

TECHNICAL MEMORANDUM

To: Nevada Environmental Response Trust

Cc: Nevada Division of Environmental Protection
United States Environmental Protection Agency

From: Dan Pastor and Dana Grady, Tetra Tech, Inc.

Date: August 29, 2018

Subject: Las Vegas Wash Bioremediation Pilot Study Monthly Progress Report

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this memorandum which summarizes Tetra Tech's progress during July 2018 toward successfully implementing the Las Vegas Wash Bioremediation Pilot Study.

Task Progress Update: July 2018

Task M19 – Las Vegas Wash Pilot Study

- Task Leader – Dana Grady/Dan Pastor
- Current Status
 - Phase 1 pre-design field activities continued to be performed during the reporting period to gather relevant data and information required to optimize the final pilot study locations and design (targeted treatment interval and depth, contaminant concentrations, etc.). Based on the data collected thus far, a Las Vegas Wash Bioremediation Pilot Study – Phase 1 Work Plan Modification is being prepared and will be submitted in August 2018. Following implementation of this modification, the Phase 1 findings and resulting Phase 2 pilot study design will be presented to NDEP, EPA and the NERT Stakeholders, followed by a third-party cost evaluation and submittal of the Las Vegas Wash Bioremediation Pilot Study Work Plan Addendum.
 - A figure set has been provided to include an overview figure (Figure 1) and Phase 1 pre-design soil boring/monitoring well location figures (Figures 2 and 3).
 - As stated in the June monthly progress report, all Phase 1 pre-design field activities in the planned Transect 1A area located on the City of Henderson (COH) parcel (Figure 2) have been completed. Results not discussed in previous monthly progress reports are presented below:
 - Nuclear magnetic resonance (NMR) logging of the deepest well in each of the twelve locations (LVWPS-MW101 through LVWPS-MW112) began on May 29, 2018 and was completed on June 8, 2018. Data processing is on-going and a brief summary of the results will be provided once the processing is complete.

- Borehole dilution testing of monitoring wells LVWPS-MW107A and LVWPS-MW107B was completed the week of June 18, 2018. Data processing is on-going and a brief summary of the results will be provided once the processing is complete.
- Bio-traps® were retrieved from monitoring wells LVWPS-MW103B and LVWPS-MW107A/B on June 20, 2018. The bio-traps® were analyzed for phospholipid fatty acids and perchlorate reductase. Results of these biotrap indicate a robust microbial population in groundwater that could possess the ability to biodegrade perchlorate and other inorganic electron acceptors, such as chlorate and nitrate. Table 1 presents a summary of microbial data. These results will be discussed in more detail in the forthcoming Las Vegas Wash Bioremediation Pilot Study Work Plan Addendum.
- Phase 1 pre-design field activities in the planned Transect 1B area located on Clark County (Figure 3) began on May 16, 2018 and are on-going. A total of 27 wells were installed at 16 locations within the planned Transect 1B area as prescribed in the Las Vegas Wash Bioremediation Pilot Study Work Plan. Soil samples were collected on approximately 10-foot intervals from the top of the water table to the base of the boring and analyzed for perchlorate. Following well development, groundwater sampling was performed the week of June 25, 2018. Tables 2 through 6 present a summary of final well construction details and associated water levels, soil analytical results, and groundwater analytical results. The attached Figure 3 provides a map of the Phase 1 pre-design monitoring well locations for reference. The following activities were completed in July 2018:
 - Nuclear magnetic resonance (NMR) logging of the deepest well in each of the sixteen locations (LVWPS-MW201 through LVWPS-MW216) began on July 9, 2018 and was completed on July 15, 2018. Data processing is ongoing, and a brief summary of the results will be provided once the processing is complete.
 - Slug testing in all 27 new monitoring wells was completed the weeks of July 9 and July 16, 2018. Borehole dilution testing of monitoring wells LVWPS-MW201A, LVWPS-MW203B, LVWPS-MW206B, and LVWPS-MW208A was completed the week of July 16, 2018. Data processing is ongoing, and a brief summary of the results will be provided once the processing is complete.
 - Bio-traps® were placed in monitoring wells LVWPS-MW210A/B/C, LVWPS-MW203B, and LVWPS-MW206C on June 28, 2018. Bio-traps® were retrieved on August 2, 2018 and sent for testing of phospholipid fatty acids and perchlorate reductase. Results will be summarized once data has been received and evaluated.
 - Surface water sampling was performed the week of July 23, 2018. Results will be summarized once data has been received and evaluated.
 - Table 2 provides an updated well construction table that includes ground surface elevations and depth to water at each monitoring well location.
 - Table 3 presents the analytical results for soil samples collected during soil boring and well installation. Perchlorate was detected in soil samples collected from the saturated alluvium (Qal) and Upper Muddy Creek formation (UMCf) at concentrations ranging from non-detect (<0.011) to 10.0 milligrams per kilogram (mg/kg). The highest detection of 10.0 mg/kg was detected in the UMCf at a depth of 120 feet below ground surface (bgs). Soil samples from several locations within the Transect 1B area contained perchlorate concentrations above the Remedial Investigation screening level at depth.
 - Microbial analysis was performed on soil samples, including analysis for phospholipid fatty acids and perchlorate reductase. Once all microbial results have been received and evaluated, a summary table will be provided in the next monthly progress report.

- Discrete-depth groundwater samples were collected at select locations to assist in vertically profiling the extent of perchlorate contamination. Location and depths of discrete groundwater samples were determined in the field based on lithology encountered and planned monitoring well screened intervals. Table 4 presents the analytical results for discrete-depth groundwater samples collected during soil boring and well installation. Perchlorate concentrations in discrete-depth groundwater samples ranged from 720 to 4,000 micrograms per liter ($\mu\text{g/L}$).
- Table 5 presents the analytical results for the groundwater sampling event conducted the week of June 25, 2018. Laboratory analytical results reported perchlorate concentrations in groundwater samples collected from the newly installed monitoring wells ranged from 120 to 10,000 $\mu\text{g/L}$. Perchlorate was detected in several deep monitoring wells, including the highest perchlorate detection of 10,000 $\mu\text{g/L}$ in one of the deepest monitoring wells screened from 100 to 120 feet bgs.
- Upon reaching groundwater, undisturbed soil samples were collected using Shelby tubes from three borehole locations at varying depths within each borehole. Shelby tubes were submitted for laboratory analysis of physical parameters including moisture content, porosity, soil density, specific gravity, and soil grain size distribution. Table 6 presents a summary of these results.
 - As discussed herein, results from these pre-design field activities near the vicinity of proposed Transect 1B have identified soil and groundwater perchlorate contamination in the alluvium and UMCf to depths of up to 120 feet bgs. Additionally, lithologic logging indicates that a paleochannel identified near the Las Vegas Wash was significantly deeper than expected (i.e., greater than the depth of the soil borings which went to 120 feet bgs). Based on these recent discoveries, additional investigations are necessary to properly define the extent of contamination and develop a more thorough understanding of the geology within this high priority area. A Las Vegas Wash Bioremediation Pilot Study – Phase 1 Modification is being prepared and will be submitted in August 2018. This modification includes the recommendation for additional soil borings and monitoring wells, soil and groundwater sampling, slug testing, borehole dilution testing, and NMR logging.
- Schedule and Progress Updates
 - The Phase 1 Modification will be submitted in August. It is anticipated that field work associated with this Phase 1 Modification will begin the week of August 27, 2018. All work will be performed as expeditiously as possible to minimize overall schedule impacts.
- Health and Safety
 - There were no safety incidents related to Task M19 during July 2018.

CERTIFICATION

Las Vegas Wash Bioremediation Pilot Study Monthly Progress Report

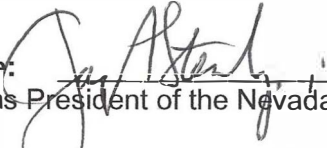
**Nevada Environmental Response Trust Site
(Former Tronox LLC Site)
Henderson, Nevada**

Nevada Environmental Response Trust (NERT) Representative Certification

I certify that this document and all attachments submitted to the Division were prepared at the request of, or under the direction or supervision of NERT. Based on my own involvement and/or my inquiry of the person or persons who manage the systems(s) or those directly responsible for gathering the information or preparing the document, or the immediate supervisor of such person(s), the information submitted and provided herein is, to the best of my knowledge and belief, true, accurate, and complete in all material respects.

Office of the Nevada Environmental Response Trust

Le Petomane XXVII, not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Signature:  _____, not individually, but solely in his representative capacity as President of the Nevada Environmental Response Trust Trustee

*not individually but solely
as Pres, Inc*

Name: Jay A. Steinberg, not individually, but solely in his representative capacity as President of the Nevada Environmental Response Trust Trustee

Title: Solely as President and not individually

Company: Le Petomane XXVII, Inc., not individually, but solely in its representative capacity as the Nevada Environmental Response Trust Trustee

Date: 8/29/18

CERTIFICATION

I hereby certify that I am responsible for the services described in this document and for the preparation of this document. The services described in this document have been prepared in a manner consistent with the current standards of the profession, and to the best of my knowledge, comply with all applicable federal, state, and local statutes, regulations, and ordinances. I hereby certify that all laboratory analytical data was generated by a laboratory certified by the NDEP for each constituent and media presented herein.

Description of Services Provided: Las Vegas Wash Bioremediation Pilot Study Monthly Progress Report, Nevada Environmental Response Trust Site, Henderson, Nevada.



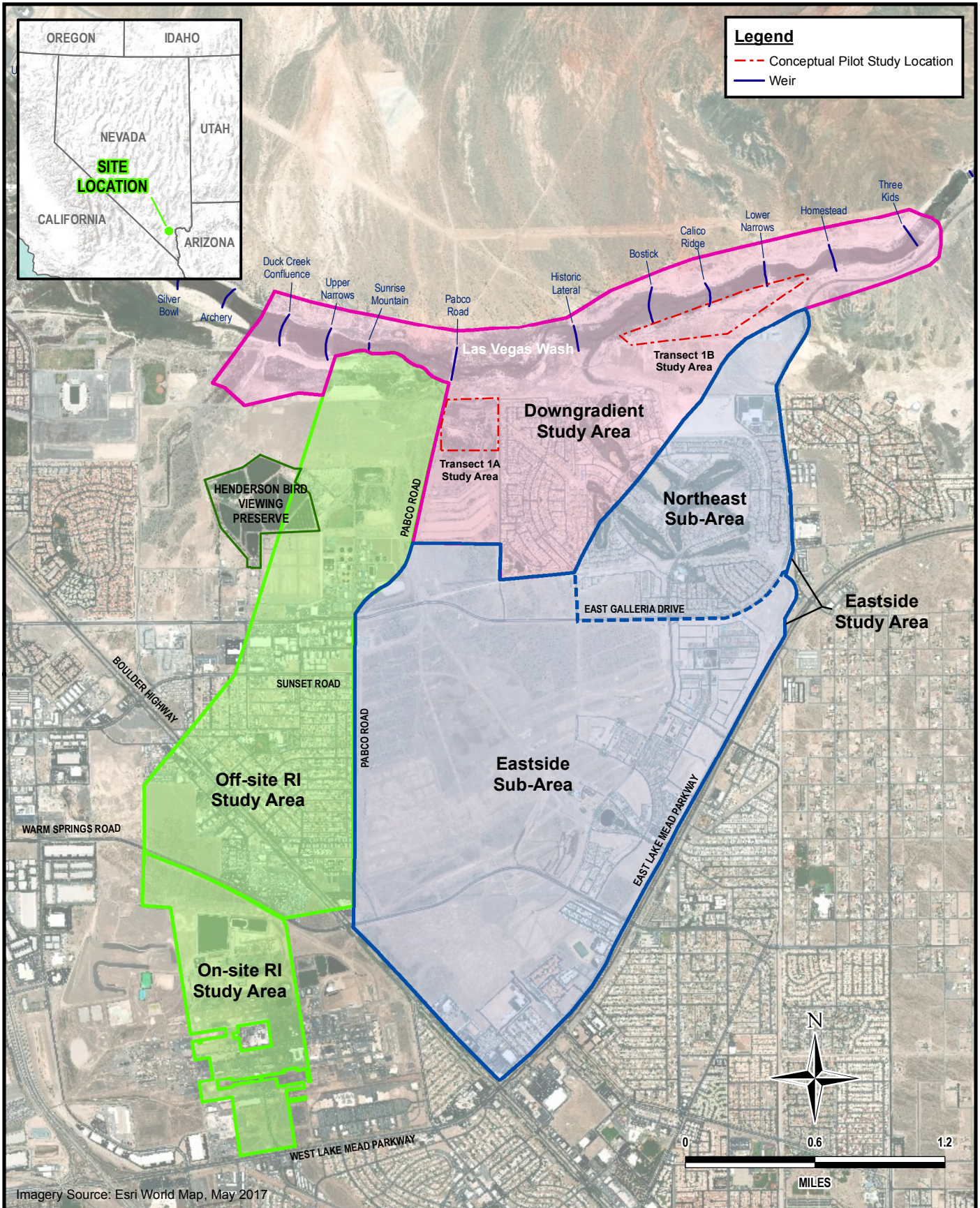
August 29, 2018

Kyle Hansen, CEM
Field Operations Manager/Geologist
Tetra Tech, Inc.

Date

Nevada CEM Certificate Number: 2167
Nevada CEM Expiration Date: September 18, 2020

Figures



TETRA TECH

www.tetrattech.com

150 S. 4th Street, Unit A
Henderson, Nevada 89015
Phone: (702) 854-2293

NEVADA ENVIRONMENTAL RESPONSE TRUST

MONTHLY PROGRESS REPORT

TREATABILITY STUDY LOCATION

Project No.: 117-7502018

Date: JULY 09, 2018

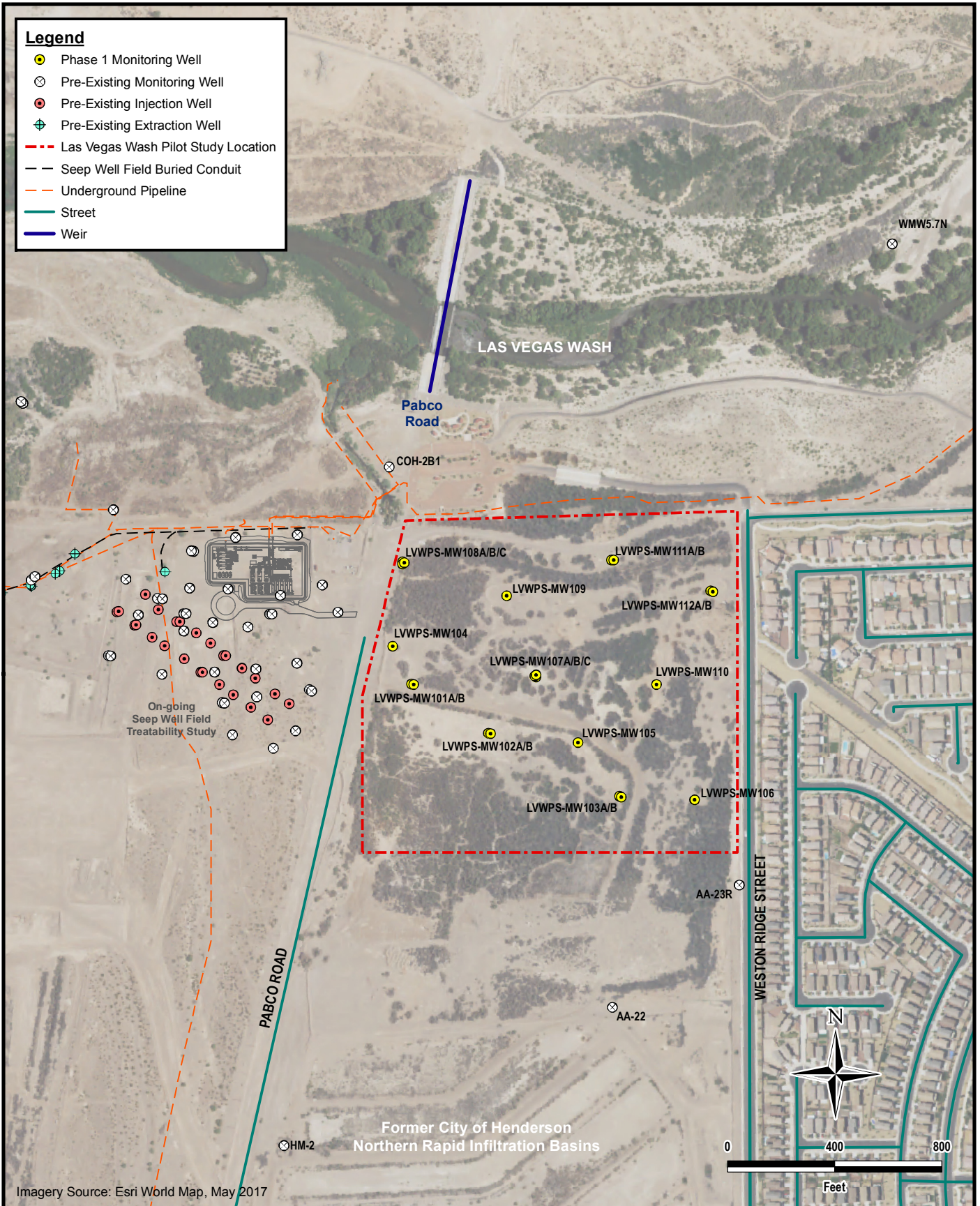
Designed By: SRA

Figure No.

1

Legend

- Phase 1 Monitoring Well
- ⊗ Pre-Existing Monitoring Well
- ⊗ Pre-Existing Injection Well
- ⊕ Pre-Existing Extraction Well
- Las Vegas Wash Pilot Study Location
- Seep Well Field Buried Conduit
- Underground Pipeline
- Street
- Weir



\\TTS100FS1\PROJECTS\NERTGIS FIGURE DATABASE\MXD\19\MP\FIGURE2.MXD

Imagery Source: Esri World Map, May 2017



www.tetrattech.com

150 S. 4th Street, Unit A
Henderson, Nevada 89015
Phone: (702) 854-2293

NEVADA ENVIRONMENTAL RESPONSE TRUST

MONTHLY PROGRESS REPORT

**LAS VEGAS WASH PILOT STUDY PRE-DESIGN
SOIL BORING AND MONITORING WELL LOCATIONS
TRANSECT 1A VICINITY**

Project No.: 117-7502018

Date: JULY 09, 2018

Designed By: SRA

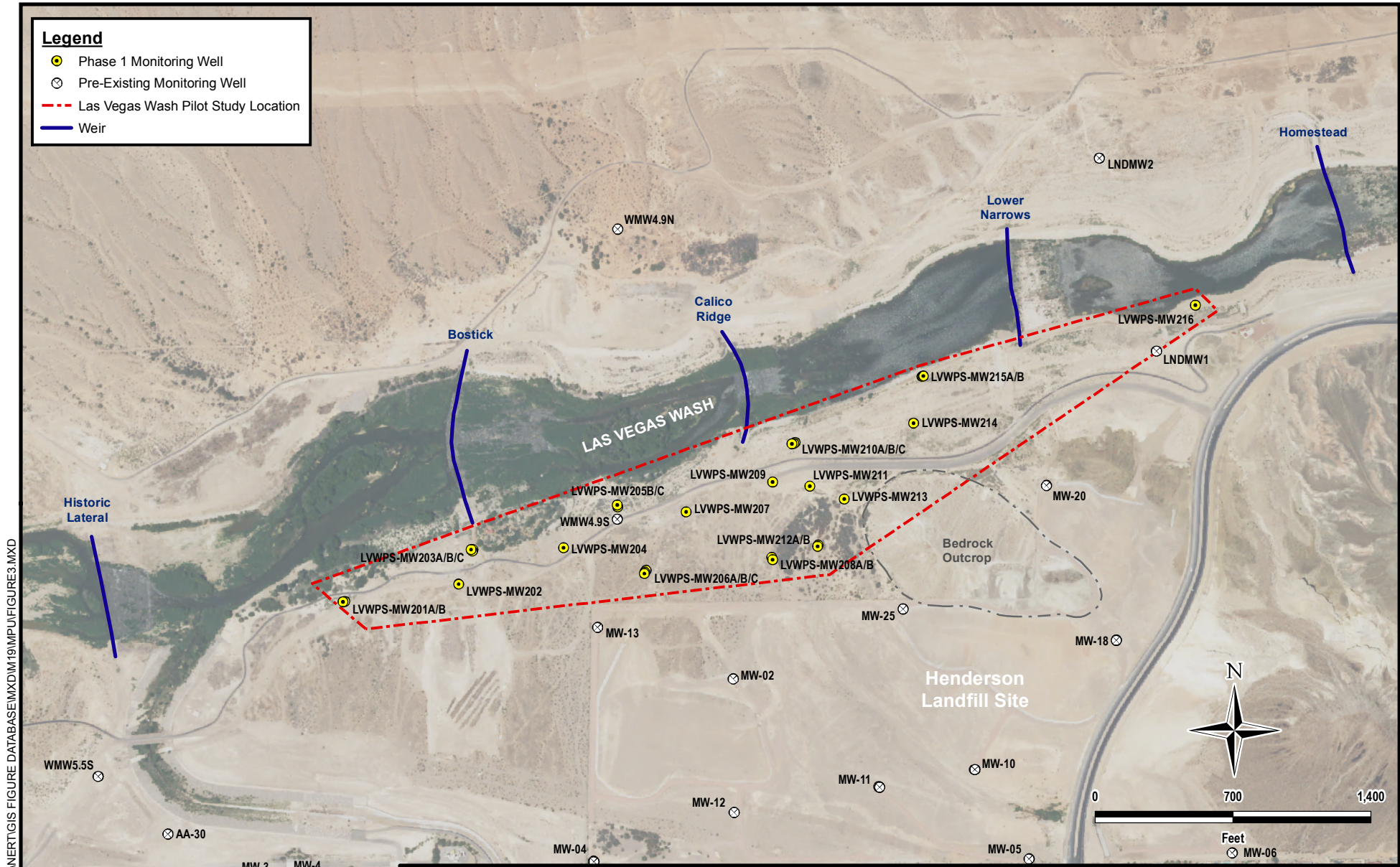
Figure No.

2

DRAFT

Legend

- Phase 1 Monitoring Well
- ⊗ Pre-Existing Monitoring Well
- - - Las Vegas Wash Pilot Study Location
- Weir



\\TTS\00F5\PROJECTS\NERTGIS\FIGURE DATABASE\MXD\19\MP\FIGURE3.MXD

Imagery Source: Esri World Map, May 2017

 <p>TETRA TECH</p> <p>www.tetratech.com</p> <p>150 S. 4th Street, Unit A Henderson, Nevada 89015 Phone: (702) 854-2293</p>	<p>NEVADA ENVIRONMENTAL RESPONSE TRUST</p> <p>MONTHLY PROGRESS REPORT</p> <p>LAS VEGAS WASH PILOT STUDY PRE-DESIGN SOIL BORING AND MONITORING WELL LOCATIONS TRANSECT 1B VICINITY</p>		<p>Project No.: 117-7502018</p>
			<p>Date: JULY 16, 2018</p> <p>Designed By: SRA</p>
			<p>Figure No.</p> <p style="font-size: 24pt; font-weight: bold; text-align: center;">3</p>

Tables

DRAFT

Table 1
Groundwater Microbial Results - Transect 1A Area
Las Vegas Wash Pilot Study

Location	Sample Date	Lab Sample ID	Sample Matrix	Microbial Census	Microbial Phospholipid Fatty Acid Analysis (PLFA)								
				Perchlorate reductase gene (pcrA)	Total Biomass	Proteobacteria (Monos)	Firmicutes (TerBrSats)	Anaerobic metal reducers (BrMonos)	SRB/Actinomycetes (MidBrSats)	General (Nsats)	Eukaryotes (polyenoics)	Slowed Growth	Decreased Permeability
				cells/gram	cells/gram	%	%	%	%	%	ratio cy/cis	ratio trans/cis	
LVWPS-MW107A	43271	094PF-1	Biotrap	<2.50E+02	2.58E+04	70.83	0	3.93	0	25.24	0	0.56	0
LVWPS-MW107B	43271	094PF-2	Biotrap	<2.50E+02	1.05E+05	77.19	1.35	2.02	0	18.16	1.29	0.10	0.09
LVWPS-MW103B	43271	094PF-3	Biotrap	<2.50E+02	3.48E+04	70.37	0	0	0	29.62	0	0.23	0

Notes
Monos Monoenoic
TerBrSats Terminally Branched Saturated
BrMonos Branched Monoenoic
MidBrSats Mid-Chain Branched Saturated
Nsats Normal Saturated
< Not detected

Table 2
Transect 1B Area Monitoring Wells
 Las Vegas Wash Pilot Study

Monitoring Well/Borehole ID	Northing	Easting	Ground Surface Elevation	Top of Casing Elevation	Depth to Water ¹	Well Diameter	Borehole Diameter	Borehole Total Depth	Well Total Depth	Bottom of Screen	Top of Screen	Screen Length	Slot Size
			feet amsl	feet amsl	feet bTOC	inches	inches	feet bgs	feet bgs	feet bgs	feet bgs	feet	inches
LVWPS-MW201A	26734867.372	837018.940	1523.10	1522.82	18.65	4	8	49.5	48.5	47.8	28.2	20	0.020
LVWPS-MW201B	26734869.473	837026.359	1522.97	1522.81	18.15	2	6	120	80.4	79.8	60.1	20	0.010
LVWPS-MW202	26734960.157	837604.939	1522.44	1522.04	24.80	2	6	120	62.0	61.5	41.8	20	0.020
LVWPS-MW203A	26735133.067	837668.334	1519.38	1518.99	21.40	2	6	56	55.0	54.5	34.8	20	0.020
LVWPS-MW203B	26735134.449	837677.531	1519.31	1519.05	22.23	4	8	96	95.4	94.7	75.1	20	0.010
LVWPS-MW203C	26735127.542	837675.108	1519.62	1519.23	111.15	2	6	121	120.6	120.0	100.3	20	0.010
LVWPS-MW204	26735143.942	838137.440	1520.86	1520.68	26.74	2	6	120	70.6	70.0	50.3	20	0.020
LVWPS-MW205B	26735351.797	838413.617	1517.41	1517.40	25.34	2	6	120	85.1	84.6	64.9	20	0.020
LVWPS-MW205C	26735359.772	838411.474	1517.33	1517.36	25.64	2	6	121	120.6	120.0	100.3	20	0.020
LVWPS-MW206A	26735026.649	838554.302	1528.94	1528.79	35.61	2	6	63	60.1	59.5	39.8	20	0.020
LVWPS-MW206B	26735020.364	838551.744	1528.85	1528.81	36.13	4	8	91	90.2	89.5	69.9	20	0.020
LVWPS-MW206C	26735013.638	838549.640	1529.04	1528.68	36.00	2	6	121	120.6	120.0	100.3	20	0.010
LVWPS-MW207	26735325.360	838761.633	1519.21	1518.96	27.78	2	6	120	88.4	87.8	68.1	20	0.020
LVWPS-MW208A	26735088.710	839198.514	1522.78	1522.63	31.45	4	8	61	60.1	59.5	39.9	20	0.020
LVWPS-MW208B	26735082.390	839200.271	1523.04	1522.84	32.00	2	6	120	85.6	85.0	65.3	20	0.020
LVWPS-MW209	26735476.503	839198.991	1517.32	1516.79	26.96	2	6	120	91.6	91.0	71.3	20	0.020
LVWPS-MW210A	26735671.028	839297.058	1515.15	1514.72	25.95	2	6	56	55.6	55.0	35.3	20	0.020
LVWPS-MW210B	26735673.799	839305.795	1515.09	1514.64	25.52	2	6	91	90.4	89.8	70.1	20	0.020
LVWPS-MW210C	26735676.651	839314.268	1514.97	1514.66	25.42	2	6	121	120.6	120.0	100.3	20	0.020
LVWPS-MW211	26735455.105	839388.413	1516.71	1516.44	26.81	2	6	120	70.2	69.7	50.0	20	0.020
LVWPS-MW212A	26735150.141	839428.278	1519.62	1519.33	28.49	2	6	55	54.6	54.0	34.3	20	0.020
LVWPS-MW212B	26735157.369	839430.869	1519.27	1519.30	28.76	2	6	120	80.1	79.5	59.8	20	0.020
LVWPS-MW213	26735391.700	839564.267	1516.70	1516.70	26.95	2	6	120	60.4	59.8	40.1	20	0.020
LVWPS-MW214	26735776.734	839916.302	1508.80	1508.31	26.82	2	6	120	44.6	44.0	34.4	10	0.020
LVWPS-MW215A	26736013.101	839957.907	1492.39	1492.30	11.58	2	6	35	33.8	33.2	13.5	20	0.020
LVWPS-MW215B	26736016.554	839966.088	1492.47	1492.06	12.31	2	6	46	45.9	45.3	40.7	5	0.010
LVWPS-MW216	26736374.699	841345.384	1480.70	1480.45	7.97	2	6	80	20.6	20.0	10.4	10	0.020

Notes:

amsl - above mean sea level

bTOC - below top of casing

bgs - below ground surface

1. Depth to water measurements collected on June 29, 2018.

Table 3
Soil Analytical Results
Las Vegas Wash Pilot Study

Table with 28 columns: Location, Sample Date, QC Type, Depth (ft bgs), Lab SampleID, EPA 314.0, Anions by EPA 300.0 (soluble), EPA 300.1, EPA 300.1 (soluble), EPA 351.2, EPA 351.2 (soluble), SW6010B, EPA 365.3 (soluble), SM2320B (soluble), SM2540C (soluble), SM5310B (soluble), SW9060A, SW6010B (soluble), SW6020 (soluble), SW7199, SW9045C. Rows include sample IDs like LVWPS-MW208B, LVWPS-MW209, LVWPS-MW210C, LVWPS-MW211, LVWPS-MW212B, LVWPS-MW213, LVWPS-MW214, LVWPS-MW215B.

Table 3
Soil Analytical Results
 Las Vegas Wash Pilot Study

Location	Sample Date	QC Type	Depth (ft bgs)	Lab SampleID	EPA 314.0	Anions by EPA 300.0 (soluble)				EPA 300.1	EPA 300.1 (soluble)	EPA 351.2	EPA 351.2 (soluble)	SW6010B	EPA 365.3 (soluble)	SM2320B (soluble)				SM2540C (soluble)	SM5310B (soluble)	SW9060A	SW6010B (soluble)				SW6020 (soluble)				SW7199	SW9045C
					Perchlorate	Chloride (as Cl)	Nitrate (as NO3)	Sulfate	Chlorate	Chlorate	Total Kjeldahl Nitrogen (TKN)	Total Kjeldahl Nitrogen (TKN)	Phosphorus	Phosphorus	Alkalinity as CaCO3	Bicarbonate Ion as HCO3	Carbonate (as CO3)	Hydroxide as OH	Total Dissolved Solids	Total Organic Carbon	Total Organic Carbon	Calcium	Magnesium	Potassium	Sodium	Arsenic	Chromium	Iron	Manganese	Chromium, Hexavalent	pH	
					mg/kg	mg/L	mg/L	mg/L	ug/kg	ug/L	mg/kg	mg/L	mg/kg	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/kg	mg/L	mg/L	mg/L	mg/L	ug/L	ug/L	ug/L	ug/L	mg/kg	SU
LVWPS-MW215B	6/4/2018	N	21	440-212752-39	0.20	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
LVWPS-MW215B	6/4/2018	N	33	440-212752-38	0.22	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
LVWPS-MW216	6/7/2018	N	13	440-213209-1	<0.013	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
LVWPS-MW216	6/7/2018	N	23	440-213209-2	0.10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
LVWPS-MW216	6/7/2018	N	33	440-213209-3	<0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
LVWPS-MW216	6/7/2018	N	43	440-213209-4	<0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
LVWPS-MW216	6/7/2018	N	53	440-213209-5	<0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
LVWPS-MW216	6/7/2018	N	63	440-213209-6	<0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
LVWPS-MW216	6/7/2018	N	73	440-213209-7	<0.011	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Notes

- ft feet
- ft bgs below ground surface
- mg/kg milligrams per kilogram
- mg/L milligrams per liter
- ug/kg micrograms per kilogram
- < The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
- J- The result is an estimated quantity, but the result may be biased low.
- J+ The result is an estimated quantity, but the result may be biased high.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- UU The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

DRAFT

Table 4
Discrete-Depth Groundwater Analytical Results - Transect 1B Area
Las Vegas Wash Pilot Study

Location	Sample Depth	Sample Date	QCType	Lab SampleID	EPA 314.0	EPA 300.1	EPA 300.0
	(ft bgs)				Perchlorate	Chlorate	Nitrate (as N)
					ug/L	ug/L	mg/L
LVWPS-MW204	29	5/23/2018	N	440-212120-11	3,400	15,000	12
LVWPS-MW205C	44	5/30/2018	N	440-212452-24	840	1,800	8.6
LVWPS-MW205C	56	5/30/2018	N	440-212452-25	720	--	--
LVWPS-MW207	29	5/24/2018	N	440-212120-18	3,900	20,000	17
LVWPS-MW207	29	5/24/2018	FD	440-212120-19	4,000	20,000	17
LVWPS-MW209	40	6/1/2018	N	440-212632-1	3,700	--	--
LVWPS-MW209	105	6/1/2018	N	440-212632-2	4,600	17,000	20
LVWPS-MW210C	63	5/30/2018	N	440-212561-1	4,400	16,000	18
LVWPS-MW211	40	5/31/2018	N	440-212752-40	2,200	--	--
LVWPS-MW213	35	6/1/2018	N	440-212752-41	790	--	--
LVWPS-MW214	40	6/1/2018	N	440-212752-44	3,100	--	--

Notes

ft bgs below ground surface
ug/L micrograms per liter
mg/L milligrams per liter
FD Field duplicate
N Normal field sample
-- Not analyzed

Table 5
Groundwater Analytical Results - Transect 1B Area
 Las Vegas Wash Pilot Study

Location	Sample Date	QCType	Lab SampleID	E314.0	Anions by EPA 300.0				E300.1	E351.2	E365.3	E218.6	FIELD TESTS	FIELD TESTS	FIELD TESTS	FIELD TESTS
				Perchlorate	Chloride (as Cl)	Nitrate (as N)	Nitrite (as N)	Sulfate	Chlorate	Total Kjeldahl Nitrogen (TKN)	Phosphorus	Chromium, Hexavalent	Dissolved Oxygen	Ferrous Iron	Oxidation-Reduction Potential	pH
				ug/L	mg/L	mg/L	mg/L	mg/L	ug/L	mg/L	mg/L	ug/L	mg/L	mg/L	mV	SU
LVWPS-MW201A	6/26/2018	N	440-214475-1	5,000	750	13	<0.70	1,600	19,000	<0.10	0.074	14	0.7	0	57.5	7.09
LVWPS-MW201A	6/26/2018	FD	440-214475-2	4,800	750	13	<0.70	1,600	19,000	<0.10	<0.025	14	--	--	--	--
LVWPS-MW201B	6/26/2018	N	440-214475-3	7,400	1,600	6.6	<1.4	3,100	11,000	<0.10	0.076	67	0.87	0	52.6	8.5
LVWPS-MW202	6/25/2018	N	440-214375-1	2,300	500	10	<0.35	1,100	7,600	<0.10	<0.025	5.7	0	0	139	6.96
LVWPS-MW203A	6/25/2018	N	440-214375-3	430	320	8.2	0.25	640	330	<0.10	0.086	<0.25	6.1	0	193	7.41
LVWPS-MW203B	6/25/2018	N	440-214375-4	5,700	960	4.6	<0.70	2,300	7,900	<0.10	0.026 J	23	0.6	0	195	7.42
LVWPS-MW203C	6/29/2018	N	440-214733-1	120	5,500	<5.5	<7.0	13,000	<250	1.6	0.079	<0.25	1.81	0	18	7.59
LVWPS-MW204	6/25/2018	N	440-214376-1	1,300	440	10	<0.14	890	2,900	<0.10	0.055	1.4	1.11	0	-10.5	7.22
LVWPS-MW205B	6/26/2018	N	440-214476-1	2,800	580	11	<0.35	1,200	11,000	<0.10 UJ	<0.025	4.0	0	0	135	6.83
LVWPS-MW205C	6/26/2018	N	440-214476-4	2,200	490	11	<0.14	1,000	6,300	<0.10	<0.025	0.33 J	0	0	116	6.9
LVWPS-MW206A	6/26/2018	N	440-214475-4	4,300	860	19	<0.70	2,200	20,000	<0.10	0.31	34	1.92	0	166	7.3
LVWPS-MW206B	6/26/2018	N	440-214475-5	4,700	900	18	<0.70	2,100	24,000	<0.10	<0.025	32	0.94	0	158	7.23
LVWPS-MW206C	6/26/2018	N	440-214492-1	4,800	690	3.8	<0.70	1,700	8,900	<0.10	0.064	27	1.14	0	144	7.58
LVWPS-MW207	6/25/2018	N	440-214375-2	4,900	810	15	<0.70	1,800	22,000	<0.10	<0.025	20	4.56	0	59	6.85
LVWPS-MW208A	6/28/2018	N	440-214604-1	2,300	480	13	<0.70	2,100	3,400	<0.10 UJ	<0.025	13	5	0	55	7.3
LVWPS-MW208A	6/28/2018	FD	440-214604-2	2,400	470	13	<0.70	2,100	3,600	<0.10	<0.025	13	--	--	--	--
LVWPS-MW208B	6/28/2018	N	440-214604-3	2,700	580	15	<0.70	2,200	4,500	<0.10	0.077	14	7.6	0	32	7.33
LVWPS-MW209	6/28/2018	N	440-214604-8	4,100	790	19	<0.70	2,100	17,000	<0.10	<0.025	29	1.75	0	146	7.09
LVWPS-MW210A	6/27/2018	N	440-214521-1	4,400	800	17	<0.70	1,800	19,000	<0.10	<0.025	22	0	0	185	6.82
LVWPS-MW210A	6/27/2018	FD	440-214521-2	4,300	810	16	<0.70	1,900	18,000	<0.10	<0.025	23	--	--	--	--
LVWPS-MW210B	6/27/2018	N	440-214521-3	4,400	840	19	<0.70	2,100	17,000	<0.10	<0.025	30	0.32	0	137	6.87
LVWPS-MW210C	6/27/2018	N	440-214521-4	10,000	1,100	7.5	<0.70	2,000	14,000	<0.10	0.11	26	0	0	111	6.91
LVWPS-MW211	6/27/2018	N	440-214521-7	3,100	590	15	<0.70	2,100	5,900	<0.10	<0.025	14	3.04	0	159	7.19
LVWPS-MW212A	6/27/2018	N	440-214521-5	370	200	7.0	<0.070	1,100	430	<0.10	<0.025	17	4.89	0	191	7.43
LVWPS-MW212B	6/27/2018	N	440-214521-6	190	190	6.1	<0.070	860	190	0.38	0.037 J	18	6.39	0	183	7.67
LVWPS-MW213	6/28/2018	N	440-214604-7	120	270	2.6	<0.35	1,500	330	<0.10	<0.025	11	3.92	0	169	7.36
LVWPS-MW214	6/28/2018	N	440-214604-4	2,800	590	15	<0.70	2,000	7,000	<0.10	<0.025	20	2.66	0	155	7.1
LVWPS-MW215A	6/27/2018	N	440-214521-9	3,700	710	14	<0.70	1,500	16,000	<0.10 UJ	<0.025	15	0.55	0	69.3	7.15
LVWPS-MW215B	6/27/2018	N	440-214521-10	950	590	2.8	<0.70	1,500	1,400	<0.10	0.13	<0.25	1.7	0	28.3	7.38
LVWPS-MW216	6/28/2018	N	440-214604-5	1,200	740	4.3	<0.70	2,000	1,800	<0.10	0.33	<0.25	0	0	36	7.19
WMW4.9S	6/26/2018	N	440-214476-2	950	390	9.6	<0.070	800	2,300	<0.10	0.054	1.6	0	0	131	6.88

Notes

ug/L micrograms per liter SU Standard Units

mg/L milligrams per liter mS/cm milliSiemens per centimeter

mV milliVolts C degrees Celsius

FD Field duplicate NTU Nephelometric Turbidity Unit

N Normal field sample

< The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J- The result is an estimated quantity, but the result may be biased low.

J+ The result is an estimated quantity, but the result may be biased high.

J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table 5
Groundwater Analytical Results - Transect 1B Area
 Las Vegas Wash Pilot Study

Location	Sample Date	QCType	Lab SampleID	FIELD TESTS	FIELD TESTS	FIELD TESTS	FIELD TESTS	NTOTAL	RSK175	SM2320B	SM2320B	SM2320B	SM2320B	SM2540C	SM5310B
				Specific Conductivity	Sulfide	Temperature	Turbidity	Nitrogen, Total	Methane	Alkalinity as CaCO3	Bicarbonate ion as HCO3	Carbonate (as CO3)	Hydroxide as OH	Total Dissolved Solids	Total Organic Carbon
				mS/cm	mg/L	C	NTU	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-MW201A	6/26/2018	N	440-214475-1	5.607	0	25.5	2.04	13	<0.00025	150	190	<2.4	<1.4	4,400	2.4
LVWPS-MW201A	6/26/2018	FD	440-214475-2	--	--	--	--	13	<0.00025	160	190	<2.4	<1.4	4,400	1.8
LVWPS-MW201B	6/26/2018	N	440-214475-3	10.67	0	26.49	30.2	6.6	<0.00025	71	85	<2.4	<1.4	8,500	<0.65
LVWPS-MW202	6/25/2018	N	440-214375-1	3.580	0	28.23	0	10	<0.00025	160	200	<2.4	<1.4	2,900	2.2
LVWPS-MW203A	6/25/2018	N	440-214375-3	2.400	0	30.43	22.8	8.5	<0.00025	180	220	<2.4	<1.4	1,900	2.4
LVWPS-MW203B	6/25/2018	N	440-214375-4	6.150	0	32.38	31	4.6	0.00078 J	130	160	<2.4	<1.4	6,000	1.0
LVWPS-MW203C	6/29/2018	N	440-214733-1	25.90	0	33.75	1,000	1.6	<0.00025	110	140	<2.4	<1.4	30,000	4.7
LVWPS-MW204	6/25/2018	N	440-214376-1	3.325	0	24.55	9.56	10	<0.00025	160	190	<2.4	<1.4	2,500	2.2
LVWPS-MW205B	6/26/2018	N	440-214476-1	3.850	0	26.16	0	11	<0.00025	150	190	<2.4	<1.4	3,400	1.7
LVWPS-MW205C	6/26/2018	N	440-214476-4	3.350	0	31.08	0	11	<0.00025	150	180	<2.4	<1.4	2,900	1.9
LVWPS-MW206A	6/26/2018	N	440-214475-4	5.960	0	28.75	100	19	<0.00025	130	150	<2.4	<1.4	5,900	1.6
LVWPS-MW206B	6/26/2018	N	440-214475-5	5.930	0	31.02	2.3	18	<0.00025	130	160	<2.4	<1.4	5,900	1.5
LVWPS-MW206C	6/26/2018	N	440-214492-1	4.840	0	44.97	19.3	3.8	<0.00025	120	150	<2.4	<1.4	4,500	0.68 J
LVWPS-MW207	6/25/2018	N	440-214375-2	5.370	0	31.5	0	15	<0.00025	140	180	<2.4	<1.4	5,200	1.9
LVWPS-MW208A	6/28/2018	N	440-214604-1	5.764	0	26.29	7.49	13	<0.00025	110	130	<2.4	<1.4	4,300	0.97 J
LVWPS-MW208A	6/28/2018	FD	440-214604-2	--	--	--	--	13	<0.00025	110	130	<2.4	<1.4	4,400	0.95 J
LVWPS-MW208B	6/28/2018	N	440-214604-3	6.390	0	28.5	175	15	<0.00025	92	110	<2.4	<1.4	4,700	1.3
LVWPS-MW209	6/28/2018	N	440-214604-8	6.110	0	28.53	8.9	19	<0.00025	130	160	<2.4	<1.4	5,600	1.6
LVWPS-MW210A	6/27/2018	N	440-214521-1	5.610	0	24.72	0	17	<0.00025	140	170	<2.4	<1.4	5,000	1.6
LVWPS-MW210A	6/27/2018	FD	440-214521-2	--	--	--	--	16	<0.00025	140	170	<2.4	<1.4	4,900	1.6
LVWPS-MW210B	6/27/2018	N	440-214521-3	6.320	0	25.27	0	19	<0.00025	150	180	<2.4	<1.4	5,600	1.6
LVWPS-MW210C	6/27/2018	N	440-214521-4	6.450	0	29.09	145	7.5	<0.00025	140	170	<2.4	<1.4	6,200	0.77 J
LVWPS-MW211	6/27/2018	N	440-214521-7	5.370	0	29.84	0	15	<0.00025	110	130	<2.4	<1.4	5,100	1.2
LVWPS-MW212A	6/27/2018	N	440-214521-5	2.760	0	26.97	9.7	7.0	<0.00025	83	100	<2.4	<1.4	2,200	<0.65
LVWPS-MW212B	6/27/2018	N	440-214521-6	2.300	0	30.12	69.7	6.5	<0.00025	78	95	<2.4	<1.4	1,900	<0.65
LVWPS-MW213	6/28/2018	N	440-214604-7	3.760	0	27.23	18.3	2.6	<0.00025	87	110	<2.4	<1.4	3,200	<0.65
LVWPS-MW214	6/28/2018	N	440-214604-4	5.460	0	24.97	0.2	15	<0.00025	110	130	<2.4	<1.4	4,600	1.2
LVWPS-MW215A	6/27/2018	N	440-214521-9	5.612	0	26.33	4.3	14	<0.00025	140	170	<2.4	<1.4	4,300	1.6
LVWPS-MW215B	6/27/2018	N	440-214521-10	5.460	0	29.41	16.95	2.8	<0.00025	160	190	<2.4	<1.4	3,900	1.4
LVWPS-MW216	6/28/2018	N	440-214604-5	5.890	0	28.35	335	4.3	<0.00025	170	200	<2.4	<1.4	4,600	0.84 J
WMW4.9S	6/26/2018	N	440-214476-2	2.840	0	24.55	0	9.6	<0.00025	190	230	<2.4	<1.4	2,300	1.9

Notes

ug/L	micrograms per liter	SU	Standard Units
mg/L	milligrams per liter	mS/cm	milliSiemens per centimeter
mV	milliVolts	C	degrees Celsius
FD	Field duplicate	NTU	Nephelometric Turbidity Unit
N	Normal field sample		

< The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J- The result is an estimated quantity, but the result may be biased low.

J+ The result is an estimated quantity, but the result may be biased high.

J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table 5
Groundwater Analytical Results - Transect 1B Area
 Las Vegas Wash Pilot Study

Location	Sample Date	QCType	Lab SampleID	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B
				Aluminum	Barium	Beryllium	Boron	Cadmium	Calcium	Chromium
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-MW201A	6/26/2018	N	440-214475-1	<0.050	0.015	<0.0010	1.4	<0.0025	370	0.013
LVWPS-MW201A	6/26/2018	FD	440-214475-2	<0.050	0.016	<0.0010	1.6	<0.0025	400	0.014
LVWPS-MW201B	6/26/2018	N	440-214475-3	<0.50	0.026	<0.0010	1.2	<0.0025	500	0.058 J+
LVWPS-MW202	6/25/2018	N	440-214375-1	0.085 J	0.017	<0.0010	1.2	<0.0025	290	0.0073 J+
LVWPS-MW203A	6/25/2018	N	440-214375-3	0.098 J	0.015	<0.0010	0.60	<0.0025	160	0.0028 J
LVWPS-MW203B	6/25/2018	N	440-214375-4	0.074 J	0.017	<0.0010	1.4	<0.0025	430	0.028 J+
LVWPS-MW203C	6/29/2018	N	440-214733-1	<0.50	<0.050	<0.010	6.0	<0.025	510	<0.025
LVWPS-MW204	6/25/2018	N	440-214376-1	0.090 J	0.015	<0.0010	0.80	<0.0025	210	0.0033 J
LVWPS-MW205B	6/26/2018	N	440-214476-1	<0.050	0.021	<0.0010	1.3	<0.0025	330	0.0055
LVWPS-MW205C	6/26/2018	N	440-214476-4	<0.050	0.020	<0.0010	1.0	<0.0025	280	<0.0025
LVWPS-MW206A	6/26/2018	N	440-214475-4	<0.50	0.024	<0.0010	1.9	<0.0025	590	0.037 J
LVWPS-MW206B	6/26/2018	N	440-214475-5	<0.50	0.025	<0.0010	2.0	<0.0025	630	0.037 J
LVWPS-MW206C	6/26/2018	N	440-214492-1	<0.050	0.016	<0.0010	1.4	<0.0025	330	0.025
LVWPS-MW207	6/25/2018	N	440-214375-2	0.063 J	0.025	<0.0010	1.8	<0.0025	530	0.023 J+
LVWPS-MW208A	6/28/2018	N	440-214604-1	<0.050	0.015	<0.0010	1.9	<0.0025	390	0.012
LVWPS-MW208A	6/28/2018	FD	440-214604-2	<0.050	0.014	<0.0010	1.9	<0.0025	400	0.012
LVWPS-MW208B	6/28/2018	N	440-214604-3	0.11	0.020	<0.0010	1.9	<0.0025	470	0.016
LVWPS-MW209	6/28/2018	N	440-214604-8	<0.050	0.016	<0.0010	1.6	<0.0025	490	0.026
LVWPS-MW210A	6/27/2018	N	440-214521-1	<0.050	0.022	<0.0010	1.6 J	<0.0025	500 J	0.023 J
LVWPS-MW210A	6/27/2018	FD	440-214521-2	<0.050	0.021	<0.0010	1.6	<0.0025	500	0.023
LVWPS-MW210B	6/27/2018	N	440-214521-3	<0.050	0.016	<0.0010	1.8	<0.0025	530	0.029
LVWPS-MW210C	6/27/2018	N	440-214521-4	<0.050	0.013	<0.0010	1.3	<0.0025	530	0.030
LVWPS-MW211	6/27/2018	N	440-214521-7	<0.050	0.019	<0.0010	1.9	<0.0025	440	0.014
LVWPS-MW212A	6/27/2018	N	440-214521-5	<0.050	0.014	<0.0010	1.5	<0.0025	220	0.018
LVWPS-MW212B	6/27/2018	N	440-214521-6	<0.050	0.021	<0.0010	1.2	<0.0025	170	0.019
LVWPS-MW213	6/28/2018	N	440-214604-7	<0.050	0.014	<0.0010	1.8	<0.0025	300	0.011
LVWPS-MW214	6/28/2018	N	440-214604-4	<0.050	0.016	<0.0010	1.7	<0.0025	430	0.019
LVWPS-MW215A	6/27/2018	N	440-214521-9	<0.050	0.018	<0.0010	1.4	<0.0025	400	0.016
LVWPS-MW215B	6/27/2018	N	440-214521-10	<0.050	0.020	<0.0010	1.3	<0.0025	310	<0.0025
LVWPS-MW216	6/28/2018	N	440-214604-5	<0.050	0.026	<0.0010	1.8	<0.0025	420	<0.0025
WMW4.9S	6/26/2018	N	440-214476-2	<0.050	0.021	<0.0010	0.58	<0.0025	210	<0.0025

Notes

ug/L	micrograms per liter	SU	Standard Units
mg/L	milligrams per liter	mS/cm	milliSiemens per centimeter
mV	milliVolts	C	degrees Celsius
FD	Field duplicate	NTU	Nephelometric Turbidity Unit
N	Normal field sample		
<	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.		
J-	The result is an estimated quantity, but the result may be biased low.		
J+	The result is an estimated quantity, but the result may be biased high.		
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.		
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.		

Table 5
Groundwater Analytical Results - Transect 1B Area
 Las Vegas Wash Pilot Study

Location	Sample Date	QCType	Lab SampleID	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Total Metals by SW6010B	Dissolved Metals by SW6010B
				Cobalt	Copper	Iron	Lead	Magnesium	Manganese	Manganese
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-MW201A	6/26/2018	N	440-214475-1	<0.0050	<0.0050	<0.050	<0.0038	130	<0.015	<0.015
LVWPS-MW201A	6/26/2018	FD	440-214475-2	<0.0050	<0.0050	<0.050	<0.0038	140	<0.015	<0.015
LVWPS-MW201B	6/26/2018	N	440-214475-3	<0.0050	0.0064 J	<0.050	<0.0038	420	<0.015	<0.015
LVWPS-MW202	6/25/2018	N	440-214375-1	<0.0050	<0.0050	<0.050	<0.0038	110	0.57	0.64
LVWPS-MW203A	6/25/2018	N	440-214375-3	<0.0050	<0.0050	<0.050	<0.0038	69	1.5	1.6
LVWPS-MW203B	6/25/2018	N	440-214375-4	<0.0050	<0.0050	<0.050	<0.0038	270	0.32	0.32
LVWPS-MW203C	6/29/2018	N	440-214733-1	<0.050	<0.050	<0.50	<0.038	2,300	2.1	1.8
LVWPS-MW204	6/25/2018	N	440-214376-1	<0.0050	<0.0050	<0.050	<0.0038	89	0.79	1.0
LVWPS-MW205B	6/26/2018	N	440-214476-1	<0.0050	<0.0050	<0.050	<0.0038	130	0.27	0.28
LVWPS-MW205C	6/26/2018	N	440-214476-4	<0.0050	<0.0050	<0.050	<0.0038	120	0.29	0.30
LVWPS-MW206A	6/26/2018	N	440-214475-4	<0.0050	0.0062 J	<0.050	<0.0038	230	0.21	<0.015
LVWPS-MW206B	6/26/2018	N	440-214475-5	<0.0050	0.0064 J	<0.050	<0.0038	210	0.021	0.021
LVWPS-MW206C	6/26/2018	N	440-214492-1	<0.0050	<0.0050	<0.050	<0.0038	200	0.38	0.35
LVWPS-MW207	6/25/2018	N	440-214375-2	<0.0050	<0.0050	<0.050	<0.0038	190	<0.015	<0.015
LVWPS-MW208A	6/28/2018	N	440-214604-1	<0.0050	<0.0050	<0.050	<0.0038	150	<0.015	<0.015
LVWPS-MW208A	6/28/2018	FD	440-214604-2	<0.0050	<0.0050	<0.050	<0.0038	160	<0.015	<0.015
LVWPS-MW208B	6/28/2018	N	440-214604-3	<0.0050	<0.0050	0.10	<0.0038	190	0.041	0.020
LVWPS-MW209	6/28/2018	N	440-214604-8	<0.0050	<0.0050	<0.050	<0.0038	180	<0.015	<0.015
LVWPS-MW210A	6/27/2018	N	440-214521-1	<0.0050	<0.0050	<0.050	<0.0038	180 J	<0.015	<0.015
LVWPS-MW210A	6/27/2018	FD	440-214521-2	<0.0050	<0.0050	<0.050	<0.0038	180	<0.015	<0.015
LVWPS-MW210B	6/27/2018	N	440-214521-3	<0.0050	<0.0050	<0.050	<0.0038	200	<0.015	<0.015
LVWPS-MW210C	6/27/2018	N	440-214521-4	<0.0050	<0.0050	<0.050	<0.0038	290	0.83	0.74
LVWPS-MW211	6/27/2018	N	440-214521-7	<0.0050	0.10	<0.050	<0.0038	190	0.078	0.076
LVWPS-MW212A	6/27/2018	N	440-214521-5	<0.0050	<0.0050	<0.050	<0.0038	73	<0.015	<0.015
LVWPS-MW212B	6/27/2018	N	440-214521-6	<0.0050	<0.0050	<0.050	<0.0038	54	0.11	0.085
LVWPS-MW213	6/28/2018	N	440-214604-7	<0.0050	<0.0050	<0.050	<0.0038	92	0.034	0.020
LVWPS-MW214	6/28/2018	N	440-214604-4	<0.0050	<0.0050	<0.050	<0.0038	160	<0.015	<0.015
LVWPS-MW215A	6/27/2018	N	440-214521-9	<0.0050	<0.0050	<0.050	<0.0038	150	<0.015	<0.015
LVWPS-MW215B	6/27/2018	N	440-214521-10	<0.0050	<0.0050	0.11	<0.0038	180	0.28	0.24
LVWPS-MW216	6/28/2018	N	440-214604-5	<0.0050	<0.0050	<0.050	<0.0038	160	0.45	0.30
WMW4.9S	6/26/2018	N	440-214476-2	<0.0050	<0.0050	<0.050	<0.0038	86	<0.015	<0.015

Notes

ug/L	micrograms per liter	SU	Standard Units
mg/L	milligrams per liter	mS/cm	milliSiemens per centimeter
mV	milliVolts	C	degrees Celsius
FD	Field duplicate	NTU	Nephelometric Turbidity Unit
N	Normal field sample		

< The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.

J- The result is an estimated quantity, but the result may be biased low.

J+ The result is an estimated quantity, but the result may be biased high.

J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.

UJ The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.

Table 5
Groundwater Analytical Results - Transect 1B Area
 Las Vegas Wash Pilot Study

Location	Sample Date	QCType	Lab SampleID	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B
				Molybdenum	Nickel	Phosphorus	Potassium	Silicon	Silver	Sodium
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-MW201A	6/26/2018	N	440-214475-1	0.031	0.0059 J	<0.10	56	17	<0.0050	420
LVWPS-MW201A	6/26/2018	FD	440-214475-2	0.033	0.0058 J	<0.10	59	23	<0.0050	440
LVWPS-MW201B	6/26/2018	N	440-214475-3	0.018 J	<0.0050	<0.10	300	20	<0.0050	930
LVWPS-MW202	6/25/2018	N	440-214375-1	0.028	0.0098 J	<0.10	48	17	<0.0050	330
LVWPS-MW203A	6/25/2018	N	440-214375-3	0.011 J	0.012	<0.10	26	10	<0.0050	200
LVWPS-MW203B	6/25/2018	N	440-214375-4	0.066	<0.0050	<0.10	140	36	<0.0050	550
LVWPS-MW203C	6/29/2018	N	440-214733-1	1.3	<0.050	<1.0	1,500	7.4	<0.050	4,400
LVWPS-MW204	6/25/2018	N	440-214376-1	0.015 J	0.010	<0.10	39	13	<0.0050	250
LVWPS-MW205B	6/26/2018	N	440-214476-1	0.025	0.010	<0.10	52	17 J-	<0.0050	360
LVWPS-MW205C	6/26/2018	N	440-214476-4	0.023	0.011	<0.10	48	17	<0.0050	320
LVWPS-MW206A	6/26/2018	N	440-214475-4	0.081	0.0062 J	<0.10	110	29	<0.0050	570
LVWPS-MW206B	6/26/2018	N	440-214475-5	0.057	0.0070 J	<0.10	100	28	<0.0050	580
LVWPS-MW206C	6/26/2018	N	440-214492-1	0.055	<0.0050	<0.10	110	35	<0.0050	420
LVWPS-MW207	6/25/2018	N	440-214375-2	0.044	0.014	<0.10	84	26	<0.0050	500
LVWPS-MW208A	6/28/2018	N	440-214604-1	0.10	<0.0050	<0.10	160	27	<0.0050	490
LVWPS-MW208A	6/28/2018	FD	440-214604-2	0.11	<0.0050	<0.10	160	28	<0.0050	510
LVWPS-MW208B	6/28/2018	N	440-214604-3	0.10	<0.0050	<0.10	140	28	<0.0050	560
LVWPS-MW209	6/28/2018	N	440-214604-8	0.074	<0.0050	<0.10	100	25	<0.0050	570
LVWPS-MW210A	6/27/2018	N	440-214521-1	0.054 J	<0.0050	<0.10	86 J	26 J	<0.0050	480 J
LVWPS-MW210A	6/27/2018	FD	440-214521-2	0.054	<0.0050	<0.10	86	26	<0.0050	480
LVWPS-MW210B	6/27/2018	N	440-214521-3	0.080	<0.0050	<0.10	100	28	<0.0050	510
LVWPS-MW210C	6/27/2018	N	440-214521-4	0.033	0.0061 J	<0.10	65	28	<0.0050	450
LVWPS-MW211	6/27/2018	N	440-214521-7	0.10	<0.0050	<0.10	120	27	<0.0050	460
LVWPS-MW212A	6/27/2018	N	440-214521-5	0.032	<0.0050	<0.10	79	30	<0.0050	250
LVWPS-MW212B	6/27/2018	N	440-214521-6	0.028	<0.0050	<0.10	63	28	<0.0050	210
LVWPS-MW213	6/28/2018	N	440-214604-7	0.027	<0.0050	<0.10	58	29	<0.0050	400
LVWPS-MW214	6/28/2018	N	440-214604-4	0.086	<0.0050	<0.10	110	27	<0.0050	520
LVWPS-MW215A	6/27/2018	N	440-214521-9	0.044	0.0069 J	<0.10	68	23	<0.0050	410
LVWPS-MW215B	6/27/2018	N	440-214521-10	0.081	0.0071 J	<0.10	49	24	<0.0050	380
LVWPS-MW216	6/28/2018	N	440-214604-5	0.096	<0.0050	<0.10	76	23	<0.0050	640
WMW4.9S	6/26/2018	N	440-214476-2	0.015 J	0.0056 J	<0.10	38	15	<0.0050	230

Notes

ug/L	micrograms per liter	SU	Standard Units
mg/L	milligrams per liter	mS/cm	milliSiemens per centimeter
mV	milliVolts	C	degrees Celsius
FD	Field duplicate	NTU	Nephelometric Turbidity Unit
N	Normal field sample		
<	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.		
J-	The result is an estimated quantity, but the result may be biased low.		
J+	The result is an estimated quantity, but the result may be biased high.		
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.		
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.		

Table 5
Groundwater Analytical Results - Transect 1B Area
 Las Vegas Wash Pilot Study

Location	Sample Date	QCType	Lab SampleID	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6010B	Dissolved Metals by SW6020
				Strontium	Tin	Titanium	Tungsten	Vanadium	Zinc	Antimony
				mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	ug/L
LVWPS-MW201A	6/26/2018	N	440-214475-1	6.8	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW201A	6/26/2018	FD	440-214475-2	7.3	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW201B	6/26/2018	N	440-214475-3	9.0	<0.050	<0.0025	<0.050	0.013	<0.012	<5.0
LVWPS-MW202	6/25/2018	N	440-214375-1	4.9	<0.050	<0.0025	<0.050	0.0060 J	<0.012	<5.0
LVWPS-MW203A	6/25/2018	N	440-214375-3	2.5	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW203B	6/25/2018	N	440-214375-4	8.8	<0.050	<0.0025	<0.050	0.0081 J	<0.012	<5.0
LVWPS-MW203C	6/29/2018	N	440-214733-1	10	<0.50	<0.025	<0.50	<0.050	<0.12	<5.0
LVWPS-MW204	6/25/2018	N	440-214376-1	3.5	<0.050	<0.0025	<0.050	0.0057 J	<0.012	<5.0
LVWPS-MW205B	6/26/2018	N	440-214476-1	5.8	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW205C	6/26/2018	N	440-214476-4	5.0	<0.050	<0.0025	<0.050	0.0057 J	<0.012	<5.0
LVWPS-MW206A	6/26/2018	N	440-214475-4	12	<0.050	<0.0025	<0.050	0.021	<0.012	<5.0
LVWPS-MW206B	6/26/2018	N	440-214475-5	12	<0.050	<0.0025	<0.050	0.019	<0.012	<5.0
LVWPS-MW206C	6/26/2018	N	440-214492-1	7.7	<0.050	<0.0025	<0.050	0.0091 J	0.048	<5.0
LVWPS-MW207	6/25/2018	N	440-214375-2	9.4	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW208A	6/28/2018	N	440-214604-1	7.9	<0.050	<0.0025	<0.050	0.0074 J	<0.012	<5.0
LVWPS-MW208A	6/28/2018	FD	440-214604-2	8.1	<0.050	<0.0025	<0.050	0.0078 J	<0.012	<5.0
LVWPS-MW208B	6/28/2018	N	440-214604-3	9.6	<0.050	0.0050	<0.050	0.0075 J	<0.012	<5.0
LVWPS-MW209	6/28/2018	N	440-214604-8	9.7	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW210A	6/27/2018	N	440-214521-1	9.4 J	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW210A	6/27/2018	FD	440-214521-2	9.3	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW210B	6/27/2018	N	440-214521-3	10	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW210C	6/27/2018	N	440-214521-4	13	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW211	6/27/2018	N	440-214521-7	9.6	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW212A	6/27/2018	N	440-214521-5	4.7	<0.050	<0.0025	<0.050	0.019	0.030	<5.0
LVWPS-MW212B	6/27/2018	N	440-214521-6	3.3	<0.050	<0.0025	<0.050	0.017	<0.012	<5.0
LVWPS-MW213	6/28/2018	N	440-214604-7	5.8	<0.050	<0.0025	<0.050	0.0083 J	<0.012	<5.0
LVWPS-MW214	6/28/2018	N	440-214604-4	9.0	<0.050	<0.0025	<0.050	0.0064 J	<0.012	<5.0
LVWPS-MW215A	6/27/2018	N	440-214521-9	7.4	<0.050	<0.0025	<0.050	<0.0050	<0.012	0.56 J
LVWPS-MW215B	6/27/2018	N	440-214521-10	8.3	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
LVWPS-MW216	6/28/2018	N	440-214604-5	9.0	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0
WMW4.9S	6/26/2018	N	440-214476-2	3.4	<0.050	<0.0025	<0.050	<0.0050	<0.012	<5.0

Notes

ug/L	micrograms per liter	SU	Standard Units
mg/L	milligrams per liter	mS/cm	milliSiemens per centimeter
mV	milliVolts	C	degrees Celsius
FD	Field duplicate	NTU	Nephelometric Turbidity Unit
N	Normal field sample		
<	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.		
J-	The result is an estimated quantity, but the result may be biased low.		
J+	The result is an estimated quantity, but the result may be biased high.		
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.		
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.		

Table 5
Groundwater Analytical Results - Transect 1B Area
 Las Vegas Wash Pilot Study

Location	Sample Date	QCType	Lab SampleID	Dissolved Metals by SW6020			Volatile Fatty Acids					
				Arsenic	Selenium	Thallium	Acetic Acid	Butyric Acid	Formic Acid	Lactic Acid	Propionic Acid	Pyruvic Acid
				ug/L	ug/L	ug/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
LWVPS-MW201A	6/26/2018	N	440-214475-1	29	18 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW201A	6/26/2018	FD	440-214475-2	29	18 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW201B	6/26/2018	N	440-214475-3	34	29	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW202	6/25/2018	N	440-214375-1	26	13 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW203A	6/25/2018	N	440-214375-3	21	7.4 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW203B	6/25/2018	N	440-214375-4	48	9.1 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW203C	6/29/2018	N	440-214733-1	7.6 J	12 J	<5.0	<1.5 UJ	<1.3	<1.3	<1.6 UJ	<1.8 UJ	<37
LWVPS-MW204	6/25/2018	N	440-214376-1	46	<5.0	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9 UJ
LWVPS-MW205B	6/26/2018	N	440-214476-1	27	12 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9 UJ
LWVPS-MW205C	6/26/2018	N	440-214476-4	25	7.7 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW206A	6/26/2018	N	440-214475-4	24	<5.0	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW206B	6/26/2018	N	440-214475-5	34	23	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW206C	6/26/2018	N	440-214492-1	51	7.8 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW207	6/25/2018	N	440-214375-2	29	24	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW208A	6/28/2018	N	440-214604-1	50	9.0 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW208A	6/28/2018	FD	440-214604-2	48	13 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW208B	6/28/2018	N	440-214604-3	48	5.8 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW209	6/28/2018	N	440-214604-8	34	18 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW210A	6/27/2018	N	440-214521-1	33	22	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW210A	6/27/2018	FD	440-214521-2	34	21	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW210B	6/27/2018	N	440-214521-3	36	23	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW210C	6/27/2018	N	440-214521-4	30	13 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW211	6/27/2018	N	440-214521-7	40	9.6 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW212A	6/27/2018	N	440-214521-5	52	6.1 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW212B	6/27/2018	N	440-214521-6	46	5.0 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW213	6/28/2018	N	440-214604-7	39	6.9 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW214	6/28/2018	N	440-214604-4	40	6.2 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9 UJ
LWVPS-MW215A	6/27/2018	N	440-214521-9	34	18	0.52 J	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9 UJ
LWVPS-MW215B	6/27/2018	N	440-214521-10	30	6.0 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
LWVPS-MW216	6/28/2018	N	440-214604-5	50	8.3 J	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9
WMW4.9S	6/26/2018	N	440-214476-2	23	<5.0	<5.0	<1.5	<1.3	<1.3	<1.6	<1.8	<1.9

Notes

ug/L	micrograms per liter	SU	Standard Units
mg/L	milligrams per liter	mS/cm	milliSiemens per centimeter
mV	milliVolts	C	degrees Celsius
FD	Field duplicate	NTU	Nephelometric Turbidity Unit
N	Normal field sample		
<	The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.		
J-	The result is an estimated quantity, but the result may be biased low.		
J+	The result is an estimated quantity, but the result may be biased high.		
J	The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.		
UJ	The analyte was analyzed for, but was not detected. The reported quantitation limit is approximate and may be inaccurate or imprecise.		

Table 6
Geotechnical Analysis of Shelby Tube Samples - Transect 1B Area
 Las Vegas Wash Pilot Study

Location	Sample Date	Depth ft bgs	ASTM D854	ASTM D2216	ASTM D2937	API RP40	ASTM D6913					
			Specific Gravity	Moisture Content %	Bulk Density (dry) lbs/ft ³	Total Porosity %	Sieve Analysis					
							Gravel		Sand			% Fines
						% Coarse	% Fine	% Coarse	% Medium	% Fine		
LWVPS-MW202	5/22/2018	35	2.598	10.2	75.0	53.6	0	34	20	22	16	8
LWVPS-MW202	5/22/2018	65	2.609	53.8	69.2	57.4	0	10	15	16	18	41
LWVPS-MW206C	5/24/2018	47	2.639	12.3	---	---	0	9	16	23	36	16
LWVPS-MW206C	5/24/2018	105	2.633	58.5	62.6	61.9	0	7	4	11	35	43
LWVPS-MW209	6/1/2018	40	2.661	17.3	116.8	29.6	0	20	13	43	19	5

Notes

- ft feet
- bgs below ground surface
- % percent
- lbs/ft³ pounds per cubic foot
- Not analyzed; Material was too loose to obtain in-situ density.