magnesium	Total	--	15.8	16	12	14	11	13	13	< 15	13
Potassium	Total	--	2.08	2.4 J	1.9 J	2.3 J	2.1 J	1.9 J	1.9 J	2.0 J	2.1 J
Sodium	Total	--	11.0	12 B	9.7	11	8.9	9.4	9.5	9.3	8.7
Hardness	Total	--	125	140	120	120	89 B	110	130	110	200
Hydroxide Alkalinity	Total	--	< 5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<4.0
Carbonate Alkalinity	Total	--	< 5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<4.0
Bicarbonate Alkalinity	Total	--	135	140	120	130	110	120	120	120	130
Chloride	Total	--	14.6	7.5	9.2	7.9	8.1 B	7.4	7.4	6.5	7.2
Sulfate	Total	--	< 1.0	<1.2	<1.2	<0.5	<1.0	<1.2	<1.2	< 0.40	<0.50
TPH-Gx	--	1	NA	< 0.094	NA	NA	NA	NA	NA	NA	NA
TPH-Dx	--	0.5	NA	< 0.24	NA	NA	NA	NA	NA	NA	NA
TPH-Oil	--	0.5	NA	< 0.47	NA	NA	NA	NA	NA	NA	NA

Notes

- <sup>1</sup> MTCA - Model Toxics Control Act Cleanup Regulation Standard
- mg/l milligrams per liter
- dup duplicate
- criteria not established
- TPH-Gx gasoline range petroleum hydrocarbons
- TPH-Dx diesel range petroleum hydrocarbons (>C12-C24)
- TPH-Oil motor oil range petroleum hydrocarbons
- Bold values and cells shaded grey represent an exceedance of the MTCA Method A/B criteria.
- NA not analyzed
- J Result is less than the RL but greater than or equal to the method detection limit and the concentration is an approximate value.
- B Compound was found in the blank and sample
- < Concentration was below reporting limit

Table 2: Summary of Groundwater Analytical Results  
Cascade Timber No.1 ("McFarland, WA") Site  
2502 Marine View Drive, Tacoma, Washington

		MTCA Method A/B <sup>1</sup>	MCW-4								
			5/18/2011	12/6/2011	6/7/2012	12/11/2012	6/6/2013	1/14/2014	5/21/2015	5/21/2015 (dup)	5/20/2016
		mg/l	mg/l								
Arsenic	Total	0.005/ 0.0048	0.00435	0.0045	0.0025	0.0063	0.0051	0.007	0.0071	0.0061	0.0050
	Dissolved		0.00444	0.0050	0.0023	0.0041	0.0024	0.0069	0.0064	0.0071	0.0055
Copper	Total	0.64	< 0.002	0.00019 J	0.00025 J	0.00094 J	0.00027 J	0.00022 J	< 0.0030	< 0.0030	<0.0020
	Dissolved		< 0.002	0.00029 J	0.00023 J	0.001	0.0011	0.00052 J	< 0.0030	< 0.0030	0.0013 J B
Lead	Total	0.015	< 0.001	0.00004 J	0.000064 J	0.00042	0.00043	0.00015 J	< 0.00017	< 0.00017	<0.00040
	Dissolved		< 0.001	<0.0004	<0.0004	0.00016 J	<0.0004	0.00018 J	< 0.00017	< 0.00017	<0.00040
Zinc	Total	4.8	< 0.01	0.0014	<0.0014	0.0023	<0.0014	<0.004	< 0.0095	< 0.0095	<0.0070
	Dissolved		< 0.01	0.0032	0.0011 J	0.0041	0.00093 J	0.0029 J	< 0.0095	< 0.0095	0.0034 J
Calcium	Total	--	31.5	35	28	36 B	28 B	30	29	29	27
Magnesium	Total	--	15.1	14	12	14	11	14	< 15	< 15	12
Potassium	Total	--	3.57	4.8	4.4	4.4	3.9	3.6	3.5	3.7	3.6
Sodium	Total	--	13.5	14 B	14	14	11	14	11	11	11
Hardness	Total	--	141	180	150	160	120 B	320	130	130	120
Hydroxide Alkalinity	Total	--	< 5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<4.0
Carbonate Alkalinity	Total	--	< 5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<4.0
Bicarbonate Alkalinity	Total	--	176	170	150	140	140	150	140	140	150
Chloride	Total	--	7.82	10	8.6	11.2	9.6 B	7.7	6.9	6.8	7.2
Sulfate	Total	--	0	<1.2	<1.2	<0.5	0.25 J	<1.2	< 0.40	< 0.40	<0.50
TPH-Gx	--	1	NA	< 0.094	NA	NA	NA	NA	NA	NA	NA
TPH-Dx	--	0.5	NA	< 0.24	NA	NA	NA	NA	NA	NA	NA
TPH-Oil	--	0.5	NA	< 0.47	NA	NA	NA	NA	NA	NA	NA

Notes

- <sup>1</sup> MTCA - Model Toxics Control Act Cleanup Regulation Standard
- mg/l milligrams per liter
- dup duplicate
- criteria not established
- TPH-Gx gasoline range petroleum hydrocarbons
- TPH-Dx diesel range petroleum hydrocarbons (>C12-C24)
- TPH-Oil motor oil range petroleum hydrocarbons
- Bold values and cells shaded grey represent an exceedance of the MTCA Method A/B criteria.
- NA not analyzed
- J Result is less than the RL but greater than or equal to the method detection limit and the concentration is an approximate value.
- B Compound was found in the blank and sample
- < Concentration was below reporting limit

**Attachment A**  
**Purge Logs**

## WATER PURGING AND SAMPLING LOG

PROJECT NAME: McFarland

FIELD PERSON: S. Leick

PROJECT NUMBER: 2132108R

PROJECT MANAGER: D. Rave

PROJECT LOCATION: Tacoma, WA

DATE: 5-20-16

<b>PURGING/SAMPLING METHOD:</b> Low Flow		<b>WELL NUMBER:</b> mcw-2	
<b>EQUIPMENT CLEANING METHOD:</b> Liquinox/Disposable		<b>CASING RADIUS:</b> 2 (in.)	<b>TOTAL DEPTH (TD):</b> 116' (ft.)
<b>PURGE WATER DISPOSAL:</b> On-site 55-gallon drum		<b>DEPTH TO WATER (DTW):</b> 8.65 (ft.)	<b>CASING VOLUME:</b> 4.80 (gal.)
<b>GALLONS PURGED:</b> ~1.5	<b>CASING VOLUMES:</b> 0.31	<b>(TD-DTW) (CR)<sup>2</sup>(.163)=</b>	
		<b>WELL VOLUMES:</b> N/A (gal.)	

PURGE START TIME: 9:45

PURGE RATE (GPM): 0.06

TIME/GALLONS PURGED	pH	CONDUCTIVITY (µmhos/cm)	TURBIDITY (NTU)	D.O. (mg/L)	TEMP (°C)	ORP (mv)	DTW COMMENTS
9:50	6.49	319	0.5	0.90	12.85	-65.1	8.87
9:53	6.51	316	0.5	0.67	12.68	-71.9	8.89
9:56	6.47	312	0.7	0.42	12.55	-71.5	8.89
9:59	6.48	310	0.7	0.32	12.48	-73.6	8.89
10:04	6.50	306	0.0	0.31	12.33	-68.5	9.00
10:09	6.53	305	0.00	0.21	12.25	-65.8	9.00

PURGE STOP TIME: 10:30

FINAL  
DTW: 9.00@ 80%  
=

LAB NAME: Test America

SAMPLE ID: MW-2-20160520

## OBSERVATIONS/COMMENTS:

Sample MW-2-20160520  
@ 10:09  
+ MW-99-20160520  
@ 10:20

PUMP SET AT = 15'

FEET

## WATER PURGING AND SAMPLING LOG

PROJECT NAME: McFarland

FIELD PERSON: S. Leick

PROJECT NUMBER: 213 2108R

PROJECT MANAGER: D. Rowe

PROJECT LOCATION: Taloma, WA

DATE: 5-20-16

<b>PURGING/SAMPLING METHOD:</b> Low Flow		<b>WELL NUMBER:</b> MCW-3	
<b>EQUIPMENT CLEANING METHOD:</b> Liquinox / Disposable		<b>CASING RADIUS:</b> 2 (in.)	<b>TOTAL DEPTH (TD):</b> 14 (ft.)
<b>PURGE WATER DISPOSAL:</b> On-site 55-gallon drum		<b>DEPTH TO WATER (DTW):</b> 7.72 (ft.)	<b>CASING VOLUME:</b> 4.09 (gal.)
<b>GALLONS PURGED:</b> ~2.0	<b>CASING VOLUMES:</b> 0.49	<b>(TD-DTW) (CR)<sup>2</sup> (.163) =</b>	
		<b>WELL VOLUMES:</b> N/A (gal.)	

PURGE START TIME: 12:22		PURGE RATE (GPM): 0.05					
TIME/GALLONS PURGED	pH	CONDUCTIVITY (µmhos/cm)	TURBIDITY (NTU)	D.O. (mg/L)	TEMP (°C)	ORP (mv)	COMMENTS
12:41	6.66	278	221.3	0.82	19.69	-46.0	water - brown
12:46	6.66	278	1028.3	0.04	18.70	-47.5	
12:49	6.63	281	461.9	0.52	16.89	-43.3	
12:52	6.60	281	1004.4	0.43	15.01	-41.0	
12:55	6.67	281	571.5	0.33	13.57	-34.7	
13:00	6.68	280	572.9	0.26	14.44	-36.8	
13:05	6.60	281	572.4	0.22	14.13	-39.0	

<b>PURGE STOP TIME:</b> 13:15	<b>FINAL DTW:</b> 8.00	<b>@</b> 80% =
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<b>LAB NAME:</b> Test America	<b>SAMPLE ID:</b> MW-3-20160520
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**OBSERVATIONS/COMMENTS:**

Sample MW-3-20160520 taken @ 13:05

DTW is measured relative to ground surface, '3.5' below top of casing

PUMP SET AT = 12' FEET



**WATER PURGING AND SAMPLING LOG**
**PROJECT NAME:**
**FIELD PERSON:** S. Leick

**PROJECT NUMBER:** 2132108R

**PROJECT MANAGER:** D. Bane

**PROJECT LOCATION:**
**DATE:** 5-20-16

<b>PURGING/SAMPLING METHOD:</b> Low Flow		<b>WELL NUMBER:</b> mw-1	
<b>EQUIPMENT CLEANING METHOD:</b> Liquinox/Disposable		<b>CASING RADIUS:</b> 2" (in.)	
<b>PURGE WATER DISPOSAL:</b> On-site 55-gallon drum		<b>TOTAL DEPTH (TD):</b> 19 (ft.)	
		<b>DEPTH TO WATER (DTW):</b> 9.33 (ft.)	
		<b>CASING VOLUME:</b> 6.30 (gal.)	
		<b>(TD-DTW) (CR)<sup>2</sup> (.163) =</b>	
<b>GALLONS PURGED:</b> ~1.5	<b>CASING VOLUMES:</b> 0.24	<b>WELL VOLUMES:</b> N/A (gal.)	

PURGE START TIME: 13:48				PURGE RATE (GPM): 0.06			
TIME/GALLONS PURGED	pH	CONDUCTIVITY (µmhos/cm)	TURBIDITY (NTU)	D.O. (mg/L)	TEMP (°C)	ORP (mv)	COMMENTS
1352	7.36	105	3.9	1.37	21.13	32.9	
1355	6.82	104	4.3	0.90	18.17	35.8	
1358	6.47	156	4.9	0.61	17.59	42.3	
1401	6.45	156	3.4	0.61	17.57	42.2	
1404	6.49	154	4.1	0.55	17.60	36.2	
1409	6.52	154	4.1	0.52	17.98	32.1	
1414	6.55	154	3.5	0.60	17.68	30.1	

<b>PURGE STOP TIME:</b> 14:25	<b>FINAL DTW:</b> 9.70 @ 80% =
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<b>LAB NAME:</b> Test America	<b>SAMPLE ID:</b> mw-1-20160520
-------------------------------	---------------------------------

Sample mw-1-20160520 taken @ 14:14  
**OBSERVATIONS/COMMENTS:** DTW is measured relative to ground surface, 3.5' below top of casing

PUMP SET AT = 15' FEET

WATER PURGING AND SAMPLING LOG

PROJECT NAME: McFarland

FIELD PERSON: S. Leick

PROJECT NUMBER: 2132108R

PROJECT MANAGER: D. Rowe

PROJECT LOCATION: Tacoma, WA

DATE: 5-20-16

PURGING/SAMPLING METHOD: LOW Flow		WELL NUMBER: MW-4	
EQUIPMENT CLEANING METHOD: Liavinox / Disposable		CASING RADIUS: 2 (in.)	
PURGE WATER DISPOSAL: On-site 55-gallon drum		TOTAL DEPTH (TD): 15' (ft.)	
		DEPTH TO WATER (DTW): 12.38 (ft.)	
		CASING VOLUME: 3.66 (gal.)	
		(TD-DTW) (CR) <sup>2</sup> (.163) =	
GALLONS PURGED: ~1.5	CASING VOLUMES: 0.41	WELL VOLUMES: N/A (gal.)	

PURGE START TIME: 1605				PURGE RATE (GPM): 0.06			
TIME/GALLONS PURGED	pH	CONDUCTIVITY (µmhos/cm)	TURBIDITY (NTU)	D.O. (mg/L)	TEMP (°C)	ORP (mv)	COMMENTS
1610	6.60	348	7.8	22.3	14.43	-91.2	
1613	6.28	346	2.7	0.81	13.85	-72.5	
1616	6.26	347	2.3	0.57	13.72	-70.2	
1619	6.29	348	3.2	0.49	13.56	-68.0	
1624	6.35	348	4.0	0.39	13.36	-67.8	
1629	6.41	349	3.5	0.36	13.21	-68.8	

PURGE STOP TIME: 1640	FINAL DTW: 12.51 @ 80% =
LAB NAME: Test America	SAMPLE ID: MW-4-20160520

OBSERVATIONS/COMMENTS:

Sample MW-4-20160520  
taken @ 1629

PUMP SET AT = 15'

FEET

**Attachment C**  
**Field Inspection Notes**

# TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

## ANALYTICAL REPORT

TestAmerica Laboratories, Inc.

TestAmerica Seattle  
5755 8th Street East  
Tacoma, WA 98424  
Tel: (253)922-2310

TestAmerica Job ID: 580-59766-1

Client Project/Site: McFarland-Tacoma, Washington  
Revision: 1

For:

Ramboll Environ US Corporation  
8440 SE Sunnybrook Blvd  
Suite 204  
Clackamas, Oregon 97015

Attn: Devon Rowe



Authorized for release by:  
6/17/2016 3:35:04 PM

Wendy Jonas, Project Manager I  
(253)922-2310  
[wendy.jonas@testamericainc.com](mailto:wendy.jonas@testamericainc.com)

### LINKS

Review your project  
results through

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[www.testamericainc.com](http://www.testamericainc.com)

*This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.*

*Results relate only to the items tested and the sample(s) as received by the laboratory.*

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## Case Narrative

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

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**Job ID: 580-59766-1**

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**Laboratory: TestAmerica Seattle**

### Narrative

#### Receipt

The samples were received on 5/20/2016 5:17 PM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 1.5° C.

#### GC Semi VOA

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### Metals

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

#### General Chemistry

No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

## Definitions/Glossary

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

### Qualifiers

#### Metals

Qualifier	Qualifier Description
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
B	Compound was found in the blank and sample.

### Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains no Free Liquid
DER	Duplicate error ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision level concentration
MDA	Minimum detectable activity
EDL	Estimated Detection Limit
MDC	Minimum detectable concentration
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative error ratio
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)



# Client Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

**Client Sample ID: MW-2-20160520**

**Date Collected: 05/20/16 10:09**

**Date Received: 05/20/16 17:17**

**Lab Sample ID: 580-59766-1**

**Matrix: Water**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.9		0.80	0.42	mg/L			05/25/16 13:01	1
Sulfate	ND		0.50	0.13	mg/L			05/25/16 13:01	1

## Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	24		1.1	0.023	mg/L		06/02/16 15:47	06/03/16 12:35	1
Potassium	5.0		3.3	0.15	mg/L		06/02/16 15:47	06/03/16 12:35	1
Sodium	11		2.0	0.55	mg/L		06/02/16 15:47	06/03/16 12:35	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00088	J	0.0010	0.00027	mg/L		06/02/16 15:47	06/03/16 12:34	1
Copper	ND		0.0020	0.00060	mg/L		06/02/16 15:47	06/03/16 12:34	1
Lead	0.000058	J	0.00040	0.000034	mg/L		06/02/16 15:47	06/03/16 12:34	1
Magnesium	11		10	3.0	mg/L		06/02/16 15:47	06/03/16 12:34	1
Zinc	0.0019	J	0.0070	0.0019	mg/L		06/02/16 15:47	06/03/16 12:34	1

## Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0013		0.0010	0.00027	mg/L		06/03/16 10:40	06/06/16 19:03	1
Arsenic	0.00095	J	0.0010	0.00027	mg/L		06/13/16 14:55	06/14/16 12:39	1
Copper	0.0021	B	0.0020	0.00060	mg/L		06/03/16 10:40	06/06/16 19:03	1
Copper	ND		0.0020	0.00060	mg/L		06/13/16 14:55	06/14/16 12:39	1
Lead	0.00011	J	0.00040	0.000034	mg/L		06/03/16 10:40	06/06/16 19:03	1
Lead	0.00011	J	0.00040	0.000034	mg/L		06/13/16 14:55	06/14/16 12:39	1
Zinc	0.0033	J	0.0070	0.0019	mg/L		06/03/16 10:40	06/06/16 19:03	1
Zinc	0.0029	J	0.0070	0.0019	mg/L		06/13/16 14:55	06/14/16 12:39	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	130		4.0	1.7	mg/L			05/25/16 09:09	1
Bicarbonate Alkalinity as CaCO3	130		4.0	1.7	mg/L			05/25/16 09:09	1
Carbonate Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Hydroxide Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	120		20	20	mg/L			05/24/16 16:00	1

TestAmerica Seattle

# Client Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

**Client Sample ID: MW-99-20160520**

**Date Collected: 05/20/16 10:20**

**Date Received: 05/20/16 17:17**

**Lab Sample ID: 580-59766-2**

**Matrix: Water**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	5.8		0.80	0.42	mg/L			05/25/16 13:14	1
Sulfate	ND		0.50	0.13	mg/L			05/25/16 13:14	1

## Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	25		1.1	0.023	mg/L		06/02/16 15:47	06/03/16 13:00	1
Potassium	5.1		3.3	0.15	mg/L		06/02/16 15:47	06/03/16 13:00	1
Sodium	11		2.0	0.55	mg/L		06/02/16 15:47	06/03/16 13:00	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.00084	J	0.0010	0.00027	mg/L		06/02/16 15:47	06/03/16 19:46	1
Copper	ND		0.0020	0.00060	mg/L		06/02/16 15:47	06/03/16 19:46	1
Lead	0.000042	J	0.00040	0.000034	mg/L		06/02/16 15:47	06/03/16 19:46	1
Magnesium	10		10	3.0	mg/L		06/02/16 15:47	06/03/16 19:46	1
Zinc	ND		0.0070	0.0019	mg/L		06/02/16 15:47	06/03/16 19:46	1

## Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0015		0.0010	0.00027	mg/L		06/03/16 10:40	06/06/16 19:47	1
Arsenic	0.0010		0.0010	0.00027	mg/L		06/13/16 14:56	06/14/16 12:26	1
Copper	0.0015	J B	0.0020	0.00060	mg/L		06/03/16 10:40	06/06/16 19:47	1
Copper	ND		0.0020	0.00060	mg/L		06/13/16 14:56	06/14/16 12:26	1
Lead	0.00014	J	0.00040	0.000034	mg/L		06/03/16 10:40	06/06/16 19:47	1
Lead	0.000056	J	0.00040	0.000034	mg/L		06/13/16 14:56	06/14/16 12:26	1
Zinc	0.0023	J	0.0070	0.0019	mg/L		06/03/16 10:40	06/06/16 19:47	1
Zinc	0.0022	J	0.0070	0.0019	mg/L		06/13/16 14:56	06/14/16 12:26	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	130		4.0	1.7	mg/L			05/25/16 09:09	1
Bicarbonate Alkalinity as CaCO3	130		4.0	1.7	mg/L			05/25/16 09:09	1
Carbonate Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Hydroxide Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	150		20	20	mg/L			05/24/16 16:00	1

TestAmerica Seattle

# Client Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

**Client Sample ID: MW-3-20160520**

**Date Collected: 05/20/16 13:05**

**Date Received: 05/20/16 17:17**

**Lab Sample ID: 580-59766-3**

**Matrix: Water**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.2		0.80	0.42	mg/L			05/25/16 13:40	1
Sulfate	ND		0.50	0.13	mg/L			05/25/16 13:40	1

## Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	23		1.1	0.023	mg/L		06/02/16 15:47	06/03/16 13:04	1
Potassium	2.1	J	3.3	0.15	mg/L		06/02/16 15:47	06/03/16 13:04	1
Sodium	8.7		2.0	0.55	mg/L		06/02/16 15:47	06/03/16 13:04	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.016		0.0010	0.00027	mg/L		06/02/16 15:47	06/03/16 19:51	1
Copper	0.00062	J	0.0020	0.00060	mg/L		06/02/16 15:47	06/03/16 19:51	1
Lead	0.00035	J	0.00040	0.000034	mg/L		06/02/16 15:47	06/03/16 19:51	1
Magnesium	13		10	3.0	mg/L		06/02/16 15:47	06/03/16 19:51	1
Zinc	0.0079		0.0070	0.0019	mg/L		06/02/16 15:47	06/03/16 19:51	1

## Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0038		0.0010	0.00027	mg/L		06/03/16 10:40	06/06/16 19:51	1
Arsenic	0.0034		0.0010	0.00027	mg/L		06/13/16 14:56	06/14/16 12:30	1
Copper	0.0016	J B	0.0020	0.00060	mg/L		06/03/16 10:40	06/06/16 19:51	1
Copper	ND		0.0020	0.00060	mg/L		06/13/16 14:56	06/14/16 12:30	1
Lead	0.000034	J	0.00040	0.000034	mg/L		06/03/16 10:40	06/06/16 19:51	1
Lead	ND		0.00040	0.000034	mg/L		06/13/16 14:56	06/14/16 12:30	1
Zinc	0.0078		0.0070	0.0019	mg/L		06/03/16 10:40	06/06/16 19:51	1
Zinc	0.0060	J	0.0070	0.0019	mg/L		06/13/16 14:56	06/14/16 12:30	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	130		4.0	1.7	mg/L			05/25/16 09:09	1
Bicarbonate Alkalinity as CaCO3	130		4.0	1.7	mg/L			05/25/16 09:09	1
Carbonate Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Hydroxide Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	200		20	20	mg/L			05/24/16 16:00	1

TestAmerica Seattle

# Client Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

**Client Sample ID: MW-1-20160520**

**Date Collected: 05/20/16 14:14**

**Date Received: 05/20/16 17:17**

**Lab Sample ID: 580-59766-4**

**Matrix: Water**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	1.3		0.80	0.42	mg/L			05/25/16 13:53	1
Sulfate	3.4		0.50	0.13	mg/L			05/25/16 13:53	1

## Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	8.6		1.1	0.023	mg/L		06/02/16 15:47	06/03/16 13:07	1
Potassium	1.7	J	3.3	0.15	mg/L		06/02/16 15:47	06/03/16 13:07	1
Sodium	13		2.0	0.55	mg/L		06/02/16 15:47	06/03/16 13:07	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0052		0.0010	0.00027	mg/L		06/02/16 15:47	06/03/16 19:55	1
Copper	0.0065		0.0020	0.00060	mg/L		06/02/16 15:47	06/03/16 19:55	1
Lead	0.00065		0.00040	0.000034	mg/L		06/02/16 15:47	06/03/16 19:55	1
Magnesium	3.1	J	10	3.0	mg/L		06/02/16 15:47	06/03/16 19:55	1
Zinc	0.0065	J	0.0070	0.0019	mg/L		06/02/16 15:47	06/03/16 19:55	1

## Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0027		0.0010	0.00027	mg/L		06/03/16 10:40	06/06/16 19:55	1
Arsenic	0.0023		0.0010	0.00027	mg/L		06/13/16 14:56	06/14/16 12:35	1
Copper	0.0013	J B	0.0020	0.00060	mg/L		06/03/16 10:40	06/06/16 19:55	1
Copper	ND		0.0020	0.00060	mg/L		06/13/16 14:56	06/14/16 12:35	1
Lead	0.000049	J	0.00040	0.000034	mg/L		06/03/16 10:40	06/06/16 19:55	1
Lead	0.000041	J	0.00040	0.000034	mg/L		06/13/16 14:56	06/14/16 12:35	1
Zinc	0.0042	J	0.0070	0.0019	mg/L		06/03/16 10:40	06/06/16 19:55	1
Zinc	0.0041	J	0.0070	0.0019	mg/L		06/13/16 14:56	06/14/16 12:35	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	65		4.0	1.7	mg/L			05/25/16 09:09	1
Bicarbonate Alkalinity as CaCO3	65		4.0	1.7	mg/L			05/25/16 09:09	1
Carbonate Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Hydroxide Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	70		20	20	mg/L			05/24/16 16:00	1

TestAmerica Seattle

# Client Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

**Client Sample ID: MW-4-20160520**

**Date Collected: 05/20/16 16:29**

**Date Received: 05/20/16 17:17**

**Lab Sample ID: 580-59766-5**

**Matrix: Water**

## Method: 300.0 - Anions, Ion Chromatography

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	7.2		0.80	0.42	mg/L			05/25/16 14:06	1
Sulfate	ND		0.50	0.13	mg/L			05/25/16 14:06	1

## Method: 200.7 Rev 4.4 - Metals (ICP)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	27		1.1	0.023	mg/L		06/02/16 15:47	06/03/16 13:10	1
Potassium	3.6		3.3	0.15	mg/L		06/02/16 15:47	06/03/16 13:10	1
Sodium	11		2.0	0.55	mg/L		06/02/16 15:47	06/03/16 13:10	1

## Method: 200.8 - Metals (ICP/MS)

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0050		0.0010	0.00027	mg/L		06/02/16 15:47	06/03/16 20:00	1
Copper	ND		0.0020	0.00060	mg/L		06/02/16 15:47	06/03/16 20:00	1
Lead	ND		0.00040	0.000034	mg/L		06/02/16 15:47	06/03/16 20:00	1
Magnesium	12		10	3.0	mg/L		06/02/16 15:47	06/03/16 20:00	1
Zinc	ND		0.0070	0.0019	mg/L		06/02/16 15:47	06/03/16 20:00	1

## Method: 200.8 - Metals (ICP/MS) - Dissolved

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	0.0055		0.0010	0.00027	mg/L		06/03/16 10:40	06/06/16 19:59	1
Arsenic	0.0053		0.0010	0.00027	mg/L		06/14/16 12:17	06/14/16 17:20	1
Copper	0.0013	J B	0.0020	0.00060	mg/L		06/03/16 10:40	06/06/16 19:59	1
Copper	ND		0.0020	0.00060	mg/L		06/14/16 12:17	06/14/16 17:20	1
Lead	ND		0.00040	0.000034	mg/L		06/03/16 10:40	06/06/16 19:59	1
Lead	ND		0.00040	0.000034	mg/L		06/14/16 12:17	06/14/16 17:20	1
Zinc	0.0034	J	0.0070	0.0019	mg/L		06/03/16 10:40	06/06/16 19:59	1
Zinc	0.0030	J	0.0070	0.0019	mg/L		06/14/16 12:17	06/14/16 17:20	1

## General Chemistry

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	150		4.0	1.7	mg/L			05/25/16 09:09	1
Bicarbonate Alkalinity as CaCO3	150		4.0	1.7	mg/L			05/25/16 09:09	1
Carbonate Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Hydroxide Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Analyte	Result	Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	120		20	20	mg/L			05/24/16 16:00	1

TestAmerica Seattle

# QC Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

## Method: 300.0 - Anions, Ion Chromatography

Lab Sample ID: MB 590-6754/1012

Matrix: Water

Analysis Batch: 6754

Client Sample ID: Method Blank  
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	ND		0.80	0.42	mg/L			05/25/16 12:48	1
Sulfate	ND		0.50	0.13	mg/L			05/25/16 12:48	1

Lab Sample ID: LCS 590-6754/1011

Matrix: Water

Analysis Batch: 6754

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Chloride	12.5	12.1		mg/L		97	90 - 110
Sulfate	12.5	12.3		mg/L		98	90 - 110

## Method: 200.7 Rev 4.4 - Metals (ICP)

Lab Sample ID: MB 580-218676/14-A

Matrix: Water

Analysis Batch: 218768

Client Sample ID: Method Blank  
Prep Type: Total/NA  
Prep Batch: 218676

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Calcium	ND		1.1	0.023	mg/L		06/02/16 15:47	06/03/16 12:25	1
Potassium	ND		3.3	0.15	mg/L		06/02/16 15:47	06/03/16 12:25	1
Sodium	ND		2.0	0.55	mg/L		06/02/16 15:47	06/03/16 12:25	1

Lab Sample ID: LCS 580-218676/15-A

Matrix: Water

Analysis Batch: 218768

Client Sample ID: Lab Control Sample  
Prep Type: Total/NA  
Prep Batch: 218676

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	10.0	10.3		mg/L		103	85 - 115
Potassium	10.0	10.3		mg/L		103	85 - 115
Sodium	10.0	9.66		mg/L		97	85 - 115

Lab Sample ID: LCSD 580-218676/16-A

Matrix: Water

Analysis Batch: 218768

Client Sample ID: Lab Control Sample Dup  
Prep Type: Total/NA  
Prep Batch: 218676

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Calcium	10.0	10.5		mg/L		105	85 - 115	2	20
Potassium	10.0	10.4		mg/L		104	85 - 115	1	20
Sodium	10.0	9.88		mg/L		99	85 - 115	2	20

Lab Sample ID: 580-59766-1 MS

Matrix: Water

Analysis Batch: 218768

Client Sample ID: MW-2-20160520  
Prep Type: Total/NA  
Prep Batch: 218676

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Calcium	24		10.0	33.9		mg/L		94	70 - 130
Potassium	5.0		10.0	14.9		mg/L		99	70 - 130
Sodium	11		10.0	20.1		mg/L		94	70 - 130

TestAmerica Seattle

# QC Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

## Method: 200.7 Rev 4.4 - Metals (ICP) (Continued)

Lab Sample ID: 580-59766-1 MSD

Matrix: Water

Analysis Batch: 218768

Client Sample ID: MW-2-20160520

Prep Type: Total/NA

Prep Batch: 218676

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Calcium	24		10.0	34.7		mg/L		103	70 - 130	2	20
Potassium	5.0		10.0	15.3		mg/L		103	70 - 130	3	20
Sodium	11		10.0	20.4		mg/L		97	70 - 130	2	20

Lab Sample ID: 580-59766-1 DU

Matrix: Water

Analysis Batch: 218768

Client Sample ID: MW-2-20160520

Prep Type: Total/NA

Prep Batch: 218676

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Calcium	24		24.0		mg/L		2	20
Potassium	5.0		4.91		mg/L		2	20
Sodium	11		10.5		mg/L		3	20

## Method: 200.8 - Metals (ICP/MS)

Lab Sample ID: MB 580-218676/14-A

Matrix: Water

Analysis Batch: 218750

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 218676

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010	0.00027	mg/L		06/02/16 15:47	06/03/16 12:21	1
Copper	ND		0.0020	0.00060	mg/L		06/02/16 15:47	06/03/16 12:21	1
Lead	ND		0.00040	0.000034	mg/L		06/02/16 15:47	06/03/16 12:21	1
Magnesium	ND		10	3.0	mg/L		06/02/16 15:47	06/03/16 12:21	1
Zinc	ND		0.0070	0.0019	mg/L		06/02/16 15:47	06/03/16 12:21	1

Lab Sample ID: LCS 580-218676/15-A

Matrix: Water

Analysis Batch: 218750

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 218676

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.100	0.0992		mg/L		99	85 - 115
Copper	0.100	0.102		mg/L		102	85 - 115
Lead	0.100	0.108		mg/L		108	85 - 115
Magnesium	10.0	10.2		mg/L		102	85 - 115
Zinc	0.100	0.101		mg/L		101	85 - 115

Lab Sample ID: LCSD 580-218676/16-A

Matrix: Water

Analysis Batch: 218750

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 218676

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	0.100	0.0997		mg/L		100	85 - 115	1	20
Copper	0.100	0.102		mg/L		102	85 - 115	1	20
Lead	0.100	0.110		mg/L		110	85 - 115	2	20
Magnesium	10.0	10.3		mg/L		103	85 - 115	1	20
Zinc	0.100	0.103		mg/L		103	85 - 115	2	20

TestAmerica Seattle



# QC Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

## Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: 580-59766-1 MS

Matrix: Water

Analysis Batch: 218750

Client Sample ID: MW-2-20160520

Prep Type: Total/NA

Prep Batch: 218676

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.00088	J	0.100	0.0991		mg/L		98	70 - 130
Copper	ND		0.100	0.0979		mg/L		98	70 - 130
Lead	0.000058	J	0.100	0.107		mg/L		107	70 - 130
Magnesium	11		10.0	20.2		mg/L		96	70 - 130
Zinc	0.0019	J	0.100	0.0999		mg/L		100	70 - 130

Lab Sample ID: 580-59766-1 MSD

Matrix: Water

Analysis Batch: 218750

Client Sample ID: MW-2-20160520

Prep Type: Total/NA

Prep Batch: 218676

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	Limits	RPD	Limit
Arsenic	0.00088	J	0.100	0.0998		mg/L		99	70 - 130	1	20
Copper	ND		0.100	0.0988		mg/L		99	70 - 130	1	20
Lead	0.000058	J	0.100	0.109		mg/L		109	70 - 130	2	20
Magnesium	11		10.0	20.3		mg/L		98	70 - 130	1	20
Zinc	0.0019	J	0.100	0.102		mg/L		102	70 - 130	2	20

Lab Sample ID: 580-59766-1 DU

Matrix: Water

Analysis Batch: 218750

Client Sample ID: MW-2-20160520

Prep Type: Total/NA

Prep Batch: 218676

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	Limit
Arsenic	0.00088	J	0.000840	J	mg/L		4	20
Copper	ND		ND		mg/L		NC	20
Lead	0.000058	J	0.0000507	J	mg/L		14	20
Magnesium	11		10.2		mg/L		4	20
Zinc	0.0019	J	ND		mg/L		NC	20

Lab Sample ID: MB 580-218721/14-A

Matrix: Water

Analysis Batch: 218990

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 218721

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010	0.00027	mg/L		06/03/16 10:40	06/06/16 18:55	1
Copper	0.00156	J	0.0020	0.00060	mg/L		06/03/16 10:40	06/06/16 18:55	1
Lead	ND		0.00040	0.000034	mg/L		06/03/16 10:40	06/06/16 18:55	1
Zinc	ND		0.0070	0.0019	mg/L		06/03/16 10:40	06/06/16 18:55	1

Lab Sample ID: LCS 580-218721/15-A

Matrix: Water

Analysis Batch: 218990

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 218721

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	Limits
Arsenic	0.100	0.103		mg/L		103	85 - 115
Copper	0.100	0.112		mg/L		112	85 - 115
Lead	0.100	0.101		mg/L		101	85 - 115
Zinc	0.100	0.102		mg/L		102	85 - 115

TestAmerica Seattle

# QC Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

## Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCSD 580-218721/16-A

Matrix: Water

Analysis Batch: 218990

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 218721

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.100	0.103		mg/L		103	85 - 115	0	20
Copper	0.100	0.111		mg/L		111	85 - 115	1	20
Lead	0.100	0.102		mg/L		102	85 - 115	1	20
Zinc	0.100	0.102		mg/L		102	85 - 115	0	20

Lab Sample ID: MB 580-219667/21-A

Matrix: Water

Analysis Batch: 219776

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 219667

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010	0.00027	mg/L		06/13/16 14:56	06/14/16 10:31	1
Copper	ND		0.0020	0.00060	mg/L		06/13/16 14:56	06/14/16 10:31	1
Lead	ND		0.00040	0.000034	mg/L		06/13/16 14:56	06/14/16 10:31	1
Zinc	ND		0.0070	0.0019	mg/L		06/13/16 14:56	06/14/16 10:31	1

Lab Sample ID: LCS 580-219667/22-A

Matrix: Water

Analysis Batch: 219776

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 219667

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.0961		mg/L		96	85 - 115
Copper	0.100	0.0951		mg/L		95	85 - 115
Lead	0.100	0.0961		mg/L		96	85 - 115
Zinc	0.100	0.0963		mg/L		96	85 - 115

Lab Sample ID: LCSD 580-219667/23-A

Matrix: Water

Analysis Batch: 219776

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 219667

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.100	0.0964		mg/L		96	85 - 115	0	20
Copper	0.100	0.0955		mg/L		96	85 - 115	0	20
Lead	0.100	0.0954		mg/L		95	85 - 115	1	20
Zinc	0.100	0.0958		mg/L		96	85 - 115	0	20

Lab Sample ID: MB 580-219760/13-A

Matrix: Water

Analysis Batch: 219863

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 219760

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Arsenic	ND		0.0010	0.00027	mg/L		06/14/16 12:17	06/14/16 16:31	1
Copper	ND		0.0020	0.00060	mg/L		06/14/16 12:17	06/14/16 16:31	1
Lead	ND		0.00040	0.000034	mg/L		06/14/16 12:17	06/14/16 16:31	1
Zinc	ND		0.0070	0.0019	mg/L		06/14/16 12:17	06/14/16 16:31	1

TestAmerica Seattle

# QC Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

## Method: 200.8 - Metals (ICP/MS) (Continued)

Lab Sample ID: LCS 580-219760/14-A

Matrix: Water

Analysis Batch: 219863

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 219760

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.100	0.101		mg/L		101	85 - 115
Copper	0.100	0.100		mg/L		100	85 - 115
Lead	0.100	0.102		mg/L		102	85 - 115
Zinc	0.100	0.101		mg/L		101	85 - 115

Lab Sample ID: LCSD 580-219760/15-A

Matrix: Water

Analysis Batch: 219863

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 219760

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.100	0.0976		mg/L		98	85 - 115	3	20
Copper	0.100	0.0966		mg/L		97	85 - 115	4	20
Lead	0.100	0.0975		mg/L		97	85 - 115	4	20
Zinc	0.100	0.0969		mg/L		97	85 - 115	4	20

Lab Sample ID: 580-59766-1 MS

Matrix: Water

Analysis Batch: 218990

Client Sample ID: MW-2-20160520

Prep Type: Dissolved

Prep Batch: 218721

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits
Arsenic	0.0013		0.100	0.101		mg/L		99	70 - 130
Copper	0.0021	B	0.100	0.107		mg/L		104	70 - 130
Lead	0.00011	J	0.100	0.0981		mg/L		98	70 - 130
Zinc	0.0033	J	0.100	0.100		mg/L		97	70 - 130

Lab Sample ID: 580-59766-1 MSD

Matrix: Water

Analysis Batch: 218990

Client Sample ID: MW-2-20160520

Prep Type: Dissolved

Prep Batch: 218721

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Arsenic	0.0013		0.100	0.105		mg/L		104	70 - 130	4	20
Copper	0.0021	B	0.100	0.112		mg/L		110	70 - 130	5	20
Lead	0.00011	J	0.100	0.100		mg/L		100	70 - 130	2	20
Zinc	0.0033	J	0.100	0.102		mg/L		99	70 - 130	2	20

Lab Sample ID: 580-59766-1 DU

Matrix: Water

Analysis Batch: 218990

Client Sample ID: MW-2-20160520

Prep Type: Dissolved

Prep Batch: 218721

Analyte	Sample Result	Sample Qualifier	DU Result	DU Qualifier	Unit	D	RPD	RPD Limit
Arsenic	0.0013		0.00138		mg/L		9	20
Copper	0.0021	B	0.00230		mg/L		9	20
Lead	0.00011	J	0.000102	J	mg/L		10	20
Zinc	0.0033	J	0.00327	J	mg/L		1	20

TestAmerica Seattle

# QC Sample Results

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

## Method: SM 2320B - Alkalinity

Lab Sample ID: MB 590-6739/1

Matrix: Water

Analysis Batch: 6739

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Alkalinity	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Bicarbonate Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Carbonate Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1
Hydroxide Alkalinity as CaCO3	ND		4.0	1.7	mg/L			05/25/16 09:09	1

Lab Sample ID: LCS 590-6739/2

Matrix: Water

Analysis Batch: 6739

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Alkalinity	500	475		mg/L		95	90 - 110
Bicarbonate Alkalinity as CaCO3	500	475		mg/L		95	90 - 110

## Method: SM 2340C - Hardness, Total (mg/l as CaCO3)

Lab Sample ID: MB 580-218001/1

Matrix: Water

Analysis Batch: 218001

Client Sample ID: Method Blank

Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	RL	RL	Unit	D	Prepared	Analyzed	Dil Fac
Hardness as calcium carbonate	ND		2.0	2.0	mg/L			05/24/16 16:00	1

Lab Sample ID: LCS 580-218001/2

Matrix: Water

Analysis Batch: 218001

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Hardness as calcium carbonate	1000	980		mg/L		98	90 - 110

TestAmerica Seattle

# Lab Chronicle

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

**Client Sample ID: MW-2-20160520**

**Date Collected: 05/20/16 10:09**

**Date Received: 05/20/16 17:17**

**Lab Sample ID: 580-59766-1**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	6754	05/25/16 13:01	MRS	TAL SPK
Total/NA	Prep	200.8			218676	06/02/16 15:47	MKN	TAL SEA
Total/NA	Analysis	200.7 Rev 4.4		1	218768	06/03/16 12:35	HJM	TAL SEA
Dissolved	Prep	200.8			219667	06/13/16 14:55	PAB	TAL SEA
Dissolved	Analysis	200.8		1	219776	06/14/16 12:39	FCW	TAL SEA
Dissolved	Prep	200.8			218721	06/03/16 10:40	MKN	TAL SEA
Dissolved	Analysis	200.8		1	218990	06/06/16 19:03	FCW	TAL SEA
Total/NA	Prep	200.8			218676	06/02/16 15:47	MKN	TAL SEA
Total/NA	Analysis	200.8		1	218750	06/03/16 12:34	FCW	TAL SEA
Total/NA	Analysis	SM 2320B		1	6739	05/25/16 09:09	JSP	TAL SPK
Total/NA	Analysis	SM 2340C		1	218001	05/24/16 16:00	Z1T	TAL SEA

**Client Sample ID: MW-99-20160520**

**Date Collected: 05/20/16 10:20**

**Date Received: 05/20/16 17:17**

**Lab Sample ID: 580-59766-2**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	6754	05/25/16 13:14	MRS	TAL SPK
Total/NA	Prep	200.8			218676	06/02/16 15:47	MKN	TAL SEA
Total/NA	Analysis	200.7 Rev 4.4		1	218768	06/03/16 13:00	HJM	TAL SEA
Dissolved	Prep	200.8			219667	06/13/16 14:56	PAB	TAL SEA
Dissolved	Analysis	200.8		1	219776	06/14/16 12:26	FCW	TAL SEA
Dissolved	Prep	200.8			218721	06/03/16 10:40	MKN	TAL SEA
Dissolved	Analysis	200.8		1	218990	06/06/16 19:47	FCW	TAL SEA
Total/NA	Prep	200.8			218676	06/02/16 15:47	MKN	TAL SEA
Total/NA	Analysis	200.8		1	218882	06/03/16 19:46	FCW	TAL SEA
Total/NA	Analysis	SM 2320B		1	6739	05/25/16 09:09	JSP	TAL SPK
Total/NA	Analysis	SM 2340C		1	218001	05/24/16 16:00	Z1T	TAL SEA

**Client Sample ID: MW-3-20160520**

**Date Collected: 05/20/16 13:05**

**Date Received: 05/20/16 17:17**

**Lab Sample ID: 580-59766-3**

**Matrix: Water**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	6754	05/25/16 13:40	MRS	TAL SPK
Total/NA	Prep	200.8			218676	06/02/16 15:47	MKN	TAL SEA
Total/NA	Analysis	200.7 Rev 4.4		1	218768	06/03/16 13:04	HJM	TAL SEA
Dissolved	Prep	200.8			219667	06/13/16 14:56	PAB	TAL SEA
Dissolved	Analysis	200.8		1	219776	06/14/16 12:30	FCW	TAL SEA
Dissolved	Prep	200.8			218721	06/03/16 10:40	MKN	TAL SEA
Dissolved	Analysis	200.8		1	218990	06/06/16 19:51	FCW	TAL SEA
Total/NA	Prep	200.8			218676	06/02/16 15:47	MKN	TAL SEA

TestAmerica Seattle

# Lab Chronicle

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

**Client Sample ID: MW-3-20160520**

**Lab Sample ID: 580-59766-3**

**Date Collected: 05/20/16 13:05**

**Matrix: Water**

**Date Received: 05/20/16 17:17**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	200.8		1	218882	06/03/16 19:51	FCW	TAL SEA
Total/NA	Analysis	SM 2320B		1	6739	05/25/16 09:09	JSP	TAL SPK
Total/NA	Analysis	SM 2340C		1	218001	05/24/16 16:00	Z1T	TAL SEA

**Client Sample ID: MW-1-20160520**

**Lab Sample ID: 580-59766-4**

**Date Collected: 05/20/16 14:14**

**Matrix: Water**

**Date Received: 05/20/16 17:17**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	6754	05/25/16 13:53	MRS	TAL SPK
Total/NA	Prep	200.8			218676	06/02/16 15:47	MKN	TAL SEA
Total/NA	Analysis	200.7 Rev 4.4		1	218768	06/03/16 13:07	HJM	TAL SEA
Dissolved	Prep	200.8			219667	06/13/16 14:56	PAB	TAL SEA
Dissolved	Analysis	200.8		1	219776	06/14/16 12:35	FCW	TAL SEA
Dissolved	Prep	200.8			218721	06/03/16 10:40	MKN	TAL SEA
Dissolved	Analysis	200.8		1	218990	06/06/16 19:55	FCW	TAL SEA
Total/NA	Prep	200.8			218676	06/02/16 15:47	MKN	TAL SEA
Total/NA	Analysis	200.8		1	218882	06/03/16 19:55	FCW	TAL SEA
Total/NA	Analysis	SM 2320B		1	6739	05/25/16 09:09	JSP	TAL SPK
Total/NA	Analysis	SM 2340C		1	218001	05/24/16 16:00	Z1T	TAL SEA

**Client Sample ID: MW-4-20160520**

**Lab Sample ID: 580-59766-5**

**Date Collected: 05/20/16 16:29**

**Matrix: Water**

**Date Received: 05/20/16 17:17**

Prep Type	Batch Type	Batch Method	Run	Dilution Factor	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	300.0		1	6754	05/25/16 14:06	MRS	TAL SPK
Total/NA	Prep	200.8			218676	06/02/16 15:47	MKN	TAL SEA
Total/NA	Analysis	200.7 Rev 4.4		1	218768	06/03/16 13:10	HJM	TAL SEA
Dissolved	Prep	200.8			219760	06/14/16 12:17	PAB	TAL SEA
Dissolved	Analysis	200.8		1	219863	06/14/16 17:20	HJM	TAL SEA
Dissolved	Prep	200.8			218721	06/03/16 10:40	MKN	TAL SEA
Dissolved	Analysis	200.8		1	218990	06/06/16 19:59	FCW	TAL SEA
Total/NA	Prep	200.8			218676	06/02/16 15:47	MKN	TAL SEA
Total/NA	Analysis	200.8		1	218882	06/03/16 20:00	FCW	TAL SEA
Total/NA	Analysis	SM 2320B		1	6739	05/25/16 09:09	JSP	TAL SPK
Total/NA	Analysis	SM 2340C		1	218001	05/24/16 16:00	Z1T	TAL SEA

## Laboratory References:

TAL SEA = TestAmerica Seattle, 5755 8th Street East, Tacoma, WA 98424, TEL (253)922-2310

TAL SPK = TestAmerica Spokane, 11922 East 1st Ave, Spokane, WA 99206, TEL (509)924-9200

TestAmerica Seattle

# Certification Summary

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

## Laboratory: TestAmerica Seattle

Unless otherwise noted, all analytes for this laboratory were covered under each certification below.

Authority	Program	EPA Region	Certification ID	Expiration Date
Washington	State Program	10	C553	02-17-17

The following analytes are included in this report, but certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
200.8	200.8	Water	Magnesium

## Laboratory: TestAmerica Spokane

All certifications held by this laboratory are listed. Not all certifications are applicable to this report.

Authority	Program	EPA Region	Certification ID	Expiration Date
Alaska (UST)	State Program	10	UST-071	10-31-16
Washington	State Program	10	C569	01-06-17



## Sample Summary

Client: Ramboll Environ US Corporation  
Project/Site: McFarland-Tacoma, Washington

TestAmerica Job ID: 580-59766-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
580-59766-1	MW-2-20160520	Water	05/20/16 10:09	05/20/16 17:17
580-59766-2	MW-99-20160520	Water	05/20/16 10:20	05/20/16 17:17
580-59766-3	MW-3-20160520	Water	05/20/16 13:05	05/20/16 17:17
580-59766-4	MW-1-20160520	Water	05/20/16 14:14	05/20/16 17:17
580-59766-5	MW-4-20160520	Water	05/20/16 16:29	05/20/16 17:17

TestAmerica Seattle  
5755 8th Street E.  
Tacoma, WA 98424  
Tel. 253-922-2310  
Fax 253-922-5047  
www.testamericainc.com

☐ KUSN  
☐ Short Hold

Chain of  
Custody Record

26718

6/17/2016

Client: Rambol Environ Client Contact: Deven Rowe - DRowe@ramboll.com Date: 5-20-16 Chain of Custody Number: 26718

Address: 901 5th Ave, Suite 2820 Telephone Number (Area Code)/Fax Number: 360-601-8315 Lab Number: 97106 Page        of       

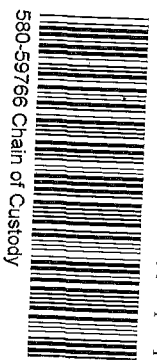
City: Seattle State: WA Zip Code: 98104 Sampler: Sam Leick Lab Contact: Sam Leick

Project Name and Location (State): McFarland - Tacoma, Washington Billing Contact: Sam Leick - sleick@ramboll.com

Contract/Purchase Order/Quote No.:

Sample ID and Location/Description (Containers for each sample may be combined on one line)	Date	Time	Matrix					Containers & Preservatives					Analysis (Attach list if more space is needed)				
			Air	Aqueous	Sed.	Soil	Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH					

1- MW-2-20160520	5/20/16	10:09	X						1								
2- MW-99-20160520	5/20/16	10:20															
3- MW-3-20160520	5/20/16	13:05															
4- MW-1-20160520	5/20/16	14:14															
5- MW-4-20160520	5/20/16	16:29															



TB A2 Cooler Cor 1.5 Unc 1.5 w/cs  
Cooler Desc Lg Bk/alky @ Lab  
WebPacks Packing  
cli dre

Cooler: ☒ Yes ☐ No Cooler Temp:        Possible Hazard Identification: ☐ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown ☒ Sample Disposal: ☒ Return to Client ☐ Archive For        Months (A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required (business days): ☐ 24 Hours ☐ 48 Hours ☐ 5 Days ☒ 10 Days ☐ 15 Days ☐ Other       

1. Relinquished By: Sam Leick / Samantha Leick Date: 5/20/16 Time: 17:17 1. Received By: Sam Leick / Blankinship Date: 5/20/16 Time: 17:17

2. Relinquished By: Sam Leick Date:        Time:        2. Received By: Blankinship Date:        Time:       

3. Relinquished By: Blankinship Date:        Time:        3. Received By: Blankinship Date:        Time:

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11

## Chain of Custody Record



**TestAmerica**  
THE LEADER IN ENVIRONMENTAL TESTING

Client Information (Sub Contract Lab)						Sampler	Lab PM	COC No:						
Client Contact						Jones, Wendy L		580-38572.1						
Shipping/Receiving						E-Mail:	wendy.jones@testamericainc.com	Page 1 of 1						
Company TestAmerica Laboratories, Inc						Analysis Requested		Job # 580-59766-1						
Address 11922 East 1st Ave,						Due Date Requested: 6/2/2016		Preservation Codes:						
City Spokane						TAT Requested (days):		A - HCL B - NaOH C - Zn Acetate D - Nitric Acid E - NaHSO4 F - MeOH G - Archlor H - Ascorbic Acid I - Ice J - DI Water K - EDTA L - EDA Other:						
State, Zip WA, 99206						PO #		M - Hexane N - None O - AsnAO2 P - Na2OAS Q - Na2SO3 R - Na2S2O3 S - H2SO4 T - TSP Dodecalhydrate U - Acetone V - MCAA W - pn 4-5 Z - other (specify)						
Phone: 509-924-9200(Tel) 509-924-9290(Fax)						Project # 58005365								
Email:						SSOW#								
Project Name: McFarland-Tacoma, Washington														
Site														
Sample Identification - Client ID (Lab ID)						Sample Date	Sample Time	Sample Type (C=Comp, G=grab)	Matrix (Water, Sealed, O-washed, BT-Titanium A-M)	Field Filtered Sample Yes or No	Retention MS/MS/Yes or No	Total Number of Containers	Special Instructions/Note:	
MMW-2-20160520 (580-59766-1)						5/20/16	10:09	Pacific	Water	X	X	1		
MMW-99-20160520 (580-59766-2)						5/20/16	10:20	Pacific	Water	X	X	1		
MMW-3-20160520 (580-59766-3)						5/20/16	13:05	Pacific	Water	X	X	1		
MMW-1-20160520 (580-59766-4)						5/20/16	14:14	Pacific	Water	X	X	1		
MMW-4-20160520 (580-59766-5)						5/20/16	16:29	Pacific	Water	X	X	1		
Possible Hazard Identification						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) <input type="checkbox"/> Return To Client <input type="checkbox"/> Dispose By Lab <input type="checkbox"/> Archive For _____ Months								
Unconfirmed Deliverable Requested: I, II, III, IV, Other (specify)						Special Instructions/QC Requirements:								
Empty Kit Relinquished by:						Date	Time	Method of Shipment						
Relinquished by:						Date/Time	5/23/16	Company	Received By:	Date/Time	5/24/16	9:55	Company	
Relinquished by:						Date/Time		Company	Received by:	Date/Time			Company	
Relinquished by:						Date/Time		Company	Received by:	Date/Time			Company	
Custody Seal Intact: A Yes X No						Custody Seal No.: 1622239						Cooler Temperature(s) °C and Other Remarks: 0.5°C 10003		

## Login Sample Receipt Checklist

Client: Ramboll Environ US Corporation

Job Number: 580-59766-1

Login Number: 59766

List Source: TestAmerica Seattle

List Number: 1

Creator: Abello, Andrea N

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	N/A	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

## Login Sample Receipt Checklist

Client: Ramboll Environ US Corporation

Job Number: 580-59766-1

Login Number: 59766

List Number: 2

Creator: Kratz, Sheila J

List Source: TestAmerica Spokane

List Creation: 05/24/16 09:59 AM

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	N/A	Received project as a subcontract.
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	

**Attachment D**  
**Site Photographs**





Photo 1: Cleanout boot; looking to the northeast (Marine View Drive in background).



Photo 2: Top of containment cell looking east from the northwest corner.





Photo 3: View to the north from the southwestern corner of the containment cell.

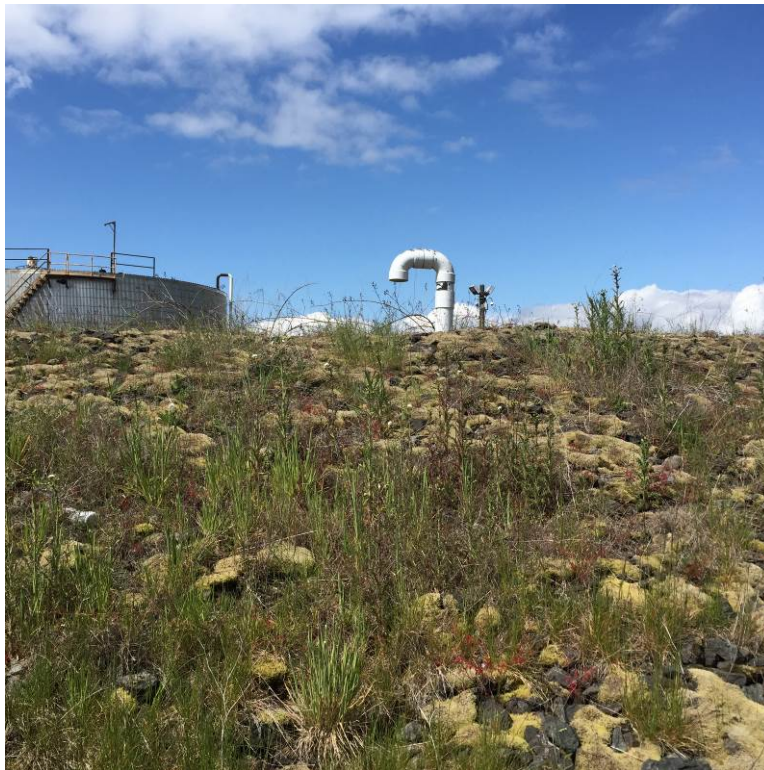


Photo 4: View to the northwest of the northern gas boot.





Photo 5: View to the east along the southern side of the containment cell. Leachate collection sump (manhole in foreground) and MCW-1 (stick-up metal pipe in background) are visible.



Photo 6: View to the northeast of the cell drain boot showing some aging on the paint coating. Scotch broom and blackberry bush growth visible.





Photo 7: View to the north of the eastern side of the containment cell.



Photo 8: View to the northwest of the southern gas vent boot.





Photo 9: View to the south of Scotch broom growth around containment cell.



Photo 10: View to the north of the Scotch broom adjacent to the southeastern side of the containment cell.





Photo 11: View to the north of the Scotch broom growth to the east of the containment cell.



Photo 12: View to the east of the northeastern clean-out boot.





Photo 13: View to the south along eastern side of the containment cell.



Photo 14: View to the west along the northern side of the containment cell.