February 14, 2012

Marvinetta Hartwig
Hartwig & Associates
188 Inverness Drive West, Suite 675
Englewood, CO 80112

RE: Limited Subsurface Investigation and Temporary Groundwater Monitoring Well Installation, U.S. Highway 6 Bridges at Interstate 25, Denver, Colorado
Olsson Associates Project #011-2359

Dear Ms. Hartwig,

The letter presents the observations and results from a limited subsurface investigation and temporary monitoring well construction performed in December 2011 and a groundwater sampling event performed in January 2012 conducted per Olsson Associate's July 2011 proposal and cost estimate. These activities were conducted in connection with the pre-construction and redevelopment of the U.S. Highway 6 Bridges between Interstate Highway 25 and Federal Boulevard in the City and County of Denver. All six of the temporary monitoring wells were located within the Colorado Department of Transportation (CDOT) right-of-way.

Limited Subsurface Investigation

The limited subsurface investigation was conducted on December 7, 9, 12, and 20, 2011 and coincided with the installation of the retaining wall geotechnical borings RW1-2, RW2-1, RW3-2, RW5-1, RW6-1, and RW7-1 as shown on Figure 1. The drilling of the retaining wall borings were overseen and logged by Rocksol, and the work was performed by Dakota Drilling, of Denver, Colorado. Olsson personnel also logged the borings to record the lithologies encountered and any evidence of petroleum hydrocarbon impact, evidence of chemical impacts, and the depth to groundwater.

Olsson personnel oversaw the installation and completion of the temporary groundwater monitoring wells in each of the retaining wall borings which were selected based on their location and expected depth that Rocksol needed to complete the geotechnical investigation. Soils collected for the geotechnical investigation were examined for evidence of staining or odor, and were screened using a photoionization detector (PID) to assess the presence of petroleum hydrocarbons. No evidence of significant petroleum hydrocarbon or chemical impacts was observed in any of the soil borings.

Soil samples were collected from the interval at or slightly above the groundwater table and also from the bottom of each boring. These were placed into laboratory provided glass sample jars and were submitted to ALS Laboratories in Houston, Texas for the analysis of the petroleum hydrocarbon constituents, benzene, toluene, ethylbenzene, and total xylenes (BTEX) by Method SW 8260, total concentrations of the eight Resource Conservation and Recovery Act (RCRA) Metals by SW 6020/SW 7471A, and percent moisture by SW 3550. The sample jars were labeled with the date, time, analytical parameters, and were placed into plastic coolers and stored on ice. The soil samples were shipped to ALS Laboratories in Houston, Texas following chain-of-custody protocols and custody seals.

Soil Analytical Results

The laboratory analytical results indicated that BTEX compound concentrations were not detected above the laboratory reporting limit in any of the soil samples, and with one exception were not detected above the method detection limit in the soil samples. Toluene was reported at an estimated concentration of 0.0097 mg/kg in the RW7-1 at 30 feet below ground surface (bgs). This toluene result is qualified with a "J" indicating that it was reported above the method detection limit, but is less than the laboratory reporting limit, and is well below the state regulatory limits for toluene in soils.

The BTEX and percent moisture results are shown on Table 1 and are compared to the Colorado Soil Evaluation Values (CSEV) established by the Colorado Department of Public Health and Environment (CDPHE) as soil cleanup standards (July 2011) as part of the Voluntary Cleanup Program. The most stringent soil cleanup standards are usually the residential soil standards which are based on toxicology data and potential routes of exposure.

The soil samples were also submitted for total metal concentrations of the eight RCRA metals. The results indicated that arsenic was detected in concentrations that exceed the residential soil standard in 9 of the 12 soil samples submitted. These arsenic concentrations may be due to naturally occurring arsenic in the soils. Estimated concentrations above the method detection limit (MDL) and at or slightly below the CSEV residential standard of 0.39 milligrams per kilogram (mg/kg) were reported in three of the samples. The highest arsenic concentration was 2.27 mg/kg in boring RW3-2 at 16 feet to 18 feet below ground surface (bgs).

The laboratory reported that concentrations of barium were detected in all 12 soil samples, but none of the concentrations exceed the residential soil standard of 15,000 mg/kg. The total barium results ranged from 6.5 mg/kg (RW2-1 at 21.5 to 22 ft) to 113 mg/kg (RW3-2 16 to 18 ft) Cadmium concentrations were reported above the MDL, but below the laboratory reporting limit in 9 of the 12 soil samples, and are qualified with a "J" as an estimated value. The laboratory reported that cadmium was not detected above the MDL in the three remaining soil samples, and all of the cadmium results are well below the CSEV residential soil standard of 70 mg/kg.

The laboratory reported that concentrations of chromium were detected in all 12 of the soil samples submitted from the six retaining wall/temporary monitoring well borings. The chromium concentrations ranged from 0.654 mg/kg (RW2-1 at 29 to 30 ft) to 8.20 mg/kg (RW7-1 at 30 ft), and are well below the CSEV residential soil limit of 120,000 mg/kg.

The laboratory reported that lead concentrations were detected in all 12 of the soil samples. The lead concentrations ranged from 1.17 mg/kg (RW2-1 at 29 to 30 ft) to 8.23 mg/kg (RW7-1 at 30 ft). The total lead concentrations are all well below the CSEV residential soil standard of 400 mg/kg.

The laboratory reported that total mercury was not detected in 8 of the 12 soil samples, and reported that mercury concentrations were estimated above the MDL in two of the soil samples. The concentrations that were reported above the laboratory reporting limit were 0.00505 mg/kg (RW3-2 at 16 to 18 ft) and 0.00824 mg/kg (RW7-1 at 30 ft), and are well below the CSEV residential soil standard for mercury of 13 mg/kg.

The laboratory reported concentrations of selenium were not detected in three of the soil samples and estimated values above the MDL, but below the reporting limit, were reported in three other soil samples. The laboratory reported that the remaining six soil samples had selenium concentrations that ranged from 0.486 mg/kg (RW2-1 21.5 to 22 ft) to 2.33 mg/kg (RW3-2 16 to 18 ft). These concentrations are all well below the CSEV residential soil standard for selenium of 390 mg/kg.

The laboratory reported that concentrations of silver were not detected in any of the 12 soil samples submitted. Therefore, silver does not appear to be an issue with any of the soils, and the laboratory reporting limit of approximately 0.5 mg/kg is well below the CSEV residential soil standard of 390 mg/kg.

Temporary Groundwater Monitoring Well Installation

Six temporary groundwater monitoring wells were installed in retaining wall geotechnical borings RW1-2, RW2-1, RW3-2, RW5-1, RW6-1, and RW7-1. The monitoring wells were constructed by Dakota Drilling with oversight from Olsson Associates. The temporary monitoring wells were constructed in accordance with the Colorado State Engineer's Office requirements.

A notice of intent was supposed to be filed with the Colorado State Engineer's Office three days prior to the drilling; however, this was not done due to an oversight. Olsson personnel did submit copies of the Well Construction and Test Reports to the Colorado State Engineer's Office after the fact.

The six borings were constructed as temporary groundwater monitoring wells, using 2-inch diameter schedule 40 polyvinyl chloride (PVC), 0.010-inch factory slotted screen, and 2-inch diameter schedule 40 PVC blank pipe casing. The total depths ranged from 25 feet bgs to 35 feet bgs. Approximately 15 feet to 20 feet of screen were used in each well. A threaded bottom cap was installed at the base of the screen section. The annulus around the screen from the bottom of the boring was filled with 10-20 Colorado Silica Sand.

The sand pack was brought up to two feet above the top of the well screen. The remaining annular space in the wells around the blank PVC pipe casing was filled with 3/8-diameter bentonite crumbles up to approximately one foot bgs. Potable water was used to hydrate the bentonite to form a seal in the well annulus. The PVC casing was capped with a locking, expandable J-plug. The top of each well was completed with a flush-mounted, traffic rated well box with a removable bolted cover. The well flush-mounted well box was grouted in place using quick setting concrete.

Groundwater Sampling

Grab groundwater samples were collected from the six temporary monitoring wells on January 4, 2012. Prior to groundwater sampling, the depth to groundwater was measured using a water level indicator in each of the monitoring wells relative to the north side top of the PVC well casing. The depth to groundwater ranged from 17.01 feet bgs (RW2-1) to 29.71 ft bgs (RW5-1) Field parameters including temperature, pH, specific conductance, dissolved oxygen, and oxidation-reduction potential were measured in each of the wells. In accordance with Olsson's July 2011 proposal the monitoring wells were not developed, nor was groundwater purged from the wells, prior to sampling. Groundwater flow is expected to be directed toward and parallel the flow in the South Platte River, i.e. to the north-northeast.

The grab groundwater samples were collected using dedicated, disposable bailers and nylon rope. The samples were placed into laboratory provided containers and were shipped on ice to ALS Laboratories in Houston, Texas following chain-of-custody protocols and custody seals. The groundwater samples were submitted for laboratory analysis of BTEX by SW 8260, Oil & Grease E 1664, total concentrations of the 8 RCRA metals SW 6020/SW 7471A, pH by E150.1, Total Suspended Solids (TSS) M2540D, and E.Coli by SM 9221F. The E.Coli samples were analyzed by Industrial Laboratories in Wheat Ridge, Colorado.

Groundwater Analytical Results

The groundwater analytical results show that concentrations of the BTEX compounds were not detected above the MDL in any of the six groundwater samples. Concentrations of oil & grease were not detected above the MDL in two samples, but were estimated above the MDL in four of the six samples ranging from 0.0638 milligrams per liter (mg/L) (RW1-2) to 1.69 mg/L (RW2-1). All four of these results are qualified with a "J" value which indicates that they were detected above the MDL, but not the laboratory reporting limit. The Colorado Basic Standards for Groundwater have a limit of 10 mg/L for Oil & Grease.

The laboratory reported total metal concentrations arsenic, barium, chromium, lead, and selenium that exceed the Colorado Basic Groundwater Quality Standards in all 6 of the samples. The laboratory reported concentrations of cadmium in 3 of the 6 samples that exceed the Colorado Basic Groundwater Quality Standard of 0.005 mg/L. Concentrations of mercury were detected, but did not exceed the Colorado Basic Groundwater Quality Standard of 0.002 mg/L. Concentrations of silver were estimated above the MDL in 5 of the groundwater samples and were reported at 0.0112 mg/L in the sample from RW1-2. The concentrations of silver did not exceed the Colorado Basic Groundwater Quality Standard of 0.05 mg/L silver.

The pH readings were all qualified with an "H" meaning that they were analyzed outside of holding time since pH has an instantaneous holding time, and was also measured in the field. The pH results ranged from 6.38 (RW1-2) to 6.54 (RW2-1). Concentrations of TSS ranged from 10,800 mg/L (RW3-2) to 48,200 mg/L (RW7-1).

Industrial Laboratories reported concentrations of E.Coli bacteria in the "most probable number per milliliter" (MPN/ml). The laboratory report states that the analysis conforms to EPA 40CFR 136. The results in three of the samples were "Non-Detect" reported at < 2 MPN/ml (RW1-2, RW5-1, and RW6-1), two of the sample results were 4 MPN/ml (RW2-1 and RW3-1), and the highest count was 7 MPN/ml (RW7-1). These results are below CDPHE WQCD 5 CCR 1002-38 regulation for E. Coli which has limits of 126/100 ml.

Conclusions

The soil analytical results did not exceed the CSEV residential cleanup goals for any of the analytes except for arsenic. According to *Elements in North American Soils – Second Edition* (Dragun and Cherkiri, 2005) background arsenic in Colorado soils range from 1.3 part per million (ppm) to 16 ppm, and mean of 6.1 ppm. Colorado surface horizon soils ranged from 1.2 ppm to 24 ppm, with a mean of 5.4 ppm. One ppm is approximately equivalent to 1 mg/kg. Therefore, the arsenic concentrations appear to be within the range of natural background.

The groundwater results for BTEX compounds show that groundwater samples were not impacted. Concentrations of oil & grease were estimated above the MDL, but were below the laboratory reporting limit, and were well below 10 mg/L.

Total concentrations of the RCRA metals, arsenic, barium, cadmium, chromium, lead, and selenium, exceed the Colorado Basic Groundwater Standards in several or all six of the monitoring well samples. The wells were not developed or purged prior to sampling and were likely very turbid, which may have resulted in the elevated metals concentrations. The groundwater samples were not filtered. The TSS numbers are also very high which indicates that the groundwater sample turbidity was also high.

The highest results for several of the parameters were collected from monitoring wells RW7-1 and RW3-2 which were the two wells closest to the South Platte River. These wells were also completed into the top of bedrock (Denver Formation); whereas the other four wells were completed entirely within the South Platte alluvium. Developing the wells to remove sediment and then allowing a minimum of 24-hours before re-sampling could result in lower total metals concentrations, or filtering the samples in the field may be another option.

The elevated total metals concentrations could pose a problem for disposal if groundwater is encounter during excavation, and if excavation dewatering is required. The CDPHE WQCD may require that the water be treated prior to discharge if the water will go to the South Platte River. If no longer needed the temporary monitoring wells should be properly abandoned and well abandonment forms should be submitted to the Colorado State Engineer's Office.

Olsson appreciates this opportunity to be of service in performing this limited subsurface investigation and groundwater monitoring for Hartwig and Associates. Please contact me at (303) 237-2072 if you have any questions.

Sincerely,

Olsson Associates

James W. Hix

James W. Hix
Senior Geologist

Attachments

TABLES

Table 1

Soil Analytical Results - Volatiles
U.S. 6 Bridges at I-25 and Bryant Street
Denver, Colorado

Sample ID and depth (feet)	Date Sampled	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Percent Moisture (wt%)
CSEV Table residential		1.2	4700	6	710	N/A
CSEV Table worker		1.6	24000	7.8	1000	N/A
CSEV Table GW Protection		0.17	50	100	75	N/A
RW1-2 @ 19ft	12/9/11	< 0.005	< 0.005	< 0.005	< 0.015	3.04
RW1-2 @ 25 ft	12/9/11	< 0.005	< 0.005	< 0.005	< 0.015	14.4
RW2-1 @ 21.5-22 ft	12/7/11	< 0.005	< 0.005	< 0.005	< 0.015	6.71
RW2-1 @ 29-30 ft	12/7/11	< 0.005	< 0.005	< 0.005	< 0.015	17.8
RW3-2 @ 16-18 ft	12/7/11	< 0.005	< 0.005	< 0.005	< 0.015	20.2
RW3-2 @ 20-21.5 ft	12/7/11	< 0.005	< 0.005	< 0.005	< 0.015	14.4
RW5-1 @ 26 ft	12/9/11	< 0.005	< 0.005	< 0.005	< 0.015	3.26
RW5-1 @ 35.5 ft	12/9/11	< 0.005	< 0.005	< 0.005	< 0.015	13.1
RW6-1 @ 26 ft	12/12/11	< 0.005	< 0.005	< 0.005	< 0.015	13.4
RW6-1 @ 31.5 ft	12/12/11	< 0.005	< 0.005	< 0.005	< 0.015	NR
RW7-1 @ 18 ft	12/20/11	< 0.005	< 0.005	< 0.005	< 0.015	3.86
RW7-1 @ 30 ft	12/20/11	< 0.005	0.0097 J	< 0.005	< 0.015	18.8

Notes: CSEV – Colorado Soil Evaluation Values, Colorado Department of Public Health and Environment (CDPHE) Soil Cleanup Standards (July 2011)
mg/kg – milligrams per kilogram
< - Analyte not detected above the method detection limit (MDL)
N/A – not applicable
NR – not reported
Percent Moisture in Weight Percent (wt %)

Table 2

Soil Analytical Results – Total RCRA Metals
U.S. 6 Bridges at I-25 and Bryant Street
Denver, Colorado

Sample ID and depth (feet)	Date Sampled	Arsenic (mg/kg)	Barium (mg/kg)	Cadmium (mg/kg)	Chromium (mg/kg)	Lead (mg/kg)	Mercury (mg/kg)	Selenium (mg/kg)	Silver (mg/kg)
CSEV Table residential		0.39	15000	70	120000	400	13	390	390
CSEV Table worker		1.6	160000	770	1500000	800	160	5100	5100
CSEV Table leachate (mg/L)		0.22	44	0.11	2.2	1.1	0.025	0.44	1.1
RW1-2 @ 19ft	12/9/11	**0.683**	22.0	0.0755 J	1.48	3.03	< 0.00358	0.545	< 0.463
RW1-2 @ 25 ft	12/9/11	**0.551**	14.9	0.0762 J	1.34	1.89	< 0.00351	0.575	< 0.469
RW2-1 @ 21.5-22 ft	12/7/11	0.345 J	6.50	0.0660 J	0.936	1.49	< 0.00343	0.486	< 0.442
RW2-1 @ 29-30 ft	12/7/11	**0.509**	14.2	0.0680 J	0.654	1.17	< 0.0034	0.299 J	< 0.437
RW3-2 @ 16-18 ft	12/7/11	**2.27**	113	0.169 J	8.20	6.15	0.00505	2.33	< 0.443
RW3-2 @ 20-21.5 ft	12/7/11	**0.987**	27.3	0.0859 J	2.50	4.04	0.00292 J	0.592	< 0.459
RW5-1 @ 26 ft	12/9/11	0.334 J	10.5	0.0753 J	1.13	1.91	< 0.00358	0.637	< 0.480
RW5-1 @ 35.5 ft	12/9/11	0.400 J	10.9	0.0707 J	1.02	1.36	< 0.00358	0.423 J	< 0.465
RW6-1 @ 26 ft	12/12/11	**0.916**	16.0	< 0.491	1.12	1.51	< 0.00345	0.304 J	< 0.491
RW6-1 @ 31.5 ft	12/12/11	**0.547**	12.2	< 0.469	1.82	1.59	0.000423 J	< 0.469	< 0.469
RW7-1 @ 18 ft	12/20/11	**0.879**	15.4	< 0.480	1.38	1.87	< 0.00345	< 0.480	< 0.480
RW7-1 @ 30 ft	12/20/11	**0.900**	93.5	0.0960 J	3.34	8.23	0.00824	< 0.463	< 0.463

Notes: CSEV – Colorado Soil Evaluation Values, Colorado Department of Public Health and Environment (CDPHE) Soil Cleanup Standards (July 2011)
Values in bold exceed the residential soil standard for arsenic.
mg/kg – milligrams per kilogram
mg/L – milligrams per liter (Leachate Value) (Total metal concentrations reported)
J – Estimated concentration reported above the method detection limit (MDL) but below the reporting limit (RL)
< - Analyte not detected above the method detection limit (MDL)

Table 3

Groundwater Analytical Results – Field Parameters
U.S. 6 Bridges at I-25 and Bryant Street
Denver, Colorado

Sample ID	Date Sampled	Depth to Water (ft-bgs)	Measuring Point Elevation (ft)	Approximate Groundwater Elevation (ft)	Temper-ature (°C)	Dissolved Oxygen (mg/L)	pH (s.u.)	Specific Conductance (mg/cm^3)	ORP
RW 1-2	01/04/2012	22.00	5214.27	5192.27	16.43	0.54	6.6	1.405	- 25.5
RW 2-1	01/04/2012	17.01	5209.19	5192.18	17.27	0.44	6.3	1.617	8.4
RW 3-2	01/04/2012	14.52	5208.11	5193.59	15.43	0.22	5.6	1.269	187.5
RW 5-1	01/04/2012	29.71	5222.43	5192.72	17.67	0.43	6.2	1.524	11.2
RW 6-1	01/04/2012	25.50	5218.23	5192.73	17.32	0.60	6.4	1.423	26.5
RW 7-1	01/04/2012	20.50	5214.10	5193.60	16.07	0.40	6.8	1.372	337.2

Notes:
Groundwater level measurements were taken using an oil/water interface probe. The groundwater elevations were calculated from survey elevation data provided by the Lund Partnership and Rocksol. Field parameter data was collected using a downhole YSI model 556 water quality meter.

Ft-bgs: Feet below ground surface
(°C) – Temperature in degrees centigrade
Mg/L – milligrams per liter
s.u. – standard units of pH
mg/cm^3 - milligrams per cubic centimeter
ORP – oxidation reduction potential

Table 4

Groundwater Analytical Results – Petroleum Constituents
U.S. 6 Bridges at I-25 and Bryant Street
Denver, Colorado

Sample ID	Date Sampled	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Total Xylenes (mg/L)	Oil & Grease (mg/L)
5 CCR 1002-41 Regulation 41		0.005	1.0	0.70	10.0	N/A
5 CCR 1002-62 Regulation 62		N/A	N/A	N/A	N/A	10
CSEV 2011		0.005	0.56	0.70	1.4	N/A
RW 1-2	01/04/2012	< 0.005	< 0.005	< 0.005	< 0.015	0.638 J
RW 2-1	01/04/2012	< 0.005	< 0.005	< 0.005	< 0.015	1.69 J
RW 3-2	01/04/2012	< 0.005	< 0.005	< 0.005	< 0.015	< 2.00
RW 5-1	01/04/2012	< 0.005	< 0.005	< 0.005	< 0.015	0.652 J
RW 6-1	01/04/2012	< 0.005	< 0.005	< 0.005	< 0.015	< 2.00
RW 7-1	01/04/2012	< 0.005	< 0.005	< 0.005	< 0.015	0.682 J

Notes:
5 CCR 1002-41 (Regulation 41) Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Commission - The Basic Standards for Groundwater, Amended October 2009, and 5 CCR 1002-62 (Regulation 62) Regulations for Effluent Limitations Amended February 2008
CSEV – Colorado Soil Evaluation Values, CDPHE July 2011
mg/L– milligrams per liter
< - Analyte not detected above the method detection limit (MDL)
J – Estimated concentration of analyte above the method detection limit (MDL) but below the laboratory reporting limit (RL).
N/A – Not Applicable

Table 5

Groundwater Analytical Results – Total RCRA Metals
U.S. 6 Bridges at I-25 and Bryant Street
Denver, Colorado

Sample ID	Date Sampled	Arsenic (mg/L)	Barium (mg/L)	Cadmium (mg/L)	Chromium (mg/L)	Lead (mg/L)	Mercury (mg/L)	Selenium (mg/L)	Silver (mg/L)
5 CCR 1002-41 Regulation 41		0.01	2.0	0.005	0.1	0.05	0.002	0.05	0.05
5 CCR 1002-38 Regulation 38		0.0002 (ch) 0.340 (ac)	2.0	0.005	0.050	0.05	0.01 (total)	0.05	0.05
CSEV 2011		0.01	2.0	0.005	0.1	0.05	0.0011	0.02	0.05
RW 1-2	01/04/2012	**0.0994**	**11.4**	**0.00640**	**0.753**	**2.07**	0.000833	**0.0984**	0.0112
RW 2-1	01/04/2012	**0.0512**	**2.66**	0.00329	**0.282**	**0.348**	0.000465	0.0312	0.00127 J
RW 3-2	01/04/2012	**0.0784**	**4.25**	**0.00615**	**0.241**	**0.628**	0.00137	0.0352	0.00194 J
RW 5-1	01/04/2012	**0.0755**	**6.61**	0.00377	**0.293**	**0.576**	0.000980	**0.0652**	0.00358 J
RW 6-1	01/04/2012	**0.143**	**4.20**	**0.0093**	**0.549**	**0.425**	0.00178	**0.0708**	0.00232 J
RW 7-1	01/04/2012	**0.112**	**4.85**	0.00486	**0.270**	**0.360**	0.00117	**0.0518**	0.00176 J

Notes:
Colorado Department of Public Health and Environment (CDPHE) 5 CCR 1002-41 (Regulation 41) Water Quality Control Commission – The Basic Standards for Groundwater Amended, October 2009
CDPHE 5 CCR 1002-38 (Regulation 38) Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin, Amended June 13, 2011. The values are for the Upper South Platte River Basin, Stream Segment 14 – Main stem of the South Platte River from the outlet of Chatfield Reservoir to the Burlington Ditch diversion in Denver, Colorado. Arsenic (acute) = 0.340 mg/L (dissolved), Arsenic chronic = 0.0002 mg/L (total recoverable)*
CSEV – Colorado Soil Evaluation Values, Water Standard CDPHE - Water Standards (July 2011)

Values in bold exceed one or more of the Groundwater Standards. Therefore, if groundwater is encountered in excavations and results in dewatering, the groundwater may require treatment prior to discharge to surface waters to meet the standards. The depth to groundwater was approximately 20 feet below ground surface as measured in the six wells.

mg/L – milligrams per liter (Total metal concentrations were reported . These samples are grab samples without prior well development or sample filtration.)
J – Estimated concentration reported above the method detection limit (MDL) but below the reporting limit (RL)
< - Analyte not detected above the method detection limit (MDL)
(ac) acute (1-day)
(ch) chronic (30-day)
Trec – total recoverable metal concentration

*The Colorado Department of Transporation (CDOT), the Regional Transportation District (RTD), and the City and County of Denver requested an emergency adoption of a revision to the water + fish arsenic standard for Segment 14 of the Upper South Platte River Basin in order to facilitate the issuance of Colorado Discharge Permit System (CDPS) permits to segment 14 with chronic arsenic effluent limitations that are achievable with current and reasonable treatment capabilities. The Commission found that he revision was necessary since achieving arsenic discharge permit limitation sthat result from the current arsenic standard appear to be technologically unachievable. CDOT, RTD, and the City and County of Denver have expended significant public funds for multiple projects attempting to comply with the limits. Therefore, the Commission adopted the emergency temporary modification for the chronic arsenic standard for Segment 14.

It is possible that the treatment used to achieve the arsenic limit would also result in lowering the concentrations of the other metals that exceed limits. Since the samples represent unfiltered grab samples from undeveloped monitoring wells, Olsson recommends that the wells be re-sampled and filtered for dissolved metal concentrations or that the wells be developed and re-sampled for total metal concentrations.

Table 6

Groundwater Analytical Results – pH, TSS, and E. Coli
U.S. 6 Bridges at I-25 and Bryant Street
Denver, Colorado

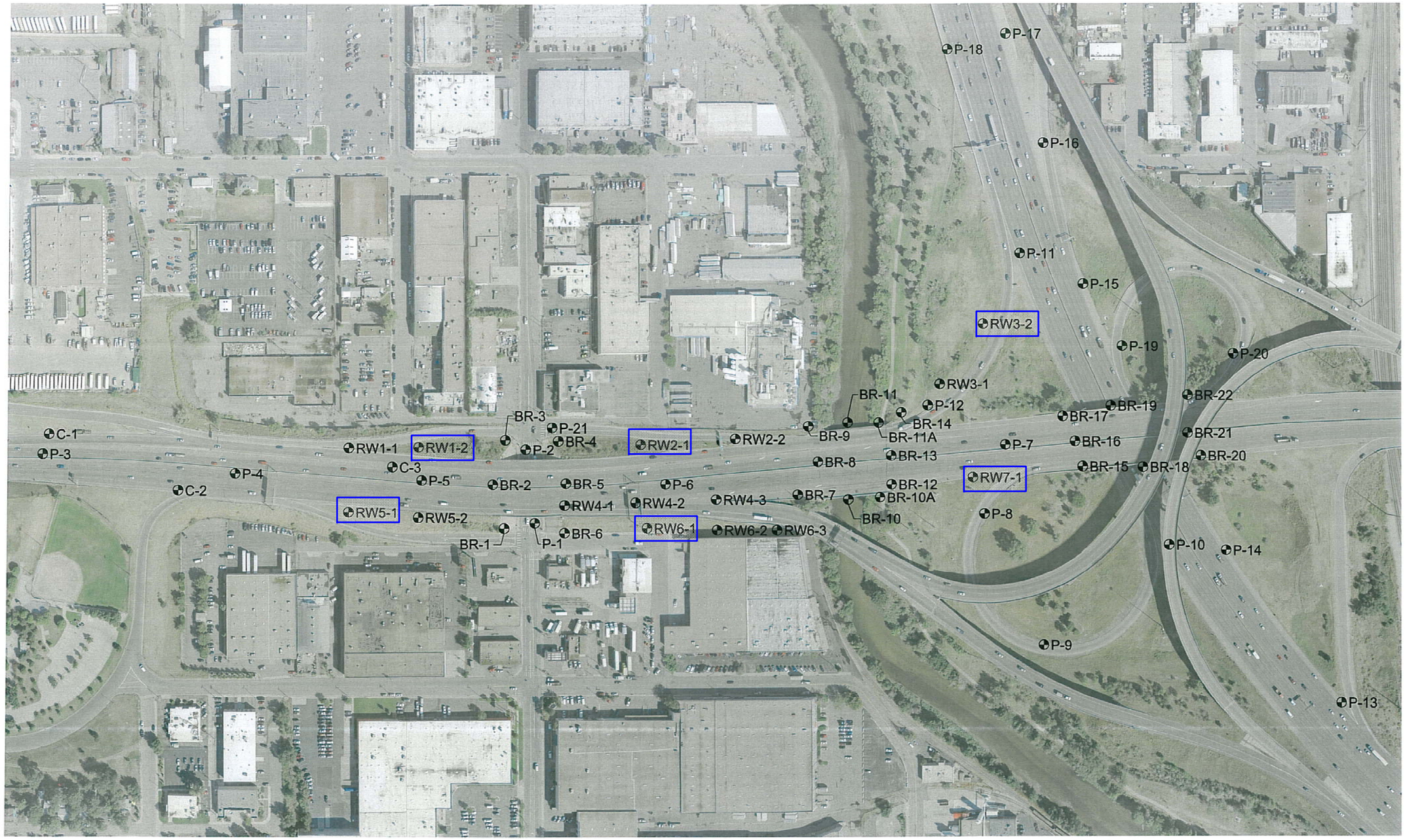
Sample ID	Date Sampled	pH (s.u.)	Total Suspended Solids (mg/L)	E. Coli (MPN/ml)
5 CCR 1002-41 Regulation 41		6.5 to 9.0	N/A	N/A
5 CCR 1002-38 Regulation 38		6.5 to 9.0	N/A	126/100 ml
5 CCR 1002-62 Regulation 62		6.0 to 9.0	45 mg/L (7-day) 30 mg/L (30-day)	N/A
CSEV 2011		N/A	N/A	N/A
RW 1-2	01/04/2012	6.38 (H)	38,100	< 2
RW 2-1	01/04/2012	6.54 (H)	14,700	4
RW 3-2	01/04/2012	6.50 (H)	10,800	4
RW 5-1	01/04/2012	6.36 (H)	19,200	< 2
RW 6-1	01/04/2012	6.33 (H)	30,400	< 2
RW 7-1	01/04/2012	6.39 (H)	48,200	7

Notes:
5 CCR 1002-41 (Regulation 41) Colorado Department of Public Health and Environment (CDPHE) Water Quality Control Commission - The Basic Standards for Groundwater, Amended October 2009, and 5 CCR 1002-62 (Regulation 62) Regulations for Effluent Limitations Amended February 2008
CDPHE 5 CCR 1002-38 (Regulation 38) Classifications and Numeric Standards for South Platte River Basin, Laramie River Basin, Republican River Basin, Smoky Hill River Basin, Amended June 13, 2011. The values are for the Upper South Platte River Basin, Stream Segment 14 – Main stem of the South Platte River from the outlet of Chatfield Reservoir to the Burlington Ditch diversion in Denver, Colorado.
CDPHE 5 CCR 1002-62 (Regulation 62) Regulations for Effluent Limitations Amended February 2008
CSEV – Colorado Soil Evaluation Values, CDPHE July 2011

mg/L– milligrams per liter
N/A – Not Applicable
E. Coli – Escherichia coli bacteria
MPN/ml – most probable number per milliliter

< - Analyte not detected above the method detection limit (MDL)
J – Analyte estimated concentration above the method detection limit (MDL) but below the laboratory reporting limit (RL).
(H) – Analyte was run outside of holding time. Since pH is temperature dependent, pH has an immediate sample hold time and should be measured in the field.

FIGURE



LEGEND:

Geotech Boring Location

RW1-2

Retaining Wall Geotech Boring Location Completed as a Temporary Monitoring Well

TEMPORARY GROUNDWATER MONITORING WELL LOCATIONS

PROJECT NO: 011-2359	U.S. Highway 6 Bridges Denver, Colorado	OLSSON ASSOCIATES 4690 Table Mountain Drive #200 Golden, CO 80403 TEL 303.237.2072 FAX 303.237.2659	EXHIBIT
DRAWN BY: JWH			1
DATE: 02/09/2012			

ATTACHMENT A
SOIL SAMPLE
ANALYTICAL REPORTS

27-Dec-2011

James Hix
Olsson Associates
4690 Table Mountain Drive
Suite 200
Golden, CO 80403

Tel: (303) 237-3139
Fax: (303) 374-3139

Re: CDOT Highway 6 Bridge Work Order: **1112365**

Dear James,

ALS Environmental received 9 samples on 10-Dec-2011 10:50 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 24.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Patricia L. Lynch

Electronically approved by: Mary K. Knowles

Patricia L. Lynch
Project Manager

Certificate No: T104704231-09A-TX

ALS Environmental

Date: 27-Dec-11

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Work Order: **1112365**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
1112365-01	RW3-2 @ 16-18ft	Soil		12/7/2011 10:45	12/10/2011 10:50	☐
1112365-02	RW3-2 @ 20-21.5ft	Soil		12/7/2011 11:02	12/10/2011 10:50	☐
1112365-03	RW2-1 @ 21.5-22ft	Soil		12/7/2011 13:30	12/10/2011 10:50	☐
1112365-04	RW2-1 @ 29-30ft	Soil		12/7/2011 14:00	12/10/2011 10:50	☐
1112365-05	RW1-2 @ 19ft	Soil		12/9/2011 09:50	12/10/2011 10:50	☐
1112365-06	RW1-2 @ 25ft	Soil		12/9/2011 10:50	12/10/2011 10:50	☐
1112365-07	RW5-1 @ 26ft	Soil		12/9/2011 12:35	12/10/2011 10:50	☐
1112365-08	RW5-1 @ 35.5ft	Soil		12/9/2011 12:45	12/10/2011 10:50	☐
1112365-09	Trip Blank 111411-28			12/9/2011 14:12	12/10/2011 10:50	☐

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Work Order: 1112365

Case Narrative

Batch 57604 Mercury, Sample 1112336-11A: MS/MSD is for an unrelated sample.

Batch 57637 Metals, Sample 1112412-21A: MS/MSD and DUP are for an unrelated sample.

ALS Environmental

Date: *27-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Work Order: 1112365
Sample ID: RW3-2 @ 16-18ft
Lab ID: 1112365-01
Collection Date: 12/7/2011 10:45 AM
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			**SW7471A**		Prep Date: **12/14/2011**	Analyst: **JCJ**
Mercury	**5.05**		**3.59**	**µg/Kg**	1	12/14/2011 07:09 PM
METALS			**SW6020**		Prep Date: **12/15/2011**	Analyst: **IGF**
Arsenic	**2.27**		**0.443**	**mg/Kg**	1	12/16/2011 06:03 AM
Barium	**113**		**0.443**	**mg/Kg**	1	12/16/2011 06:03 AM
Cadmium	**0.169**	J	**0.443**	**mg/Kg**	1	12/16/2011 06:03 AM
Chromium	**8.20**		**0.443**	**mg/Kg**	1	12/16/2011 06:03 AM
Lead	**6.15**		**0.443**	**mg/Kg**	1	12/16/2011 06:03 AM
Selenium	**2.33**		**0.443**	**mg/Kg**	1	12/16/2011 06:03 AM
Silver	U		0.443	mg/Kg	1	12/16/2011 06:03 AM
VOLATILES			**SW8260**			Analyst: **WLR**
Benzene	U		5.0	µg/Kg	1	12/14/2011 11:22 AM
Ethylbenzene	U		5.0	µg/Kg	1	12/14/2011 11:22 AM
Toluene	U		5.0	µg/Kg	1	12/14/2011 11:22 AM
Xylenes, Total	U		15	µg/Kg	1	12/14/2011 11:22 AM
Surr: 1,2-Dichloroethane-d4	*79.2*		*70-128*	*%REC*	1	12/14/2011 11:22 AM
Surr: 4-Bromofluorobenzene	*93.5*		*73-126*	*%REC*	1	12/14/2011 11:22 AM
Surr: Dibromofluoromethane	*84.5*		*71-128*	*%REC*	1	12/14/2011 11:22 AM
Surr: Toluene-d8	*93.9*		*73-127*	*%REC*	1	12/14/2011 11:22 AM
MOISTURE			**SW3550**			Analyst: **KAH**
Percent Moisture	**20.2**		**0.0100**	**wt%**	1	12/15/2011 03:20 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *27-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Sample ID: RW3-2 @ 20-21.5ft
Collection Date: 12/7/2011 11:02 AM

Work Order: 1112365
Lab ID: 1112365-02
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			**SW7471A**		Prep Date: **12/14/2011**	Analyst: **JCJ**
Mercury	**2.92**	J	**3.47**	**µg/Kg**	1	12/14/2011 07:11 PM
METALS			**SW6020**		Prep Date: **12/15/2011**	Analyst: **IGF**
Arsenic	**0.987**		**0.459**	**mg/Kg**	1	12/16/2011 06:10 AM
Barium	**27.3**		**0.459**	**mg/Kg**	1	12/16/2011 06:10 AM
Cadmium	**0.0859**	J	**0.459**	**mg/Kg**	1	12/16/2011 06:10 AM
Chromium	**2.50**		**0.459**	**mg/Kg**	1	12/16/2011 06:10 AM
Lead	**4.04**		**0.459**	**mg/Kg**	1	12/16/2011 06:10 AM
Selenium	**0.592**		**0.459**	**mg/Kg**	1	12/16/2011 06:10 AM
Silver	U		0.459	mg/Kg	1	12/16/2011 06:10 AM
VOLATILES			**SW8260**			Analyst: **WLR**
Benzene	U		5.0	µg/Kg	1	12/14/2011 11:49 AM
Ethylbenzene	U		5.0	µg/Kg	1	12/14/2011 11:49 AM
Toluene	U		5.0	µg/Kg	1	12/14/2011 11:49 AM
Xylenes, Total	U		15	µg/Kg	1	12/14/2011 11:49 AM
Surr: 1,2-Dichloroethane-d4	*81.1*		*70-128*	*%REC*	1	12/14/2011 11:49 AM
Surr: 4-Bromofluorobenzene	*94.4*		*73-126*	*%REC*	1	12/14/2011 11:49 AM
Surr: Dibromofluoromethane	*91.8*		*71-128*	*%REC*	1	12/14/2011 11:49 AM
Surr: Toluene-d8	*96.6*		*73-127*	*%REC*	1	12/14/2011 11:49 AM
MOISTURE			**SW3550**			Analyst: **KAH**
Percent Moisture	**14.4**		**0.0100**	**wt%**	1	12/15/2011 03:20 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *27-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Sample ID: RW2-1 @ 21.5-22ft
Collection Date: 12/7/2011 01:30 PM

Work Order: 1112365
Lab ID: 1112365-03
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			**SW7471A**		Prep Date: **12/14/2011**	Analyst: **JCJ**
Mercury	U		3.43	µg/Kg	1	12/14/2011 07:13 PM
METALS			**SW6020**		Prep Date: **12/15/2011**	Analyst: **IGF**
Arsenic	**0.345**	J	**0.442**	**mg/Kg**	1	12/16/2011 06:45 AM
Barium	**6.50**		**0.442**	**mg/Kg**	1	12/16/2011 06:45 AM
Cadmium	**0.0660**	J	**0.442**	**mg/Kg**	1	12/16/2011 06:45 AM
Chromium	**0.936**		**0.442**	**mg/Kg**	1	12/16/2011 06:45 AM
Lead	**1.49**		**0.442**	**mg/Kg**	1	12/16/2011 06:45 AM
Selenium	**0.486**		**0.442**	**mg/Kg**	1	12/16/2011 06:45 AM
Silver	U		0.442	mg/Kg	1	12/16/2011 06:45 AM
VOLATILES			**SW8260**			Analyst: **WLR**
Benzene	U		5.0	µg/Kg	1	12/14/2011 01:40 PM
Ethylbenzene	U		5.0	µg/Kg	1	12/14/2011 01:40 PM
Toluene	U		5.0	µg/Kg	1	12/14/2011 01:40 PM
Xylenes, Total	U		15	µg/Kg	1	12/14/2011 01:40 PM
Surr: 1,2-Dichloroethane-d4	*81.5*		*70-128*	*%REC*	1	12/14/2011 01:40 PM
Surr: 4-Bromofluorobenzene	*95.4*		*73-126*	*%REC*	1	12/14/2011 01:40 PM
Surr: Dibromofluoromethane	*85.6*		*71-128*	*%REC*	1	12/14/2011 01:40 PM
Surr: Toluene-d8	*98.1*		*73-127*	*%REC*	1	12/14/2011 01:40 PM
MOISTURE			**SW3550**			Analyst: **KAH**
Percent Moisture	**6.71**		**0.0100**	**wt%**	1	12/15/2011 03:20 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *27-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Sample ID: RW2-1 @ 29-30ft
Collection Date: 12/7/2011 02:00 PM

Work Order: 1112365
Lab ID: 1112365-04
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			**SW7471A**		Prep Date: **12/14/2011**	Analyst: **JCJ**
Mercury	U		3.40	µg/Kg	1	12/14/2011 07:15 PM
METALS			**SW6020**		Prep Date: **12/15/2011**	Analyst: **IGF**
Arsenic	**0.509**		**0.437**	**mg/Kg**	1	12/16/2011 06:52 AM
Barium	**14.2**		**0.437**	**mg/Kg**	1	12/16/2011 06:52 AM
Cadmium	**0.0680**	J	**0.437**	**mg/Kg**	1	12/16/2011 06:52 AM
Chromium	**0.654**		**0.437**	**mg/Kg**	1	12/16/2011 06:52 AM
Lead	**1.17**		**0.437**	**mg/Kg**	1	12/16/2011 06:52 AM
Selenium	**0.299**	J	**0.437**	**mg/Kg**	1	12/16/2011 06:52 AM
Silver	U		0.437	mg/Kg	1	12/16/2011 06:52 AM
VOLATILES			**SW8260**			Analyst: **WLR**
Benzene	U		5.0	µg/Kg	1	12/14/2011 02:08 PM
Ethylbenzene	U		5.0	µg/Kg	1	12/14/2011 02:08 PM
Toluene	U		5.0	µg/Kg	1	12/14/2011 02:08 PM
Xylenes, Total	U		15	µg/Kg	1	12/14/2011 02:08 PM
Surr: 1,2-Dichloroethane-d4	*77.5*		*70-128*	*%REC*	1	12/14/2011 02:08 PM
Surr: 4-Bromofluorobenzene	*98.8*		*73-126*	*%REC*	1	12/14/2011 02:08 PM
Surr: Dibromofluoromethane	*87.3*		*71-128*	*%REC*	1	12/14/2011 02:08 PM
Surr: Toluene-d8	*102*		*73-127*	*%REC*	1	12/14/2011 02:08 PM
MOISTURE			**SW3550**			Analyst: **KAH**
Percent Moisture	**17.8**		**0.0100**	**wt%**	1	12/15/2011 03:20 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *27-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Sample ID: RW1-2 @ 19ft
Collection Date: 12/9/2011 09:50 AM

Work Order: 1112365
Lab ID: 1112365-05
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			**SW7471A**		Prep Date: **12/14/2011**	Analyst: **JCJ**
Mercury	U		3.58	µg/Kg	1	12/14/2011 07:17 PM
METALS			**SW6020**		Prep Date: **12/15/2011**	Analyst: **IGF**
Arsenic	**0.683**		**0.463**	**mg/Kg**	1	12/16/2011 06:58 AM
Barium	**22.0**		**0.463**	**mg/Kg**	1	12/16/2011 06:58 AM
Cadmium	**0.0755**	J	**0.463**	**mg/Kg**	1	12/16/2011 06:58 AM
Chromium	**1.48**		**0.463**	**mg/Kg**	1	12/16/2011 06:58 AM
Lead	**3.03**		**0.463**	**mg/Kg**	1	12/16/2011 06:58 AM
Selenium	**0.545**		**0.463**	**mg/Kg**	1	12/16/2011 06:58 AM
Silver	U		0.463	mg/Kg	1	12/16/2011 06:58 AM
VOLATILES			**SW8260**			Analyst: **WLR**
Benzene	U		5.0	µg/Kg	1	12/14/2011 02:36 PM
Ethylbenzene	U		5.0	µg/Kg	1	12/14/2011 02:36 PM
Toluene	U		5.0	µg/Kg	1	12/14/2011 02:36 PM
Xylenes, Total	U		15	µg/Kg	1	12/14/2011 02:36 PM
Surr: 1,2-Dichloroethane-d4	*80.1*		*70-128*	*%REC*	1	12/14/2011 02:36 PM
Surr: 4-Bromofluorobenzene	*96.3*		*73-126*	*%REC*	1	12/14/2011 02:36 PM
Surr: Dibromofluoromethane	*80.0*		*71-128*	*%REC*	1	12/14/2011 02:36 PM
Surr: Toluene-d8	*96.8*		*73-127*	*%REC*	1	12/14/2011 02:36 PM
MOISTURE			**SW3550**			Analyst: **KAH**
Percent Moisture	**3.04**		**0.0100**	**wt%**	1	12/15/2011 03:20 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *27-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Sample ID: RW1-2 @ 25ft
Collection Date: 12/9/2011 10:50 AM

Work Order: 1112365
Lab ID: 1112365-06
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			**SW7471A**		Prep Date: **12/14/2011**	Analyst: **JCJ**
Mercury	U		3.51	µg/Kg	1	12/14/2011 07:19 PM
METALS			**SW6020**		Prep Date: **12/15/2011**	Analyst: **IGF**
Arsenic	**0.551**		**0.469**	**mg/Kg**	1	12/16/2011 07:04 AM
Barium	**14.9**		**0.469**	**mg/Kg**	1	12/16/2011 07:04 AM
Cadmium	**0.0762**	J	**0.469**	**mg/Kg**	1	12/16/2011 07:04 AM
Chromium	**1.34**		**0.469**	**mg/Kg**	1	12/16/2011 07:04 AM
Lead	**1.89**		**0.469**	**mg/Kg**	1	12/16/2011 07:04 AM
Selenium	**0.575**		**0.469**	**mg/Kg**	1	12/16/2011 07:04 AM
Silver	U		0.469	mg/Kg	1	12/16/2011 07:04 AM
VOLATILES			**SW8260**			Analyst: **WLR**
Benzene	U		5.0	µg/Kg	1	12/14/2011 03:04 PM
Ethylbenzene	U		5.0	µg/Kg	1	12/14/2011 03:04 PM
Toluene	U		5.0	µg/Kg	1	12/14/2011 03:04 PM
Xylenes, Total	U		15	µg/Kg	1	12/14/2011 03:04 PM
Surr: 1,2-Dichloroethane-d4	*79.9*		*70-128*	*%REC*	1	12/14/2011 03:04 PM
Surr: 4-Bromofluorobenzene	*96.8*		*73-126*	*%REC*	1	12/14/2011 03:04 PM
Surr: Dibromofluoromethane	*92.5*		*71-128*	*%REC*	1	12/14/2011 03:04 PM
Surr: Toluene-d8	*98.2*		*73-127*	*%REC*	1	12/14/2011 03:04 PM
MOISTURE			**SW3550**			Analyst: **KAH**
Percent Moisture	**14.4**		**0.0100**	**wt%**	1	12/15/2011 03:20 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *27-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Sample ID: RW5-1 @ 26ft
Collection Date: 12/9/2011 12:35 PM

Work Order: 1112365
Lab ID: 1112365-07
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			**SW7471A**		Prep Date: **12/14/2011**	Analyst: **JCJ**
Mercury	U		3.58	µg/Kg	1	12/14/2011 07:21 PM
METALS			**SW6020**		Prep Date: **12/15/2011**	Analyst: **IGF**
Arsenic	**0.334**	J	**0.480**	**mg/Kg**	1	12/16/2011 07:10 AM
Barium	**10.5**		**0.480**	**mg/Kg**	1	12/16/2011 07:10 AM
Cadmium	**0.0753**	J	**0.480**	**mg/Kg**	1	12/16/2011 07:10 AM
Chromium	**1.13**		**0.480**	**mg/Kg**	1	12/16/2011 07:10 AM
Lead	**1.91**		**0.480**	**mg/Kg**	1	12/16/2011 07:10 AM
Selenium	**0.637**		**0.480**	**mg/Kg**	1	12/16/2011 07:10 AM
Silver	U		0.480	mg/Kg	1	12/16/2011 07:10 AM
VOLATILES			**SW8260**			Analyst: **WLR**
Benzene	U		5.0	µg/Kg	1	12/14/2011 03:31 PM
Ethylbenzene	U		5.0	µg/Kg	1	12/14/2011 03:31 PM
Toluene	U		5.0	µg/Kg	1	12/14/2011 03:31 PM
Xylenes, Total	U		15	µg/Kg	1	12/14/2011 03:31 PM
Surr: 1,2-Dichloroethane-d4	*80.1*		*70-128*	*%REC*	1	12/14/2011 03:31 PM
Surr: 4-Bromofluorobenzene	*97.4*		*73-126*	*%REC*	1	12/14/2011 03:31 PM
Surr: Dibromofluoromethane	*91.2*		*71-128*	*%REC*	1	12/14/2011 03:31 PM
Surr: Toluene-d8	*97.4*		*73-127*	*%REC*	1	12/14/2011 03:31 PM
MOISTURE			**SW3550**			Analyst: **KAH**
Percent Moisture	**3.26**		**0.0100**	**wt%**	1	12/15/2011 03:20 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *27-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Sample ID: RW5-1 @ 35.5ft
Collection Date: 12/9/2011 12:45 PM

Work Order: 1112365
Lab ID: 1112365-08
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			**SW7471A**		Prep Date: **12/14/2011**	Analyst: **JCJ**
Mercury	U		3.58	µg/Kg	1	12/14/2011 07:23 PM
METALS			**SW6020**		Prep Date: **12/15/2011**	Analyst: **IGF**
Arsenic	**0.400**	J	**0.465**	**mg/Kg**	1	12/16/2011 07:16 AM
Barium	**10.9**		**0.465**	**mg/Kg**	1	12/16/2011 07:16 AM
Cadmium	**0.0707**	J	**0.465**	**mg/Kg**	1	12/16/2011 07:16 AM
Chromium	**1.02**		**0.465**	**mg/Kg**	1	12/16/2011 07:16 AM
Lead	**1.36**		**0.465**	**mg/Kg**	1	12/16/2011 07:16 AM
Selenium	**0.423**	J	**0.465**	**mg/Kg**	1	12/16/2011 07:16 AM
Silver	U		0.465	mg/Kg	1	12/16/2011 07:16 AM
VOLATILES			**SW8260**			Analyst: **WLR**
Benzene	U		5.0	µg/Kg	1	12/14/2011 03:59 PM
Ethylbenzene	U		5.0	µg/Kg	1	12/14/2011 03:59 PM
Toluene	U		5.0	µg/Kg	1	12/14/2011 03:59 PM
Xylenes, Total	U		15	µg/Kg	1	12/14/2011 03:59 PM
Surr: 1,2-Dichloroethane-d4	*80.9*		*70-128*	*%REC*	1	12/14/2011 03:59 PM
Surr: 4-Bromofluorobenzene	*98.8*		*73-126*	*%REC*	1	12/14/2011 03:59 PM
Surr: Dibromofluoromethane	*87.1*		*71-128*	*%REC*	1	12/14/2011 03:59 PM
Surr: Toluene-d8	*98.0*		*73-127*	*%REC*	1	12/14/2011 03:59 PM
MOISTURE			**SW3550**			Analyst: **KAH**
Percent Moisture	**13.1**		**0.0100**	**wt%**	1	12/15/2011 03:20 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *27-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
Sample ID: Trip Blank 111411-28
Collection Date: 12/9/2011 02:12 PM

Work Order: 1112365
Lab ID: 1112365-09
Matrix:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
VOLATILES			**SW8260**			Analyst: **PC**
Benzene	U		5.0	µg/L	1	12/16/2011 06:52 PM
Ethylbenzene	U		5.0	µg/L	1	12/16/2011 06:52 PM
Toluene	U		5.0	µg/L	1	12/16/2011 06:52 PM
Xylenes, Total	U		15	µg/L	1	12/16/2011 06:52 PM
Surr: 1,2-Dichloroethane-d4	*89.1*		*70-125*	*%REC*	1	12/16/2011 06:52 PM
Surr: 4-Bromofluorobenzene	*90.7*		*72-125*	*%REC*	1	12/16/2011 06:52 PM
Surr: Dibromofluoromethane	*92.8*		*71-125*	*%REC*	1	12/16/2011 06:52 PM
Surr: Toluene-d8	*96.8*		*75-125*	*%REC*	1	12/16/2011 06:52 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: 27-Dec-11

Client: Olsson Associates
Work Order: 1112365
Project: CDOT Highway 6 Bridge

QC BATCH REPORT

Batch ID: **57604** Instrument ID **HG02** Method: **SW7471A**

MBLK Sample ID: **GBLKS4-121411-57604** Units: **µg/Kg** Analysis Date: **12/14/2011 06:22 PM**
Client ID: Run ID: **HG02_111214A** SeqNo: **2628387** Prep Date: **12/14/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	U	3.3								

LCS Sample ID: **GLCSS4-121411-57604** Units: **µg/Kg** Analysis Date: **12/14/2011 06:24 PM**
Client ID: Run ID: **HG02_111214A** SeqNo: **2628388** Prep Date: **12/14/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	352	3.3	333.3	0	106	85-115	0			

MS Sample ID: **1112336-11AMS** Units: **µg/Kg** Analysis Date: **12/14/2011 06:30 PM**
Client ID: Run ID: **HG02_111214A** SeqNo: **2628391** Prep Date: **12/14/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	467.3	3.5	354	174.9	82.6	85-115	0			S

MSD Sample ID: **1112336-11AMSD** Units: **µg/Kg** Analysis Date: **12/14/2011 06:32 PM**
Client ID: Run ID: **HG02_111214A** SeqNo: **2628392** Prep Date: **12/14/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	463	3.4	342.5	174.9	84.1	85-115	467.3	0.912	20	S

DUP Sample ID: **1112336-11ADUP** Units: **µg/Kg** Analysis Date: **12/14/2011 06:28 PM**
Client ID: Run ID: **HG02_111214A** SeqNo: **2628390** Prep Date: **12/14/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	175.3	3.4	0	0	0		174.9	0.221	20	

The following samples were analyzed in this batch:

1112365-01B	1112365-02B	1112365-03B
1112365-04B	1112365-05B	1112365-06B
1112365-07B	1112365-08B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112365
Project: CDOT Highway 6 Bridge

QC BATCH REPORT

Batch ID: **57637** Instrument ID **ICPMS03** Method: **SW6020**

MBLK Sample ID: **MBLKS2-121511-57637** Units: **mg/Kg** Analysis Date: **12/15/2011 09:37 PM**

Client ID: Run ID: **ICPMS03_111215A** SeqNo: **2630024** Prep Date: **12/15/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	U	0.50								
Barium	U	0.50								
Cadmium	U	0.50								
Chromium	U	0.50								
Lead	U	0.50								
Selenium	U	0.50								
Silver	U	0.50								

LCS Sample ID: **MLCSS2-121511-57637** Units: **mg/Kg** Analysis Date: **12/15/2011 09:44 PM**

Client ID: Run ID: **ICPMS03_111215A** SeqNo: **2630025** Prep Date: **12/15/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	9.524	0.50	10	0	95.2	80-120	0			
Barium	10.33	0.50	10	0	103	80-120	0			
Cadmium	10.39	0.50	10	0	104	80-120	0			
Chromium	9.512	0.50	10	0	95.1	80-120	0			
Lead	10.15	0.50	10	0	102	80-120	0			
Selenium	9.585	0.50	10	0	95.8	80-120	0			
Silver	9.247	0.50	10	0	92.5	80-120	0			

MS Sample ID: **1112412-21BMS** Units: **mg/Kg** Analysis Date: **12/15/2011 10:08 PM**

Client ID: Run ID: **ICPMS03_111215A** SeqNo: **2630029** Prep Date: **12/15/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	9.259	0.47	9.474	0.2807	94.8	75-125	0			
Barium	36.29	0.47	9.474	28.76	79.5	75-125	0			
Cadmium	9.616	0.47	9.474	0.02573	101	75-125	0			
Chromium	13.05	0.47	9.474	7.888	54.4	75-125	0			S
Lead	15.95	0.47	9.474	20.95	-52.7	75-125	0			S
Selenium	9.09	0.47	9.474	0.221	93.6	75-125	0			
Silver	8.842	0.47	9.474	-0.08362	94.2	75-125	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112365
Project: CDOT Highway 6 Bridge

QC BATCH REPORT

Batch ID: **57637** Instrument ID **ICPMS03** Method: **SW6020**

MSD Sample ID: **1112412-21BMSD** Units: **mg/Kg** Analysis Date: **12/15/2011 10:15 PM**

Client ID: Run ID: **ICPMS03_111215A** SeqNo: **2630030** Prep Date: **12/15/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	8.901	0.47	9.414	0.2807	91.6	75-125	9.259	3.94	25	
Barium	31.05	0.47	9.414	28.76	24.3	75-125	36.29	15.6	25	S
Cadmium	9.443	0.47	9.414	0.02573	100	75-125	9.616	1.82	25	
Chromium	10.65	0.47	9.414	7.888	29.3	75-125	13.05	20.2	25	S
Lead	12.1	0.47	9.414	20.95	-94	75-125	15.95	27.5	25	SR
Selenium	8.965	0.47	9.414	0.221	92.9	75-125	9.09	1.38	25	
Silver	8.591	0.47	9.414	-0.08362	92.1	75-125	8.842	2.89	25	

DUP Sample ID: **1112412-21BDUP** Units: **mg/Kg** Analysis Date: **12/15/2011 10:02 PM**

Client ID: Run ID: **ICPMS03_111215A** SeqNo: **2630028** Prep Date: **12/15/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.2831	0.48	0	0	0	0-0	0.2807	0	25	J
Barium	24.18	0.48	0	0	0	0-0	28.76	17.3	25	
Cadmium	U	0.48	0	0	0	0-0	0.02573	0	25	
Chromium	3.204	0.48	0	0	0	0-0	7.888	84.5	25	R
Lead	4.542	0.48	0	0	0	0-0	20.95	129	25	R
Selenium	0.2663	0.48	0	0	0	0-0	0.221	0	25	J
Silver	U	0.48	0	0	0	0-0	-0.08362	0	25	

The following samples were analyzed in this batch:

1112365-01B	1112365-02B	1112365-03B
1112365-04B	1112365-05B	1112365-06B
1112365-07B	1112365-08B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112365
Project: CDOT Highway 6 Bridge

QC BATCH REPORT

Batch ID: **R120596** Instrument ID **VOA3** Method: **SW8260**

MBLK Sample ID: **VBLKS1-121411-R120596** Units: **µg/Kg** Analysis Date: **12/14/2011 10:54 AM**

Client ID: Run ID: **VOA3_111214A** SeqNo: **2628048** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	5.0								
Ethylbenzene	U	5.0								
Toluene	U	5.0								
Xylenes, Total	U	15								
Surr: 1,2-Dichloroethane-d4	*39.31*	0	*50*	0	*78.6*	*70-128*	0			
Surr: 4-Bromofluorobenzene	*47.12*	0	*50*	0	*94.2*	*73-126*	0			
Surr: Dibromofluoromethane	*45.26*	0	*50*	0	*90.5*	*71-128*	0			
Surr: Toluene-d8	*48.87*	0	*50*	0	*97.7*	*73-127*	0			

LCS Sample ID: **VLCSS1-121411-R120596** Units: **µg/Kg** Analysis Date: **12/14/2011 08:36 AM**

Client ID: Run ID: **VOA3_111214A** SeqNo: **2628046** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	43.06	5.0	50	0	86.1	79-120	0			
Ethylbenzene	44.76	5.0	50	0	89.5	80-122	0			
Toluene	45.13	5.0	50	0	90.3	79-120	0			
Xylenes, Total	132.3	15	150	0	88.2	80-120	0			
Surr: 1,2-Dichloroethane-d4	*40.99*	0	*50*	0	*82*	*70-128*	0			
Surr: 4-Bromofluorobenzene	*50.34*	0	*50*	0	*101*	*73-126*	0			
Surr: Dibromofluoromethane	*48.1*	0	*50*	0	*96.2*	*71-128*	0			
Surr: Toluene-d8	*49.26*	0	*50*	0	*98.5*	*73-127*	0			

LCSD Sample ID: **VLCSDS1-121411-R120596** Units: **µg/Kg** Analysis Date: **12/14/2011 09:58 AM**

Client ID: Run ID: **VOA3_111214A** SeqNo: **2628047** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	48.19	5.0	50	0	96.4	79-120	43.06	11.3	30	
Ethylbenzene	48.17	5.0	50	0	96.3	80-122	44.76	7.35	30	
Toluene	48.36	5.0	50	0	96.7	79-120	45.13	6.91	30	
Xylenes, Total	144.7	15	150	0	96.5	80-120	132.3	8.92	30	
Surr: 1,2-Dichloroethane-d4	*40.89*	0	*50*	0	*81.8*	*70-128*	40.99	*0.245*	*30*	
Surr: 4-Bromofluorobenzene	*48.91*	0	*50*	0	*97.8*	*73-126*	50.34	*2.88*	*30*	
Surr: Dibromofluoromethane	*43.68*	0	*50*	0	*87.4*	*71-128*	48.1	*9.63*	*30*	
Surr: Toluene-d8	*49.03*	0	*50*	0	*98.1*	*73-127*	49.26	*0.458*	*30*	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112365
Project: CDOT Highway 6 Bridge

QC BATCH REPORT

Batch ID: **R120596** Instrument ID **VOA3** Method: **SW8260**

MS Sample ID: **1112365-01AMS** Units: **µg/Kg** Analysis Date: **12/14/2011 12:17 PM**

Client ID: **RW3-2 @ 16-18ft** Run ID: **VOA3_111214A** SeqNo: **2628050** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	46.03	5.0	50	0	92.1	79-120	0			
Ethylbenzene	46.99	5.0	50	0	94	80-122	0			
Toluene	46.74	5.0	50	0	93.5	79-120	0			
Xylenes, Total	137.3	15	150	0	91.5	80-120	0			
Surr: 1,2-Dichloroethane-d4	*40.2*	0	*50*	0	*80.4*	*70-128*	0			
Surr: 4-Bromofluorobenzene	*48.52*	0	*50*	0	*97*	*73-126*	0			
Surr: Dibromofluoromethane	*42.29*	0	*50*	0	*84.6*	*71-128*	0			
Surr: Toluene-d8	*49.37*	0	*50*	0	*98.7*	*73-127*	0			

MSD Sample ID: **1112365-01AMSD** Units: **µg/Kg** Analysis Date: **12/14/2011 12:45 PM**

Client ID: **RW3-2 @ 16-18ft** Run ID: **VOA3_111214A** SeqNo: **2628051** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	48.99	5.0	50	0	98	79-120	46.03	6.22	30	
Ethylbenzene	48.73	5.0	50	0	97.5	80-122	46.99	3.62	30	
Toluene	49.19	5.0	50	0	98.4	79-120	46.74	5.1	30	
Xylenes, Total	144	15	150	0	96	80-120	137.3	4.74	30	
Surr: 1,2-Dichloroethane-d4	*39.19*	0	*50*	0	*78.4*	*70-128*	40.2	*2.52*	*30*	
Surr: 4-Bromofluorobenzene	*49.68*	0	*50*	0	*99.4*	*73-126*	48.52	*2.37*	*30*	
Surr: Dibromofluoromethane	*46.34*	0	*50*	0	*92.7*	*71-128*	42.29	*9.16*	*30*	
Surr: Toluene-d8	*48.86*	0	*50*	0	*97.7*	*73-127*	49.37	*1.04*	*30*	

The following samples were analyzed in this batch:

1112365-01A	1112365-02A	1112365-03A
1112365-04A	1112365-05A	1112365-06A
1112365-07A	1112365-08A	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112365
Project: CDOT Highway 6 Bridge

QC BATCH REPORT

Batch ID: **R120728** Instrument ID **VOA1** Method: **SW8260**

MBLK Sample ID: **VBLKW-121611-R120728** Units: **µg/L** Analysis Date: **12/16/2011 10:11 AM**

Client ID: Run ID: **VOA1_111216B** SeqNo: **2631676** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	5.0								
Ethylbenzene	U	5.0								
Toluene	U	5.0								
Xylenes, Total	U	15								
Surr: 1,2-Dichloroethane-d4	*46.1*	5.0	*50*	0	*92.2*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*45.04*	5.0	*50*	0	*90.1*	*72-125*	0			
Surr: Dibromofluoromethane	*45.67*	5.0	*50*	0	*91.3*	*71-125*	0			
Surr: Toluene-d8	*44.42*	5.0	*50*	0	*88.8*	*75-125*	0			

LCS Sample ID: **VLCSW-121611-R120728** Units: **µg/L** Analysis Date: **12/16/2011 09:45 AM**

Client ID: Run ID: **VOA1_111216B** SeqNo: **2631675** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	45.06	5.0	50	0	90.1	73-121	0			
Ethylbenzene	49.99	5.0	50	0	100	80-120	0			
Toluene	45.58	5.0	50	0	91.2	80-120	0			
Xylenes, Total	148	15	150	0	98.7	80-120	0			
Surr: 1,2-Dichloroethane-d4	*44.42*	5.0	*50*	0	*88.8*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*46.09*	5.0	*50*	0	*92.2*	*72-125*	0			
Surr: Dibromofluoromethane	*47.57*	5.0	*50*	0	*95.1*	*71-125*	0			
Surr: Toluene-d8	*46.26*	5.0	*50*	0	*92.5*	*75-125*	0			

MS Sample ID: **1112430-01AMS** Units: **µg/L** Analysis Date: **12/16/2011 03:25 PM**

Client ID: Run ID: **VOA1_111216B** SeqNo: **2631679** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	42.77	5.0	50	0	85.5	73-121	0			
Ethylbenzene	49.77	5.0	50	0	99.5	80-120	0			
Toluene	47.28	5.0	50	0	94.6	80-120	0			
Xylenes, Total	150.5	15	150	0	100	80-120	0			
Surr: 1,2-Dichloroethane-d4	*43.58*	5.0	*50*	0	*87.2*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*48.36*	5.0	*50*	0	*96.7*	*72-125*	0			
Surr: Dibromofluoromethane	*48.11*	5.0	*50*	0	*96.2*	*71-125*	0			
Surr: Toluene-d8	*48.14*	5.0	*50*	0	*96.3*	*75-125*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112365
Project: CDOT Highway 6 Bridge

QC BATCH REPORT

Batch ID: **R120728** Instrument ID **VOA1** Method: **SW8260**

MSD Sample ID: **1112430-01AMSD** Units: **µg/L** Analysis Date: **12/16/2011 03:51 PM**

Client ID: Run ID: **VOA1_111216B** SeqNo: **2631680** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	43.74	5.0	50	0	87.5	73-121	42.77	2.26	20	
Ethylbenzene	46.09	5.0	50	0	92.2	80-120	49.77	7.69	20	
Toluene	43.26	5.0	50	0	86.5	80-120	47.28	8.86	20	
Xylenes, Total	137.1	15	150	0	91.4	80-120	150.5	9.36	20	
Surr: 1,2-Dichloroethane-d4	*43.06*	5.0	*50*	0	*86.1*	*70-125*	43.58	*1.2*	*20*	
Surr: 4-Bromofluorobenzene	*45.78*	5.0	*50*	0	*91.6*	*72-125*	48.36	*5.47*	*20*	
Surr: Dibromofluoromethane	*46.71*	5.0	*50*	0	*93.4*	*71-125*	48.11	*2.94*	*20*	
Surr: Toluene-d8	*45.43*	5.0	*50*	0	*90.9*	*75-125*	48.14	*5.78*	*20*	

The following samples were analyzed in this batch: 1112365-09A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112365
Project: CDOT Highway 6 Bridge

QC BATCH REPORT

Batch ID: **R120688** Instrument ID **Balance1** Method: **SW3550**

DUP Sample ID: **1112380-01CDUP** Units: **wt%** Analysis Date: **12/15/2011 03:20 PM**

Client ID: Run ID: **BALANCE1_111215G** SeqNo: **2630868** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Percent Moisture	14.94	0.010	0	0	0	0-0	15.85	5.86	20	

The following samples were analyzed in this batch:

1112365-01B	1112365-02B	1112365-03B
1112365-04B	1112365-05B	1112365-06B
1112365-07B	1112365-08B	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

ALS Environmental

Date: 19-Dec-11

Client: Olsson Associates
Project: CDOT Highway 6 Bridge
WorkOrder: **1112365**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Units Reported	Description
µg/Kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
mg/Kg	Milligrams per Kilogram
wt%	

ALS Environmental

Chain of Custody Form

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COC ID: 48613

1112365

OLSSON ASSOC - GOLDEN: Olsson Associates

Project: CDOT US 6 Bridges

ALS Project Manager:

Customer Information		Project Information			
Purchase Order		Project Name	CDOT Highway 6 Bridgework	A	BTEX (8260)
Work Order		Project Number	011-~~2319~~ 2359-200 200002	B	Total Metals (6020/7000) RCRA8
Company Name	Olsson Associates	Bill To Company	Olsson Associates	C	
Send Report To	James Hix	Invoice Attn	James Hix	D	
Address	4690 Table Mountain Drive	Address	4690 Table Mountain Drive	E	
	Suite 200		Suite 200	F	
City/State/Zip	Golden, CO 80403	City/State/Zip	Golden, CO 80403	G	
Phone	(303) 237-2072	Phone	(303) 237-2072	H	
Fax	(303) 237-2659	Fax	(303) 237-2659	I	
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	RW3-2 @ 16-18 ft	12/7/11	10:45	S			✓	✓									
2	RW3-2 @ 20-21.5 ft	12/7/11	11:02	S			✓	✓									
3	RW2-1 @ 21.5-22 ft	12/7/11	13:30	S			✓	✓									
4	RW2-1 @ 29-30 ft	12/7/11	14:00	S			✓	✓									
5	RW1-2 @ 19 ft	12/9/11	09:50	S			✓	✓									
6	RW1-2 @ 25 ft	12/9/11	10:05	S			✓	✓									
7	RW5-1 @ 26 ft	12/9/11	12:35	S			✓	✓									
8	RW5-1 @ 35.5 ft	12/9/11	12:45	S			✓	✓									
9	111411-28 (Trip Blank)	12/9/11	14:12	W			✓										
10																	

Sampler(s) Please Print & Sign: James W. Hix James W. Hix

Shipment Method: Fed-Ex

Required Turnaround Time: (Check Box) ☑ Std 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☐ 24 Hour ☐ Other _____

Results Due Date:

Relinquished by:	Date:	Time:	Received by:	Notes: 10 Day TAT
James W. Hix	12/9/11	14:20	FedEx	
Relinquished by:	Date:	Time:	Received by (Laboratory): 12.10.11 1050.	Cooler ID: 3743. / Cooler Temp.
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):	

QC Package: (Check One Box Below)
- ☑ Level II Std QC
- ☐ Level III Std QC/Raw Data
- ☐ Level IV SW846/CLP
- ☐ Other / EDD _____
- ☐ TRRP CheckList
- ☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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ALS Environmental

Sample Receipt Checklist

Client Name: **OLSSON ASSOC - GOLDEN** Date/Time Received: **10-Dec-11 10:50**

Work Order: **1112365** Received by: **PMG**

Checklist completed by Johnnie B. Allen (eSignature) 13-Dec-11 (Date) Reviewed by: Patricia L. Lynch (eSignature) 27-Dec-11 (Date)

Matrices: soil/water
Carrier name: ALS.HS

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	2.1 C	002	
Cooler(s)/Kit(s):			
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:	-		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

ALS Environmental
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

3743

Date: 12/09/11
Name: James Hix
Company: Olsson Assoc.

CUSTODY SEAL
Time: 14:20

Seal Broken By:
Date: 12-10-11

ALS Environmental
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

Date: 12/9/11
Name: James Hix
Company: Olsson Associates

CUSTODY SEAL
Time: 14:20

Seal Broken By:
Date: 12-10-11

This portion can be retained for recipient's records.

Date 12/9/11
FedEx Tracking Number 898941675364

Sender's Name James Hix
Phone 303 589-1572
303 837 2072

Company Olsson Associates

Address 4690 Table Mountain Dr.
Dept./Floor/Suite/Room 200

City Golden
State CO ZIP 80403

Your Internal Billing Reference 011-2359 200 200002

29-Dec-2011

James Hix
Olsson Associates
4690 Table Mountain Drive
Suite 200
Golden, CO 80403

Tel: (303) 237-3139
Fax: (303) 374-3139

Re: CDOT Highway 6 Bridge Work Work Order: **1112485**

Dear James,

ALS Environmental received 3 samples on 14-Dec-2011 09:10 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 18.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Patricia L. Lynch

Electronically approved by: Mary K. Knowles

Patricia L. Lynch
Project Manager

Certificate No: T104704231-09A-TX

ALS Environmental

Date: 29-Dec-11

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
Work Order: **1112485**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
1112485-01	RW6-1@ 26ft	Soil		12/12/2011 11:14	12/14/2011 09:10	☐
1112485-02	RW6-1 @ 31.5ft	Soil		12/12/2011 11:25	12/14/2011 09:10	☐
1112485-03	TB 111411-08	Water		12/13/2011 08:21	12/14/2011 09:10	☐

ALS Environmental

Date: 29-Dec-11

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
Work Order: 1112485

Case Narrative

Batch 57708 Metals: MS/MSD is for an unrelated sample.

Batch 57753 Mercury: MS/MSD is for an unrelated sample.

ALS Environmental

Date: *29-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
Work Order: 1112485
Sample ID: RW6-1@ 26ft
Lab ID: 1112485-01
Collection Date: 12/12/2011 11:14 AM
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			**SW7471A**		Prep Date: **12/21/2011**	Analyst: **JCJ**
Mercury	U		3.45	µg/Kg	1	12/21/2011 03:33 PM
METALS			**SW6020**		Prep Date: **12/19/2011**	Analyst: **IGF**
Arsenic	**0.916**		**0.491**	**mg/Kg**	1	12/20/2011 10:13 AM
Barium	**16.0**		**0.491**	**mg/Kg**	1	12/20/2011 10:13 AM
Cadmium	U		0.491	mg/Kg	1	12/20/2011 10:13 AM
Chromium	**1.12**		**0.491**	**mg/Kg**	1	12/20/2011 10:13 AM
Lead	**1.51**		**0.491**	**mg/Kg**	1	12/20/2011 10:13 AM
Selenium	**0.304**	J	**0.491**	**mg/Kg**	1	12/20/2011 10:13 AM
Silver	U		0.491	mg/Kg	1	12/20/2011 10:13 AM
VOLATILES			**SW8260**			Analyst: **WLR**
Benzene	U		5.0	µg/Kg	1	12/16/2011 04:03 PM
Ethylbenzene	U		5.0	µg/Kg	1	12/16/2011 04:03 PM
Toluene	U		5.0	µg/Kg	1	12/16/2011 04:03 PM
Xylenes, Total	U		15	µg/Kg	1	12/16/2011 04:03 PM
Surr: 1,2-Dichloroethane-d4	*90.6*		*70-128*	*%REC*	1	12/16/2011 04:03 PM
Surr: 4-Bromofluorobenzene	*96.0*		*73-126*	*%REC*	1	12/16/2011 04:03 PM
Surr: Dibromofluoromethane	*86.7*		*71-128*	*%REC*	1	12/16/2011 04:03 PM
Surr: Toluene-d8	*94.9*		*73-127*	*%REC*	1	12/16/2011 04:03 PM
MOISTURE			**SW3550**			Analyst: **KAH**
Percent Moisture	**13.4**		**0.0100**	**wt%**	1	12/19/2011 06:00 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *29-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
Work Order: 1112485
Sample ID: RW6-1 @ 31.5ft
Lab ID: 1112485-02
Collection Date: 12/12/2011 11:25 AM
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY - SW7471B			**SW7471A**		Prep Date: **12/21/2011**	Analyst: **JCJ**
Mercury	**0.423**	J	**3.51**	**µg/Kg**	1	12/21/2011 03:40 PM
METALS			**SW6020**		Prep Date: **12/19/2011**	Analyst: **IGF**
Arsenic	**0.547**		**0.469**	**mg/Kg**	1	12/20/2011 10:20 AM
Barium	**12.2**		**0.469**	**mg/Kg**	1	12/20/2011 10:20 AM
Cadmium	U		0.469	mg/Kg	1	12/20/2011 10:20 AM
Chromium	**1.82**		**0.469**	**mg/Kg**	1	12/20/2011 10:20 AM
Lead	**1.59**		**0.469**	**mg/Kg**	1	12/20/2011 10:20 AM
Selenium	U		0.469	mg/Kg	1	12/20/2011 10:20 AM
Silver	U		0.469	mg/Kg	1	12/20/2011 10:20 AM
VOLATILES			**SW8260**			Analyst: **WLR**
Benzene	U		5.0	µg/Kg	1	12/16/2011 04:30 PM
Ethylbenzene	U		5.0	µg/Kg	1	12/16/2011 04:30 PM
Toluene	U		5.0	µg/Kg	1	12/16/2011 04:30 PM
Xylenes, Total	U		15	µg/Kg	1	12/16/2011 04:30 PM
Surr: 1,2-Dichloroethane-d4	*90.8*		*70-128*	*%REC*	1	12/16/2011 04:30 PM
Surr: 4-Bromofluorobenzene	*95.9*		*73-126*	*%REC*	1	12/16/2011 04:30 PM
Surr: Dibromofluoromethane	*88.4*		*71-128*	*%REC*	1	12/16/2011 04:30 PM
Surr: Toluene-d8	*99.3*		*73-127*	*%REC*	1	12/16/2011 04:30 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *29-Dec-11*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
Sample ID: TB 111411-08
Collection Date: 12/13/2011 08:21 AM

Work Order: 1112485
Lab ID: 1112485-03
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
VOLATILES			**SW8260**			Analyst: **PC**
Benzene	U		5.0	µg/L	1	12/18/2011 08:33 PM
Ethylbenzene	U		5.0	µg/L	1	12/18/2011 08:33 PM
Toluene	U		5.0	µg/L	1	12/18/2011 08:33 PM
Xylenes, Total	U		15	µg/L	1	12/18/2011 08:33 PM
Surr: 1,2-Dichloroethane-d4	*86.6*		*70-125*	*%REC*	1	12/18/2011 08:33 PM
Surr: 4-Bromofluorobenzene	*90.9*		*72-125*	*%REC*	1	12/18/2011 08:33 PM
Surr: Dibromofluoromethane	*89.5*		*71-125*	*%REC*	1	12/18/2011 08:33 PM
Surr: Toluene-d8	*94.1*		*75-125*	*%REC*	1	12/18/2011 08:33 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: 29-Dec-11

Client: Olsson Associates
Work Order: 1112485
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **57708** Instrument ID **ICPMS04** Method: **SW6020**

MBLK Sample ID: **MBLKS3-121911-57708** Units: **mg/Kg** Analysis Date: **12/20/2011 01:17 PM**

Client ID: Run ID: **ICPMS04_111219A** SeqNo: **2633966** Prep Date: **12/19/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	U	0.50								
Barium	U	0.50								
Cadmium	U	0.50								
Chromium	U	0.50								
Lead	U	0.50								
Selenium	U	0.50								
Silver	U	0.50								

LCS Sample ID: **MLCSS3-121911-57708** Units: **mg/Kg** Analysis Date: **12/20/2011 07:20 AM**

Client ID: Run ID: **ICPMS04_111219A** SeqNo: **2633328** Prep Date: **12/19/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	9.629	0.50	10	0	96.3	80-120	0			
Barium	10.36	0.50	10	0	104	80-120	0			
Cadmium	10.28	0.50	10	0	103	80-120	0			
Chromium	9.352	0.50	10	0	93.5	80-120	0			
Lead	10.81	0.50	10	0	108	80-120	0			
Selenium	9.161	0.50	10	0	91.6	80-120	0			
Silver	9.027	0.50	10	0	90.3	80-120	0			

MS Sample ID: **1112446-06CMS** Units: **mg/Kg** Analysis Date: **12/20/2011 08:56 AM**

Client ID: Run ID: **ICPMS04_111219A** SeqNo: **2633343** Prep Date: **12/19/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	9.983	0.45	8.955	1.633	93.2	75-125	0			
Barium	61.59	0.45	8.955	26.77	389	75-125	0			S
Cadmium	8.87	0.45	8.955	0.1083	97.8	75-125	0			
Chromium	11.53	0.45	8.955	2.452	101	75-125	0			
Lead	20.81	0.45	8.955	8.331	139	75-125	0			S
Selenium	8.447	0.45	8.955	0.1467	92.7	75-125	0			
Silver	9.018	0.45	8.955	0.00614	101	75-125	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112485
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **57708** Instrument ID **ICPMS04** Method: **SW6020**

MSD Sample ID: **1112446-06CMSD** Units: **mg/Kg** Analysis Date: **12/20/2011 09:03 AM**

Client ID: Run ID: **ICPMS04_111219A** SeqNo: **2633344** Prep Date: **12/19/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	10.24	0.44	8.875	1.633	97	75-125	9.983	2.54	25	
Barium	29.75	0.44	8.875	26.77	33.6	75-125	61.59	69.7	25	SR
Cadmium	9.198	0.44	8.875	0.1083	102	75-125	8.87	3.63	25	
Chromium	11.22	0.44	8.875	2.452	98.8	75-125	11.53	2.68	25	
Lead	22.66	0.44	8.875	8.331	162	75-125	20.81	8.52	25	S
Selenium	8.872	0.44	8.875	0.1467	98.3	75-125	8.447	4.91	25	
Silver	8.844	0.44	8.875	0.00614	99.6	75-125	9.018	1.94	25	

The following samples were analyzed in this batch: 1112485-01B 1112485-02B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112485
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **57753** Instrument ID **HG02** Method: **SW7471A**

MBLK Sample ID: **GBLKS1-122111-57753** Units: **µg/Kg** Analysis Date: **12/21/2011 01:55 PM**
Client ID: Run ID: **HG02_111221A** SeqNo: **2635609** Prep Date: **12/21/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	U	3.3								

LCS Sample ID: **GLCSS1-122111-57753** Units: **µg/Kg** Analysis Date: **12/21/2011 01:57 PM**
Client ID: Run ID: **HG02_111221A** SeqNo: **2635610** Prep Date: **12/21/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	344	3.3	333.3	0	103	85-115	0			

MS Sample ID: **1112503-01AMS** Units: **µg/Kg** Analysis Date: **12/21/2011 02:28 PM**
Client ID: Run ID: **HG02_111221A** SeqNo: **2635634** Prep Date: **12/21/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	847	3.6	355.9	388	129	85-115	0			SE

MSD Sample ID: **1112503-01AMSD** Units: **µg/Kg** Analysis Date: **12/21/2011 02:51 PM**
Client ID: Run ID: **HG02_111221A** SeqNo: **2635636** Prep Date: **12/21/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	771.4	3.6	357.1	388	107	85-115	847	9.34	20	E

DUP Sample ID: **1112503-01ADUP** Units: **µg/Kg** Analysis Date: **12/21/2011 02:05 PM**
Client ID: Run ID: **HG02_111221A** SeqNo: **2635612** Prep Date: **12/21/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	382.8	3.6	0	0	0		388	1.35	20	

The following samples were analyzed in this batch: 1112485-01B 1112485-02B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112485
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **R120731** Instrument ID **VOA3** Method: **SW8260**

MBLK Sample ID: **VBLKS1-121811-R120731** Units: **µg/Kg** Analysis Date: **12/16/2011 03:36 PM**

Client ID: Run ID: **VOA3_111216A** SeqNo: **2631780** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	5.0								
Ethylbenzene	U	5.0								
Toluene	U	5.0								
Xylenes, Total	U	15								
Surr: 1,2-Dichloroethane-d4	*42.56*	0	*50*	0	*85.1*	*70-128*	0			
Surr: 4-Bromofluorobenzene	*48.56*	0	*50*	0	*97.1*	*73-126*	0			
Surr: Dibromofluoromethane	*43.82*	0	*50*	0	*87.6*	*71-128*	0			
Surr: Toluene-d8	*48.21*	0	*50*	0	*96.4*	*73-127*	0			

LCS Sample ID: **VLCSS1-121811-R120731** Units: **µg/Kg** Analysis Date: **12/16/2011 02:13 PM**

Client ID: Run ID: **VOA3_111216A** SeqNo: **2631777** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	49.74	5.0	50	0	99.5	79-120	0			
Ethylbenzene	45.64	5.0	50	0	91.3	80-122	0			
Toluene	44.11	5.0	50	0	88.2	79-120	0			
Xylenes, Total	129.8	15	150	0	86.6	80-120	0			
Surr: 1,2-Dichloroethane-d4	*51.03*	0	*50*	0	*102*	*70-128*	0			
Surr: 4-Bromofluorobenzene	*48.91*	0	*50*	0	*97.8*	*73-126*	0			
Surr: Dibromofluoromethane	*47.97*	0	*50*	0	*95.9*	*71-128*	0			
Surr: Toluene-d8	*49.09*	0	*50*	0	*98.2*	*73-127*	0			

LCSD Sample ID: **VLCSDS1-121811-R120731** Units: **µg/Kg** Analysis Date: **12/16/2011 02:41 PM**

Client ID: Run ID: **VOA3_111216A** SeqNo: **2631778** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	52.12	5.0	50	0	104	79-120	49.74	4.67	30	
Ethylbenzene	48.58	5.0	50	0	97.2	80-122	45.64	6.24	30	
Toluene	46.65	5.0	50	0	93.3	79-120	44.11	5.59	30	
Xylenes, Total	140.4	15	150	0	93.6	80-120	129.8	7.78	30	
Surr: 1,2-Dichloroethane-d4	*51*	0	*50*	0	*102*	*70-128*	51.03	*0.0593*	*30*	
Surr: 4-Bromofluorobenzene	*49.54*	0	*50*	0	*99.1*	*73-126*	48.91	*1.28*	*30*	
Surr: Dibromofluoromethane	*47.95*	0	*50*	0	*95.9*	*71-128*	47.97	*0.0241*	*30*	
Surr: Toluene-d8	*48.15*	0	*50*	0	*96.3*	*73-127*	49.09	*1.93*	*30*	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112485
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **R120731** Instrument ID **VOA3** Method: **SW8260**

MS Sample ID: **1112485-01AMS** Units: **µg/Kg** Analysis Date: **12/16/2011 04:58 PM**

Client ID: **RW6-1@ 26ft** Run ID: **VOA3_111216A** SeqNo: **2631785** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	47.45	5.0	50	0	94.9	79-120	0			
Ethylbenzene	45.51	5.0	50	0	91	80-122	0			
Toluene	45	5.0	50	0	90	79-120	0			
Xylenes, Total	126.3	15	150	0	84.2	80-120	0			
Surr: 1,2-Dichloroethane-d4	*49.14*	0	*50*	0	*98.3*	*70-128*	0			
Surr: 4-Bromofluorobenzene	*49.7*	0	*50*	0	*99.4*	*73-126*	0			
Surr: Dibromofluoromethane	*44.64*	0	*50*	0	*89.3*	*71-128*	0			
Surr: Toluene-d8	*50.77*	0	*50*	0	*102*	*73-127*	0			

MSD Sample ID: **1112485-01AMSD** Units: **µg/Kg** Analysis Date: **12/16/2011 05:25 PM**

Client ID: **RW6-1@ 26ft** Run ID: **VOA3_111216A** SeqNo: **2631786** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	49.81	5.0	50	0	99.6	79-120	47.45	4.85	30	
Ethylbenzene	48.89	5.0	50	0	97.8	80-122	45.51	7.18	30	
Toluene	47.67	5.0	50	0	95.3	79-120	45	5.77	30	
Xylenes, Total	135.2	15	150	0	90.2	80-120	126.3	6.87	30	
Surr: 1,2-Dichloroethane-d4	*47.17*	0	*50*	0	*94.3*	*70-128*	49.14	*4.09*	*30*	
Surr: 4-Bromofluorobenzene	*48.72*	0	*50*	0	*97.4*	*73-126*	49.7	*2*	*30*	
Surr: Dibromofluoromethane	*49.11*	0	*50*	0	*98.2*	*71-128*	44.64	*9.53*	*30*	
Surr: Toluene-d8	*49.95*	0	*50*	0	*99.9*	*73-127*	50.77	*1.62*	*30*	

The following samples were analyzed in this batch: 1112485-01A 1112485-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112485
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **R120733** Instrument ID **VOA1** Method: **SW8260**

MBLK Sample ID: **VBLKW-121811-R120733** Units: **µg/L** Analysis Date: **12/18/2011 12:07 PM**

Client ID: Run ID: **VOA1_111218A** SeqNo: **2631897** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	5.0								
Ethylbenzene	U	5.0								
Toluene	U	5.0								
Xylenes, Total	U	15								
Surr: 1,2-Dichloroethane-d4	*44.5*	5.0	*50*	0	*89*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*46.61*	5.0	*50*	0	*93.2*	*72-125*	0			
Surr: Dibromofluoromethane	*45.79*	5.0	*50*	0	*91.6*	*71-125*	0			
Surr: Toluene-d8	*45.19*	5.0	*50*	0	*90.4*	*75-125*	0			

LCS Sample ID: **VLCSW-121811-R120733** Units: **µg/L** Analysis Date: **12/18/2011 11:17 AM**

Client ID: Run ID: **VOA1_111218A** SeqNo: **2631896** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	46.32	5.0	50	0	92.6	73-121	0			
Ethylbenzene	53.79	5.0	50	0	108	80-120	0			
Toluene	49.49	5.0	50	0	99	80-120	0			
Xylenes, Total	146	15	150	0	97.3	80-120	0			
Surr: 1,2-Dichloroethane-d4	*46*	5.0	*50*	0	*92*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*46.8*	5.0	*50*	0	*93.6*	*72-125*	0			
Surr: Dibromofluoromethane	*47.96*	5.0	*50*	0	*95.9*	*71-125*	0			
Surr: Toluene-d8	*47.98*	5.0	*50*	0	*96*	*75-125*	0			

MS Sample ID: **1112250-09AMS** Units: **µg/L** Analysis Date: **12/18/2011 02:39 PM**

Client ID: Run ID: **VOA1_111218A** SeqNo: **2631905** Prep Date: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	495.2	50	500	18.33	95.4	73-121	0			
Ethylbenzene	501.1	50	500	0	100	80-120	0			
Toluene	472.7	50	500	0	94.5	80-120	0			
Xylenes, Total	1530	150	1500	0	102	80-120	0			
Surr: 1,2-Dichloroethane-d4	*423.7*	50	*500*	0	*84.7*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*467.7*	50	*500*	0	*93.5*	*72-125*	0			
Surr: Dibromofluoromethane	*457*	50	*500*	0	*91.4*	*71-125*	0			
Surr: Toluene-d8	*470.6*	50	*500*	0	*94.1*	*75-125*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112485
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **R120733** Instrument ID **VOA1** Method: **SW8260**

MSD Sample ID: **1112250-09AMSD** Units: **µg/L** Analysis Date: **12/18/2011 03:05 PM**

Client ID: Run ID: **VOA1_111218A** SeqNo: **2631907** Prep Date: DF: **10**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	455.3	50	500	18.33	87.4	73-121	495.2	8.39	20	
Ethylbenzene	499.5	50	500	0	99.9	80-120	501.1	0.322	20	
Toluene	454.2	50	500	0	90.8	80-120	472.7	3.98	20	
Xylenes, Total	1476	150	1500	0	98.4	80-120	1530	3.56	20	
Surr: 1,2-Dichloroethane-d4	*457.6*	50	*500*	0	*91.5*	*70-125*	423.7	*7.69*	*20*	
Surr: 4-Bromofluorobenzene	*463.8*	50	*500*	0	*92.8*	*72-125*	467.7	*0.836*	*20*	
Surr: Dibromofluoromethane	*472.6*	50	*500*	0	*94.5*	*71-125*	457	*3.37*	*20*	
Surr: Toluene-d8	*448.7*	50	*500*	0	*89.7*	*75-125*	470.6	*4.76*	*20*	

The following samples were analyzed in this batch: 1112485-03A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112485
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **R120806** Instrument ID **Balance1** Method: **SW3550**

DUP Sample ID: **1112453-19ADUP** Units: **wt%** Analysis Date: **12/19/2011 06:00 PM**

Client ID: Run ID: **BALANCE1_111219D** SeqNo: **2633643** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Percent Moisture	51.86	0.010	0	0	0	0-0	53.83	3.74	20	

The following samples were analyzed in this batch: 1112485-01B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

ALS Environmental

Date: 21-Dec-11

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
WorkOrder: **1112485**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Units Reported	Description
µg/Kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
mg/Kg	Milligrams per Kilogram
wt%	

ALS Environmental

Chain of Custody Form

Page ____ of ____

COC ID: 48612

1112485

OLSSON ASSOC - GOLDEN: Olsson Associates

Project: CDOT US 6 Bridges

ALS Project Manager:

Customer Information		Project Information			
Purchase Order		Project Name	CDOT Highway 6 Bridgework	A	BTEX (6200)
Work Order	Quote ID# 5134	Project Number	011-2359 200 200002	B	Total Metals (6020/7000) RCRA8
Company Name	Olsson Associates	Bill To Company	Olsson Associates	C	
Send Report To	James Hix	Invoice Attn	James Hix	D	
Address	4690 Table Mountain Drive Suite 200	Address	4690 Table Mountain Drive Suite 200	E F	
City/State/Zip	Golden, CO 80403	City/State/Zip	Golden, CO 80403	G	
Phone	(303) 237-2072	Phone	(303) 237-2072	H	
Fax	(303) 237-2659	Fax	(303) 237-2659	I	
e-Mail Address	jhix@oaconsulting.com	e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	RW6-1 @ 26 ft	12/12/11	11:14	S	ice	2	✓	✓									
2	RW6-1 @ 31.5 ft	12/12/11	11:25	S	ice	2	✓	✓									
3	TB 111411-08	12/13/11	8:21	W	ice	2	✓										
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign: James W. Hix James W. Hix

Shipment Method: Fed-Ex

Required Turnaround Time: (Check Box) ☑ Std 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☐ 24 Hour ☐ Other ____

Results Due Date:

Relinquished by:	Date:	Time:	Received by:
James Hix	12/13/11	08:30	Fed-Ex
Relinquished by:	Date:	Time:	Received by (Laboratory): 12.14.11 0910.
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes: 10 Day TAT

Cooler ID	Cooler Temp.
3480.	

QC Package: (Check One Box Below)
☑ Level II Std QC ☐ TRRP CheckList
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other / EDD ____

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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Sample Receipt Checklist

Client Name: **OLSSON ASSOC - GOLDEN** Date/Time Received: **14-Dec-11 09:10**

Work Order: **1112485** Received by: **PMG**

Checklist completed by Johnnie B. Allen (eSignature) 16-Dec-11 (Date) Reviewed by: Patricia L. Lynch (eSignature) 16-Dec-11 (Date)

Matrices: soil/water
Carrier name: FedEx

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on shipping container/cooler?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time?	Yes ☑	No ☐	
Container/Temp Blank temperature in compliance?	Yes ☑	No ☐	
Temperature(s)/Thermometer(s):	2.4 C	002	
Cooler(s)/Kit(s):			
Water - VOA vials have zero headspace?	Yes ☑	No ☐	No VOA vials submitted ☐
Water - pH acceptable upon receipt?	Yes ☑	No ☐	N/A ☐
pH adjusted?	Yes ☐	No ☑	N/A ☐
pH adjusted by:	_		

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

ALS Environmental
10450 Stancliff Rd., Suite 210
Houston, Texas 77099
Tel. +1 281 530 5656
Fax. +1 281 530 5887

3480

Date: 12/13/11 Time: 0830
Name: James Hix
Company: Olsson Assoc.

CUSTODY SEAL

Seal Broken By:
Date: 12/14/11

This portion can be removed for recipient's records.

Date 12/13/11 FedEx Tracking Number 8 8894167537 5

Sender's Name James Hix Phone 303 237-2072

Company Olsson Associates

Address 4690 Table Mountain Drive 200
Dept./Floor/Suite/Room

City Golden State CO ZIP 80403

Your Internal Billing Reference 011-2359-200 200002

09-Jan-2012

James Hix
Olsson Associates
4690 Table Mountain Drive
Suite 200
Golden, CO 80403

Tel: (303) 237-3139
Fax: (303) 374-3139

Re: CDOT Highway 6 Bridge Work Work Order: **1112719**

Dear James,

ALS Environmental received 2 samples on 22-Dec-2011 10:45 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 15.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Patricia L. Lynch

Electronically approved by: Yvan K. Ty

Patricia L. Lynch
Project Manager

Certificate No: T104704231-09A-TX

ALS Environmental

Date: 09-Jan-12

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
Work Order: **1112719**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
1112719-01	RW 7-1@18ft	Soil		12/20/2011 12:50	12/22/2011 10:45	☐
1112719-02	RW 7-1@30ft	Soil		12/20/2011 13:20	12/22/2011 10:45	☐

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
Work Order: 1112719

Case Narrative

Batch 57849 Metals: MS/MSD is for an unrelated sample.

ALS Environmental

Date: *09-Jan-12*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
Work Order: 1112719
Sample ID: RW 7-1@18ft
Lab ID: 1112719-01
Collection Date: 12/20/2011 12:50 PM
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Prep	Date Analyzed
MERCURY - SW7471B			**SW7471A**				Analyst: **JCJ**
Mercury	U		3.45	µg/Kg	1	12/27/2011	12/27/2011 03:40 PM
METALS			**SW6020**				Analyst: **IGF**
Arsenic	**0.879**		**0.480**	**mg/Kg**	1	12/28/2011	12/30/2011 06:26 AM
Barium	**15.4**		**0.480**	**mg/Kg**	1	12/28/2011	12/30/2011 06:26 AM
Cadmium	U		0.480	mg/Kg	1	12/28/2011	12/30/2011 06:26 AM
Chromium	**1.38**		**0.480**	**mg/Kg**	1	12/28/2011	12/30/2011 06:26 AM
Lead	**1.87**		**0.480**	**mg/Kg**	1	12/28/2011	12/30/2011 06:26 AM
Selenium	U		0.480	mg/Kg	1	12/28/2011	12/30/2011 06:26 AM
Silver	U		0.480	mg/Kg	1	12/28/2011	12/30/2011 06:26 AM
VOLATILES			**SW8260**				Analyst: **PC**
Benzene	U		5.0	µg/Kg	1		12/30/2011 06:20 PM
Ethylbenzene	U		5.0	µg/Kg	1		12/30/2011 06:20 PM
Toluene	U		5.0	µg/Kg	1		12/30/2011 06:20 PM
Xylenes, Total	U		15	µg/Kg	1		12/30/2011 06:20 PM
Surr: 1,2-Dichloroethane-d4	*99.5*		*70-128*	*%REC*	1		12/30/2011 06:20 PM
Surr: 4-Bromofluorobenzene	*99.0*		*73-126*	*%REC*	1		12/30/2011 06:20 PM
Surr: Dibromofluoromethane	*94.4*		*71-128*	*%REC*	1		12/30/2011 06:20 PM
Surr: Toluene-d8	*96.6*		*73-127*	*%REC*	1		12/30/2011 06:20 PM
MOISTURE			**SW3550**				Analyst: **RPM**
Percent Moisture	**3.86**		**0.0100**	**wt%**	1		1/6/2012 06:30 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *09-Jan-12*

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
Work Order: 1112719
Sample ID: RW 7-1@30ft
Lab ID: 1112719-02
Collection Date: 12/20/2011 01:20 PM
Matrix: SOIL

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Prep	Date Analyzed
MERCURY - SW7471B			**SW7471A**				Analyst: **JCJ**
Mercury	**8.24**		**3.51**	**µg/Kg**	1	12/27/2011	12/27/2011 03:42 PM
METALS			**SW6020**				Analyst: **IGF**
Arsenic	**0.900**		**0.463**	**mg/Kg**	1	12/28/2011	12/30/2011 08:18 AM
Barium	**93.5**		**0.463**	**mg/Kg**	1	12/28/2011	12/30/2011 08:18 AM
Cadmium	**0.0960**	J	**0.463**	**mg/Kg**	1	12/28/2011	12/30/2011 08:18 AM
Chromium	**3.34**		**0.463**	**mg/Kg**	1	12/28/2011	12/30/2011 08:18 AM
Lead	**8.23**		**0.463**	**mg/Kg**	1	12/28/2011	12/30/2011 08:18 AM
Selenium	U		0.463	mg/Kg	1	12/28/2011	12/30/2011 08:18 AM
Silver	U		0.463	mg/Kg	1	12/28/2011	12/30/2011 08:18 AM
VOLATILES			**SW8260**				Analyst: **PC**
Benzene	U		5.0	µg/Kg	1		12/30/2011 06:47 PM
Ethylbenzene	U		5.0	µg/Kg	1		12/30/2011 06:47 PM
Toluene	**0.97**	J	**5.0**	**µg/Kg**	1		12/30/2011 06:47 PM
Xylenes, Total	U		15	µg/Kg	1		12/30/2011 06:47 PM
Surr: 1,2-Dichloroethane-d4	*103*		*70-128*	*%REC*	1		12/30/2011 06:47 PM
Surr: 4-Bromofluorobenzene	*98.1*		*73-126*	*%REC*	1		12/30/2011 06:47 PM
Surr: Dibromofluoromethane	*96.1*		*71-128*	*%REC*	1		12/30/2011 06:47 PM
Surr: Toluene-d8	*97.9*		*73-127*	*%REC*	1		12/30/2011 06:47 PM
MOISTURE			**SW3550**				Analyst: **RPM**
Percent Moisture	**18.8**		**0.0100**	**wt%**	1		1/6/2012 06:30 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: 09-Jan-12

Client: Olsson Associates
Work Order: 1112719
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **57812** Instrument ID **HG02** Method: **SW7471A**

MBLK Sample ID: **GBLKS1-122711-57812** Units: **µg/Kg** Analysis Date: **12/27/2011 02:22 PM**
Client ID: Run ID: **HG02_111227A** SeqNo: **2638534** Prep Date: **12/27/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	U	3.3								

LCS Sample ID: **GLCSS1-122711-57812** Units: **µg/Kg** Analysis Date: **12/27/2011 02:24 PM**
Client ID: Run ID: **HG02_111227A** SeqNo: **2638535** Prep Date: **12/27/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	342	3.3	333.3	0	103	85-115	0			

MS Sample ID: **1112721-09AMS** Units: **µg/Kg** Analysis Date: **12/27/2011 02:34 PM**
Client ID: Run ID: **HG02_111227A** SeqNo: **2638538** Prep Date: **12/27/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	574.9	3.5	348.4	263.9	89.3	85-115	0			

MSD Sample ID: **1112721-09AMSD** Units: **µg/Kg** Analysis Date: **12/27/2011 02:36 PM**
Client ID: Run ID: **HG02_111227A** SeqNo: **2638539** Prep Date: **12/27/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	575	3.4	341.9	263.9	91	85-115	574.9	0.0226	20	

DUP Sample ID: **1112721-09ADUP** Units: **µg/Kg** Analysis Date: **12/27/2011 02:31 PM**
Client ID: Run ID: **HG02_111227A** SeqNo: **2638537** Prep Date: **12/27/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	258	3.5	0	0	0		263.9	2.23	20	

The following samples were analyzed in this batch: 1112719-01B 1112719-02B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112719
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **57849** Instrument ID **ICPMS04** Method: **SW6020**

MBLK Sample ID: **MBLKS2-122811-57849** Units: **mg/Kg** Analysis Date: **12/28/2011 11:59 PM**
Client ID: Run ID: **ICPMS04_111227A** SeqNo: **2640876** Prep Date: **12/28/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	U	0.50								
Cadmium	U	0.50								
Chromium	U	0.50								
Lead	U	0.50								
Selenium	U	0.50								

MBLK Sample ID: **MBLKS2-122811-57849** Units: **mg/Kg** Analysis Date: **12/29/2011 07:03 PM**
Client ID: Run ID: **ICPMS04_111229A** SeqNo: **2642145** Prep Date: **12/28/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	U	0.50								
Silver	U	0.50								

LCS Sample ID: **MLCSS2-122811-57849** Units: **mg/Kg** Analysis Date: **12/29/2011 12:05 AM**
Client ID: Run ID: **ICPMS04_111227A** SeqNo: **2640877** Prep Date: **12/28/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Barium	9.992	0.50	10	0	99.9	80-120	0			
Cadmium	9.924	0.50	10	0	99.2	80-120	0			
Chromium	9.099	0.50	10	0	91	80-120	0			
Lead	10.32	0.50	10	0	103	80-120	0			
Selenium	8.912	0.50	10	0	89.1	80-120	0			

LCS Sample ID: **MLCSS2-122811-57849** Units: **mg/Kg** Analysis Date: **12/29/2011 02:42 PM**
Client ID: Run ID: **ICPMS04_111229A** SeqNo: **2641709** Prep Date: **12/28/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	10.15	0.50	10	0	101	80-120	0			
Silver	8.958	0.50	10	0	89.6	80-120	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112719
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **57849** Instrument ID **ICPMS04** Method: **SW6020**

MS Sample ID: **1112774-04AMS** Units: **mg/Kg** Analysis Date: **12/29/2011 03:48 AM**
Client ID: Run ID: **ICPMS04_111227A** SeqNo: **2640912** Prep Date: **12/28/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	8.81	0.46	9.274	1.369	80.2	75-125	0			
Barium	48.12	0.46	9.274	46.77	14.6	75-125	0			SO
Cadmium	8.026	0.46	9.274	0.02746	86.2	75-125	0			
Chromium	11.5	0.46	9.274	4.04	80.4	75-125	0			
Lead	13.29	0.46	9.274	5.659	82.3	75-125	0			
Selenium	7.453	0.46	9.274	0.4762	75.2	75-125	0			
Silver	5.76	0.46	9.274	0.0133	62	75-125	0			S

MSD Sample ID: **1112774-04AMSD** Units: **mg/Kg** Analysis Date: **12/29/2011 03:55 AM**
Client ID: Run ID: **ICPMS04_111227A** SeqNo: **2640913** Prep Date: **12/28/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	8.599	0.46	9.223	1.369	78.4	75-125	8.81	2.43	25	
Barium	50.04	0.46	9.223	46.77	35.5	75-125	48.12	3.92	25	SO
Cadmium	7.94	0.46	9.223	0.02746	85.8	75-125	8.026	1.07	25	
Chromium	11.49	0.46	9.223	4.04	80.7	75-125	11.5	0.111	25	
Lead	13.28	0.46	9.223	5.659	82.6	75-125	13.29	0.0967	25	
Selenium	7.51	0.46	9.223	0.4762	76.3	75-125	7.453	0.762	25	
Silver	5.991	0.46	9.223	0.0133	64.8	75-125	5.76	3.95	25	S

DUP Sample ID: **1112774-04ADUP** Units: **mg/Kg** Analysis Date: **12/29/2011 03:42 AM**
Client ID: Run ID: **ICPMS04_111227A** SeqNo: **2640911** Prep Date: **12/28/2011** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	1.268	0.47	0	0	0	0-0	1.369	7.63	25	
Barium	44.57	0.47	0	0	0	0-0	46.77	4.82	25	
Cadmium	U	0.47	0	0	0	0-0	0.02746	0	25	
Chromium	4.153	0.47	0	0	0	0-0	4.04	2.75	25	
Lead	5.655	0.47	0	0	0	0-0	5.659	0.0592	25	
Selenium	0.4132	0.47	0	0	0	0-0	0.4762	0	25	J
Silver	U	0.47	0	0	0	0-0	0.0133	0	25	

The following samples were analyzed in this batch: 1112719-01B 1112719-02B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112719
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **R121198** Instrument ID **VOA3** Method: **SW8260**

MBLK Sample ID: **VBLKS-123011-R121198** Units: **µg/Kg** Analysis Date: **12/30/2011 12:01 PM**

Client ID: Run ID: **VOA3_111230A** SeqNo: **2642923** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	5.0								
Ethylbenzene	U	5.0								
Toluene	U	5.0								
Xylenes, Total	U	15								
Surr: 1,2-Dichloroethane-d4	*51.39*	0	*50*	0	*103*	*70-128*	0			
Surr: 4-Bromofluorobenzene	*50.77*	0	*50*	0	*102*	*73-126*	0			
Surr: Dibromofluoromethane	*48.66*	0	*50*	0	*97.3*	*71-128*	0			
Surr: Toluene-d8	*50.38*	0	*50*	0	*101*	*73-127*	0			

LCS Sample ID: **VLCSS-123011-R121198** Units: **µg/Kg** Analysis Date: **12/30/2011 10:40 AM**

Client ID: Run ID: **VOA3_111230A** SeqNo: **2642919** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	50.29	5.0	50	0	101	79-120	0			
Ethylbenzene	51.45	5.0	50	0	103	80-122	0			
Toluene	52.6	5.0	50	0	105	79-120	0			
Xylenes, Total	153.9	15	150	0	103	80-120	0			
Surr: 1,2-Dichloroethane-d4	*50.64*	0	*50*	0	*101*	*70-128*	0			
Surr: 4-Bromofluorobenzene	*51.66*	0	*50*	0	*103*	*73-126*	0			
Surr: Dibromofluoromethane	*54.99*	0	*50*	0	*110*	*71-128*	0			
Surr: Toluene-d8	*50.72*	0	*50*	0	*101*	*73-127*	0			

LCSD Sample ID: **VLCSDS-123011-R121198** Units: **µg/Kg** Analysis Date: **12/30/2011 11:07 AM**

Client ID: Run ID: **VOA3_111230A** SeqNo: **2642921** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	50.32	5.0	50	0	101	79-120	50.29	0.0659	30	
Ethylbenzene	51.53	5.0	50	0	103	80-122	51.45	0.164	30	
Toluene	52.21	5.0	50	0	104	79-120	52.6	0.73	30	
Xylenes, Total	154.9	15	150	0	103	80-120	153.9	0.622	30	
Surr: 1,2-Dichloroethane-d4	*51.8*	0	*50*	0	*104*	*70-128*	50.64	*2.26*	*30*	
Surr: 4-Bromofluorobenzene	*51.87*	0	*50*	0	*104*	*73-126*	51.66	*0.389*	*30*	
Surr: Dibromofluoromethane	*50*	0	*50*	0	*100*	*71-128*	54.99	*9.5*	*30*	
Surr: Toluene-d8	*52.78*	0	*50*	0	*106*	*73-127*	50.72	*3.98*	*30*	

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112719
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **R121198** Instrument ID **VOA3** Method: **SW8260**

MS Sample ID: **1112779-04ZMS** Units: **µg/Kg** Analysis Date: **12/30/2011 01:22 PM**

Client ID: Run ID: **VOA3_111230A** SeqNo: **2643110** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	56.14	5.0	50	0	112	79-120	0			
Ethylbenzene	53.47	5.0	50	0	107	80-122	0			
Toluene	56.98	5.0	50	1.784	110	79-120	0			
Xylenes, Total	160	15	150	0	107	80-120	0			
Surr: 1,2-Dichloroethane-d4	*51.18*	0	*50*	0	*102*	*70-128*	0			
Surr: 4-Bromofluorobenzene	*48.32*	0	*50*	0	*96.6*	*73-126*	0			
Surr: Dibromofluoromethane	*45.56*	0	*50*	0	*91.1*	*71-128*	0			
Surr: Toluene-d8	*50.83*	0	*50*	0	*102*	*73-127*	0			

MSD Sample ID: **1112779-04ZMSD** Units: **µg/Kg** Analysis Date: **12/30/2011 01:49 PM**

Client ID: Run ID: **VOA3_111230A** SeqNo: **2643111** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	56.91	5.0	50	0	114	79-120	56.14	1.35	30	
Ethylbenzene	53.27	5.0	50	0	107	80-122	53.47	0.366	30	
Toluene	58.85	5.0	50	1.784	114	79-120	56.98	3.23	30	
Xylenes, Total	160.1	15	150	0	107	80-120	160	0.0479	30	
Surr: 1,2-Dichloroethane-d4	*50.42*	0	*50*	0	*101*	*70-128*	51.18	*1.48*	*30*	
Surr: 4-Bromofluorobenzene	*48.73*	0	*50*	0	*97.5*	*73-126*	48.32	*0.843*	*30*	
Surr: Dibromofluoromethane	*46.4*	0	*50*	0	*92.8*	*71-128*	45.56	*1.83*	*30*	
Surr: Toluene-d8	*52.35*	0	*50*	0	*105*	*73-127*	50.83	*2.94*	*30*	

The following samples were analyzed in this batch: 1112719-01A 1112719-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1112719
Project: CDOT Highway 6 Bridge Work

QC BATCH REPORT

Batch ID: **R121503** Instrument ID **Balance1** Method: **SW3550**

DUP Sample ID: **1201109-06ADUP** Units: **wt%** Analysis Date: **1/6/2012 06:30 PM**

Client ID: Run ID: **BALANCE1_120106C** SeqNo: **2649929** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Percent Moisture	24.72	0.010	0	0	0	0-0	25.33	2.44	20	

The following samples were analyzed in this batch: 1112719-01B 1112719-02B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

ALS Environmental

Date: 09-Jan-12

Client: Olsson Associates
Project: CDOT Highway 6 Bridge Work
WorkOrder: **1112719**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Units Reported	Description
µg/Kg	Micrograms per Kilogram
mg/Kg	Milligrams per Kilogram
wt%	

ALS Environmental

Sample Receipt Checklist

Client Name: **OLSSON ASSOC - GOLDEN** Date/Time Received: **22-Dec-11 10:45**

Work Order: **1112719** Received by: **PMG**

Checklist completed by Robert D. Harris (eSignature) 23-Dec-11 (Date) Reviewed by: Patricia L. Lynch (eSignature) 27-Dec-11 (Date)

Matrices: soils
Carrier name: FedEx

	Yes	No	Not Present
Shipping container/cooler in good condition?	☑	☐	☐
Custody seals intact on shipping container/cooler?	☐	☐	☑
Custody seals intact on sample bottles?	☐	☐	☑
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s): 3.7c 002

Cooler(s)/Kit(s):

	Yes	No		
Water - VOA vials have zero headspace?	☐	☐	No VOA vials submitted	☑
Water - pH acceptable upon receipt?	☐	☐	N/A	☑
pH adjusted?	☐	☐	N/A	☑

pH adjusted by: _

Login Notes:

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

ALS Environmental

Chain of Custody Form

Page ____ of ____

COC ID: 48614

1112719

OLSSON ASSOC - GOLDEN: Olsson Associates

Project: CDOT US 6 Bridges

ALS Project Manager:

Customer Information		Project Information			
Purchase Order		Project Name	CDOT Highway 6 Bridgework	A	BTEX (8260)
Work Order		Project Number	011-2359 200 200002	B	Total Metals (6020/7000) RCRA8
Company Name	Olsson Associates	Bill To Company	Olsson Associates	C	
Send Report To	James Hix	Invoice Attn	James Hix	D	
Address	4690 Table Mountain Drive Suite 200	Address	4690 Table Mountain Drive Suite 200	E F	
City/State/Zip	Golden, CO 80403	City/State/Zip	Golden, CO 80403	G	
Phone	(303) 237-2072	Phone	(303) 237-2072	H	
Fax	(303) 237-2659	Fax	(303) 237-2659	I	
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	RW7-1 @ 18 ft	12/20/11	12:50	S	Neat	2	✓	✓									
2	RW7-1 @ 30 ft	12/20/11	13:20	S	Neat	2	✓	✓									
3	~~Trip Blank~~ ~~Jutt~~ 12/21/11	~~12/20/11~~		~~W~~	~~ice~~	~~2~~	~~✓~~										
4																	
5																	
6																	
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign

Shipment Method

Required Turnaround Time: (Check Box)
☑ Std 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☐ 24 Hour ☐ Other ____

Results Due Date:

Relinquished by:	Date:	Time:	Received by:
James W. Hix	12/21/11	09:34	Fed-Ex
Relinquished by:	Date:	Time:	Received by (Laboratory): 12.22-11 10:45
Logged by (Laboratory):	Date:	Time:	Checked by (Laboratory):

Notes: 10 Day TAT

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
☑ Level II Std QC ☐ TRRP CheckList
☐ Level III Std QC/Raw Data ☐ TRRP Level IV
☐ Level IV SW846/CLP
☐ Other / EDD ____

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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From: (303) 237-2072
Mary Lou Lazo James Hix
Olsson Assocaites
4690 Table Mountain Dr
SUITE 200
Golden, CO 80403

Origin ID: WHHA

FedEx Express

J11201108050225

Ship Date: 21DEC11
ActWgt: 11.0 LB
CAD: 5396423/INET3210

Delivery Address Bar Code

SHIP TO: (281) 530-5656 BILL SENDER

Sample Reeiving
ALS Laboratory Group
10450 STANCLIFF RD STE 210

HOUSTON, TX 77099

Ref # Project ???? James Hix
Invoice #
PO #
Dept #

THU - 22 DEC A2
PRIORITY OVERNIGHT

TRK# 7930 4396 2024
0201

AB SGRA

77099
TX-US
IAH

50FG1/859F/F5F4

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ATTACHMENT B
GROUNDWATER SAMPLE ANALYTICAL RESULTS

18-Jan-2012

James Hix
Olsson Associates
4690 Table Mountain Drive
Suite 200
Golden, CO 80403

Tel: (303) 237-3139
Fax: (303) 374-3139

Re: CDOT Highway 6 Bridgework Work Order: **1201112**

Dear James,

ALS Environmental received 8 samples on 05-Jan-2012 09:00 AM for the analyses presented in the following report.

The analytical data provided relates directly to the samples received by ALS Environmental and for only the analyses requested. Results are expressed as "as received" unless otherwise noted.

QC sample results for this data met EPA or laboratory specifications except as noted in the Case Narrative or as noted with qualifiers in the QC batch information. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained by ALS Environmental. Samples will be disposed in 30 days unless storage arrangements are made.

The total number of pages in this report is 24.

If you have any questions regarding this report, please feel free to call me.

Sincerely,

Patricia L. Lynch

Electronically approved by: Yvan K. Ty

Patricia L. Lynch
Project Manager

Certificate No: T104704231-09A-TX

ALS Environmental

Date: 18-Jan-12

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
Work Order: **1201112**

Work Order Sample Summary

Lab Samp ID	Client Sample ID	Matrix	Tag Number	Collection Date	Date Received	Hold
1201112-01	RW6-1	Water		1/4/2012 12:20	1/5/2012 09:00	☐
1201112-02	RW7-1	Water		1/4/2012 12:50	1/5/2012 09:00	☐
1201112-03	RW3-2	Water		1/4/2012 10:30	1/5/2012 09:00	☐
1201112-04	RW2-1	Water		1/4/2012 11:00	1/5/2012 09:00	☐
1201112-05	RW1-2	Water		1/4/2012 11:30	1/5/2012 09:00	☐
1201112-06	RW5-1	Water		1/4/2012 12:00	1/5/2012 09:00	☐
1201112-07	Trip Blank - 111411-23	Water		1/5/2012 18:30	1/5/2012 09:00	☐
1201112-08	Trip Blank - 111411-24	Water		1/4/2012	1/5/2012 09:00	☐

ALS Environmental

Date: 18-Jan-12

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
Work Order: 1201112

Case Narrative

The data for pH is flagged with H indicating that the holding time was exceeded. The holding time for pH is "immediate" per 40CFR136.

ALS Environmental

Date: *18-Jan-12*

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
Work Order: 1201112
Sample ID: RW6-1
Lab ID: 1201112-01
Collection Date: 1/4/2012 12:20 PM
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY			**SW7470**		Prep Date: **1/16/2012**	Analyst: **JCJ**
Mercury	**0.00178**		**0.000200**	**mg/L**	1	1/16/2012 03:32 PM
METALS			**SW6020**		Prep Date: **1/10/2012**	Analyst: **ALR**
Arsenic	**0.143**		**0.0500**	**mg/L**	10	1/11/2012 12:04 AM
Barium	**4.20**		**0.0500**	**mg/L**	10	1/11/2012 12:04 AM
Cadmium	**0.00930**		**0.00200**	**mg/L**	1	1/12/2012 06:01 AM
Chromium	**0.549**		**0.0500**	**mg/L**	10	1/11/2012 12:04 AM
Lead	**0.425**		**0.0500**	**mg/L**	10	1/11/2012 12:04 AM
Selenium	**0.0708**		**0.0500**	**mg/L**	10	1/11/2012 12:04 AM
Silver	**0.00232**	J	**0.00500**	**mg/L**	1	1/12/2012 06:01 AM
VOLATILES			**SW8260**			Analyst: **PC**
Benzene	U		5.0	µg/L	1	1/9/2012 03:07 PM
Ethylbenzene	U		5.0	µg/L	1	1/9/2012 03:07 PM
Toluene	U		5.0	µg/L	1	1/9/2012 03:07 PM
Xylenes, Total	U		15	µg/L	1	1/9/2012 03:07 PM
Surr: 1,2-Dichloroethane-d4	*107*		*70-125*	*%REC*	1	1/9/2012 03:07 PM
Surr: 4-Bromofluorobenzene	*96.1*		*72-125*	*%REC*	1	1/9/2012 03:07 PM
Surr: Dibromofluoromethane	*103*		*71-125*	*%REC*	1	1/9/2012 03:07 PM
Surr: Toluene-d8	*94.1*		*75-125*	*%REC*	1	1/9/2012 03:07 PM
OIL AND GREASE			**E1664**			Analyst: **CMC**
Oil and Grease	U		2.00	mg/L	1	1/16/2012 10:00 AM
PH			**E150.1**			Analyst: **TDW**
pH	**6.33**	H	**0.100**	**pH units**	1	1/6/2012 02:00 PM
TOTAL SUSPENDED SOLIDS			**M2540D**			Analyst: **KAH**
Suspended Solids (Residue, Non-Filterable)	**30,400**		**2.00**	**mg/L**	1	1/6/2012 01:45 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *18-Jan-12*

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
Work Order: 1201112
Sample ID: RW7-1
Lab ID: 1201112-02
Collection Date: 1/4/2012 12:50 PM
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY			**SW7470**		Prep Date: **1/16/2012**	Analyst: **JCJ**
Mercury	**0.00117**		**0.000200**	**mg/L**	1	1/16/2012 03:38 PM
METALS			**SW6020**		Prep Date: **1/10/2012**	Analyst: **ALR**
Arsenic	**0.112**		**0.0500**	**mg/L**	10	1/11/2012 12:10 AM
Barium	**4.85**		**0.0500**	**mg/L**	10	1/11/2012 12:10 AM
Cadmium	**0.00486**		**0.00200**	**mg/L**	1	1/12/2012 06:07 AM
Chromium	**0.270**		**0.0500**	**mg/L**	10	1/11/2012 12:10 AM
Lead	**0.360**		**0.0500**	**mg/L**	10	1/11/2012 12:10 AM
Selenium	**0.0518**		**0.0500**	**mg/L**	10	1/11/2012 12:10 AM
Silver	**0.00176**	J	**0.00500**	**mg/L**	1	1/12/2012 06:07 AM
VOLATILES			**SW8260**			Analyst: **PC**
Benzene	U		5.0	µg/L	1	1/10/2012 03:55 PM
Ethylbenzene	U		5.0	µg/L	1	1/10/2012 03:55 PM
Toluene	U		5.0	µg/L	1	1/10/2012 03:55 PM
Xylenes, Total	U		15	µg/L	1	1/10/2012 03:55 PM
Surr: 1,2-Dichloroethane-d4	*94.5*		*70-125*	*%REC*	1	1/10/2012 03:55 PM
Surr: 4-Bromofluorobenzene	*91.9*		*72-125*	*%REC*	1	1/10/2012 03:55 PM
Surr: Dibromofluoromethane	*96.3*		*71-125*	*%REC*	1	1/10/2012 03:55 PM
Surr: Toluene-d8	*91.8*		*75-125*	*%REC*	1	1/10/2012 03:55 PM
OIL AND GREASE			**E1664**			Analyst: **CMC**
Oil and Grease	**0.682**	J	**2.00**	**mg/L**	1	1/16/2012 10:00 AM
PH			**E150.1**			Analyst: **TDW**
pH	**6.39**	H	**0.100**	**pH units**	1	1/6/2012 02:00 PM
TOTAL SUSPENDED SOLIDS			**M2540D**			Analyst: **KAH**
Suspended Solids (Residue, Non-Filterable)	**48,200**		**2.00**	**mg/L**	1	1/6/2012 01:45 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *18-Jan-12*

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
Work Order: 1201112
Sample ID: RW3-2
Lab ID: 1201112-03
Collection Date: 1/4/2012 10:30 AM
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY			**SW7470**		Prep Date: **1/16/2012**	Analyst: **JCJ**
Mercury	**0.00137**		**0.000200**	**mg/L**	1	1/16/2012 03:40 PM
METALS			**SW6020**		Prep Date: **1/10/2012**	Analyst: **ALR**
Arsenic	**0.0784**		**0.0500**	**mg/L**	10	1/11/2012 12:16 AM
Barium	**4.25**		**0.0500**	**mg/L**	10	1/11/2012 12:16 AM
Cadmium	**0.00615**		**0.00200**	**mg/L**	1	1/12/2012 06:14 AM
Chromium	**0.241**		**0.0500**	**mg/L**	10	1/11/2012 12:16 AM
Lead	**0.628**		**0.0500**	**mg/L**	10	1/11/2012 12:16 AM
Selenium	**0.0352**		**0.00500**	**mg/L**	1	1/12/2012 06:14 AM
Silver	**0.00194**	J	**0.00500**	**mg/L**	1	1/12/2012 06:14 AM
VOLATILES			**SW8260**			Analyst: **PC**
Benzene	U		5.0	µg/L	1	1/9/2012 12:23 PM
Ethylbenzene	U		5.0	µg/L	1	1/9/2012 12:23 PM
Toluene	U		5.0	µg/L	1	1/9/2012 12:23 PM
Xylenes, Total	U		15	µg/L	1	1/9/2012 12:23 PM
Surr: 1,2-Dichloroethane-d4	*111*		*70-125*	*%REC*	1	1/9/2012 12:23 PM
Surr: 4-Bromofluorobenzene	*87.3*		*72-125*	*%REC*	1	1/9/2012 12:23 PM
Surr: Dibromofluoromethane	*103*		*71-125*	*%REC*	1	1/9/2012 12:23 PM
Surr: Toluene-d8	*86.7*		*75-125*	*%REC*	1	1/9/2012 12:23 PM
OIL AND GREASE			**E1664**			Analyst: **CMC**
Oil and Grease	U		2.00	mg/L	1	1/16/2012 10:00 AM
PH			**E150.1**			Analyst: **TDW**
pH	**6.50**	H	**0.100**	**pH units**	1	1/6/2012 02:00 PM
TOTAL SUSPENDED SOLIDS			**M2540D**			Analyst: **KAH**
Suspended Solids (Residue, Non-Filterable)	**10,800**		**2.00**	**mg/L**	1	1/6/2012 01:45 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *18-Jan-12*

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
Work Order: 1201112
Sample ID: RW2-1
Lab ID: 1201112-04
Collection Date: 1/4/2012 11:00 AM
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY			**SW7470**		Prep Date: **1/16/2012**	Analyst: **JCJ**
Mercury	**0.000465**		**0.000200**	**mg/L**	1	1/16/2012 03:42 PM
METALS			**SW6020**		Prep Date: **1/10/2012**	Analyst: **ALR**
Arsenic	**0.0512**		**0.0500**	**mg/L**	10	1/11/2012 12:23 AM
Barium	**2.66**		**0.0500**	**mg/L**	10	1/11/2012 12:23 AM
Cadmium	**0.00329**		**0.00200**	**mg/L**	1	1/12/2012 06:39 AM
Chromium	**0.282**		**0.0500**	**mg/L**	10	1/11/2012 12:23 AM
Lead	**0.348**		**0.0500**	**mg/L**	10	1/11/2012 12:23 AM
Selenium	**0.0312**		**0.00500**	**mg/L**	1	1/12/2012 06:39 AM
Silver	**0.00127**	J	**0.00500**	**mg/L**	1	1/12/2012 06:39 AM
VOLATILES			**SW8260**			Analyst: **PC**
Benzene	U		5.0	µg/L	1	1/9/2012 12:52 PM
Ethylbenzene	U		5.0	µg/L	1	1/9/2012 12:52 PM
Toluene	U		5.0	µg/L	1	1/9/2012 12:52 PM
Xylenes, Total	U		15	µg/L	1	1/9/2012 12:52 PM
Surr: 1,2-Dichloroethane-d4	*107*		*70-125*	*%REC*	1	1/9/2012 12:52 PM
Surr: 4-Bromofluorobenzene	*90.1*		*72-125*	*%REC*	1	1/9/2012 12:52 PM
Surr: Dibromofluoromethane	*106*		*71-125*	*%REC*	1	1/9/2012 12:52 PM
Surr: Toluene-d8	*89.3*		*75-125*	*%REC*	1	1/9/2012 12:52 PM
OIL AND GREASE			**E1664**			Analyst: **CMC**
Oil and Grease	**1.69**	J	**2.00**	**mg/L**	1	1/16/2012 10:00 AM
PH			**E150.1**			Analyst: **TDW**
pH	**6.54**	H	**0.100**	**pH units**	1	1/6/2012 02:00 PM
TOTAL SUSPENDED SOLIDS			**M2540D**			Analyst: **KAH**
Suspended Solids (Residue, Non-Filterable)	**14,700**		**2.00**	**mg/L**	1	1/6/2012 01:45 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *18-Jan-12*

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
Work Order: 1201112
Sample ID: RW1-2
Lab ID: 1201112-05
Collection Date: 1/4/2012 11:30 AM
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY			**SW7470**		Prep Date: **1/16/2012**	Analyst: **JCJ**
Mercury	**0.000833**		**0.000200**	**mg/L**	1	1/16/2012 03:44 PM
METALS			**SW6020**		Prep Date: **1/10/2012**	Analyst: **ALR**
Arsenic	**0.0994**		**0.0500**	**mg/L**	10	1/11/2012 12:29 AM
Barium	**11.4**		**0.0500**	**mg/L**	10	1/11/2012 12:29 AM
Cadmium	**0.00640**		**0.00200**	**mg/L**	1	1/12/2012 06:45 AM
Chromium	**0.753**		**0.0500**	**mg/L**	10	1/11/2012 12:29 AM
Lead	**2.07**		**0.0500**	**mg/L**	10	1/11/2012 12:29 AM
Selenium	**0.0984**		**0.0500**	**mg/L**	10	1/11/2012 12:29 AM
Silver	**0.0112**		**0.00500**	**mg/L**	1	1/12/2012 06:45 AM
VOLATILES			**SW8260**			Analyst: **PC**
Benzene	U		5.0	µg/L	1	1/9/2012 02:14 PM
Ethylbenzene	U		5.0	µg/L	1	1/9/2012 02:14 PM
Toluene	U		5.0	µg/L	1	1/9/2012 02:14 PM
Xylenes, Total	U		15	µg/L	1	1/9/2012 02:14 PM
Surr: 1,2-Dichloroethane-d4	*101*		*70-125*	*%REC*	1	1/9/2012 02:14 PM
Surr: 4-Bromofluorobenzene	*92.8*		*72-125*	*%REC*	1	1/9/2012 02:14 PM
Surr: Dibromofluoromethane	*102*		*71-125*	*%REC*	1	1/9/2012 02:14 PM
Surr: Toluene-d8	*92.9*		*75-125*	*%REC*	1	1/9/2012 02:14 PM
OIL AND GREASE			**E1664**			Analyst: **CMC**
Oil and Grease	**0.638**	J	**2.00**	**mg/L**	1	1/16/2012 10:00 AM
PH			**E150.1**			Analyst: **TDW**
pH	**6.38**	H	**0.100**	**pH units**	1	1/6/2012 02:00 PM
TOTAL SUSPENDED SOLIDS			**M2540D**			Analyst: **KAH**
Suspended Solids (Residue, Non-Filterable)	**38,100**		**2.00**	**mg/L**	1	1/6/2012 01:45 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *18-Jan-12*

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
Work Order: 1201112
Sample ID: RW5-1
Lab ID: 1201112-06
Collection Date: 1/4/2012 12:00 PM
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
MERCURY			**SW7470**		Prep Date: **1/16/2012**	Analyst: **JCJ**
Mercury	**0.000980**		**0.000200**	**mg/L**	1	1/16/2012 03:46 PM
METALS			**SW6020**		Prep Date: **1/10/2012**	Analyst: **ALR**
Arsenic	**0.0755**		**0.0500**	**mg/L**	10	1/11/2012 12:35 AM
Barium	**6.61**		**0.0500**	**mg/L**	10	1/11/2012 12:35 AM
Cadmium	**0.00377**		**0.00200**	**mg/L**	1	1/12/2012 06:51 AM
Chromium	**0.293**		**0.0500**	**mg/L**	10	1/11/2012 12:35 AM
Lead	**0.576**		**0.0500**	**mg/L**	10	1/11/2012 12:35 AM
Selenium	**0.0652**		**0.0500**	**mg/L**	10	1/11/2012 12:35 AM
Silver	**0.00358**	J	**0.00500**	**mg/L**	1	1/12/2012 06:51 AM
VOLATILES			**SW8260**			Analyst: **PC**
Benzene	U		5.0	µg/L	1	1/9/2012 02:41 PM
Ethylbenzene	U		5.0	µg/L	1	1/9/2012 02:41 PM
Toluene	U		5.0	µg/L	1	1/9/2012 02:41 PM
Xylenes, Total	U		15	µg/L	1	1/9/2012 02:41 PM
Surr: 1,2-Dichloroethane-d4	*105*		*70-125*	*%REC*	1	1/9/2012 02:41 PM
Surr: 4-Bromofluorobenzene	*94.6*		*72-125*	*%REC*	1	1/9/2012 02:41 PM
Surr: Dibromofluoromethane	*100*		*71-125*	*%REC*	1	1/9/2012 02:41 PM
Surr: Toluene-d8	*92.1*		*75-125*	*%REC*	1	1/9/2012 02:41 PM
OIL AND GREASE			**E1664**			Analyst: **CMC**
Oil and Grease	**0.652**	J	**2.00**	**mg/L**	1	1/16/2012 10:00 AM
PH			**E150.1**			Analyst: **TDW**
pH	**6.36**	H	**0.100**	**pH units**	1	1/6/2012 02:00 PM
TOTAL SUSPENDED SOLIDS			**M2540D**			Analyst: **KAH**
Suspended Solids (Residue, Non-Filterable)	**19,200**		**2.00**	**mg/L**	1	1/6/2012 01:45 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *18-Jan-12*

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
Sample ID: Trip Blank - 111411-23
Collection Date: 1/5/2012 06:30 PM

Work Order: 1201112
Lab ID: 1201112-07
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
VOLATILES			**SW8260**			Analyst: **PC**
Benzene	U		5.0	µg/L	1	1/9/2012 06:40 PM
Ethylbenzene	U		5.0	µg/L	1	1/9/2012 06:40 PM
Toluene	U		5.0	µg/L	1	1/9/2012 06:40 PM
Xylenes, Total	U		15	µg/L	1	1/9/2012 06:40 PM
Surr: 1,2-Dichloroethane-d4	*113*		*70-125*	*%REC*	1	1/9/2012 06:40 PM
Surr: 4-Bromofluorobenzene	*94.9*		*72-125*	*%REC*	1	1/9/2012 06:40 PM
Surr: Dibromofluoromethane	*107*		*71-125*	*%REC*	1	1/9/2012 06:40 PM
Surr: Toluene-d8	*96.7*		*75-125*	*%REC*	1	1/9/2012 06:40 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: *18-Jan-12*

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
Sample ID: Trip Blank - 111411-24
Collection Date: 1/4/2012

Work Order: 1201112
Lab ID: 1201112-08
Matrix: WATER

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
VOLATILES			**SW8260**			Analyst: **PC**
Benzene	U		5.0	µg/L	1	1/9/2012 07:07 PM
Ethylbenzene	U		5.0	µg/L	1	1/9/2012 07:07 PM
Toluene	U		5.0	µg/L	1	1/9/2012 07:07 PM
Xylenes, Total	U		15	µg/L	1	1/9/2012 07:07 PM
Surr: 1,2-Dichloroethane-d4	*109*		*70-125*	*%REC*	1	1/9/2012 07:07 PM
Surr: 4-Bromofluorobenzene	*95.9*		*72-125*	*%REC*	1	1/9/2012 07:07 PM
Surr: Dibromofluoromethane	*102*		*71-125*	*%REC*	1	1/9/2012 07:07 PM
Surr: Toluene-d8	*90.3*		*75-125*	*%REC*	1	1/9/2012 07:07 PM

Note: See Qualifiers Page for a list of qualifiers and their explanation.

ALS Environmental

Date: 18-Jan-12

Client: Olsson Associates
Work Order: 1201112
Project: CDOT Highway 6 Bridgework

QC BATCH REPORT

Batch ID: **58036** Instrument ID **ICPMS03** Method: **SW6020**

MBLK Sample ID: **MBLKW4-011012-58036** Units: **mg/L** Analysis Date: **1/10/2012 09:21 PM**

Client ID: Run ID: **ICPMS03_120110A** SeqNo: **2651456** Prep Date: **1/10/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	U	0.0050								
Barium	U	0.0050								
Cadmium	U	0.0020								
Chromium	U	0.0050								
Lead	U	0.0050								
Selenium	0.00143	0.0050								J
Silver	U	0.0050								

LCS Sample ID: **MLCSW4-011012-58036** Units: **mg/L** Analysis Date: **1/10/2012 09:28 PM**

Client ID: Run ID: **ICPMS03_120110A** SeqNo: **2651457** Prep Date: **1/10/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.04937	0.0050	0.05	0	98.7	80-120	0			
Barium	0.0536	0.0050	0.05	0	107	80-120	0			
Cadmium	0.04973	0.0020	0.05	0	99.5	80-120	0			
Chromium	0.04978	0.0050	0.05	0	99.6	80-120	0			
Lead	0.05158	0.0050	0.05	0	103	80-120	0			
Selenium	0.0496	0.0050	0.05	0	99.2	80-120	0			
Silver	0.05089	0.0050	0.05	0	102	80-120	0			

MS Sample ID: **1201103-01CMS** Units: **mg/L** Analysis Date: **1/10/2012 09:53 PM**

Client ID: Run ID: **ICPMS03_120110A** SeqNo: **2651461** Prep Date: **1/10/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.0503	0.0050	0.05	0.000005941	101	80-120	0			
Barium	0.05454	0.0050	0.05	-0.00002379	109	80-120	0			
Cadmium	0.05096	0.0020	0.05	0.0001141	102	80-120	0			
Chromium	0.0504	0.0050	0.05	0.000387	100	80-120	0			
Lead	0.0527	0.0050	0.05	0.0001094	105	80-120	0			
Selenium	0.05089	0.0050	0.05	0.001378	99	80-120	0			
Silver	0.05212	0.0050	0.05	-0.000202	105	80-120	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1201112
Project: CDOT Highway 6 Bridgework

QC BATCH REPORT

Batch ID: **58036** Instrument ID **ICPMS03** Method: **SW6020**

MSD Sample ID: **1201103-01CMSD** Units: **mg/L** Analysis Date: **1/10/2012 09:59 PM**

Client ID: Run ID: **ICPMS03_120110A** SeqNo: **2651462** Prep Date: **1/10/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	0.04856	0.0050	0.05	0.000005941	97.1	80-120	0.0503	3.52	15	
Barium	0.05347	0.0050	0.05	-0.00002379	107	80-120	0.05454	1.98	15	
Cadmium	0.04929	0.0020	0.05	0.0001141	98.4	80-120	0.05096	3.33	15	
Chromium	0.04876	0.0050	0.05	0.000387	96.7	80-120	0.0504	3.31	15	
Lead	0.05111	0.0050	0.05	0.0001094	102	80-120	0.0527	3.06	15	
Selenium	0.04836	0.0050	0.05	0.001378	94	80-120	0.05089	5.1	15	
Silver	0.05084	0.0050	0.05	-0.000202	102	80-120	0.05212	2.49	15	

DUP Sample ID: **1201103-01CDUP** Units: **mg/L** Analysis Date: **1/10/2012 09:40 PM**

Client ID: Run ID: **ICPMS03_120110A** SeqNo: **2651459** Prep Date: **1/10/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Arsenic	U	0.0050	0	0	0	0-0	0.000005941	0	25	
Barium	U	0.0050	0	0	0	0-0	-0.00002379	0	25	
Cadmium	U	0.0020	0	0	0	0-0	0.0001141	0	25	
Chromium	U	0.0050	0	0	0	0-0	0.000387	0	25	
Lead	U	0.0050	0	0	0	0-0	0.0001094	0	25	
Selenium	0.001118	0.0050	0	0	0	0-0	0.001378	0	25	J
Silver	U	0.0050	0	0	0	0-0	-0.000202	0	25	

The following samples were analyzed in this batch:

1201112-01C	1201112-02C	1201112-03C
1201112-04C	1201112-05C	1201112-06C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1201112
Project: CDOT Highway 6 Bridgework

QC BATCH REPORT

Batch ID: **58176** Instrument ID **Mercury** Method: **SW7470**

MBLK Sample ID: **GBLKW3-011612-58176** Units: **mg/L** Analysis Date: **1/16/2012 03:06 PM**
Client ID: Run ID: **MERCURY_120116A** SeqNo: **2656042** Prep Date: **1/16/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	U	0.00020								

LCS Sample ID: **GLCSW3-011612-58176** Units: **mg/L** Analysis Date: **1/16/2012 03:08 PM**
Client ID: Run ID: **MERCURY_120116A** SeqNo: **2656043** Prep Date: **1/16/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.0055	0.00020	0.005	0	110	85-115	0			

MS Sample ID: **1201308-01CMS** Units: **mg/L** Analysis Date: **1/16/2012 03:20 PM**
Client ID: Run ID: **MERCURY_120116A** SeqNo: **2656046** Prep Date: **1/16/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00544	0.00020	0.005	-0.000001	109	85-115	0			

MSD Sample ID: **1201308-01CMSD** Units: **mg/L** Analysis Date: **1/16/2012 03:22 PM**
Client ID: Run ID: **MERCURY_120116A** SeqNo: **2656049** Prep Date: **1/16/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	0.00554	0.00020	0.005	-0.000001	111	85-115	0.00544	1.82	20	

DUP Sample ID: **1201308-01CDUP** Units: **mg/L** Analysis Date: **1/16/2012 03:18 PM**
Client ID: Run ID: **MERCURY_120116A** SeqNo: **2656045** Prep Date: **1/16/2012** DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Mercury	U	0.00020	0	0	0	0-0	-0.000001	0	20	

The following samples were analyzed in this batch:

1201112-01C	1201112-02C	1201112-03C
1201112-04C	1201112-05C	1201112-06C

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1201112
Project: CDOT Highway 6 Bridgework

QC BATCH REPORT

Batch ID: **R121537** Instrument ID **VOA1** Method: **SW8260**

MBLK Sample ID: **VBLKW-010912-R121537** Units: **µg/L** Analysis Date: **1/9/2012 11:22 AM**

Client ID: Run ID: **VOA1_120109A** SeqNo: **2650552** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	5.0								
Ethylbenzene	U	5.0								
Toluene	U	5.0								
Xylenes, Total	U	15								
Surr: 1,2-Dichloroethane-d4	*52.85*	5.0	*50*	0	*106*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*46.48*	5.0	*50*	0	*93*	*72-125*	0			
Surr: Dibromofluoromethane	*50.56*	5.0	*50*	0	*101*	*71-125*	0			
Surr: Toluene-d8	*45.3*	5.0	*50*	0	*90.6*	*75-125*	0			

LCS Sample ID: **VLCSW-010912-R121537** Units: **µg/L** Analysis Date: **1/9/2012 10:20 AM**

Client ID: Run ID: **VOA1_120109A** SeqNo: **2650551** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	48.95	5.0	50	0	97.9	73-121	0			
Ethylbenzene	48.79	5.0	50	0	97.6	80-120	0			
Toluene	46.87	5.0	50	0	93.7	80-120	0			
Xylenes, Total	144	15	150	0	96	80-120	0			
Surr: 1,2-Dichloroethane-d4	*49.56*	5.0	*50*	0	*99.1*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*49.61*	5.0	*50*	0	*99.2*	*72-125*	0			
Surr: Dibromofluoromethane	*49.96*	5.0	*50*	0	*99.9*	*71-125*	0			
Surr: Toluene-d8	*47.17*	5.0	*50*	0	*94.3*	*75-125*	0			

MS Sample ID: **1201118-01AMS** Units: **µg/L** Analysis Date: **1/9/2012 01:20 PM**

Client ID: Run ID: **VOA1_120109A** SeqNo: **2650556** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	48.02	5.0	50	0	96	73-121	0			
Ethylbenzene	43.42	5.0	50	0	86.8	80-120	0			
Toluene	46.11	5.0	50	0	92.2	80-120	0			
Xylenes, Total	141.6	15	150	0	94.4	80-120	0			
Surr: 1,2-Dichloroethane-d4	*51.89*	5.0	*50*	0	*104*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*54.14*	5.0	*50*	0	*108*	*72-125*	0			
Surr: Dibromofluoromethane	*50.58*	5.0	*50*	0	*101*	*71-125*	0			
Surr: Toluene-d8	*50.99*	5.0	*50*	0	*102*	*75-125*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1201112
Project: CDOT Highway 6 Bridgework

QC BATCH REPORT

Batch ID: **R121537** Instrument ID **VOA1** Method: **SW8260**

MSD Sample ID: **1201118-01AMSD** Units: **µg/L** Analysis Date: **1/9/2012 01:47 PM**

Client ID: Run ID: **VOA1_120109A** SeqNo: **2650557** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	47.53	5.0	50	0	95.1	73-121	48.02	1.03	20	
Ethylbenzene	46.12	5.0	50	0	92.2	80-120	43.42	6.03	20	
Toluene	46.13	5.0	50	0	92.3	80-120	46.11	0.0428	20	
Xylenes, Total	136	15	150	0	90.7	80-120	141.6	4	20	
Surr: 1,2-Dichloroethane-d4	*52.58*	5.0	*50*	0	*105*	*70-125*	51.89	*1.32*	*20*	
Surr: 4-Bromofluorobenzene	*47.9*	5.0	*50*	0	*95.8*	*72-125*	54.14	*12.2*	*20*	
Surr: Dibromofluoromethane	*51.51*	5.0	*50*	0	*103*	*71-125*	50.58	*1.82*	*20*	
Surr: Toluene-d8	*44.6*	5.0	*50*	0	*89.2*	*75-125*	50.99	*13.4*	*20*	

The following samples were analyzed in this batch:

1201112-01A	1201112-03A	1201112-04A
1201112-05A	1201112-06A	1201112-07A
1201112-08A		

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1201112
Project: CDOT Highway 6 Bridgework

QC BATCH REPORT

Batch ID: **R121573** Instrument ID **VOA1** Method: **SW8260**

MBLK Sample ID: **VBLKW-011012-R121573** Units: **µg/L** Analysis Date: **1/10/2012 11:39 AM**

Client ID: Run ID: **VOA1_120110A** SeqNo: **2651227** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	U	5.0								
Ethylbenzene	U	5.0								
Toluene	U	5.0								
Xylenes, Total	U	15								
Surr: 1,2-Dichloroethane-d4	*51.92*	5.0	*50*	0	*104*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*46.22*	5.0	*50*	0	*92.4*	*72-125*	0			
Surr: Dibromofluoromethane	*52.91*	5.0	*50*	0	*106*	*71-125*	0			
Surr: Toluene-d8	*46.74*	5.0	*50*	0	*93.5*	*75-125*	0			

LCS Sample ID: **VLCSW-011012-R121573** Units: **µg/L** Analysis Date: **1/10/2012 12:06 PM**

Client ID: Run ID: **VOA1_120110A** SeqNo: **2651228** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	52.83	5.0	50	0	106	73-121	0			
Ethylbenzene	50.19	5.0	50	0	100	80-120	0			
Toluene	48.86	5.0	50	0	97.7	80-120	0			
Xylenes, Total	150.2	15	150	0	100	80-120	0			
Surr: 1,2-Dichloroethane-d4	*51.59*	5.0	*50*	0	*103*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*48.61*	5.0	*50*	0	*97.2*	*72-125*	0			
Surr: Dibromofluoromethane	*50.4*	5.0	*50*	0	*101*	*71-125*	0			
Surr: Toluene-d8	*46.95*	5.0	*50*	0	*93.9*	*75-125*	0			

MS Sample ID: **1201103-18ZMS** Units: **µg/L** Analysis Date: **1/10/2012 01:47 PM**

Client ID: Run ID: **VOA1_120110A** SeqNo: **2651232** Prep Date: DF: **100**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	11120	500	5000	7047	81.5	73-121	0			
Ethylbenzene	9029	500	5000	4112	98.3	80-120	0			
Toluene	4534	500	5000	0	90.7	80-120	0			
Xylenes, Total	16650	1,500	15000	1457	101	80-120	0			
Surr: 1,2-Dichloroethane-d4	*4950*	500	*5000*	0	*99*	*70-125*	0			
Surr: 4-Bromofluorobenzene	*4824*	500	*5000*	0	*96.5*	*72-125*	0			
Surr: Dibromofluoromethane	*5072*	500	*5000*	0	*101*	*71-125*	0			
Surr: Toluene-d8	*4482*	500	*5000*	0	*89.6*	*75-125*	0			

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1201112
Project: CDOT Highway 6 Bridgework

QC BATCH REPORT

Batch ID: **R121573** Instrument ID **VOA1** Method: **SW8260**

MSD Sample ID: **1201103-18ZMSD** Units: **µg/L** Analysis Date: **1/10/2012 02:13 PM**

Client ID: Run ID: **VOA1_120110A** SeqNo: **2651233** Prep Date: DF: **100**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Benzene	11400	500	5000	7047	87.1	73-121	11120	2.49	20	
Ethylbenzene	8627	500	5000	4112	90.3	80-120	9029	4.56	20	
Toluene	4226	500	5000	0	84.5	80-120	4534	7.02	20	
Xylenes, Total	14970	1,500	15000	1457	90.1	80-120	16650	10.7	20	
Surr: 1,2-Dichloroethane-d4	*5066*	500	*5000*	0	*101*	*70-125*	4950	*2.32*	*20*	
Surr: 4-Bromofluorobenzene	*4434*	500	*5000*	0	*88.7*	*72-125*	4824	*8.41*	*20*	
Surr: Dibromofluoromethane	*4893*	500	*5000*	0	*97.9*	*71-125*	5072	*3.6*	*20*	
Surr: Toluene-d8	*4225*	500	*5000*	0	*84.5*	*75-125*	4482	*5.9*	*20*	

The following samples were analyzed in this batch: 1201112-02A

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1201112
Project: CDOT Highway 6 Bridgework

QC BATCH REPORT

Batch ID: **R121455** Instrument ID **WetChem** Method: **E150.1**

LCS Sample ID: **WLCSDW1-010612-R121455** Units: **pH units** Analysis Date: **1/6/2012 02:00 PM**

Client ID: Run ID: **WETCHEM_120106B** SeqNo: **2648795** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	6	0.10	6	0	100	90-110	0			

DUP Sample ID: **1201112-01BDUP** Units: **pH units** Analysis Date: **1/6/2012 02:00 PM**

Client ID: **RW6-1** Run ID: **WETCHEM_120106B** SeqNo: **2648802** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
pH	6.38	0.10	0	0	0	0-0	6.33	0.787	20	H

The following samples were analyzed in this batch:

1201112-01B	1201112-02B	1201112-03B
1201112-04B	1201112-05B	1201112-06B

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1201112
Project: CDOT Highway 6 Bridgework

QC BATCH REPORT

Batch ID: **R121501** Instrument ID **Balance1** Method: **M2540D**

MBLK Sample ID: **WBLK-010612-R121501** Units: **mg/L** Analysis Date: **1/6/2012 01:45 PM**

Client ID: Run ID: **BALANCE1_120106B** SeqNo: **2649899** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Suspended Solids (Residue, Non-Fi	U	2.0								

DUP Sample ID: **1201084-02DDUP** Units: **mg/L** Analysis Date: **1/6/2012 01:45 PM**

Client ID: Run ID: **BALANCE1_120106B** SeqNo: **2649878** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Suspended Solids (Residue, Non-Fi	20.25	2.0	0	0	0	0-0	22	8.28	20	

DUP Sample ID: **1201115-02EDUP** Units: **mg/L** Analysis Date: **1/6/2012 01:45 PM**

Client ID: Run ID: **BALANCE1_120106B** SeqNo: **2649891** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Suspended Solids (Residue, Non-Fi	4332	2.0	0	0	0	0-0	4392	1.38	20	

The following samples were analyzed in this batch:

1201112-01D	1201112-02D	1201112-03D
1201112-04D	1201112-05D	1201112-06D

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

Client: Olsson Associates
Work Order: 1201112
Project: CDOT Highway 6 Bridgework

QC BATCH REPORT

Batch ID: **R121824** Instrument ID **WetChem** Method: **E1664**

MBLK Sample ID: **WBLKW1-011612-R121824** Units: **mg/L** Analysis Date: **1/16/2012 10:00 AM**

Client ID: Run ID: **WETCHEM_120116J** SeqNo: **2656662** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	U	2.0								

LCS Sample ID: **WLCSW1-011612-R121824** Units: **mg/L** Analysis Date: **1/16/2012 10:00 AM**

Client ID: Run ID: **WETCHEM_120116J** SeqNo: **2656663** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	38.78	2.0	40	0	96.9	78-114		0		

MS Sample ID: **1201293-01EMS** Units: **mg/L** Analysis Date: **1/16/2012 10:00 AM**

Client ID: Run ID: **WETCHEM_120116J** SeqNo: **2656704** Prep Date: DF: **1**

Analyte	Result	PQL	SPK Val	SPK Ref Value	%REC	Control Limit	RPD Ref Value	%RPD	RPD Limit	Qual
Oil and Grease	44.33	2.0	40	3.69	102	78-114		0		

The following samples were analyzed in this batch:

1201112-01E	1201112-02E	1201112-03E
1201112-04E	1201112-05E	1201112-06E

Note: See Qualifiers Page for a list of Qualifiers and their explanation.

ALS Environmental

Date: 18-Jan-12

Client: Olsson Associates
Project: CDOT Highway 6 Bridgework
WorkOrder: **1201112**

QUALIFIERS, ACRONYMS, UNITS

Qualifier	Description
*	Value exceeds Regulatory Limit
a	Not accredited
B	Analyte detected in the associated Method Blank above the Reporting Limit
E	Value above quantitation range
H	Analyzed outside of Holding Time
J	Analyte detected below quantitation limit
M	Manually integrated, see raw data for justification
n	Not offered for accreditation
ND	Not Detected at the Reporting Limit
O	Sample amount is > 4 times amount spiked
P	Dual Column results percent difference > 40%
R	RPD above laboratory control limit
S	Spike Recovery outside laboratory control limits
U	Analyzed but not detected above the MDL

Acronym	Description
DCS	Detectability Check Study
DUP	Method Duplicate
LCS	Laboratory Control Sample
LCSD	Laboratory Control Sample Duplicate
MBLK	Method Blank
MDL	Method Detection Limit
MQL	Method Quantitation Limit
MS	Matrix Spike
MSD	Matrix Spike Duplicate
PDS	Post Digestion Spike
PQL	Practical Quantitation Limit
SD	Serial Dilution
SDL	Sample Detection Limit
TRRP	Texas Risk Reduction Program

Units Reported	Description
µg/L	Micrograms per Liter
mg/L	Milligrams per Liter
pH units	

ALS Environmental

Sample Receipt Checklist

Client Name: **OLSSON ASSOC - GOLDEN** Date/Time Received: **05-Jan-12 09:00**

Work Order: **1201112** Received by: **RNG**

Checklist completed by Paresh M. Giga (eSignature) 05-Jan-12 (Date) Reviewed by: Patricia L. Lynch (eSignature) 06-Jan-12 (Date)

Matrices: Water
Carrier name: FedEx

	Yes	No	Not Present
Shipping container/cooler in good condition?	☑	☐	☐
Custody seals intact on shipping container/cooler?	☑	☐	☐
Custody seals intact on sample bottles?	☐	☐	☑
Chain of custody present?	☑	☐	
Chain of custody signed when relinquished and received?	☑	☐	
Chain of custody agrees with sample labels?	☑	☐	
Samples in proper container/bottle?	☑	☐	
Sample containers intact?	☑	☐	
Sufficient sample volume for indicated test?	☑	☐	
All samples received within holding time?	☑	☐	
Container/Temp Blank temperature in compliance?	☑	☐	

Temperature(s)/Thermometer(s): 2.6, 2.2 | 002

Cooler(s)/Kit(s): 3446, 1871

	Yes	No		
Water - VOA vials have zero headspace?	☑	☐	No VOA vials submitted	☐
Water - pH acceptable upon receipt?	☑	☐	N/A	☐
pH adjusted?	☐	☑	N/A	☐

pH adjusted by: _

Login Notes: COC states incorrect bottle count - RW5-1 has 8 bottles & RW3-2 has 7 bottles - logged in per correct count. Received 2 trip blanks; not on COC.

Client Contacted: Date Contacted: Person Contacted:

Contacted By: Regarding:

Comments:

CorrectiveAction:

ALS Environmental

Chain of Custody Form

Page 1 of 1

COC ID: 49196

1201112

OLSSON ASSOC - GOLDEN: Olsson Associates

Project: CDOT Highway 6 Bridgework

ALS Project Manager:

Customer Information		Project Information			
Purchase Order		Project Name	CDOT Highway 6 Bridgework	A	BTEX (8260)
Work Order		Project Number		B	Total Metals (6020/7000) RCRA8
Company Name	Olsson Associates	Bill To Company	Olsson Associates	C	Oil & Grease
Send Report To	James Hix	Invoice Attn	James Hix	D	pH
Address	4690 Table Mountain Drive Suite 200	Address	4690 Table Mountain Drive Suite 200	E	TSS
				F	
City/State/Zip	Golden, CO 80403	City/State/Zip	Golden, CO 80403	G	
Phone	(303) 237-2072	Phone	(303) 237-2072	H	
Fax	(303) 237-2659	Fax	(303) 237-2659	I	
e-Mail Address		e-Mail Address		J	

No.	Sample Description	Date	Time	Matrix	Pres.	# Bottles	A	B	C	D	E	F	G	H	I	J	Hold
1	RW6-1	1/4/12	12:20	W	Y	8	X	X	X	X	X						
2	RW7-1		12:50	W		8	X	X	X	X	X						
3	RW3-2		1030	W		8	X	X	X	X	X						
4	RW2-1		11:00	W		8	X	X	X	X	X						
5	RW1-2		11:30	W		8	X	X	X	X	X						
6	RW5-1		12:00	W		7	X	X	X	X	X						
7																	
8																	
9																	
10																	

Sampler(s) Please Print & Sign

Shipment Method

Required Turnaround Time: (Check Box) ☑ Std 10 WK Days ☐ 5 WK Days ☐ 2 WK Days ☐ 24 Hour ☐ Other _____

Results Due Date:

Relinquished by: [signature] Date: 1/4/12 Time: 1410 Received by:

Relinquished by: Date: Time: Received by (Laboratory): [signature] 1/5/12 09:00

Logged by (Laboratory): Date: Time: Checked by (Laboratory):

Notes: 10 Day TAT

Cooler ID	Cooler Temp.

QC Package: (Check One Box Below)
- ☑ Level II Std QC
- ☐ Level III Std QC/Raw Data
- ☐ Level IV SW846/CLP
- ☐ Other / EDD _____
- ☐ TRRP CheckList
- ☐ TRRP Level IV

Preservative Key: 1-HCl 2-HNO_3 3-H_2SO_4 4-NaOH 5-$Na_2S_2O_3$ 6-$NaHSO_4$ 7-Other 8-4°C 9-5035

Note: 1. Any changes must be made in writing once samples and COC Form have been submitted to ALS Environmental.
2. Unless otherwise agreed in a formal contract, services provided by ALS Environmental are expressly limited to the terms and conditions stated on the reverse.
3. The Chain of Custody is a legal document. All information must be completed accurately.

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industrial LABORATORIES

Industrial Laboratories is your independent, third-party analytical testing laboratory

To: Olsson Associates
4690 Table Mountain Drive
#200
Golden CO 80403

Attn: James Hix

TEST REPORT

OLSSONASSO
Date Received: 1/4/2012
Date Reported: 1/9/2012
PO Number: 011-2359 200

Note: Sample test procedures conform to EPA 40CFR136 requirements.

Lab No.	Sample Description	Test Method	Result	Units	MDL	Analysis Date/By
120104015-01A	RW 6-1, 1/4/12	* Escherichia coli SM 9221 F	<2	MPN/100mL		KM 1/5/2012
120104015-02A	RW 7-1, 1/4/12	* Escherichia coli SM 9221 F	7	MPN/100mL		KM 1/5/2012
120104015-03A	RW 3-2, 1/4/12	* Escherichia coli SM 9221 F	4	MPN/100mL		KM 1/5/2012
120104015-04A	RW 2-1, 1/4/12	* Escherichia coli SM 9221 F	4	MPN/100mL		KM 1/5/2012
120104015-05A	RW 1-2, 1/4/12	* Escherichia coli SM 9221 F	<2	MPN/100mL		KM 1/5/2012
120104015-06A	RW 5-1, 1/4/12	* Escherichia coli SM 9221 F	<2	MPN/100mL		KM 1/5/2012

Department Manager

* = Scope Analysis
# = Subcontracted Analysis
MDL = Method Detection Limit
ND = Not Detected at the Method Detection Limit

4046 Youngfield Street • Wheat Ridge, Colorado 80033 • (303) 287-9691 • (303) 287-0964 FAX • www.industriallabs.net

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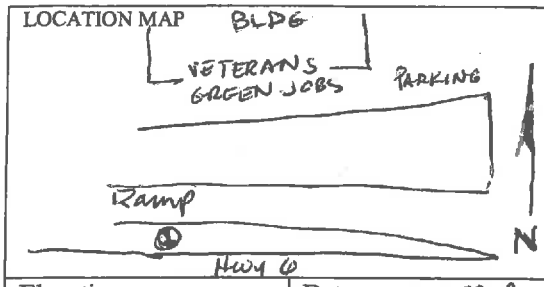
ATTACHMENT C
SOIL BORING LOGS AND
WELL COMPLETION REPORTS

LOCATION MAP



OLSSON ASSOCIATES

4690 Table Mountain Drive #200
Golden, CO 80403
T. 303.237.2072 F. 303.237.2659

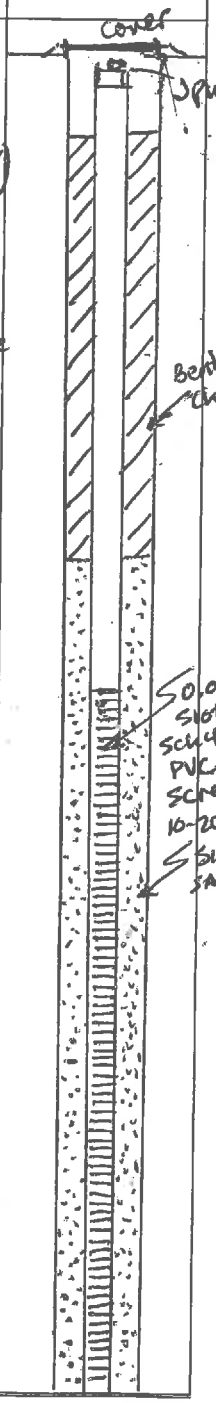
TEST HOLE/ WELL LOG

Page 1 of 2

Test/Well Number: RWT-2	Project: Hartwig Assoc US. 6 Bridges
Date: 12/09/11	Project Number: 011-2359 200 200
Logged By: James Hix	Drilled By: Dakota Drilling
Drilling Method: HSA CME55	Sampling Method: split spoon
Elevation:	Detector: OVM 580B
Seal: Bentonite Chips	Grout: Sakrete
Gravel Pack: 10-20 Silica Sand	Hole Dia.: 7 1/4
Casing Type: Schedule 40 PVC	Diameter: 2" Length: 10
Screen Type: Sch 40 PVC Slot: 0.010	Diameter: 2" Length: 15
	DTP: ND
	Well Depth: 25
	F. L. Meter:
	DTW: 19.5'
	Total Depth: 25

Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistence	LITHOLOGY/REMARKS
							0				Snow Cover
							1		100%		0.0 to 2.0 ft Clay, fill,
CL	10YR 5/4	Dry	40% Clay	MASS	0.0	No	2		12	12 22	dry, 40% clay, massive, Hard moderate yellowish brown (10YR 5/4) OVM HS 0.0 ppm@2' Fill material
							3				No odor/No apparent staining
							4		100%	5 6	4.0 to 5.0 ft Silty Sandy Clay
CL	10YR 5/4	Moist	45% CL 40% Si	MASS	0.0	No	5				dry, moderately plastic, moderate yellowish brown (10YR 5/4) moist, 45% clay 40% silt, Massive
							6				OVM HS 0.0 ppm@4.0 ft
							7				No odor, No apparent staining. Fill
							8				
CL	10YR	Dry Moist		MASS	0.0	No	9		100%	11/11	9.0 to 10.0 ft Silty clay,
							10				Dusky yellowish brown (10YR Dry to slightly moist, 45% clay massive, OVM HS 0.0 ppm@9
							11				No apparent staining, No odor Fill
							12				
							13				
SM/GM	10YR	Dry	35Si 40S 20G	Sub Blocky	0.0	No	14		100%	15 17 30	14.0 to 15.5 ft Silty sand to silty gravelly sand, Blocky yellowish orange, arkosic, Dry
							15				OVM HS 0.0 ppm No odor; No Staining
							16				
SM/GM	10YR	Dry	45Si 40S 10G	Sub Angular	0.0	No	17		100%	9 22 25 25	17.0 to 19.0 Silty sand w/ Some Gravel, moderate yellowish brown, Dry Subangular, OVM HS 0.0 ppm
							18				No apparent odor, No Staining
							19	X 09:50			
							20				

WELL COMPLETION



LOCATION MAP

See page 1

OLSSON ASSOCIATES

4690 Table Mountain Drive #200
Golden, CO 80403
T. 303.237.2072 F. 303.237.2659

TEST HOLE/ WELL LOG

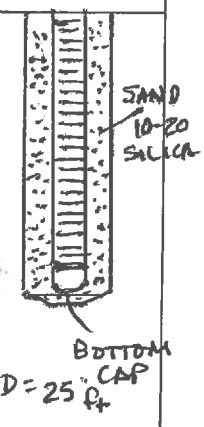
Page 2 of 2

Test/Well Number: RW1-2	Project: Hartwig Assoc U.S. 6 Bridge
Date: 12/09/11	Project Number: 011-2359
Logged By: James Hix	Drilled By: Dakota Drilling / Rocksol
Drilling Method: HSA CME 55	Sampling Method: Split spoon

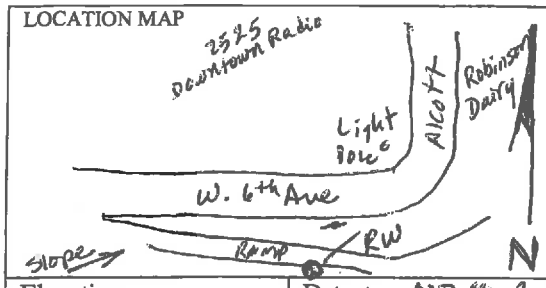
Elevation:	Detector: OVM 580B	Seal: Bentonite Chips 3/8"	Grout: Sakrete	
Gravel Pack: 10-20 Silica Sand			Hole Dia.: 7 1/4"	F. L. Meter: N/A
Casing Type: Schedule 40 PVC	Diameter: 2"	Length: 10	DTP: ND	DTW: 19.5
Screen Type: Sched 40 PVC Slot: 0.010	Diameter: 2"	Length: 15	Well Depth: 25	Total Depth: 25

Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistence	LITHOLOGY/REMARKS
							21			18	19-21.5 ft Sandy gravel, wet
GM	10YR 5/4	V wet		MASS	0.0	NO	22			21 22	@ 19.5ft to 20 ft. massive OVM HS 0.0 ppm No odor; NO staining
							23				
		SAT		MASS	0.0	NO	24			12	24-25.5 ft Sandy gravel, wet well rounded, arkosic, SAT.
GM							25	X 100DS	100 %	15 15	Massive, OVM HS 0.0 ppm No odor; No staining
							26				
							27				TD: 25.5 ft
							28				

WELL COMPLETION



LOCATION MAP



OLSSON ASSOCIATES

4690 Table Mountain Drive #200
Golden, CO 80403
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TEST HOLE/ WELL LOG

Page 1 of 2

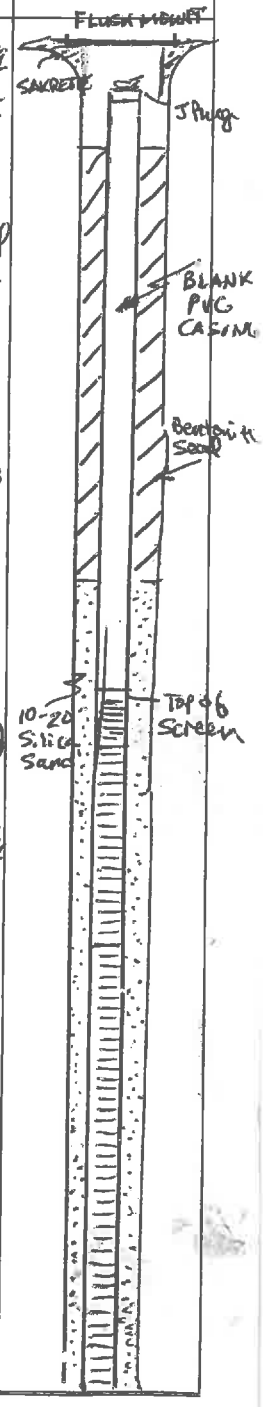
Test/Well Number: RW2-1	Project: Hartwig & Assoc US6 Bridge
Date: 12/7/11	Project Number: 011-2359 200 200002
Logged By: James Hix	Drilled By: Dakota Drilling / Rocksol
Drilling Method: HSA CME55	Sampling Method: Split spoon

Elevation:	Detector: PID MiniRae	Seal: Bentonite Chips 3/8"	Grout: Sakrete
Gravel Pack: 10-20 Silica Sand (30' - 8' bgs)		Hole Dia.: 8"	F. L. Meter: N/A
Casing Type: Schedule 40 PVC	Diameter: 2"	Length: 10	DTP: ND / DTW: 20.5 ft
Screen Type: Sched 40	Slot: 0.010	Diameter: 2" Length: 20	Well Depth: 30 / Total Depth: 30

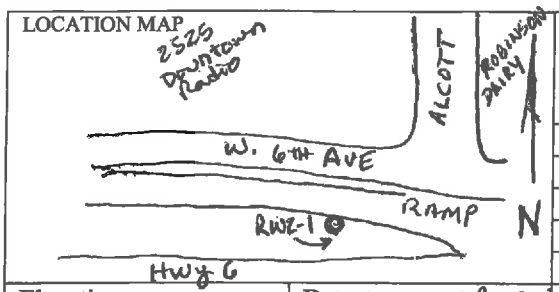
	Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistence	LITHOLOGY/REMARKS
12:25								0				Snow cover - Boring located along curb for U.S. 6 off Ramp - South of W. 6th Ave ⊥ Alcott St. / Robinson Dairy. Cuttings - dusky yellowish brown, Gravelly clay / Cobbles
	GC	10YR	Dry			←	No	1				• Rocksol Collecting 0-5 ft interval - pavement sample / Retaining wall
								2				
								3				
								4			8	
								5			12	No odor - Dusky yellowish brown Clay / rock/debris layer size of spoon
								6			50/11	(Grass/roots @ surface - Cuttings) Asphalt / gravel w/ depth → Cobbles
								7				
								8				
								9				
13:06	CL	10YR 5/4	Moist			0.0 MASS	No	10			4	10 to 11.5 ft: Clay / Silty clay (CL) moderate yellowish brown (10YR 5/4)
								11		18"	5 4	Fill material - brick & asphalt fragments. Massive
								12				Cuttings - "ball clay" med plasticity
								13				
								14				
13:13	SW / GW		Dry			0.1 MASS	No	15		12"	9 11	15.0 to 16.5 ft: well graded Sand & Gravel (Poorly sorted) Arkosic little or no fines. No apparent odor No apparent staining, dry
								16				
								17				
								18				
								19				Massive — well graded gravel
13:30	GW / GC		▽ wet SAT		MASS	0.0	No	20		(DWD) 30 36	30 36	20 to 21.5 ft Gravelly Clay 1/2" diameter, arkosic Gravel

12/7/11 (JWD)

WELL COMPLETION



LOCATION MAP



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Golden, CO 80403
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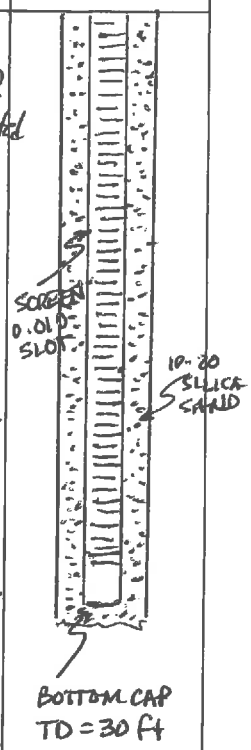
TEST HOLE/ WELL LOG

Test/Well Number: RW2-1	Project:
Date: 12/7/11	Project Number: 011-2359
Logged By: James Hix	Drilled By: Dakota Drilling/Rocksol
Drilling Method: HSA-CME 55	Sampling Method: Split spoon

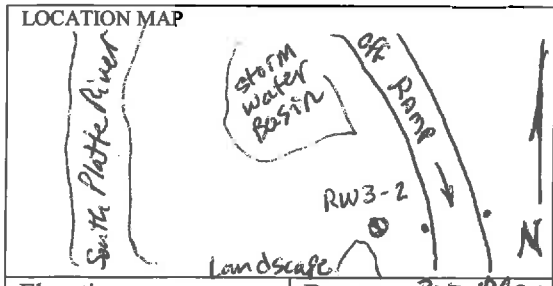
Elevation:	Detector: MiniRae 2000	Seal: Bentonite Chips 3/8"	Grout: Sakrete
Gravel Pack: 10-20 Silica Sand			Hole Dia.: 8" / F. L. Meter: N/A
Casing Type: Schedule 40 PVC	Diameter: 2"	Length: 10'	DTP: ND / DTW: 20.5'
Screen Type: Sched 40	Slot: 0.010	Diameter: 2" / Length: 20'	Well Depth: 30' / Total Depth: 30'

	Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistance	LITHOLOGY/REMARKS
	GC	5YR	SAT		MASS	0.0	NO	X 21		30	30	21.5 to 22 ft Clayey Gravel Clay Sand-Gravel mixtures. HS 0.0 ppm. No odor; No staining, Saturated massive
								22				
								23				
								24				
1345	GC	10YR 5/4	SAT		MASS	0.1	NO	25			12	25.0 to 26.5 ft Clayey sandy gravel. Moderate yellow brown (10YR 5/4) Saturated/ Massive HS 0.1 ppm No odor; No Staining
								26			15	
								27			14	
								28				
14:00	SC GC		WET		MASS	0.0	NO	X 29		18"	13	29 to 30 ft Clayey Sand/ Clayey Sandy Gravel mixtures wet, Massive HS 0.0 ppm No apparent odor, No apparent Staining. TD = 30 ft bgs.
								30			13	
											8	

WELL COMPLETION



LOCATION MAP



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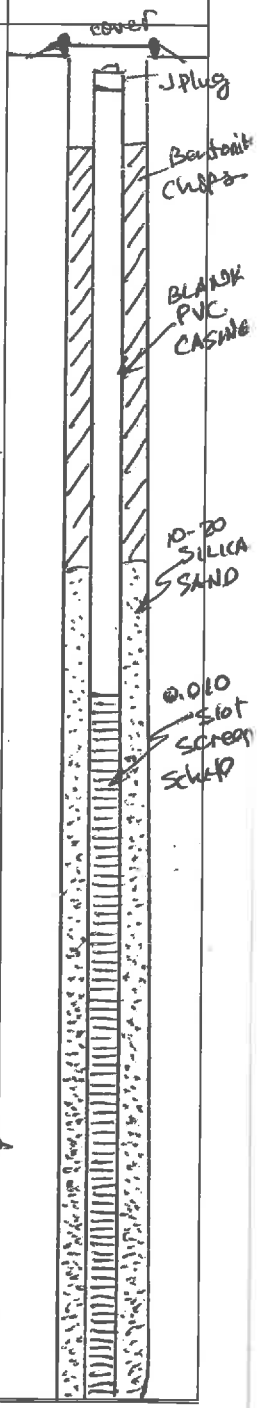
TEST HOLE/ WELL LOG

Test/Well Number: RW 3-2	Project: Hartwig Assoc. U.S. Hwy 6
Date: 12/7/11	Project Number: 011-2359 Job 200002
Logged By: JWH	Drilled By: Dakota Drilling
Drilling Method: HSA CME 55	Sampling Method: Split Spoon
Elevation:	Detector: PID MIR2000
Seal: Bentonite Chips 3/8"	Grout: Sakrete
Gravel Pack: 10-20 Silica Sand	Hole Dia.: 8"
F. L. Meter: N/A	
Casing Type: Schedule 40 PVC	Diameter: 2" Length: 10 ft
DTP: ND	DTW: 15 ft
Screen Type: Sch 40	Slot: 0.010 Diameter: 2" Length: 15 ft
Well Depth: 25 ft	Total Depth: 25 ft

Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistence	LITHOLOGY/REMARKS
							0				Snow cover
SC											Sandy Clay
							1			8	
	10YR	Dry		Mass		No	2			12	0-2 ft: Clayey Gravel - Cobbles Dusky yellowish brown (10YR) (cuttings) well rounded cobbles moderately plastic clay.
GC											
							3				
							4				Bounce
							5			9	2-5 ft: Cuttings - Dusky yellowish brown to moderate yellowish brown Clayey Gravels - well rounded Cobbles Moderately plastic clay. No odor No staining. HS = 8.0 ppm Mini Rae 2000
GC	10YR 5/4	Moist		Mass	8.0	No	6				
							7				
							8				
							9				
							10			3	10-11.5 Cobbles/Gravel
							11			3	
										3	
							12				
							13				
							14				
I		WET @15'		Mass			15				
SM											Sample 16 ft - 18 ft: Silty Sand Grading into well graded Sand and then back to Clayey Gravels yellowish orn. No apparent odor. No apparent staining Saturated. HS 0.0 ppm
GM							16			8	
SW					0.0	No	17		24"	4	
										5	
GC							18			10	
							19				
		SAT					20			15	
										20	

WELL COMPLETION



LOCATION MAP

See Pg 1

OLSSON ASSOCIATES

4690 Table Mountain Drive #200
Golden, CO 80403
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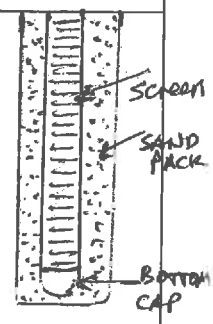
TEST HOLE/ WELL LOG

Test/Well Number: RW3-2	Project: Hartwig & Assoc. U.S. 6 Bridge
Date: 12/7/11	Project Number: 011-2359 200 200002
Logged By: JWH	Drilled By: Dakota Drilling
Drilling Method: HSA CME 55	Sampling Method: Split Spoon

Elevation:	Detector: PID	Seal: Bentonite Chips 3/8"		Grout: Sackrete	
Gravel Pack: 10-20 Silica Sand				Hole Dia.: 8"	F. L. Meter: N/A
Casing Type: Schedule 40 PVC	Diameter: 2"	Length: 10		DTP: ND	DTW: 15 ft
Screen Type: Sched. 40 PVC Slot: 0.010	Diameter: 2"	Length: 15		Well Depth:	Total Depth: 25 ft

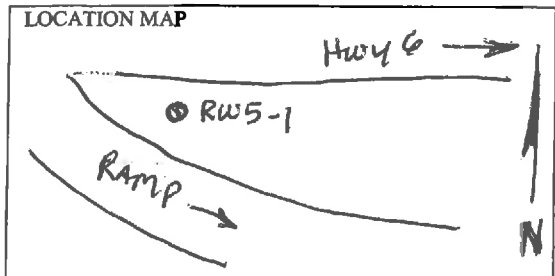
Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistence	LITHOLOGY/REMARKS
SW					0.0	ND, 0	21		21"	50/12	20 to 21.5 ft SW: well graded Sand. No apparent odor & No apparent Staining. HS 0.0 ppm Bottom Sand
							22				
							23				
SC		MOIST			0.0		24				24 - 25.5 ft SC Clayey Sand
		DRY		weak platy BLK	NO	NO	25				Bottom 6" Denver Blue Claystone TKd Bedrock, Dry,
							26				

WELL COMPLETION



TD=25

LOCATION MAP



OLSSON ASSOCIATES

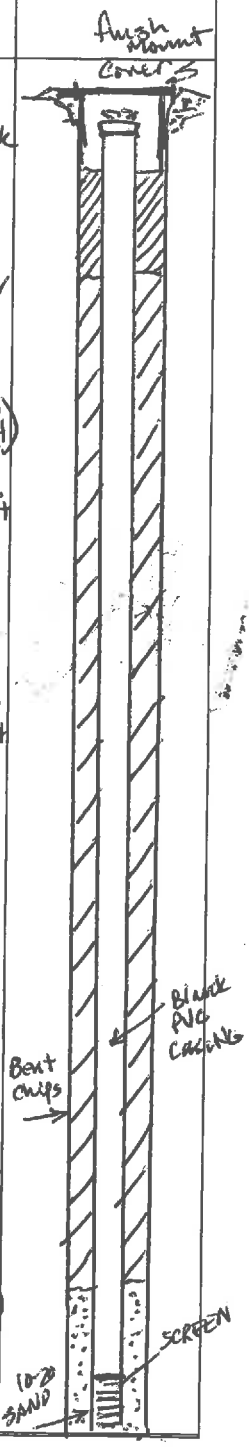
4690 Table Mountain Drive #200
Golden, CO 80403
T. 303.237.2072 F. 303.237.2659

TEST HOLE/ WELL LOG

Test/Well Number: RW5-1	Project: Hartwig & Assoc. U.S. 6 Bridge
Date: 12/9/11	Project Number: OH-2359
Logged By: James Hix	Drilled By: Dakota Drilling/Rocksol
Drilling Method: HSA CME 55	Sampling Method: split spoon
Elevation:	Detector: OVM 580B
Seal: Bentonite	Grout: ~~Sakrete~~ Quikrete
Gravel Pack: 10-20 Silica Sand (35 ft to 20 ft)	Hole Dia.: 7 1/4
Casing Type: PVC Schedule 40	Diameter: 2" Length: 20 ft
Screen Type: PVC Sched 40	Slot: 0.010 Diameter: 2" Length: 15 ft
F. L. Meter:	
DTP: ND	DTW: 29.5 ft
Well Depth: 35 ft	Total Depth: 35 ft

Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistance	LITHOLOGY/REMARKS
GM	10YR 6/2	Dry		MASS	0.0	NO	0–2		100%	12, 7, 11	0.0 to 2.0 ft Dark yellowish brown fill material, rock, brick debris, – Gravelly silt (GM) Grayish brown, dry, Some Gravel subrounded, massive, OVM$_{HS}$ 0.0 ppm @ 2 ft Ryan Lepro w/ Rocksol collects [Bulk Sample 0–5 (pavement)]
GC	10YR 5/4	Dry		MASS	0.0	NO	4–5		100%	12, 9, 11	4.0 to 5.0 ft Dusky yellow brown Gravelly Clay, to moderate yellowish brown (10YR 5/4) Dry, massive, No apparent odor No staining, OVM$_{HS}$ 0.0 ppm @ 4 ft (California tubes)
GC	N	MOIST		MASS	0.0	yes	9–10		100%	9, 9, 1	9.0 to 10.0 ft Dusky yellowish brown to Black. Gravelly Clay Odor detected. OVM$_{HS}$ 0.0 ppm @ 9 ft Fill. (California tube) Slight odor: "Motor oil" old oil or asphalt.
CL		MOIST		MASS	0.0	NO	14–15		18" (60%)	6, 6, 8	14.0 to 15.5 ft Clay - Silty Clay (CL) Grayish brown, moist, massive, No apparent staining, No odor OVM$_{HS}$ 0.0 ppm
SM	10YR 6/2	Dry		MASS	0.0	NO	19–20		100%	7, 9	19.0 to 20.0 ft Silt / Clayey Silt (SM) Pale yellowish brown (10YR 6/2), Dry massive, No apparent odor, No Staining OVM$_{HS}$ 0.0 ppm @ 19'

WELL COMPLETION



LOCATION MAP

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OLSSON ASSOCIATES

4690 Table Mountain Drive #200
Golden, CO 80403
T. 303.237.2072 F. 303.237.2659

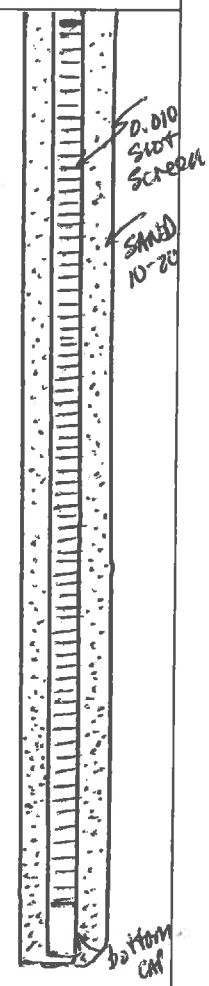
TEST HOLE/ WELL LOG

Test/Well Number: RW5-1	Project: Hartwig U.S. 6 Bridges
Date: 12/9/11	Project Number: 011-2359
Logged By: James Hix	Drilled By: Dakota Drilling/Rocksol
Drilling Method: HSA CME 55	Sampling Method: Splitspoon

Elevation:	Detector: OVM580B	Seal: Bentonite Chips/Granules	Grout: Sakrete	
Gravel Pack: 10-20 Silica Sand		(35'-18')	Hole Dia.: 7 1/4	F. L. Meter: N/A
Casing Type: Schedule 40 PVC		Diameter: 2" Length: 20 ft	DTP: ND	DTW: 29.5
Screen Type: Sch 40	Slot: 0.010	Diameter: 2" Length: 15 ft	Well Depth: 35'	Total Depth: 35'

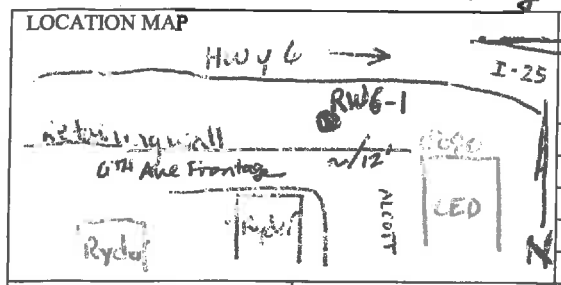
Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistence	LITHOLOGY/REMARKS
GM	5YR	Dry/moist		MASS	0.0	No	24			13	24.0 to 26.0 ft Sandy gravel
							25		100%	19	Silty sandy gravel (GM)
										17	Dry/slightly moist, arkosic,
							26	X 1235		16	massive. No odor; No staining
											Pale orange to pink
											DVM_{HS} 0.0 ppm
SC/GC	10YR 5/4	Wet @29.5		MASS	0.0	No	29			13	29.0 to 30.5 Clayey sand/Clayey
							30		75%	14	Sandy gravel. Moderate yellow
										15	brown (10YR 5/4) wet @ 29.5 ft
		SAT									Massive, poorly sorted. No
											odor; No staining.
											OVM_{HS} 0.0 ppm @ 30.5' Saturated
GC	10YR 6/6	Wet		MASS	0.0	No	34			8	34.0 to 35.5 Clayey Sandy Gravel
							35	X 1245	95%	13	(GC) Orange, wet, massive
										15	well rounded/subrounded,
											No apparent odor; No staining
											OVM: 0.0 ppm @ 35.5 ft

WELL COMPLETION



Robinson Dairy

LOCATION MAP



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4690 Table Mountain Drive #200
Golden, CO 80403
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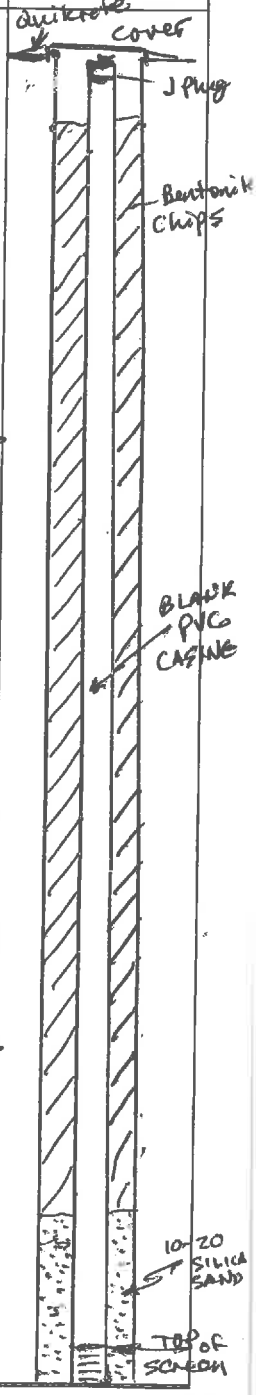
TEST HOLE/ WELL LOG

Page 1 of 2

Test/Well Number: RW6-1	Project: Hartwig Hs. 6 Bridges
Date: 12/12/11	Project Number: 0011 -
Logged By: James Hix	Drilled By: Dakota Drilling/Rocksol
Drilling Method: HSA CME50	Sampling Method: splitspoon
Elevation:	Detector: OVM580B
Seal: Bentonite	Grout: concrete
Gravel Pack: 10-20 Silica Sand	Hole Dia.: 7 3/4
F. L. Meter: N/A	
Casing Type: Schedule 40 PVC	Diameter: 2" Length: 20
DTP: ND	DTW: 25
Screen Type: Sch40 PVC	Slot: 0.010 Diameter: 2" Length: 10
Well Depth: 30	Total Depth: 30

	Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistance	LITHOLOGY/REMARKS
	GC	10YR	Dry		MASS		No			100	22 / 28	Weeds _ Dark Gray Brn Soil 0.0 to 2.0 Gravelly clay, Dusky yellowish brown, Dry, Massive No odor, No Staining, Fill.
	CL	10YR 5/4	Dry		MASS		No			100	18 / 26	(California tube) 4.0 to 6.0 Sandy Silty Clay w/ trace gravel. - Increasing w/ depth, Dry, massive. wall fill. No odor, No Staining
10:30	SC	10YR 5/6	Dry		MASS	0.0	No			60%	10 / 10 / 7 / 5	10.0 to 11.5 feet (spwtspoon) Sandy Clay (SC), Dusky yellow brown (10YR 5/4), Massive, Fill. No odor, No Staining. OVM HS 0.0 ppm @ 11.5 ft.
10:45	GC GM	10YR 5/4 5YR	Dry		MASS	0.0	No			75%	50/11	15.0 to 16.0' (California Tube) (GC) Clayey Arkosic Gravel, to Gravelly silt Sand mixtures (GM), Dry, Massive No apparent odor, No Staining OVM HS 0.0 ppm @ 16 ft
10:50	SM	5YR	Dry		SBR		No			40%	8 / 9	20.0 to 21.5 ft Arkosic Sandy Silt w/ trace gravel. Dry (SM)

WELL COMPLETION



LOCATION MAP

See Pg 1

OLSSON ASSOCIATES

4690 Table Mountain Drive #200
Golden, CO 80403
T. 303.237.2072 F. 303.237.2659

TEST HOLE/ WELL LOG

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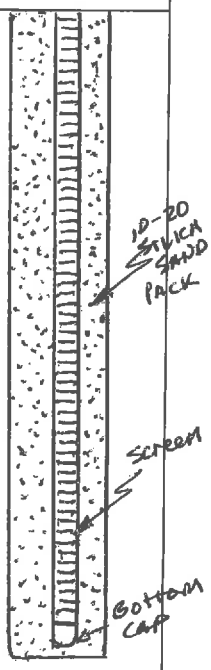
Test/Well Number: RW6-1	Project: Hartwig U.S. 6 Bridge
Date: 12/12/11	Project Number: 01.1
Logged By: James Hix	Drilled By: Dakota Drilling
Drilling Method: HSA CME 50	Sampling Method: Splitspoon

Elevation:	Detector: ONM580B	Seal: Bentonite	Grout:
Gravel Pack: 10-20 Silica Sand (30 ft - 18 ft)			Hole Dia.: 7 3/4 — F. L. Meter: N/A
Casing Type: Schedule 40 PVC	Diameter: 2"	Length: 20 ft	DTP: ND — DTW: 25 ft
Screen Type: Sch 40 PVC Slot: 0.010	Diameter: 2"	Length: 10 ft	Well Depth: 30 ft — Total Depth: 30 ft

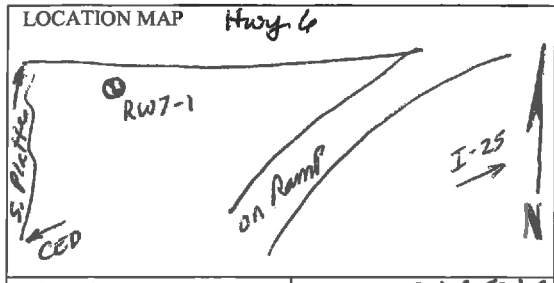
Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistance	LITHOLOGY/REMARKS
				~~SBK~~			21			13	20 to 21.5 ft (continued)
SM	5YR	Dry		MASS	0.0	NO	22				Arkosic Sand & Silt (SM) Dry Subangular Blocky to Massive, No Odor, No Staining OVM HS 0.0 @ 21.5 ft Gravelly Silty Sand
							23				
							24				
11:00 GM	5YR	WET I		SBK found		NO	25		50%	19	25.0 to 26.0 (California tube)
					0.0	NO	26 X 11:14		40%	12	Arkosic Sand, Silt, Gravel, wet I Subangular blocky to well Rounded, Poorly sorted, large rocks 1 1/2" dia in brass sleeves OVM HS 0.0 ppm @ 25-26.5 ft (Sample splitspoon 26-27.5 ft)
							27			9 10 11	
							28				
							29				
							30		—	19	30.0 to 31.5 ft (splitspoon)
11:25 GC	10YR 5/4	WET		SBK ~~WET~~ found	0.0	NO	31 X 1125		80%	21 19	Arkosic gravels / Sandy Silty Clay, Mod. yellow brown, wet Subangular to well Rounded No odor, No Staining OVM HS 0.0 ppm @ 31.5 ft
							32				
							33				
							34				
							35				

WELL COMPLETION



TD = 30 ft

LOCATION MAP Hwy 6



OLSSON ASSOCIATES

4690 Table Mountain Drive #200
Golden, CO 80403
T. 303.237.2072 F. 303.237.2659

TEST HOLE/ WELL LOG

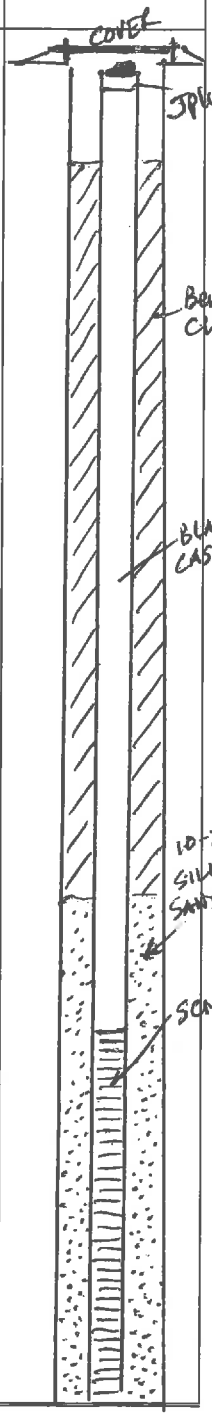
Page 1 of 2

Test/Well Number: RW7-1	Project: Hartwig US 6 Bridges
Date: 12/20/11	Project Number: 011-2359 200002
Logged By: James Hix	Drilled By: Dakota Drilling (Blake)
Drilling Method: HSA CME 55	Sampling Method: Splitspoon

Elevation:	Detector: OVM 580B	Seal: Bentonite		Grout: Quikrete	
Gravel Pack: 10-20 Silica Sand (30' to 13')				Hole Dia.: 7¼	F. L. Meter: N/A
Casing Type: Schedule 40 PVC	Diameter: 2"	Length: 15		DTP: ND	DTW: ~~18 ft~~ 21½"
Screen Type: Sch 40 PVC	Slot: 0.010	Diameter: 2"	Length: 15	Well Depth: 30	Total Depth: 30

Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistence	LITHOLOGY/REMARKS
							0				0.0 ft Gravelly Clay Fill Material Dusky yellowish brown dry
CL							1		95%	15 30	OVM HS 0.0 ppm @ 2.0 ft (TWH)
					0.0	NO	2				Clay
GC	10YR	Dry		MASS		NO	3		98%	7 8	2.0 to 4.0 ft Gravelly clay, mod. yel brown, dry, massive
(SM)					0.0		4			15/12	No apparent odor; No staining fine sand at bottom (Shelby tube)
							5				OVM HS 0.0 ppm @ 4.0 ft
							6				Grayish brown cuttings Fill No odor; No staining
							7				
							8				
SM	10YR 6/4	Moist		MASS		NO				4	9.0 to 10.0 ft clayey silty sand
					0.0		9		100%	5	V. fine grained, Dusky yellowish brown, moist, massive
							10				No apparent odor, No staining
							11				OVM HS 0.0 ppm @ 9 ft
							12				
							13				
GM	10YR 5/4 Brinkish	Dry		MASS	0.0	NO	14		50%	13 13"	14.0 to 15.0 ft silty Sandy gravel (GM) Coarse, Arkosic, well graded angular, Dry, Massive
							15				OVM HS 0.0 ppm @ 14 ft No odor
					0		16				No staining.
							17			5	17.0 to 19.0 ft (splitspoon) (GM)
							18		50%	5	Sandy Gravel, Well rounded Gr.
GM		WET		MASS		NO		(2) 12/20/11 12:50		5	Arkosic, wet, Massive, Well Graded (Poorly sorted)
					0.0		19			8	OVM HS 0.0 ppm @ 19 ft
							20				No odor, No Staining.

WELL COMPLETION



LOCATION MAP

see page 1

OLSSON ASSOCIATES

4690 Table Mountain Drive #200
Golden, CO 80403
T. 303.237.2072 F. 303.237.2659

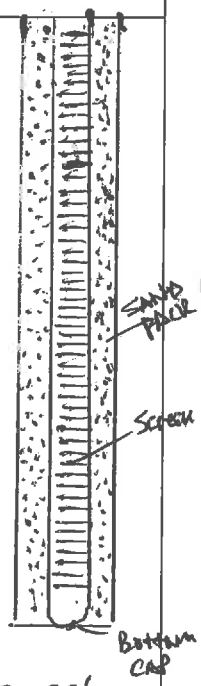
TEST HOLE/ WELL LOG

Test/Well Number: RW7-1	Project: Hastwig US6 Bridges
Date: 12/20/11	Project Number: 011-2359
Logged By: James Hix	Drilled By: Dakota Drilling
Drilling Method: HSA CME55	Sampling Method: Split Spoon

Elevation:	Detector: OVM 580B	Seal: Bentonite	Grout: Quikrete	
Gravel Pack: 10-20 Silica Sand			Hole Dia.: 7 1/4	F. L. Meter:
Casing Type: Schedule 40 PVC	Diameter: 2"	Length: 15	DTP: ND	DTW: 21'2"
Screen Type: Sch 40 PVC Slot: 0.010	Diameter: 2"	Length: 15	Well Depth: 30	Total Depth: 30

Soil/Rock Type	Color	Moisture Content	% Fines	Structure	Vapor	Staining	Sample #	Depth	Sample Recovery	Penetration Resistence	LITHOLOGY/REMARKS
							21			6	21.0 to 22.5 ft Quartz Sand/Ark.
										8	5YR 7/4, Saturated, massive, ND
SM/GM	5YR 7/4	SAT		MASS	0.0	NO	22		65%	13	odor; No Staining
										18	OVM HS 0.0 ppm @ 21.5 ft - 22.5 ft
							23				
							24				
							25				
							26				
							27				
GM		SAT					28		100%	2	28.0 to 30.0 ft gravelly sand - Sand Gravel mix Qtz, arkosic, wet/saturate —
Bdrk	10YR 5/4	Dry		Blky	0.0	ND	29			15	Bedrock - Claystone mod. yellow
							30			50	brown w/ orange mottles, Dry,
							31				Blocky structure, OVM HS 0.0 ppm
											@ 30 ft No odor; No Staining
											TD = 30 ft

WELL COMPLETION



FORM NO. GWS-31 10/2011

WELL CONSTRUCTION AND TEST REPORT

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER
1313 Sherman St., Ste 821, Denver, CO 80203
Main (303) 866-3581 Fax (303) 866-3589

For Office Use Only

1. WELL PERMIT NUMBER:

2. WELL OWNER INFORMATION

NAME OF WELL OWNER: Colorado Department of Transportation

MAILING ADDRESS: 4201 East Arkansas Avenue

CITY: Denver STATE: CO ZIP CODE: 80222

TELEPHONE NUMBER: (303) 757 - 9011

3. WELL LOCATION AS DRILLED: NE 1/4, NE 1/4, Sec. 8, Twp. 4 ☐ N or ☒ S, Range 68 ☐ E or ☒ W

DISTANCES FROM SEC. LINES: 10 ft. from ☒ N or ☐ S section line and 1,105 ft. from ☐ E or ☒ W section line.

SUBDIVISION: Wier Addition, LOT ____, BLOCK ____, FILING (UNIT) ____

Optional GPS Location: GPS Unit must use the following settings: Format must be **UTM**, Units must be **meters**, Datum must be **NAD83**, Unit must be set to **true N**, ☐ Zone 12 or ☒ Zone 13

Owner's Well Designation: RW1-2
Easting: 498315 m
Northing: 4397301 m

STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION 5216 feet DRILLING METHOD HSA CME 55

DATE COMPLETED 12/09/11 TOTAL DEPTH 25 feet DEPTH COMPLETED 25 feet

5. GEOLOGIC LOG:

Depth	Type	Grain Size	Color	Water Loc.
0 to 2 ft	fill	clay	dk brn	
4 to 5 ft	sandy clay	sand-clay	med brn	
9 to 10 ft	silty clay	silt-clay	dk yel brn	
14 to 15 ft	silty sand/grv	sand/gr	yel orn	
17 to 19 ft	silty sand/grv	gravel	yel brn	
19 to 21 ft	sand - gravel	gravel	yel brn	V 19.5
24 to 26 ft	sand - gravel	gravel	yel brn	

6. HOLE DIAM (in.)

	From (ft)	To (ft)
7 3/4	0	25

7. PLAIN CASING:

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
2.0	PVC	Sch 40	0	10

PERFORATED CASING: Screen Slot Size (in): 0.010

2.0	PVC	Sch 40	10	25

8. FILTER PACK:
Material Silica Sand
Size 10-20
Interval 8 to 25 ft

9. PACKER PLACEMENT:
Type
Depth

10. GROUTING RECORD

Material	Amount	Density	Interval	Placement
Bentonite			8 ft - 2 ft	Gravity
Quikrete			2 ft - 0 ft	

Remarks:

11. DISINFECTION: Type N/A Amt. Used

12. WELL TEST DATA: ☐ Check box if Test Data is submitted on Form Number GWS 39 Supplemental Well Test.

TESTING METHOD

Static Level ____ ft. Date/Time measured: ____, Production Rate ____ gpm.

Pumping Level ____ ft. Date/Time measured ____, Test Length (hrs) ____.

Remarks:

13. I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402-2. [The filing of a document that contains false statements is a violation of section 37-91-108(1)(e), C.R.S., and is punishable by fines up to $5000 and/or revocation of the contracting license.]

Company Name: Olsson Associates Phone: (303) 237- 2072 License Number:

Mailing Address: 4690 Table Mountain Drive #200

Signature: Print Name and Title James W. Hix - Senior Project Geologist Date 12/21/11

FORM NO. GWS-31 10/2011

WELL CONSTRUCTION AND TEST REPORT

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER
1313 Sherman St., Ste 821, Denver, CO 80203
Main (303) 866-3581 Fax (303) 866-3589

For Office Use Only

1. WELL PERMIT NUMBER:

2. WELL OWNER INFORMATION

NAME OF WELL OWNER: Colorado Department of Transportation

MAILING ADDRESS: 4201 East Arkansas Avenue

CITY: Denver STATE: CO ZIP CODE: 80222

TELEPHONE NUMBER: (303) 757 - 9011

3. WELL LOCATION AS DRILLED: NE 1/4, NE 1/4, Sec. 8, Twp. 4 ☐ N or ☒ S, Range 68 ☐ E or ☒ W

DISTANCES FROM SEC. LINES: 40 ft. from ☒ N or ☐ S section line and 490 ft. from ☒ E or ☐ W section line.

SUBDIVISION: Wier Addition, LOT ____, BLOCK ____, FILING (UNIT) ____

Optional GPS Location: GPS Unit must use the following settings: Format must be **UTM**, Units must be **meters**, Datum must be **NAD83**, Unit must be set to **true N**, ☐ Zone 12 or ☒ Zone 13

Owner's Well Designation: RW2-1
Easting: 498747 m
Northing: 439738 m

STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION 5321 feet DRILLING METHOD HSA CME 55

DATE COMPLETED 12/07/11 TOTAL DEPTH 30 feet DEPTH COMPLETED 30 feet

5. GEOLOGIC LOG:

Depth	Type	Grain Size	Color	Water Loc.
0 to 2 ft	fill - gravel/clay	gravel clay	dk brown	
4 to 5 ft	clay	clay	dk yelbrn	
10 to 11 ft	clay/silty clay	clay	med brn	
15 to 16 ft	sand gravel	sandgravel	yel brn	
20 to 21 ft	gravel	gravel	yel brn	V - 20.5
21.5 to 22	clayey gravel	cl gravel	pink brn	
25 to 26 ft	clayey gravel	clay gravel	yel brn	
29 to 30 ft	clay sand/gr	clay gravel	yel brn	

6. HOLE DIAM (in.)

	From (ft)	To (ft)
7 3/4	0	30

7. PLAIN CASING:

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
2.0	PVC	Sch 40	0	10

PERFORATED CASING: Screen Slot Size (in): 0.010

2.0	PVC	Sch 40	10	30

8. FILTER PACK:
Material Silica Sand
Size 10-20
Interval 8 ft to 30 ft

9. PACKER PLACEMENT:
Type
Depth

10. GROUTING RECORD

Material	Amount	Density	Interval	Placement
Bentonite			8 ft - 2 ft	Gravity
Sakrete			2 ft - 0 ft	Trowel

Remarks:

11. DISINFECTION: Type N/A Amt. Used

12. WELL TEST DATA: ☐ Check box if Test Data is submitted on Form Number GWS 39 Supplemental Well Test.

TESTING METHOD

Static Level ____ ft. Date/Time measured: ____, Production Rate ____ gpm.

Pumping Level ____ ft. Date/Time measured ____, Test Length (hrs) ____.

Remarks:

13. I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402-2. [The filing of a document that contains false statements is a violation of section 37-91-108(1)(e), C.R.S., and is punishable by fines up to $5000 and/or revocation of the contracting license.]

Company Name: Olsson Associates Phone: (303) 237- 2072 License Number:

Mailing Address: 4690 Table Mountain Drive #200

Signature: Print Name and Title James W. Hix - Senior Project Geologist Date 12/21/11

FORM NO. GWS-31 10/2011

WELL CONSTRUCTION AND TEST REPORT

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER
1313 Sherman St., Ste 821, Denver, CO 80203
Main (303) 866-3581 Fax (303) 866-3589

For Office Use Only

1. WELL PERMIT NUMBER:

2. WELL OWNER INFORMATION

NAME OF WELL OWNER: Colorado Department of Transportation

MAILING ADDRESS: 4201 East Arkansas Avenue

CITY: Denver STATE: CO ZIP CODE: 80222

TELEPHONE NUMBER: (303) 757 - 9011

3. WELL LOCATION AS DRILLED: SW 1/4, SW 1/4, Sec. 4, Twp. 4 ☐ N or ☒ S, Range 68 ☐ E or ☒ W

DISTANCES FROM SEC. LINES: 225 ft. from ☐ N or ☒ S section line and 300 ft. from ☐ E or ☒ W section line.

SUBDIVISION: Wier Addition, LOT ____, BLOCK ____, FILING (UNIT) ____

Optional GPS Location: GPS Unit must use the following settings: Format must be **UTM**, Units must be **meters**, Datum must be **NAD83**, Unit must be set to **true N**, ☐ Zone 12 or ☒ Zone 13

Owner's Well Designation: RW3-2
Easting: 498747 m
Northing: 4397381 m

STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION 5321 feet DRILLING METHOD HSA CME 55

DATE COMPLETED 12/07/2011 TOTAL DEPTH 25 feet DEPTH COMPLETED 25 feet

5. GEOLOGIC LOG:

Depth	Type	Grain Size	Color	Water Loc.
0-2 ft	sandy clay	clay	Yel-Brn	
2-5 ft	clayey gravel	gravel	Pink/Brn	
10-11ft	cobbles	cobbles	Pink/Brn	
16-18 ft	silty sand	sand	Yel/Orn	V - 15 ft
20-21ft	sand	sand	Yel-Brn	
24-25.5 ft	sand/bedrock	claystone	Blue-Gry	
	TKd - Denver Fm			

6. HOLE DIAM (in.)

	From (ft)	To (ft)
7 3/4	0	25

7. PLAIN CASING:

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
2.0	PVC	Sch 40	0	10

PERFORATED CASING: Screen Slot Size (in): 0.010

2.0	PVC	Sch 40	10	25

8. FILTER PACK:
Material Silica Sand
Size 10-20
Interval 8 ft to 25 ft

9. PACKER PLACEMENT:
Type
Depth

10. GROUTING RECORD

Material	Amount	Density	Interval	Placement
Bentonite			8 ft - 2 ft	Gravity
Sakrete			2 ft - 0 ft	

Remarks:

11. DISINFECTION: Type N/A Amt. Used

12. WELL TEST DATA: ☐ Check box if Test Data is submitted on Form Number GWS 39 Supplemental Well Test.

TESTING METHOD

Static Level ____ ft. Date/Time measured: ____, Production Rate ____ gpm.

Pumping Level ____ ft. Date/Time measured ____, Test Length (hrs) ____.

Remarks:

13. I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402-2. [The filing of a document that contains false statements is a violation of section 37-91-108(1)(e), C.R.S., and is punishable by fines up to $5000 and/or revocation of the contracting license.]

Company Name: Olsson Associates Phone: (303) 237- 2072 License Number:

Mailing Address: 4690 Table Mountain Drive #200

Signature: Print Name and Title James W. Hix - Senior Project Geologist Date 12/21/11

FORM NO. GWS-31 10/2011

WELL CONSTRUCTION AND TEST REPORT

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER
1313 Sherman St., Ste 821, Denver, CO 80203
Main (303) 866-3581 Fax (303) 866-3589

For Office Use Only

1. WELL PERMIT NUMBER:

2. WELL OWNER INFORMATION

NAME OF WELL OWNER: Colorado Department of Transportation

MAILING ADDRESS: 4201 East Arkansas Avenue

CITY: Denver STATE: CO ZIP CODE: 80222

TELEPHONE NUMBER: (303) 757 - 9011

3. WELL LOCATION AS DRILLED: NE 1/4, NE 1/4, Sec. 8, Twp. 4 ☐ N or ☒ S, Range 68 ☐ E or ☒ W

DISTANCES FROM SEC. LINES: 180 ft. from ☒ N or ☐ S section line and 1,180 ft. from ☒ E or ☐ W section line.

SUBDIVISION: Wier Addition, LOT ____, BLOCK ____, FILING (UNIT) ____

Optional GPS Location: GPS Unit must use the following settings: Format must be **UTM**, Units must be **meters**, Datum must be **NAD83**, Unit must be set to **true N**, ☐ Zone 12 or ☒ Zone 13

Owner's Well Designation: RW5-1
Easting: 498254 m
Northing: 4397249 m

STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION 5228 feet DRILLING METHOD HSA CME 55

DATE COMPLETED 12/09/11 TOTAL DEPTH 35 feet DEPTH COMPLETED 35 feet

5. GEOLOGIC LOG:

Depth	Type	Grain Size	Color	Water Loc.
0 to 2 ft	fill	silt-gravel	dk brn	
4 to 5 ft	gravelly clay	grvl clay	med brn	
9 to 10 ft	gravelly clay	grvl clay	dk yel brn	
14 to 15 ft	silty clay	silty clay	gray brn	
19 to 20 ft	clayey silt	clay silt	pale brn	
24 to 26 ft	sand - gravel	gravel	yel brn	
29 to 30 ft	clayey gravel	gravel	med brn	V - 29.5
34 to 35 ft	sandy gravel	gravel	orange	

6. HOLE DIAM (in.)

	From (ft)	To (ft)
7 3/4	0	35

7. PLAIN CASING:

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
2.0	PVC	Sch 40	0	20

PERFORATED CASING: Screen Slot Size (in): 0.010

2.0	PVC	Sch 40	20	35

8. FILTER PACK:
Material Silica Sand
Size 10-20
Interval 35 to 19 ft

9. PACKER PLACEMENT:
Type
Depth

10. GROUTING RECORD

Material	Amount	Density	Interval	Placement
Bentonite			19 ft- 2 ft	Gravity
Quikrete			2 ft - 0 ft	

Remarks:

11. DISINFECTION: Type N/A Amt. Used

12. WELL TEST DATA: ☐ Check box if Test Data is submitted on Form Number GWS 39 Supplemental Well Test.

TESTING METHOD

Static Level ____ ft. Date/Time measured: ____, Production Rate ____ gpm.

Pumping Level ____ ft. Date/Time measured ____, Test Length (hrs) ____.

Remarks:

13. I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402-2. [The filing of a document that contains false statements is a violation of section 37-91-108(1)(e), C.R.S., and is punishable by fines up to $5000 and/or revocation of the contracting license.]

Company Name: Olsson Associates Phone: (303) 237- 2072 License Number:

Mailing Address: 4690 Table Mountain Drive #200

Signature: Print Name and Title James W. Hix - Senior Project Geologist Date 12/21/11

FORM NO. GWS-31 10/2011

WELL CONSTRUCTION AND TEST REPORT

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER
1313 Sherman St., Ste 821, Denver, CO 80203
Main (303) 866-3581 Fax (303) 866-3589

For Office Use Only

1. WELL PERMIT NUMBER:

2. WELL OWNER INFORMATION

NAME OF WELL OWNER: Colorado Department of Transportation

MAILING ADDRESS: 4201 East Arkansas Avenue

CITY: Denver STATE: CO ZIP CODE: 80222

TELEPHONE NUMBER: (303) 757 - 9011

3. WELL LOCATION AS DRILLED: NE 1/4, NE 1/4, Sec. 8, Twp. 4 ☐ N or ☒ S, Range 68 ☐ E or ☒ W

DISTANCES FROM SEC. LINES: 215 ft. from ☒ N or ☐ S section line and 500 ft. from ☒ E or ☐ W section line.

SUBDIVISION: Wier Addition, LOT ____, BLOCK ____, FILING (UNIT) ____

Optional GPS Location: GPS Unit must use the following settings: Format must be **UTM**, Units must be **meters**, Datum must be **NAD83**, Unit must be set to **true N**, ☐ Zone 12 or ☒ Zone 13

Owner's Well Designation: RW6-1
Easting: 498487 m
Northing: 4397235 m

STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION 5212 feet DRILLING METHOD HSA CME 55

DATE COMPLETED 12/07/11 TOTAL DEPTH 30 feet DEPTH COMPLETED 31 feet

5. GEOLOGIC LOG:

Depth	Type	Grain Size	Color	Water Loc.
0 to 2 ft	fill - gravel clay	gravel clay	dk brn	
4 to 5 ft	sand-silt-clay	silty clay	med brn	
10 to 11 ft	sandy clay	sand clay	dk yelbrn	
15 to 16 ft	silty sand	silt sand	pink brn	
20 to 21 ft	sandy silt	sand silt	pink brn	
25 to 26 ft	sandy gravel	gravel	pink brn	V - 25 ft
30 to 31 ft	sand gravel	gravel	yel brn	

Remarks:

6. HOLE DIAM (in.)

	From (ft)	To (ft)
7 3/4	0	31

7. PLAIN CASING:

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
2.0	PVC	Sch 40	0	20

PERFORATED CASING: Screen Slot Size (in): 0.010

2.0	PVC	Sch 40	20	31

8. FILTER PACK:
Material Silica Sand
Size 10-20
Interval 31 ft to 18 ft

9. PACKER PLACEMENT:
Type
Depth

10. GROUTING RECORD

Material	Amount	Density	Interval	Placement
Bentonite			18 ft - 2 ft	Gravity
Quikrete			2 ft - 0 ft	Trowel

11. DISINFECTION: Type N/A Amt. Used

12. WELL TEST DATA: ☐ Check box if Test Data is submitted on Form Number GWS 39 Supplemental Well Test.

TESTING METHOD N/A

Static Level ____ ft. Date/Time measured: ____, Production Rate ____ gpm.

Pumping Level ____ ft. Date/Time measured ____, Test Length (hrs) ____.

Remarks:

13. I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402-2. [The filing of a document that contains false statements is a violation of section 37-91-108(1)(e), C.R.S., and is punishable by fines up to $5000 and/or revocation of the contracting license.]

Company Name: Olsson Associates Phone: (303) 237- 2072 License Number:

Mailing Address: 4690 Table Mountain Drive #200

Signature: Print Name and Title James W. Hix - Senior Project Geologist Date 12/21/11

FORM NO. GWS-31 10/2011

WELL CONSTRUCTION AND TEST REPORT

STATE OF COLORADO, OFFICE OF THE STATE ENGINEER
1313 Sherman St., Ste 821, Denver, CO 80203
Main (303) 866-3581 Fax (303) 866-3589

For Office Use Only

1. WELL PERMIT NUMBER:

2. WELL OWNER INFORMATION

NAME OF WELL OWNER: Colorado Department of Transportation

MAILING ADDRESS: 4201 East Arkansas Avenue

CITY: Denver STATE: CO ZIP CODE: 80222

TELEPHONE NUMBER: (303) 757 - 9011

3. WELL LOCATION AS DRILLED: NW 1/4, NW 1/4, Sec. 9, Twp. 4 ☐ N or ☒ S, Range 68 ☐ E or ☒ W

DISTANCES FROM SEC. LINES: 155 ft. from ☒ N or ☐ S section line and 256 ft. from ☐ E or ☒ W section line.

SUBDIVISION: Wier Addition, LOT ____, BLOCK ____, FILING (UNIT) ____

Optional GPS Location: GPS Unit must use the following settings: Format must be **UTM**, Units must be **meters**, Datum must be **NAD83**, Unit must be set to **true N**, ☐ Zone 12 or ☒ Zone 13

Owner's Well Designation: RW7-1
Easting: 498743 m
Northing: 4307269 m

STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION 5209 feet DRILLING METHOD HSA CME 55

DATE COMPLETED 12/20/11 TOTAL DEPTH 30 feet DEPTH COMPLETED 30 feet

5. GEOLOGIC LOG:

Depth	Type	Grain Size	Color	Water Loc.
0 to 2 ft	fill - gravel clay	gravel clay	dk brn	
2 to 4 ft	gravelly clay	gravel clay	med brn	
9 to 10 ft	clay-silt-sand	clay-sand	dk yelbrn	
14 to 15 ft	sandy gravel	gravel	yel brn	
17 to 19 ft	sandy gravel	gravel	pink brn	
21 to 22 ft	gravelly sand	sand	pink brn	
28 to 29.5	gravelly sand	gravel	yel brn	
29.5-30 ft	claystone bedrock (TKd)		yel brn	

6. HOLE DIAM (in.)

	From (ft)	To (ft)
7 3/4	0	30

7. PLAIN CASING:

OD (in)	Kind	Wall Size (in)	From (ft)	To (ft)
2.0	PVC	Sch 40	0	15

PERFORATED CASING: Screen Slot Size (in): 0.010

2.0	PVC	Sch 40	15	30

8. FILTER PACK:
Material Silica Sand
Size 10-20
Interval 30 ft to 13 ft

9. PACKER PLACEMENT:
Type
Depth

10. GROUTING RECORD

Material	Amount	Density	Interval	Placement
Bentonite			13 ft - 2 ft	Gravity
Quikrete			2 ft - 0 ft	Trowel

Remarks:

11. DISINFECTION: Type N/A Amt. Used

12. WELL TEST DATA: ☐ Check box if Test Data is submitted on Form Number GWS 39 Supplemental Well Test.

TESTING METHOD N/A

Static Level ____ ft. Date/Time measured: ____, Production Rate ____ gpm.

Pumping Level ____ ft. Date/Time measured ____, Test Length (hrs) ____.

Remarks:

13. I have read the statements made herein and know the contents thereof, and they are true to my knowledge. This document is signed and certified in accordance with Rule 17.4 of the Water Well Construction Rules, 2 CCR 402-2. [The filing of a document that contains false statements is a violation of section 37-91-108(1)(e), C.R.S., and is punishable by fines up to $5000 and/or revocation of the contracting license.]

Company Name: Olsson Associates Phone: (303) 237- 2072 License Number:

Mailing Address: 4690 Table Mountain Drive #200

Signature: Print Name and Title James W. Hix - Senior Project Geologist Date 12/21/11