

# TECHNICAL MEMORANDUM

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**To:** Nevada Environmental Response Trust

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

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**From:** Dana Grady

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**Date:** October 4, 2021

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**Subject:** Las Vegas Wash Bioremediation Pilot Study Monthly Progress Report

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At the direction of the Nevada Environmental Response Trust (NERT or Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this memorandum to summarize Tetra Tech's progress during August 2021 toward successfully implementing the Las Vegas Wash Bioremediation Pilot Study.

## Task Progress Update: August 2021

### Task M19 – Las Vegas Wash Pilot Study

- Current Status
  - Injections – The first injection event was completed in December 2020 and included injections into all three pilot study zones (Zones 1, 2, and 3) within the alluvium and/or Upper Muddy Creek formation (UMCf). The second injection event was performed from April 12, 2021 to April 21, 2021 and included injections into only the Zone 2 alluvium. A summary of the first and second injection events was provided in the January 2021 and April 2021 monthly progress reports, respectively. The final injection event is anticipated to occur in October 2021, with the exact timing determined based on future effectiveness monitoring results. A layout map and construction details of all injection, monitoring, and extraction wells are provided on Figures 1 through 4 and Table 1.
  - Effectiveness Monitoring – Baseline groundwater sampling was completed in the fall of 2020 prior to the first injection event. The monitoring program described in the NDEP-approved Las Vegas Wash Bioremediation Pilot Study Work Plan Addendum (referred to as Work Plan Addendum) was subsequently implemented to evaluate the effectiveness of in-situ bioremediation. As part of this monitoring program, groundwater sampling was conducted on a biweekly basis for the Zone 2 alluvium for the first two months post-injection and followed by a monthly sampling program thereafter, which is ongoing. Groundwater sampling for the UMCf and UMCf-coarse grained (UMCf-cg) in Zones 1, 2, and 3 has been conducted monthly over the first four months following the first injection event. In accordance with the Work Plan Addendum, groundwater sampling frequencies in the UMCf and UMCf-cg were reduced to a bimonthly basis approximately four

months after the first injection event (beginning in May 2021) due to the slower groundwater flow rates present in the UMCf/UMCf-cg. Bimonthly sampling will continue until the next injection event into the UMCf/UMCf-cg in Zones 1, 2, and 3, at which time monthly sampling will resume.

Available groundwater analytical results from the baseline sampling event and subsequent effectiveness monitoring events performed from December 2020 to July 2021 are provided on Table 2. The July 2021 groundwater results from key cross-gradient and downgradient monitoring wells located within Zone 2 are summarized below. Zones 1, 2, and 3 UMCf/UMCf-cg results are not discussed in this monthly progress report because the UMCf/UMCf-cg was not sampled in July 2021 due to the transition to bimonthly sampling for the UMCf/UMCf-cg. Groundwater analytical results from the most recent sampling event performed August 9, 2021 through August 13, 2021, which included sampling from all zones and lithology, will be provided in future monthly progress reports as the data are received from the laboratory.

- Zone 2 Alluvium:
  - Groundwater samples collected from cross-gradient monitoring wells LVWPS-A2-MW04A/B and LVWPS-A2-MW05A/B, which are located approximately 17 feet from each end of the Zone 2 injection well transect, continue to exhibit perchlorate concentration decreases ranging from 42 percent to greater than 99 percent reduction when compared to baseline concentrations. Groundwater samples collected from LVWPS-A2-MW05B exhibited perchlorate concentrations below the detection limit of 0.31 µg/L during the July 2021 sampling event.
  - Groundwater samples collected from the 14 monitoring wells located approximately 50 to 100 feet downgradient from the injection well transect exhibited an overall average percentage decrease in groundwater perchlorate concentrations (compared to baseline concentrations) of 63 percent during the July 2021 sampling event. This sampling event also continued to indicate better overall perchlorate reductions than those observed following the first injection event. Groundwater samples collected from nine of these 14 monitoring wells exhibit perchlorate concentration reductions of greater than 75 percent when compared to baseline, with six of these nine wells exhibiting groundwater perchlorate concentration decreases of greater than 90 percent.
  - Groundwater samples collected in July 2021 from monitoring wells LVWPS-MW208B and LVWPS-MW223B, which are located approximately 200-250 feet downgradient from the injection well transect, exhibited perchlorate concentration decreases of 62 percent and 79 percent, respectively, when compared to baseline concentrations.
  - Chlorate results followed a similar pattern to perchlorate results for samples collected in July 2021. Specifically, groundwater samples collected from two of the four cross-gradient monitoring wells (LVWPS-A2-MW04B and LVWPS-A2-MW05B) continued to show decreases in chlorate concentrations of greater than 98 percent compared to baseline. Groundwater samples collected from eight of the 18 monitoring wells located between 50 and 250 feet downgradient from the injection well transect exhibited reductions in chlorate concentrations of greater than 75 percent.
  - Nitrate concentrations in groundwater were also evaluated because it is often a competing and preferred electron acceptor and carbon substrate consumer. Nitrate concentrations in groundwater samples collected from Zone 2 alluvium monitoring wells averaged 17 milligrams per liter (mg/L) during the baseline sampling event. Groundwater samples collected from cross-gradient and

downgradient monitoring wells during the July 2021 sampling event indicate nitrate concentrations were reduced by an average of 59 percent compared to baseline conditions. During the July 2021 sampling event, groundwater samples collected from 15 of the 22 cross-gradient or downgradient monitoring wells exhibited nitrate concentrations of less than 10 mg/L. Groundwater samples collected from seven of these 22 monitoring wells exhibited nitrate concentrations of less than 1 mg/L.

- Surface water sampling in the Las Vegas Wash was performed prior to injection activities on October 16, 2020 and October 29, 2020. Nine surface water sampling events have been performed on a monthly basis since December 2020 (including during the December 2020 injections and on a monthly basis after injections through August 2021). Although limited surface water sampling will be periodically conducted downgradient from the study area, reducing perchlorate concentrations in surface water is not an objective of this pilot study. As of the July 2021 surface water sampling event, no significant change in perchlorate concentrations in surface water has been observed. Noteworthy surface water results related to the pilot study will be summarized in future monthly progress reports as warranted.
- Periodic Aquifer Testing – Slug testing of select monitoring wells within each remediation zone began on June 28, 2021 and concluded on July 9, 2021. Slug test results indicate that downgradient monitoring wells show no significant change in hydraulic conductivity since baseline.
- Access and Permitting
  - All access agreements and permits are in place for all pilot study activities.
- Schedule and Progress Updates
  - The next monthly effectiveness monitoring event is scheduled for the week of September 13<sup>th</sup> and will include sampling of Zone 2 alluvium only. As previously noted, the effectiveness monitoring program associated with Zones 1, 2, and 3 UMCf and UMCf-cg transitioned to a bimonthly frequency following the April 2021 sampling event and will continue on a bimonthly basis until the second injection event is performed in the UMCf/UMCf-cg. As a result, groundwater sampling of the UMCf/UMCf-cg will not be performed in September 2021.
  - The third injection event is tentatively planned for October 2021. The exact timing of the injection event will be determined based on results from the on-going effectiveness monitoring program.
  - Microbial sampling is planned for the third quarter of 2021 prior to the third injection event.
- Health and Safety
  - There were no safety incidents related to Task M19 during August 2021.

## CERTIFICATION

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### 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:** Jay A Steinberg Not Individually, but Solely  
as President of the Trustee \_\_\_\_\_, not individually,  
but solely in his representative capacity as President of the Nevada Environmental Response Trust Trustee

**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:** 10/4/21

## CERTIFICATION

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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.



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**David S. Wilson, CEM**  
Principal Engineer  
Tetra Tech, Inc.

October 4, 2021

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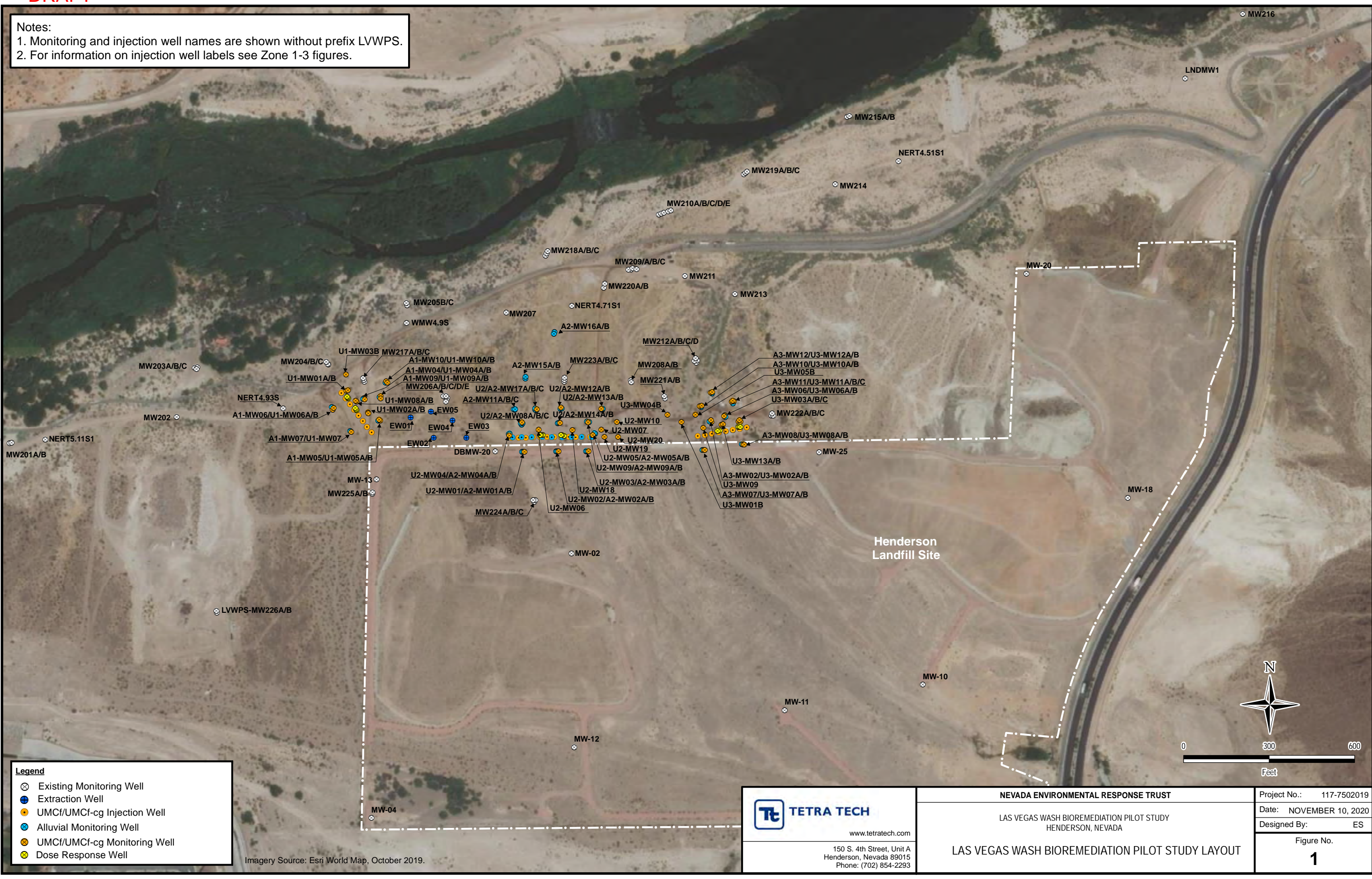
Date

Nevada CEM Certificate Number: 2385  
Nevada CEM Expiration Date: September 19, 2022

## Figures

Notes:  
 1. Monitoring and injection well names are shown without prefix LVWPS.  
 2. For information on injection well labels see Zone 1-3 figures.

C:\USERS\ELLYN.SWENSON\LVW MONITORING WELL INSTALLATION FIGURES\B04 GROUNDWATER CONTOUR SIZE OVERVIEW\_11102020.MXD



**Legend**

- ⊗ Existing Monitoring Well
- ⊕ Extraction Well
- UMCf/UMCf-cg Injection Well
- ⊖ Alluvial Monitoring Well
- ⊙ UMCf/UMCf-cg Monitoring Well
- Dose Response Well

Imagery Source: Esri World Map, October 2019.

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**NEVADA ENVIRONMENTAL RESPONSE TRUST**  
 LAS VEGAS WASH BIOREMEDIATION PILOT STUDY  
 HENDERSON, NEVADA  
**LAS VEGAS WASH BIOREMEDIATION PILOT STUDY LAYOUT**

Project No.:	117-7502019
Date:	NOVEMBER 10, 2020
Designed By:	ES
Figure No.	<b>1</b>

- Legend**
- ⊕ Extraction Well
  - ⊙ Dual-Nested UMCf Injection Well
  - ⊗ Alluvial Monitoring Well
  - ⊗ UMCf Monitoring Well
  - ⊗ UMCf (Semi-consolidated) Monitoring Well
  - ⊗ Dose Response Well



Note:  
Monitoring and injection well names are shown without prefix LVWPS.



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NEVADA ENVIRONMENTAL RESPONSE TRUST

LAS VEGAS WASH BIOREMEDIATION PILOT STUDY  
HENDERSON, NEVADA

WELL LAYOUT FOR ZONE 1 STUDY AREA

PROJECT NO.: 117-7502019

DATE: NOVEMBER 10, 2020

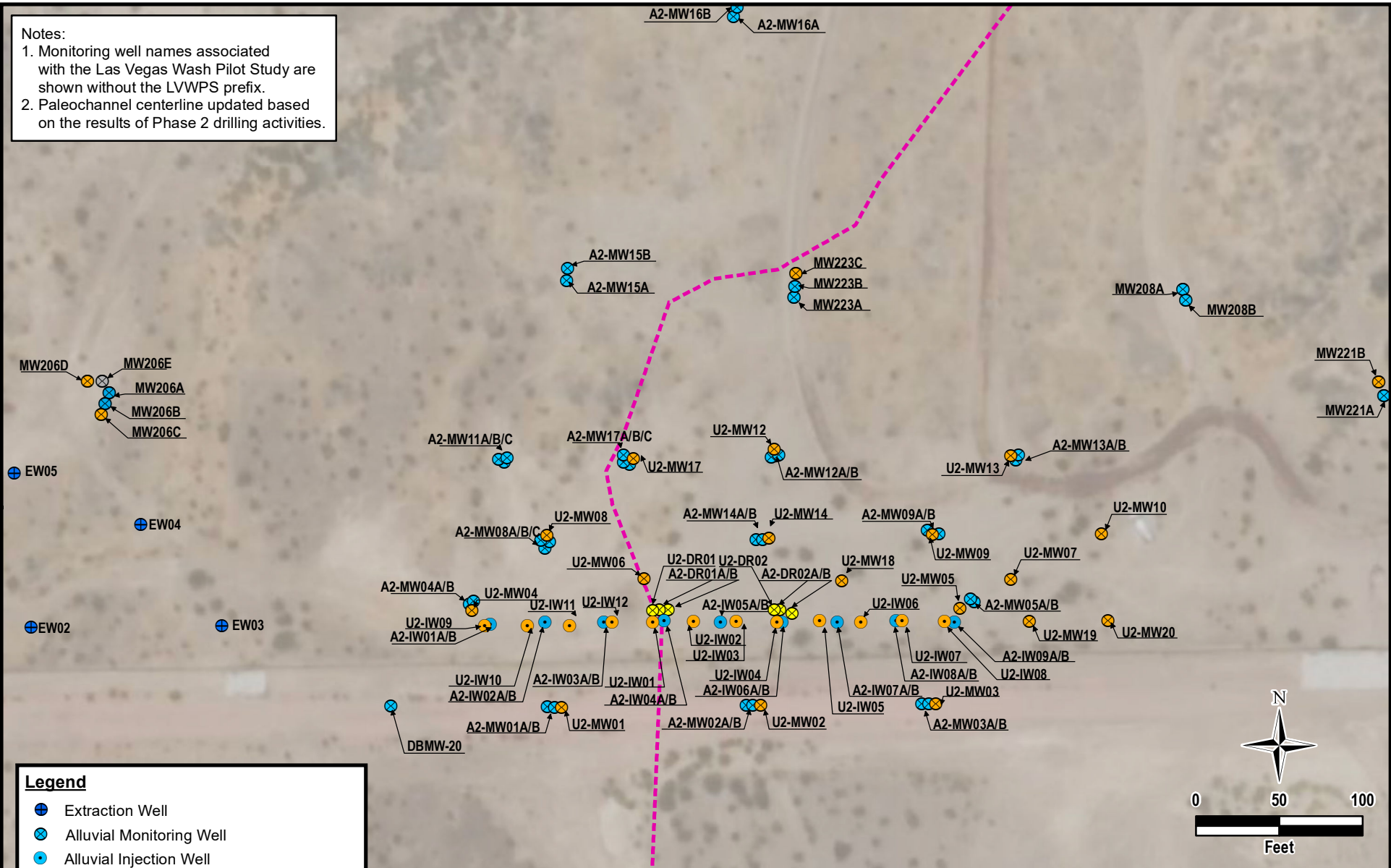
DESIGNED BY: ES

Figure No.

2



Notes:  
 1. Monitoring well names associated with the Las Vegas Wash Pilot Study are shown without the LVWPS prefix.  
 2. Paleochannel centerline updated based on the results of Phase 2 drilling activities.



**Legend**

- ⊕ Extraction Well
- ⊗ Alluvial Monitoring Well
- ⊙ Alluvial Injection Well
- ⊗ UMCf Monitoring Well
- ⊗ UMCf (semi-consolidated) Monitoring Well
- ⊙ UMCf Injection Well
- ⊗ Dose-Response Well
- Paleochannel Centerline

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**NEVADA ENVIRONMENTAL RESPONSE TRUST**  
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 HENDERSON, NEVADA

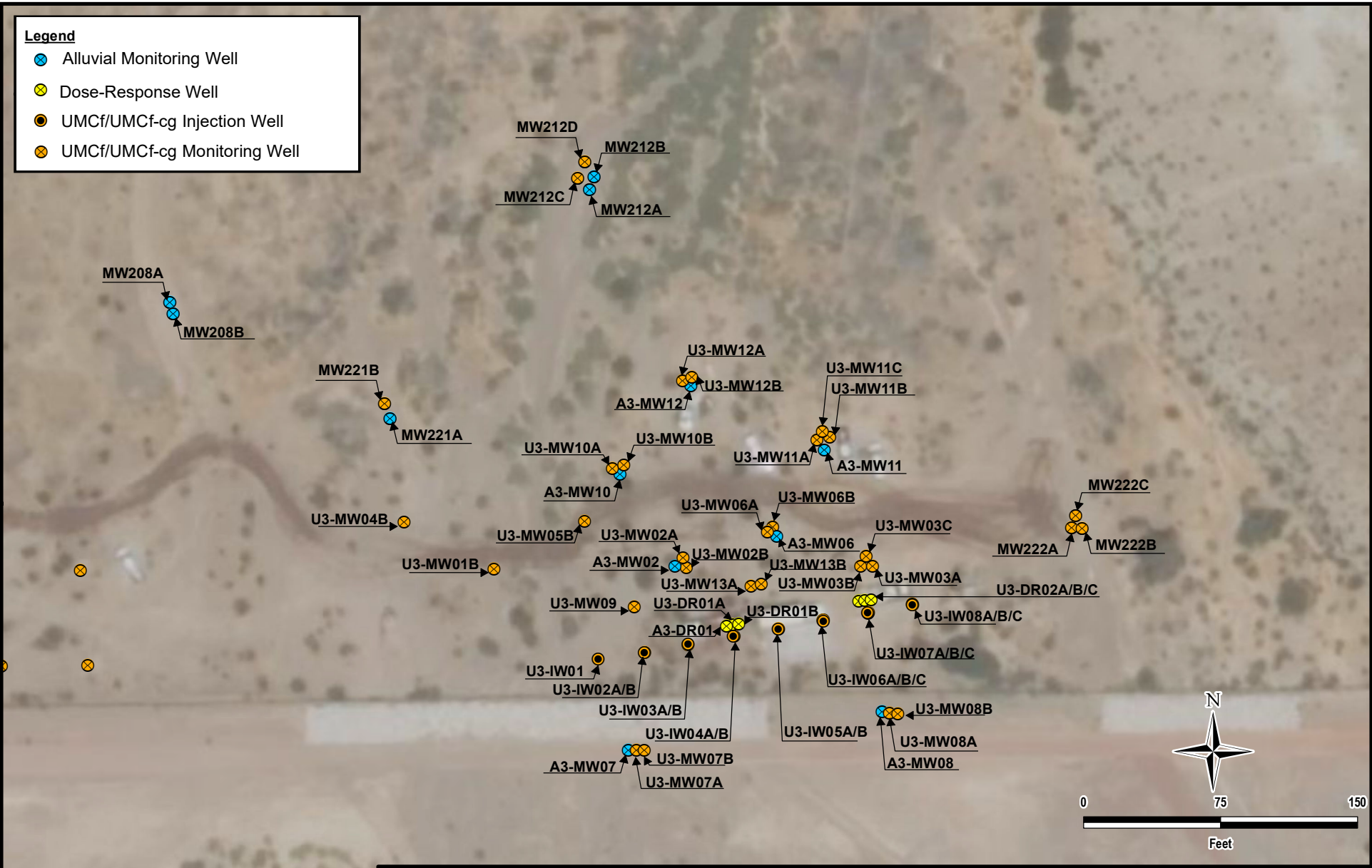
**WELL LAYOUT FOR ZONE 2 STUDY AREA**

PROJECT NO.:	117-7502019
DATE:	APRIL 7, 2021
DESIGNED BY:	ES
Figure No.	<b>3</b>

C:\Users\JENNIFER\JACOBS\Desktop\Zone2\_FieldSurveyLocations.mxd

**Legend**

-  Alluvial Monitoring Well
-  Dose-Response Well
-  UMCf/UMCf-cg Injection Well
-  UMCf/UMCf-cg Monitoring Well



Notes:  
 1. Monitoring and injection well names are shown without prefix LVWPS.



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NEVADA ENVIRONMENTAL RESPONSE TRUST  
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 HENDERSON, NEVADA  
**WELL LAYOUT FOR ZONE 3 STUDY AREA**

PROJECT NO.:	117-7502019
DATE:	MARCH 30, 2021
DESIGNED BY:	ES
Figure No.	<b>4</b>

## Tables







**Table 1**  
**Phase 2 Well Construction Details**  
 Las Vegas Wash Bioremediation Pilot Study

Well ID	Screened Lithology	Northing	Easting	Ground Surface Elevation	Top of Casing Elevation	Depth to Water <sup>1</sup>	Construction Type	Construction Material	Slot Size	Filter Pack Gradation	Borehole Diameter	Borehole Total Depth	Well Diameter	Nominal Screen Length	Well Total Depth	Bottom of Screen	Top of Screen	
				feet amsl	feet amsl	feet bTOC			inches		inches	feet bgs	inches	feet	feet bgs	feet bgs	feet bgs	
LWVPS-U3-MW03B	UMCf-cg	26734944.11	839576.72	1522.86	1522.49	30.68	Single	Schedule 80 PVC	0.010	#2/16	8	179.0	4	25	176.2	175.7	151.1	
LWVPS-U3-MW03C	UMCf-cg	26734949.67	839579.79	1522.47	1522.21	30.32	Single	Schedule 40 PVC	0.010	#2/16	6	143.5	2	25	143	142.5	117.8	
LWVPS-U3-MW04B	UMCf-cg	26734968.11	839326.96	1522.25	1521.92	30.36	Single	Schedule 80 PVC	0.010	#2/16	8	102.5	4	20	98.2	97.7	78.2	
LWVPS-U3-MW05B	UMCf-cg	26734968.70	839425.48	1522.17	1521.98	30.50	Single	Schedule 80 PVC	0.010	#2/16	8	112.5	4	20	105.2	104.7	85.2	
LWVPS-U3-MW06A	UMCf-cg	26734962.99	839525.84	1522.04	1521.91	30.10	Single	Schedule 40 PVC	0.010	#2/16	6	116.5	2	25	115.5	115	90.3	
LWVPS-U3-MW06B	UMCf-cg	26734965.59	839528.63	1522.18	1521.92	30.20	Single	Schedule 80 PVC	0.010	#2/16	8	152.5	4	25	150.4	149.9	125.3	
LWVPS-U3-MW07A	UMCf-cg	26734843.54	839454.21	1525.21	1524.95	32.40	Single	Schedule 40 PVC	0.010	#2/16	6	100	2	15	98	97.5	82.8	
LWVPS-U3-MW07B	UMCf-cg	26734843.26	839458.27	1525.26	1524.93	32.87	Single	Schedule 40 PVC	0.010	#2/16	6	126	2	20	125	124.5	104.8	
LWVPS-U3-MW08A	UMCf-cg	26734863.82	839592.64	1525.64	1525.45	33.40	Single	Schedule 40 PVC	0.010	#2/16	6	145	2	25	143	142.5	117.8	
LWVPS-U3-MW08B	UMCf-cg	26734863.16	839597.03	1525.70	1525.28	33.21	Single	Schedule 80 PVC	0.010	#2/16	6	175	2	25	174.5	174	149.3	
LWVPS-U3-MW09	UMCf-cg	26734922.06	839452.86	1522.74	1525.38	34.00	Single	Schedule 40 PVC	0.010	#2/16	6	115.0	2	25	108	107.5	82.8	
LWVPS-U3-MW10A	UMCf-cg	26734997.78	839440.95	1521.78	1521.47	30.09	Single	Schedule 40 PVC	0.010	#2/16	6	97.0	2	10	95.5	95	85.3	
LWVPS-U3-MW10B	UMCf-cg	26734999.52	839447.11	1521.68	1521.55	30.14	Single	Schedule 40 PVC	0.010	#2/16	6	130.0	2	20	121.5	121	101.3	
LWVPS-U3-MW11A	UMCf-cg	26735013.48	839552.91	1521.42	1521.39	29.79	Single	Schedule 40 PVC	0.010	#2/16	6	107.5	2	20	106.5	106	86.3	
LWVPS-U3-MW11B	UMCf-cg	26735014.90	839559.83	1521.28	1521.35	29.91	Single	Schedule 40 PVC	0.010	#2/16	6	138.0	2	25	137.5	137	112.3	
LWVPS-U3-MW11C	UMCf-cg	26735017.93	839555.86	1521.33	1521.20	29.83	Single	Schedule 80 PVC	0.010	#2/16	6	170.0	2	20	163.4	163	143.3	
LWVPS-U3-MW12A	UMCf-cg	26735045.73	839479.41	1521.01	1520.83	29.40	Single	Schedule 40 PVC	0.010	#2/16	6	109.5	2	20	108.5	108	88.3	
LWVPS-U3-MW12B	UMCf-cg	26735047.74	839484.29	1520.91	1520.74	29.36	Single	Schedule 40 PVC	0.010	#2/16	6	140.0	2	25	138.5	138	113.3	
LWVPS-U3-MW13A	UMCf-cg	26734933.25	839516.75	1522.40	1522.24	30.21	Single	Schedule 40 PVC	0.010	#2/16	6	122.5	2	25	121.5	121	96.3	
LWVPS-U3-MW13B	UMCf-cg	26734934.09	839522.37	1522.01	1521.91	30.00	Single	Schedule 40 PVC	0.010	#2/16	6	155.0	2	15	148	147.5	132.8	
Extraction Wells																		
LWVPS-EW01	Alluvium	26734957.94	838426.21	1530.03	1529.74	35.74	Single	Schedule 40 PVC with Stainless Steel Wire Wrap Screen	0.020	12-20	10	95.0	6	40	85	84.5	44.8	
LWVPS-EW02	Alluvium	26734885.98	838507.29	1523.66	1523.25	29.20	Single	Schedule 40 PVC with Stainless Steel Wire Wrap Screen	0.020	12-20	10	61.0	6	30	58.5	58	28.3	
LWVPS-EW03	Alluvium	26734886.94	838621.90	1523.14	1522.70	28.95	Single	Schedule 40 PVC with Stainless Steel Wire Wrap Screen	0.020	12-20	10	81.0	6	30	70.5	70	40.3	
LWVPS-EW04	Alluvium	26734947.54	838573.33	1522.40	1521.92	28.20	Single	Schedule 40 PVC with Stainless Steel Wire Wrap Screen	0.020	12-20	10	47.0	6	20	46.5	46	26.3	
LWVPS-EW05	Alluvium	26734978.54	838497.51	1529.76	1529.42	35.60	Single	Schedule 40 PVC with Stainless Steel Wire Wrap Screen	0.020	12-20	10	81.0	6	30	80.5	80	50.3	

Notes  
 amsl - above mean sea level  
 bgs - below ground surface  
 bTOC - below top of casing  
 PVC - polyvinyl chloride  
 UMCf - Upper Muddy Creek formation  
 UMCf-cg - Upper Muddy Creek formation - coarse grained facies  
 UMCf/Horse Springs- Alternating layers of UMCf, semi-consolidated UMCf, and reworked Horse Springs formation.  
 UMCf (Semi-Cons) - Semi-consolidated Upper Muddy Creek formation  
 --- Not Applicable

1. Depth to water measurements collected in October 2020.
2. Well names including IW indicate an injection well. Well names including DR indicate a dose response well. Well names including MW indicate a monitoring well. Well names including EW indicate an extraction well.

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
<b>Zone 1</b>													
LVWPS-MW204	9/28/2020	N	BL04	Cross Gradient	N/A	Qal	50.3 - 70.0	1,600	10,000	14	1,300	1.4	1.84
LVWPS-MW204	9/28/2020	FD	BL04	Cross Gradient	N/A	Qal	50.3 - 70.0	1,600	10,000	14	1,300	1.3	----
LVWPS-MW204B	9/28/2020	N	BL04	Cross Gradient	N/A	UMCf	101.5 - 121.2	12,000	22,000	15	1,800	0.75	2.92
LVWPS-U1-MW03B	9/29/2020	N	BL04	Cross Gradient	N/A	UMCf	134.5 - 154.0	4,300	7,800	14	1,400	1.5	6.71
LVWPS-U1-MW03B	1/14/2021	N	EM02	Cross Gradient	N/A	UMCf	134.5 - 154.0	5,500	8,900	13	1,400	1.2	0.69
LVWPS-U1-MW03B	2/11/2021	N	EM04	Cross Gradient	N/A	UMCf	134.5 - 154.0	5,500	8,500	14 J-	1,400	1.2	1.13
LVWPS-U1-MW03B	3/11/2021	N	EM05	Cross Gradient	N/A	UMCf	134.5 - 154.0	6,300	9,700	13	1,500	1.3	1.21
LVWPS-U1-MW03B	4/9/2021	N	EM06	Cross Gradient	N/A	UMCf	134.5 - 154.0	5,100	8,600	13	1,400	1.2	2.54
LVWPS-U1-MW03B	6/10/2021	N	EM08	Cross Gradient	N/A	UMCf	134.5 - 154.0	5,200	5,800	14	1,400	1.0	1.35
LVWPS-U1-MW01A	9/28/2020	N	BL04	Downgradient	22	UMCf	90.3 - 115.0	6,100	11,000	14	1,600	1.0	1.98
LVWPS-U1-MW01A	1/14/2021	N	EM02	Downgradient	22	UMCf	90.3 - 115.0	6,900	11,000	12	1,600	1.2 J	2.08
LVWPS-U1-MW01A	2/10/2021	N	EM04	Downgradient	22	UMCf	90.3 - 115.0	7,800	11,000	13	1,600	1.5	1.93
LVWPS-U1-MW01A	3/11/2021	N	EM05	Downgradient	22	UMCf	90.3 - 115.0	6,500	10,000	13	1,500	1.4 J	5.27
LVWPS-U1-MW01A	4/8/2021	N	EM06	Downgradient	22	UMCf	90.3 - 115.0	6,900	12,000	13	1,600	1.5 J	1.83
LVWPS-U1-MW01A	6/10/2021	N	EM08	Downgradient	22	UMCf	90.3 - 115.0	7,000	11,000	13	1,500	1.4 J	2.44
LVWPS-U1-MW01B	9/28/2020	N	BL04	Downgradient	22	UMCf	133.5 - 153.0	7,100	12,000	13	1,800	1.2 J-	1.72
LVWPS-U1-MW01B	1/14/2021	N	EM02	Downgradient	22	UMCf	133.5 - 153.0	510	1,100	1.5	360	2.1	1.58
LVWPS-U1-MW01B	2/10/2021	N	EM04	Downgradient	22	UMCf	133.5 - 153.0	8,200	13,000	12	1,900	1.0	0.63
LVWPS-U1-MW01B	3/11/2021	N	EM05	Downgradient	22	UMCf	133.5 - 153.0	8,900	12,000	10	1,800	1.2	0.69
LVWPS-U1-MW01B	4/7/2021	N	EM06	Downgradient	22	UMCf	133.5 - 153.0	6,200	9,800	8.9	1,900	1.2 J+	1.25
LVWPS-U1-MW01B	6/10/2021	N	EM08	Downgradient	22	UMCf	133.5 - 153.0	5,500	6,600 J+	6.6	1,800	1.2	0.85
LVWPS-U1-MW08A	9/30/2020	N	BL04	Downgradient	25	UMCf	93.8 - 118.5	4,700	7,300	13	1,500	1.7	2.21
LVWPS-U1-MW08A	1/12/2021	N	EM02	Downgradient	25	UMCf	93.8 - 118.5	<0.31	<10	<0.14	990	300	0.33
LVWPS-U1-MW08A	2/9/2021	N	EM04	Downgradient	25	UMCf	93.8 - 118.5	<0.31	<10	<0.014	700	420 J-	1.21
LVWPS-U1-MW08A	3/11/2021	N	EM05	Downgradient	25	UMCf	93.8 - 118.5	<0.31	<10	<0.014	410	180	0.30
LVWPS-U1-MW08A	4/8/2021	N	EM06	Downgradient	25	UMCf	93.8 - 118.5	310	24 J	0.038 J	460	40	0.45
LVWPS-U1-MW08A	6/9/2021	N	EM08	Downgradient	25	UMCf	93.8 - 118.5	50	<24	<0.014	480	8.5	0.12
LVWPS-U1-MW08B	9/30/2020	N	BL04	Downgradient	25	UMCf	125.3 - 150.0	2,800	5,500	10	1,400	1.3	3.10
LVWPS-U1-MW08B	1/11/2021	N	EM02	Downgradient	25	UMCf	125.3 - 150.0	3.9	<10	<0.014	1,100	230	0.23
LVWPS-U1-MW08B	1/11/2021	FD	EM02	Downgradient	25	UMCf	125.3 - 150.0	3.8	<10	0.014 R	1,400	220	----
LVWPS-U1-MW08B	2/9/2021	N	EM04	Downgradient	25	UMCf	125.3 - 150.0	<0.31	<10	<0.014	1,100	270 J-	0.41
LVWPS-U1-MW08B	2/9/2021	FD	EM04	Downgradient	25	UMCf	125.3 - 150.0	<0.31	<10	<0.014	1,100	300 J-	----
LVWPS-U1-MW08B	3/10/2021	N	EM05	Downgradient	25	UMCf	125.3 - 150.0	54	35 J	0.047 J	1,000	100	0.39
LVWPS-U1-MW08B	3/10/2021	FD	EM05	Downgradient	25	UMCf	125.3 - 150.0	43	35 J	0.060	1,000	98	----
LVWPS-U1-MW08B	4/9/2021	N	EM06	Downgradient	25	UMCf	125.3 - 150.0	700	400	0.76	1,100	55	0.44
LVWPS-U1-MW08B	4/9/2021	FD	EM06	Downgradient	25	UMCf	125.3 - 150.0	640	400	0.92	1,100	46	----
LVWPS-U1-MW08B	6/9/2021	N	EM08	Downgradient	25	UMCf	125.3 - 150.0	740	770	2.4	1,400	10	0.30
LVWPS-U1-MW08B	6/9/2021	FD	EM08	Downgradient	25	UMCf	125.3 - 150.0	790	790	2.2	1,200	9.4	----
LVWPS-U1-MW02A	9/29/2020	N	BL04	Downgradient	32.5	UMCf	94.3 - 119.0	4,200	7,600	12	1,600	1.2	4.60
LVWPS-U1-MW02A	1/14/2021	N	EM02	Downgradient	32.5	UMCf	94.3 - 119.0	5,400	8,400	12	1,700	1.3 J	0.9
LVWPS-U1-MW02A	2/11/2021	N	EM04	Downgradient	32.5	UMCf	94.3 - 119.0	5,600	8,500	12	1,700	1.1	0.72
LVWPS-U1-MW02A	3/11/2021	N	EM05	Downgradient	32.5	UMCf	94.3 - 119.0	5,400	8,300	12	1,700	1.4 J	1.54
LVWPS-U1-MW02A	4/8/2021	N	EM06	Downgradient	32.5	UMCf	94.3 - 119.0	5,100	8,600	12	1,700	1.1	1.29
LVWPS-U1-MW02A	6/10/2021	N	EM08	Downgradient	32.5	UMCf	94.3 - 119.0	5,400	9,600	12	1,700	1.3 J	1.99
LVWPS-U1-MW02B	10/7/2020	N	BL04	Downgradient	32.5	UMCf	136.9 - 161.5	2,400	4,100	11	8,300	1.1	2.35
LVWPS-U1-MW02B	1/14/2021	N	EM02	Downgradient	32.5	UMCf	136.9 - 161.5	2,300	3,500	6.5	1,700	1.6	0.88
LVWPS-U1-MW02B	2/11/2021	N	EM04	Downgradient	32.5	UMCf	136.9 - 161.5	2,100	2,900	5.9 J-	1,700	1.5	0.77
LVWPS-U1-MW02B	3/11/2021	N	EM05	Downgradient	32.5	UMCf	136.9 - 161.5	2,900	4,500	8.0	1,700	1.3	0.75



**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-U1-MW02B	4/6/2021	N	EM06	Downgradient	32.5	UMCf	136.9 - 161.5	2,800	4,700	9.4	1,600	1.2 J+	1.04
LVWPS-U1-MW02B	6/11/2021	N	EM08	Downgradient	32.5	UMCf	136.9 - 161.5	2,400	4,200	8.0	1,500	1.3 J+	1.33
LVWPS-A1-MW04	9/30/2020	N	BL04	Downgradient	50	Qal	69.3 - 89.0	2,000	12,000	15	1,600	1.5	2.26
LVWPS-A1-MW04	1/13/2021	N	EM02	Downgradient	50	Qal	69.3 - 89.0	2,400	15,000	17	1,700	1.5	1.38
LVWPS-A1-MW04	1/13/2021	FD	EM02	Downgradient	50	Qal	69.3 - 89.0	2,800	15,000	17	1,700	1.4	----
LVWPS-A1-MW04	2/9/2021	N	EM04	Downgradient	50	Qal	69.3 - 89.0	3,000	15,000	17	1,800	1.4 J-	1.35
LVWPS-A1-MW04	2/9/2021	FD	EM04	Downgradient	50	Qal	69.3 - 89.0	3,000	15,000	17	1,800	1.4 J-	----
LVWPS-A1-MW04	3/9/2021	N	EM05	Downgradient	50	Qal	69.3 - 89.0	3,000	16,000	16	1,900	1.5	0.74
LVWPS-A1-MW04	3/9/2021	FD	EM05	Downgradient	50	Qal	69.3 - 89.0	2,900	15,000	16	2,000	1.5	----
LVWPS-A1-MW04	4/7/2021	N	EM06	Downgradient	50	Qal	69.3 - 89.0	2,700	14,000	16	1,700	1.4 J+	0.75
LVWPS-A1-MW04	4/7/2021	FD	EM06	Downgradient	50	Qal	69.3 - 89.0	2,700	18,000	16	1,700	1.5 J+	----
LVWPS-A1-MW04	6/8/2021	N	EM08	Downgradient	50	Qal	69.3 - 89.0	2,500	11,000	15	1,800	1.3 J+	1.20
LVWPS-A1-MW04	6/8/2021	FD	EM08	Downgradient	50	Qal	69.3 - 89.0	2,700	11,000	15	1,600	1.4 J+	----
LVWPS-A1-MW05	9/30/2020	N	BL04	Downgradient	50	Qal	69.3 - 89.0	2,900	16,000	19	2,000	1.6	2.90
LVWPS-A1-MW05	1/15/2021	N	EM02	Downgradient	50	Qal	69.3 - 89.0	3,300	17,000	21	2,200	1.6	1.54
LVWPS-A1-MW05	2/10/2021	N	EM04	Downgradient	50	Qal	69.3 - 89.0	3,600	18,000	20	2,200	1.7	1.20
LVWPS-A1-MW05	3/10/2021	N	EM05	Downgradient	50	Qal	69.3 - 89.0	3,400	16,000	20	2,000	1.5	2.03
LVWPS-A1-MW05	4/8/2021	N	EM06	Downgradient	50	Qal	69.3 - 89.0	3,200	17,000	20	2,100	1.5	1.79
LVWPS-A1-MW05	6/9/2021	N	EM08	Downgradient	50	Qal	69.3 - 89.0	3,400	15,000	20	2,000	2.5	1.57
LVWPS-U1-MW04A	9/30/2020	N	BL04	Downgradient	50	UMCf	99.3 - 124.0	4,500	9,100	13	1,600	1.0	0.84
LVWPS-U1-MW04A	1/13/2021	N	EM02	Downgradient	50	UMCf	99.3 - 124.0	6,400	10,000	13	1,600	1.3 J	1.15
LVWPS-U1-MW04A	2/10/2021	N	EM04	Downgradient	50	UMCf	99.3 - 124.0	6,500	11,000	13	1,700	1.0	1.96
LVWPS-U1-MW04A	3/9/2021	N	EM05	Downgradient	50	UMCf	99.3 - 124.0	6,000	8,900	11	1,700	1.3 J	0.84
LVWPS-U1-MW04A	4/7/2021	N	EM06	Downgradient	50	UMCf	99.3 - 124.0	6,200	12,000	12	1,700	1.3 J	0.90
LVWPS-U1-MW04A	6/8/2021	N	EM08	Downgradient	50	UMCf	99.3 - 124.0	6,200	10,000	12	1,700	1.2 J	1.22
LVWPS-U1-MW04B	10/1/2020	N	BL04	Downgradient	50	UMCf	139.9 - 164.5	4,200	9,200	13	1,700	2.1	1.75
LVWPS-U1-MW04B	1/13/2021	N	EM02	Downgradient	50	UMCf	139.9 - 164.5	5,300	10,000	13	1,700	1.8	0.46
LVWPS-U1-MW04B	2/9/2021	N	EM04	Downgradient	50	UMCf	139.9 - 164.5	4,900	9,700	14	1,700	1.7 J-	0.68
LVWPS-U1-MW04B	3/9/2021	N	EM05	Downgradient	50	UMCf	139.9 - 164.5	6,000	9,500	14	1,800	1.8 J	0.83
LVWPS-U1-MW04B	4/9/2021	N	EM06	Downgradient	50	UMCf	139.9 - 164.5	5,600	9,400	14	1,700	1.2	1.33
LVWPS-U1-MW04B	6/8/2021	N	EM08	Downgradient	50	UMCf	139.9 - 164.5	6,200	8,400	14	1,700	1.2 J+	1.59
LVWPS-U1-MW05A	9/29/2020	N	BL04	Downgradient	50	UMCf	95.8 - 120.5	10,000	15,000	14	1,900	1.0	2.23
LVWPS-U1-MW05A	1/18/2021	N	EM02	Downgradient	50	UMCf	95.8 - 120.5	8,900	15,000	14	2,100	<2.1	1.11
LVWPS-U1-MW05A	2/10/2021	N	EM04	Downgradient	50	UMCf	95.8 - 120.5	10,000	15,000	14	2,100	1.1	0.89
LVWPS-U1-MW05A	3/10/2021	N	EM05	Downgradient	50	UMCf	95.8 - 120.5	8,300	14,000	13	1,800	1.6 J	3.61
LVWPS-U1-MW05A	4/8/2021	N	EM06	Downgradient	50	UMCf	95.8 - 120.5	8,500	15,000	14	2,000	1.2 J	2.03
LVWPS-U1-MW05A	6/9/2021	N	EM08	Downgradient	50	UMCf	95.8 - 120.5	8,800	15,000	14	1,900	1.1 J	1.53
LVWPS-U1-MW05B	9/29/2020	N	BL04	Downgradient	50	UMCf	136.9 - 161.5	5,100	8,800	13	1,800	1.2	1.71
LVWPS-U1-MW05B	1/13/2021	N	EM02	Downgradient	50	UMCf	136.9 - 161.5	9,800	14,000	13	1,800	1.1	0.5
LVWPS-U1-MW05B	2/10/2021	N	EM04	Downgradient	50	UMCf	136.9 - 161.5	12,000	19,000	15	2,200	1.2	0.90
LVWPS-U1-MW05B	3/9/2021	N	EM05	Downgradient	50	UMCf	136.9 - 161.5	9,600	15,000	14	2,100	1.0	0.92
LVWPS-U1-MW05B	4/7/2021	N	EM06	Downgradient	50	UMCf	136.9 - 161.5	11,000	18,000	14	2,000	1.1 J+	1.31
LVWPS-U1-MW05B	6/11/2021	N	EM08	Downgradient	50	UMCf	136.9 - 161.5	11,000	19,000	15	1,900	1.1 J+	1.24
LVWPS-A1-MW09	9/30/2020	N	BL04	Downgradient	100	Qal	85.8 - 105.5	2,700	15,000	16	1,600	1.6	1.17
LVWPS-A1-MW09	1/13/2021	N	EM02	Downgradient	100	Qal	85.8 - 105.5	2,500	14,000	13	1,800	4.2	1.06
LVWPS-A1-MW09	2/11/2021	N	EM04	Downgradient	100	Qal	85.8 - 105.5	3,100	14,000	15 J-	2,000	1.6	0.66
LVWPS-A1-MW09	3/11/2021	N	EM05	Downgradient	100	Qal	85.8 - 105.5	3,200	16,000	18	1,900	1.5	1.83
LVWPS-A1-MW09	4/8/2021	N	EM06	Downgradient	100	Qal	85.8 - 105.5	2,700	14,000	16	1,800	1.6	0.65

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-A1-MW09	6/11/2021	N	EM08	Downgradient	100	Qal	85.8 - 105.5	2,600	9,900	16	1,700	1.5 J+	1.38
LVWPS-MW217A	9/30/2020	N	BL04	Downgradient	100	Qal	51.3 - 71.0	2,200	11,000	15	1,500	1.4	2.60
LVWPS-MW217A	1/12/2021	N	EM02	Downgradient	100	Qal	51.3 - 71.0	2,600	14,000	17	1,800	1.5	1.75
LVWPS-MW217A	2/9/2021	N	EM04	Downgradient	100	Qal	51.3 - 71.0	2,700	14,000	17	1,300	1.5 J-	2.21
LVWPS-MW217A	3/12/2021	N	EM05	Downgradient	100	Qal	51.3 - 71.0	2,800	15,000	17	1,600	1.6 J+	1.31
LVWPS-MW217A	4/8/2021	N	EM06	Downgradient	100	Qal	51.3 - 71.0	2,500	13,000	17	1,600	1.4	1.55
LVWPS-MW217A	6/9/2021	N	EM08	Downgradient	100	Qal	51.3 - 71.0	2,300	11,000	16	1,500	1.4	1.25
LVWPS-MW217B	9/30/2020	N	BL04	Downgradient	100	UMCf	100.3 - 120.0	7,300	14,000	15	1,600	1.0	2.53
LVWPS-MW217B	1/13/2021	N	EM02	Downgradient	100	UMCf	100.3 - 120.0	9,500	14,000	15	1,700	1.3 J	1.03
LVWPS-MW217B	2/10/2021	N	EM04	Downgradient	100	UMCf	100.3 - 120.0	8,600	14,000	15	1,800	1.1	1.12
LVWPS-MW217B	3/10/2021	N	EM05	Downgradient	100	UMCf	100.3 - 120.0	9,400	13,000	14	1,800	1.2 J	1.19
LVWPS-MW217B	4/8/2021	N	EM06	Downgradient	100	UMCf	100.3 - 120.0	8,100	17,000	14	1,700	1.1 J	1.61
LVWPS-MW217B	6/9/2021	N	EM08	Downgradient	100	UMCf	100.3 - 120.0	6,600	14,000	15	1,700	1.3 J	1.40
LVWPS-MW217C	10/5/2020	N	BL04	Downgradient	100	UMCf	155.5 - 175.0	6,200	10,000	12	1,600	1.5	2.53
LVWPS-MW217C	1/13/2021	N	EM02	Downgradient	100	UMCf	155.5 - 175.0	7,100	11,000	12	1,700	1.8 J	1.02
LVWPS-MW217C	1/13/2021	FD	EM02	Downgradient	100	UMCf	155.5 - 175.0	7,500	10,000	12	1,700	1.8 J	----
LVWPS-MW217C	2/10/2021	N	EM04	Downgradient	100	UMCf	155.5 - 175.0	6,700	11,000	12	1,700	1.7	1.19
LVWPS-MW217C	2/10/2021	FD	EM04	Downgradient	100	UMCf	155.5 - 175.0	6,700	11,000	12	1,700	1.6	----
LVWPS-MW217C	3/10/2021	N	EM05	Downgradient	100	UMCf	155.5 - 175.0	7,200	10,000	11	1,800	1.4	1.13
LVWPS-MW217C	3/10/2021	FD	EM05	Downgradient	100	UMCf	155.5 - 175.0	7,300	10,000	13	1,800	1.5	----
LVWPS-MW217C	4/9/2021	N	EM06	Downgradient	100	UMCf	155.5 - 175.0	6,300	14,000	12	1,600	1.4	1.83
LVWPS-MW217C	4/9/2021	FD	EM06	Downgradient	100	UMCf	155.5 - 175.0	6,300	13,000	12	1,700	1.6	----
LVWPS-MW217C	6/14/2021	N	EM08	Downgradient	100	UMCf	155.5 - 175.0	6,300	8,000	13	1,700	1.5	1.10
LVWPS-MW217C	6/14/2021	FD	EM08	Downgradient	100	UMCf	155.5 - 175.0	6,200	7,600	13	1,700	1.5	----
LVWPS-U1-MW09A	9/30/2020	N	BL04	Downgradient	100	UMCf	115.3 - 125.0	7,500	12,000	13	1,900	1.8	1.62
LVWPS-U1-MW09A	1/13/2021	N	EM02	Downgradient	100	UMCf	115.3 - 125.0	8,600	13,000	12	1,900	0.88	0.75
LVWPS-U1-MW09A	2/10/2021	N	EM04	Downgradient	100	UMCf	115.3 - 125.0	7,800	12,000	12	2,000	1.1	1.08
LVWPS-U1-MW09A	3/11/2021	N	EM05	Downgradient	100	UMCf	115.3 - 125.0	9,100	12,000	12	2,100	0.95	0.99
LVWPS-U1-MW09A	4/8/2021	N	EM06	Downgradient	100	UMCf	115.3 - 125.0	7,400	16,000	13	1,900	0.91	1.74
LVWPS-U1-MW09A	6/10/2021	N	EM08	Downgradient	100	UMCf	115.3 - 125.0	7,600	8,200	13	1,900	0.94	1.20
LVWPS-U1-MW09B	9/30/2020	N	BL04	Downgradient	100	UMCf	130.3 - 155.0	6,400	11,000	9.6	1,900	0.89	1.80
LVWPS-U1-MW09B	1/13/2021	N	EM02	Downgradient	100	UMCf	130.3 - 155.0	3,800	5,900	12	1,700	<2.1	0.74
LVWPS-U1-MW09B	2/10/2021	N	EM04	Downgradient	100	UMCf	130.3 - 155.0	3,500	5,700	11	1,700	1.2	0.60
LVWPS-U1-MW09B	3/11/2021	N	EM05	Downgradient	100	UMCf	130.3 - 155.0	4,200	5,300	10	2,300	1.4 J	0.89
LVWPS-U1-MW09B	4/8/2021	N	EM06	Downgradient	100	UMCf	130.3 - 155.0	3,100	6,300	11	1,700	1.2 J	1.19
LVWPS-U1-MW09B	6/10/2021	N	EM08	Downgradient	100	UMCf	130.3 - 155.0	3,200	5,400	10	1,500	1.4 J	0.87
LVWPS-A1-MW10	10/1/2020	N	BL04	Downgradient	150	Qal	70.8 - 90.5	4,400 J-	14,000	16	1,600	1.4	1.13
LVWPS-A1-MW10	10/1/2020	FD	BL04	Downgradient	150	Qal	70.8 - 90.5	3,700	14,000	16	1,700	1.5	----
LVWPS-A1-MW10	1/13/2021	N	EM02	Downgradient	150	Qal	70.8 - 90.5	3,100	16,000	17	1,800	1.5	1.11
LVWPS-A1-MW10	2/8/2021	N	EM04	Downgradient	150	Qal	70.8 - 90.5	3,600	16,000	17	1,800	1.5 J-	0.60
LVWPS-A1-MW10	3/9/2021	N	EM05	Downgradient	150	Qal	70.8 - 90.5	3,000	16,000	17	2,000	1.4	0.77
LVWPS-A1-MW10	4/7/2021	N	EM06	Downgradient	150	Qal	70.8 - 90.5	2,700	14,000	16	1,700	1.4 J+	0.62
LVWPS-A1-MW10	6/8/2021	N	EM08	Downgradient	150	Qal	70.8 - 90.5	2,900	10,000	16	1,600	1.4 J	0.60
LVWPS-U1-MW10A	10/2/2020	N	BL04	Downgradient	150	UMCf	99.3 - 124.0	9,200	16,000	9.9	2,000	0.55	3.77
LVWPS-U1-MW10A	1/13/2021	N	EM02	Downgradient	150	UMCf	99.3 - 124.0	13,000 J	17,000	10	2,000	1.2 J	3.28
LVWPS-U1-MW10A	2/9/2021	N	EM04	Downgradient	150	UMCf	99.3 - 124.0	10,000	16,000	9.8	2,000	0.46 J	5.98
LVWPS-U1-MW10A	3/9/2021	N	EM05	Downgradient	150	UMCf	99.3 - 124.0	12,000	17,000	10	2,100	0.49 J	3.70
LVWPS-U1-MW10A	4/7/2021	N	EM06	Downgradient	150	UMCf	99.3 - 124.0	10,000	17,000	9.9	2,000	<1.0	3.92

**Table 2**  
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 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-U1-MW10A	6/9/2021	N	EM08	Downgradient	150	UMCf	99.3 - 124.0	11,000	9,600	9.6	1,900	<1.0	3.33
LVWPS-U1-MW10B	10/2/2020	N	BL04	Downgradient	150	UMCf	130.3 - 155.0	4,600	5,100	3.8	1,800	0.53	1.68
LVWPS-U1-MW10B	1/12/2021	N	EM02	Downgradient	150	UMCf	130.3 - 155.0	4,600	5,500	4.6	1,900	<1.3	1.37
LVWPS-U1-MW10B	2/9/2021	N	EM04	Downgradient	150	UMCf	130.3 - 155.0	2,900	6,800	4.0	1,900	<1.0 UJ	2.00
LVWPS-U1-MW10B	3/9/2021	N	EM05	Downgradient	150	UMCf	130.3 - 155.0	3,900	5,700	4.1	2,000	<1.0	2.27
LVWPS-U1-MW10B	4/7/2021	N	EM06	Downgradient	150	UMCf	130.3 - 155.0	3,700	5,700	4.2	1,900	<1.0	2.00
LVWPS-U1-MW10B	6/8/2021	N	EM08	Downgradient	150	UMCf	130.3 - 155.0	3,500	5,200	4.0	2,000	<1.0	1.67
LVWPS-U1-IW01A	9/29/2020	N	BL04	Injection Well Transect	0	UMCf	88.8 - 113.5	9,700	18,000	14	----	----	0.86
LVWPS-U1-IW01B	9/29/2020	N	BL04	Injection Well Transect	0	UMCf	120.3 - 145.0	7,800	13,000	13	----	----	0.80
LVWPS-U1-IW02A	9/30/2020	N	BL04	Injection Well Transect	0	UMCf	90.3 - 115.0	2,200	5,000	11	----	----	0.68
LVWPS-U1-IW02B	9/30/2020	N	BL04	Injection Well Transect	0	UMCf	121.3 - 151.0	3,400	6,900	9.8	----	----	1.82
LVWPS-U1-IW03A	9/30/2020	N	BL04	Injection Well Transect	0	UMCf	93.8 - 118.5	2,500	5,200	13	----	----	0.68
LVWPS-U1-IW03B	9/30/2020	N	BL04	Injection Well Transect	0	UMCf	125.3 - 150.0	1,400	3,900	10	----	----	2.18
LVWPS-U1-IW04A	9/28/2020	N	BL04	Injection Well Transect	0	UMCf	86.8 - 116.5	3,500	6,600	12	----	----	0.53
LVWPS-U1-IW04A	9/28/2020	FD	BL04	Injection Well Transect	0	UMCf	86.8 - 116.5	3,500	6,600	12	----	----	----
LVWPS-U1-IW04B	9/28/2020	N	BL04	Injection Well Transect	0	UMCf	122.8 - 152.5	3,400	4,800	11	----	----	2.37
LVWPS-U1-IW05A	9/29/2020	N	BL04	Injection Well Transect	0	UMCf	88.8 - 113.5	2,100	4,300	10	----	----	0.51
LVWPS-U1-IW05B	9/29/2020	N	BL04	Injection Well Transect	0	UMCf	120.3 - 145.0	2,500	5,100	11	----	----	1.34
LVWPS-U1-IW06A	9/30/2020	N	BL04	Injection Well Transect	0	UMCf	87.8 - 112.5	2,400	3,600	8.5	----	----	1.60
LVWPS-U1-IW06B	9/30/2020	N	BL04	Injection Well Transect	0	UMCf	119.3 - 149.0	2,500	3,900	10	----	----	2.07
LVWPS-U1-IW07A	10/1/2020	N	BL04	Injection Well Transect	0	UMCf	95.8 - 120.5	3,100	4,500	9.5	----	----	3.39
LVWPS-U1-IW07B	10/1/2020	N	BL04	Injection Well Transect	0	UMCf	127.3 - 152.0	4,300	4,900	9.5	----	----	2.21
LVWPS-U1-IW08A	10/1/2020	N	BL04	Injection Well Transect	0	UMCf	95.3 - 125.0	4,000	7,500	9.7	----	----	1.60
LVWPS-U1-IW08B	10/1/2020	N	BL04	Injection Well Transect	0	UMCf	131.8 - 156.5	4,900	6,700	11	----	----	1.92
LVWPS-A1-MW06	9/29/2020	N	BL04	Upgradient	-60	Qal	59.3 - 79.0	1,900	9,000	13	1,300	1.4	1.16
LVWPS-A1-MW06	1/14/2021	N	EM02	Upgradient	-60	Qal	59.3 - 79.0	3,200 J	11,000	15	1,500	1.5	1.38
LVWPS-A1-MW06	1/14/2021	FD	EM02	Upgradient	-60	Qal	59.3 - 79.0	2,300 J	11,000	15	1,600	1.4	----
LVWPS-A1-MW06	2/9/2021	N	EM04	Upgradient	-60	Qal	59.3 - 79.0	2,300	11,000	15	1,500	1.5 J-	1.07
LVWPS-A1-MW06	2/9/2021	FD	EM04	Upgradient	-60	Qal	59.3 - 79.0	2,300	11,000	15	1,500	1.3 J-	----
LVWPS-A1-MW06	3/9/2021	N	EM05	Upgradient	-60	Qal	59.3 - 79.0	2,300	11,000	15	1,600	1.4	1.22
LVWPS-A1-MW06	3/9/2021	FD	EM05	Upgradient	-60	Qal	59.3 - 79.0	2,400	11,000	15	1,600	1.5	----
LVWPS-A1-MW06	4/9/2021	N	EM06	Upgradient	-60	Qal	59.3 - 79.0	1,900	13,000	14	1,400	1.4	1.40
LVWPS-A1-MW06	4/9/2021	FD	EM06	Upgradient	-60	Qal	59.3 - 79.0	1,900	11,000	14	1,400	1.5	----
LVWPS-A1-MW06	6/9/2021	N	EM08	Upgradient	-60	Qal	59.3 - 79.0	1,900	9,700	15	1,300	1.4	0.85
LVWPS-A1-MW06	6/9/2021	FD	EM08	Upgradient	-60	Qal	59.3 - 79.0	1,900	9,900	15	1,700	1.3	----
LVWPS-A1-MW07	9/30/2020	N	BL04	Upgradient	-60	Qal	58.3 - 78.0	2,900	16,000	19	1,900	1.6	1.43
LVWPS-A1-MW07	1/14/2021	N	EM02	Upgradient	-60	Qal	58.3 - 78.0	3,200	17,000	20	2,200	1.6	1.22
LVWPS-A1-MW07	2/10/2021	N	EM04	Upgradient	-60	Qal	58.3 - 78.0	3,400	17,000	19	2,200	1.6	1.08
LVWPS-A1-MW07	3/9/2021	N	EM05	Upgradient	-60	Qal	58.3 - 78.0	3,400	17,000	20	2,200	1.5	1.21
LVWPS-A1-MW07	4/7/2021	N	EM06	Upgradient	-60	Qal	58.3 - 78.0	3,100	17,000	18	2,000	1.4 J+	1.25
LVWPS-A1-MW07	6/9/2021	N	EM08	Upgradient	-60	Qal	58.3 - 78.0	3,200	20,000	18	2,700	1.4	1.01
LVWPS-U1-MW06A	9/29/2020	N	BL04	Upgradient	-60	UMCf	85.3 - 105.0	1,100	3,300	11	970	1.5	0.98
LVWPS-U1-MW06A	1/14/2021	N	EM02	Upgradient	-60	UMCf	85.3 - 105.0	1,300	3,300	9.0	1,100	2.0	0.84
LVWPS-U1-MW06A	2/9/2021	N	EM04	Upgradient	-60	UMCf	85.3 - 105.0	1,300	3,000	10	990	1.4 J-	0.52
LVWPS-U1-MW06A	3/10/2021	N	EM05	Upgradient	-60	UMCf	85.3 - 105.0	1,400	3,100	10	1,100	1.5	0.70
LVWPS-U1-MW06A	4/12/2021	N	EM06	Upgradient	-60	UMCf	85.3 - 105.0	1,300	3,100	11 J-	970	1.9 J	0.83
LVWPS-U1-MW06A	6/9/2021	N	EM08	Upgradient	-60	UMCf	85.3 - 105.0	1,300	3,600	11	960	1.4	0.38
LVWPS-U1-MW06B	9/29/2020	N	BL04	Upgradient	-60	UMCf	109.3 - 134.0	1,700	3,800	11	1,000	1.7	1.03

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-U1-MW06B	1/12/2021	N	EM02	Upgradient	-60	UMCf	109.3 - 134.0	21	8.7 J	0.17 J	1,100	12	0.27
LVWPS-U1-MW06B	2/10/2021	N	EM04	Upgradient	-60	UMCf	109.3 - 134.0	1,000	1,400	2.0	1,100	1.9	0.74
LVWPS-U1-MW06B	3/10/2021	N	EM05	Upgradient	-60	UMCf	109.3 - 134.0	1,300	2,300	4.4	1,200	1.8 J	0.38
LVWPS-U1-MW06B	4/8/2021	N	EM06	Upgradient	-60	UMCf	109.3 - 134.0	1,200	2,600	6.4	1,000	2.0	1.05
LVWPS-U1-MW06B	6/9/2021	N	EM08	Upgradient	-60	UMCf	109.3 - 134.0	1,400	3,100	8.2	1,000	1.7 J	0.72
LVWPS-U1-MW07	9/30/2020	N	BL04	Upgradient	-60	UMCf	86.3 - 111.0	4,100	7,700	5.6	2,000	0.84	3.78
LVWPS-U1-MW07	1/14/2021	N	EM02	Upgradient	-60	UMCf	86.3 - 111.0	430	110	<0.014	1,700	210	0.73
LVWPS-U1-MW07	2/10/2021	N	EM04	Upgradient	-60	UMCf	86.3 - 111.0	370	180	0.081	1,600	180	0.38
LVWPS-U1-MW07	3/12/2021	N	EM05	Upgradient	-60	UMCf	86.3 - 111.0	1,300	2,000	0.42	1,800	19 J+	0.32
LVWPS-U1-MW07	4/7/2021	N	EM06	Upgradient	-60	UMCf	86.3 - 111.0	2,500	2,600	0.41	2,000	16 J+	0.40
LVWPS-U1-MW07	6/10/2021	N	EM08	Upgradient	-60	UMCf	86.3 - 111.0	4,000	3,300	1.9	1,700	3.9	0.04
<b>Zone 2</b>													
LVWPS-U2-MW04	10/6/2020	N	BL04	Cross Gradient	12	UMCf	103.2 - 128.0	160	260	0.27	3,000	0.27 J	0.93
LVWPS-U2-MW04	1/11/2021	N	EM02	Cross Gradient	12	UMCf	103.2 - 128.0	2.0	<10	<0.014	2,900	9.5	0.49
LVWPS-U2-MW04	2/8/2021	N	EM04	Cross Gradient	12	UMCf	103.2 - 128.0	<1.6	<10	<0.014	2,800	38	1.56
LVWPS-U2-MW04	3/8/2021	N	EM05	Cross Gradient	12	UMCf	103.2 - 128.0	<0.31	<10	<0.014	3,700	56	0.81
LVWPS-U2-MW04	4/5/2021	N	EM06	Cross Gradient	12	UMCf	103.2 - 128.0	<0.31	<10	<0.014	2,900	1.7	0.80
LVWPS-U2-MW04	6/7/2021	N	EM08	Cross Gradient	12	UMCf	103.2 - 128.0	<0.31	<24	<0.014	2,900	0.69	0.50
LVWPS-U2-MW05	10/5/2020	N	BL04	Cross Gradient	12	UMCf	83.2 - 108.0	9,300	15,000	8.4	1,300	0.41 J	4.35
LVWPS-U2-MW05	1/13/2021	N	EM02	Cross Gradient	12	UMCf	83.2 - 108.0	2.7	<10	<0.014	1,100	1,100	0.24
LVWPS-U2-MW05	2/10/2021	N	EM04	Cross Gradient	12	UMCf	83.2 - 108.0	<0.31 UJ	<10	<0.014	810	910	0.51
LVWPS-U2-MW05	3/10/2021	N	EM05	Cross Gradient	12	UMCf	83.2 - 108.0	<0.31	<10	0.016 J	420	1,000	1.22
LVWPS-U2-MW05	4/7/2021	N	EM06	Cross Gradient	12	UMCf	83.2 - 108.0	<0.31	<10	<0.014	300	960	0.20
LVWPS-U2-MW05	6/15/2021	N	EM08	Cross Gradient	12	UMCf	83.2 - 108.0	<0.31	<24	<0.014	23	840	0.44
LVWPS-A2-MW04A	10/2/2020	N	BL04	Cross Gradient	17	Qal	43.8 - 63.5	4,100 J	5,300	19	2,100	1.7	5.60
LVWPS-A2-MW04A	10/2/2020	FD	BL04	Cross Gradient	17	Qal	43.8 - 63.5	2,900 J	5,200	19	2,100	1.7	----
LVWPS-A2-MW04A	12/22/2020	N	EM01	Cross Gradient	17	Qal	43.8 - 63.5	2,600	5,100	19	2,100	2.2 J	3.79
LVWPS-A2-MW04A	12/22/2020	FD	EM01	Cross Gradient	17	Qal	43.8 - 63.5	2,600	5,100	19	2,100	1.8	----
LVWPS-A2-MW04A	1/12/2021	N	EM02	Cross Gradient	17	Qal	43.8 - 63.5	2,700	4,900	20	2,200	1.9	3.84
LVWPS-A2-MW04A	1/12/2021	FD	EM02	Cross Gradient	17	Qal	43.8 - 63.5	2,700	4,900	19	2,200	2.1	----
LVWPS-A2-MW04A	1/26/2021	N	EM03	Cross Gradient	17	Qal	43.8 - 63.5	2,800	4,900	19	1,900	2.0 J+	3.67
LVWPS-A2-MW04A	1/26/2021	FD	EM03	Cross Gradient	17	Qal	43.8 - 63.5	2,700	4,900	19	1,900	1.8 J+	----
LVWPS-A2-MW04A	2/9/2021	N	EM04	Cross Gradient	17	Qal	43.8 - 63.5	2,100	7,200	21	1,900	3.4 J-	4.44
LVWPS-A2-MW04A	2/9/2021	FD	EM04	Cross Gradient	17	Qal	43.8 - 63.5	2,200	7,100	21	1,800	2.4 J-	----
LVWPS-A2-MW04A	3/9/2021	N	EM05	Cross Gradient	17	Qal	43.8 - 63.5	2,900	5,400	19	2,300	1.9	4.00
LVWPS-A2-MW04A	3/9/2021	FD	EM05	Cross Gradient	17	Qal	43.8 - 63.5	2,800	5,200	19	2,200	2.0	----
LVWPS-A2-MW04A	4/6/2021	N	EM06	Cross Gradient	17	Qal	43.8 - 63.5	2,600	5,000	22	2,100	2.0 J+	4.48
LVWPS-A2-MW04A	4/6/2021	FD	EM06	Cross Gradient	17	Qal	43.8 - 63.5	2,600	5,000	21	2,100	2.1 J+	----
LVWPS-A2-MW04A	5/3/2021	N	EM07	Cross Gradient	17	Qal	43.8 - 63.5	2,500	3,900	13	2,500	2.4	1.30
LVWPS-A2-MW04A	5/3/2021	FD	EM07	Cross Gradient	17	Qal	43.8 - 63.5	2,800	4,000	14	2,200	2.3	----
LVWPS-A2-MW04A	6/8/2021	N	EM08	Cross Gradient	17	Qal	43.8 - 63.5	2,100	2,700	16	2,100	5.2	2.35
LVWPS-A2-MW04A	6/8/2021	FD	EM08	Cross Gradient	17	Qal	43.8 - 63.5	2,100	3,000	16	2,100	5.2	----
LVWPS-A2-MW04A	7/6/2021	N	EM09	Cross Gradient	17	Qal	43.8 - 63.5	2,100	2,900	13	2,000	5.1	1.93
LVWPS-A2-MW04A	7/6/2021	FD	EM09	Cross Gradient	17	Qal	43.8 - 63.5	2,100	2,500	13	2,000	4.8	----
LVWPS-A2-MW04B	10/2/2020	N	BL04	Cross Gradient	17	Qal	75.3 - 95.0	3,400	7,300	22	2,200	1.7	3.65
LVWPS-A2-MW04B	12/22/2020	N	EM01	Cross Gradient	17	Qal	75.3 - 95.0	2,800	7,300	13	2,100	23	0.49
LVWPS-A2-MW04B	1/12/2021	N	EM02	Cross Gradient	17	Qal	75.3 - 95.0	700	1,300	3.0	2,300	52	0.66
LVWPS-A2-MW04B	1/26/2021	N	EM03	Cross Gradient	17	Qal	75.3 - 95.0	1,100	2,400	3.7	1,900	34	0.46

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-A2-MW04B	2/9/2021	N	EM04	Cross Gradient	17	Qal	75.3 - 95.0	650	1,800	3.5	2,000	51 J-	4.06
LVWPS-A2-MW04B	3/9/2021	N	EM05	Cross Gradient	17	Qal	75.3 - 95.0	1,200	1,700	4.0	2,100	34	0.29
LVWPS-A2-MW04B	4/6/2021	N	EM06	Cross Gradient	17	Qal	75.3 - 95.0	870	1,700	4.4	2,000	7.0 J+	0.40
LVWPS-A2-MW04B	5/3/2021	N	EM07	Cross Gradient	17	Qal	75.3 - 95.0	120	<9.8	0.042 J	1,900	150	0.26
LVWPS-A2-MW04B	6/8/2021	N	EM08	Cross Gradient	17	Qal	75.3 - 95.0	46	49 J	0.018 J	1,400	7.7	0.05
LVWPS-A2-MW04B	7/6/2021	N	EM09	Cross Gradient	17	Qal	75.3 - 95.0	50	<9.8	0.072	1,800	3.7	-0.03
LVWPS-A2-MW05A	10/5/2020	N	BL04	Cross Gradient	17	Qal	36.8 - 51.5	2,400	3,900	14	2,200	1.1	6.22
LVWPS-A2-MW05A	12/22/2020	N	EM01	Cross Gradient	17	Qal	36.8 - 51.5	310	73	0.91	2,200	170	0.91
LVWPS-A2-MW05A	1/13/2021	N	EM02	Cross Gradient	17	Qal	36.8 - 51.5	330	190	1.5	2,000	50	0.28
LVWPS-A2-MW05A	1/26/2021	N	EM03	Cross Gradient	17	Qal	36.8 - 51.5	720	460	1.8	1,600	120	0.44
LVWPS-A2-MW05A	2/9/2021	N	EM04	Cross Gradient	17	Qal	36.8 - 51.5	1,900	2,500	7.4	2,000	9.8 J-	3.20
LVWPS-A2-MW05A	3/10/2021	N	EM05	Cross Gradient	17	Qal	36.8 - 51.5	1,200	1,200	5.2 J+	1,700	22	1.70
LVWPS-A2-MW05A	4/7/2021	N	EM06	Cross Gradient	17	Qal	36.8 - 51.5	1,500	1,400	8.1	2,100	4.1 J+	1.04
LVWPS-A2-MW05A	5/4/2021	N	EM07	Cross Gradient	17	Qal	36.8 - 51.5	940	870	4.0	1,800	140	0.30
LVWPS-A2-MW05A	6/9/2021	N	EM08	Cross Gradient	17	Qal	36.8 - 51.5	1,600	2,100	8.5	2,200	7.1	0.45
LVWPS-A2-MW05A	7/7/2021	N	EM09	Cross Gradient	17	Qal	36.8 - 51.5	1,400	1,700	5.6	1,900	5.1 J+	-0.04
LVWPS-A2-MW05B	10/5/2020	N	BL04	Cross Gradient	17	Qal	58.8 - 73.5	1,900	2,300	8.7	2,000	0.66	7.24
LVWPS-A2-MW05B	12/22/2020	N	EM01	Cross Gradient	17	Qal	58.8 - 73.5	2.9	<4.0	<0.014	1,800	170 J-	0.35
LVWPS-A2-MW05B	12/22/2020	FD	EM01	Cross Gradient	17	Qal	58.8 - 73.5	2.9	<4.0	0.026 J	2,000	170	----
LVWPS-A2-MW05B	1/13/2021	N	EM02	Cross Gradient	17	Qal	58.8 - 73.5	<0.31	<10	<0.014	1,400	150	0.29
LVWPS-A2-MW05B	1/13/2021	FD	EM02	Cross Gradient	17	Qal	58.8 - 73.5	<0.31	<10	<0.014	1,400	150	----
LVWPS-A2-MW05B	1/26/2021	N	EM03	Cross Gradient	17	Qal	58.8 - 73.5	<0.31	<10	<0.014	860	220	0.45
LVWPS-A2-MW05B	2/9/2021	N	EM04	Cross Gradient	17	Qal	58.8 - 73.5	<0.31	<10	<0.014	590	160 J-	0.26
LVWPS-A2-MW05B	2/9/2021	FD	EM04	Cross Gradient	17	Qal	58.8 - 73.5	<0.31	<10	<0.014	610	140 J-	----
LVWPS-A2-MW05B	3/10/2021	N	EM05	Cross Gradient	17	Qal	58.8 - 73.5	<0.31	<10	<0.014	270	280 J	1.25
LVWPS-A2-MW05B	3/10/2021	FD	EM05	Cross Gradient	17	Qal	58.8 - 73.5	<0.31	<10	<0.014	270	170 J	----
LVWPS-A2-MW05B	4/7/2021	N	EM06	Cross Gradient	17	Qal	58.8 - 73.5	1.3	<10	<0.014	470	170	0.41
LVWPS-A2-MW05B	4/7/2021	FD	EM06	Cross Gradient	17	Qal	58.8 - 73.5	1.3	<10	<0.014	450	170	----
LVWPS-A2-MW05B	5/4/2021	N	EM07	Cross Gradient	17	Qal	58.8 - 73.5	3.0	38 J	<0.014	1,200	1,800	0.25
LVWPS-A2-MW05B	5/4/2021	FD	EM07	Cross Gradient	17	Qal	58.8 - 73.5	3.1	<4.9	<0.014	1,200	1,500	----
LVWPS-A2-MW05B	6/9/2021	N	EM08	Cross Gradient	17	Qal	58.8 - 73.5	<0.31	<9.8	<0.014	1.4 J	590 J-	0.38
LVWPS-A2-MW05B	7/7/2021	N	EM09	Cross Gradient	17	Qal	58.8 - 73.5	<0.31	56 J	<0.014	25 J	170	0.16
LVWPS-A2-MW05B	7/7/2021	FD	EM09	Cross Gradient	17	Qal	58.8 - 73.5	<0.31	56 J	<0.014	17 J	170	----
LVWPS-A2-MW11A	10/2/2020	N	BL04	Cross/Downgradient	100	Qal	40.3 - 60.0	3,100	5,300	19	2,100	1.7	4.72
LVWPS-A2-MW11A	10/2/2020	FD	BL04	Cross/Downgradient	100	Qal	40.3 - 60.0	3,100	5,100	19	2,100	1.7	----
LVWPS-A2-MW11A	12/23/2020	N	EM01	Cross/Downgradient	100	Qal	40.3 - 60.0	2,900	5,000	19	2,100	2.0	3.75
LVWPS-A2-MW11A	1/13/2021	N	EM02	Cross/Downgradient	100	Qal	40.3 - 60.0	2,500	5,600	19	2,100	1.9	3.37
LVWPS-A2-MW11A	1/27/2021	N	EM03	Cross/Downgradient	100	Qal	40.3 - 60.0	2,200	4,700	5.2	1,900	1.9	3.34
LVWPS-A2-MW11A	2/9/2021	N	EM04	Cross/Downgradient	100	Qal	40.3 - 60.0	2,700	4,700	21	2,000 J-	1.7 J-	5.05
LVWPS-A2-MW11A	3/9/2021	N	EM05	Cross/Downgradient	100	Qal	40.3 - 60.0	2,800	4,900	21	2,300	1.8	4.31
LVWPS-A2-MW11A	4/6/2021	N	EM06	Cross/Downgradient	100	Qal	40.3 - 60.0	2,800	5,200	22	2,200	1.8 J+	4.46
LVWPS-A2-MW11A	5/4/2021	N	EM07	Cross/Downgradient	100	Qal	40.3 - 60.0	2,800	5,200	22	2,300	1.7 J-	4.75
LVWPS-A2-MW11A	6/8/2021	N	EM08	Cross/Downgradient	100	Qal	40.3 - 60.0	2,700	4,300 J+	20	4,400	1.7 J-	5.21
LVWPS-A2-MW11A	7/6/2021	N	EM09	Cross/Downgradient	100	Qal	40.3 - 60.0	2,700	4,500	20	2,200	1.7	3.89
LVWPS-A2-MW11B	10/2/2020	N	BL04	Cross/Downgradient	100	Qal	65.3 - 85.0	2,900	7,200	21	2,100	1.7	4.18
LVWPS-A2-MW11B	12/23/2020	N	EM01	Cross/Downgradient	100	Qal	65.3 - 85.0	2,600	6,100	22	2,100	2.3 J	7.73
LVWPS-A2-MW11B	1/13/2021	N	EM02	Cross/Downgradient	100	Qal	65.3 - 85.0	2,600	6,500	22	2,100	2.2	7.13
LVWPS-A2-MW11B	1/27/2021	N	EM03	Cross/Downgradient	100	Qal	65.3 - 85.0	3,300	6,900	23	1,900	1.9	3.35

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-A2-MW11B	2/8/2021	N	EM04	Cross/Downgradient	100	Qal	65.3 - 85.0	3,200	8,000	23	2,000	1.8	8.67
LVWPS-A2-MW11B	3/9/2021	N	EM05	Cross/Downgradient	100	Qal	65.3 - 85.0	3,000	6,600	23	2,100	1.8	6.28
LVWPS-A2-MW11B	4/6/2021	N	EM06	Cross/Downgradient	100	Qal	65.3 - 85.0	2,800	7,800	24	2,100	1.8 J+	4.14
LVWPS-A2-MW11B	5/3/2021	N	EM07	Cross/Downgradient	100	Qal	65.3 - 85.0	2,900	7,400	22	2,200	1.7	4.24 E
LVWPS-A2-MW11B	6/8/2021	N	EM08	Cross/Downgradient	100	Qal	65.3 - 85.0	3,000	6,200	24	2,100	1.6	4.14
LVWPS-A2-MW11B	7/6/2021	N	EM09	Cross/Downgradient	100	Qal	65.3 - 85.0	3,000	5,100	22	2,100	1.7	3.66
LVWPS-A2-MW11C	10/2/2020	N	BL04	Cross/Downgradient	100	Qal	90.3 - 110.0	3,500	11,000	23	2,100	1.6	3.91
LVWPS-A2-MW11C	12/23/2020	N	EM01	Cross/Downgradient	100	Qal	90.3 - 110.0	3,000	9,800	23	2,100	<0.26	3.43
LVWPS-A2-MW11C	1/14/2021	N	EM02	Cross/Downgradient	100	Qal	90.3 - 110.0	2,900	9,900	23	2,300	1.7	3.14
LVWPS-A2-MW11C	1/27/2021	N	EM03	Cross/Downgradient	100	Qal	90.3 - 110.0	3,500	11,000	24	2,000	2.2	2.67
LVWPS-A2-MW11C	2/9/2021	N	EM04	Cross/Downgradient	100	Qal	90.3 - 110.0	3,200	11,000	24	1,900	1.6 J-	6.27
LVWPS-A2-MW11C	3/10/2021	N	EM05	Cross/Downgradient	100	Qal	90.3 - 110.0	3,000	11,000	24	2,100	2.0	3.91
LVWPS-A2-MW11C	4/6/2021	N	EM06	Cross/Downgradient	100	Qal	90.3 - 110.0	2,700	12,000	25	2,200	2.5 J	3.53
LVWPS-A2-MW11C	5/4/2021	N	EM07	Cross/Downgradient	100	Qal	90.3 - 110.0	3,300	13,000	24	2,200	1.5	5.43
LVWPS-A2-MW11C	6/8/2021	N	EM08	Cross/Downgradient	100	Qal	90.3 - 110.0	3,400	7,800	24 J-	2,200	1.7 J	3.41
LVWPS-A2-MW11C	7/7/2021	N	EM09	Cross/Downgradient	100	Qal	90.3 - 110.0	3,200	13,000	23	2,200	1.6 J+	2.69
LVWPS-A2-MW15A	10/7/2020	N	BL04	Cross/Downgradient	200	Qal	39.8 - 59.5	3,400	5,100	20	2,100	1.7	4.55
LVWPS-A2-MW15A	12/21/2020	N	EM01	Cross/Downgradient	200	Qal	39.8 - 59.5	3,000	5,100	19	2,000	1.9	4.42
LVWPS-A2-MW15A	1/11/2021	N	EM02	Cross/Downgradient	200	Qal	39.8 - 59.5	2,800	5,400	19	2,200	1.9	3.70
LVWPS-A2-MW15A	1/25/2021	N	EM03	Cross/Downgradient	200	Qal	39.8 - 59.5	2,900	5,000	18	2,000	2.0 J+	3.59
LVWPS-A2-MW15A	2/9/2021	N	EM04	Cross/Downgradient	200	Qal	39.8 - 59.5	2,200	4,800	20	1,900	2.0 J-	4.64
LVWPS-A2-MW15A	3/9/2021	N	EM05	Cross/Downgradient	200	Qal	39.8 - 59.5	2,800	4,900	21	2,000	1.9	4.17
LVWPS-A2-MW15A	4/6/2021	N	EM06	Cross/Downgradient	200	Qal	39.8 - 59.5	2,600	5,100	21	2,100	2.5 J+	3.99
LVWPS-A2-MW15A	5/4/2021	N	EM07	Cross/Downgradient	200	Qal	39.8 - 59.5	2,700	5,000	20	2,200	1.8	5.52
LVWPS-A2-MW15A	6/11/2021	N	EM08	Cross/Downgradient	200	Qal	39.8 - 59.5	2,500	4,000	21	2,000	1.9 J+	4.48
LVWPS-A2-MW15A	7/8/2021	N	EM09	Cross/Downgradient	200	Qal	39.8 - 59.5	2,600	4,500	20	2,100	1.8 J+	4.07
LVWPS-A2-MW15B	10/8/2020	N	BL04	Cross/Downgradient	200	Qal	70.3 - 90.0	3,200	9,000	22	2,300	1.7	3.90
LVWPS-A2-MW15B	12/22/2020	N	EM01	Cross/Downgradient	200	Qal	70.3 - 90.0	3,300	7,600	24	2,200	2.0	4.30
LVWPS-A2-MW15B	1/12/2021	N	EM02	Cross/Downgradient	200	Qal	70.3 - 90.0	3,300	8,400	24	2,300	1.8	3.05
LVWPS-A2-MW15B	1/26/2021	N	EM03	Cross/Downgradient	200	Qal	70.3 - 90.0	3,400	9,000	25	2,000	1.8 J+	9.30 E
LVWPS-A2-MW15B	2/9/2021	N	EM04	Cross/Downgradient	200	Qal	70.3 - 90.0	2,600	9,500	24	1,800	1.7 J-	3.99
LVWPS-A2-MW15B	3/9/2021	N	EM05	Cross/Downgradient	200	Qal	70.3 - 90.0	3,100	9,400	25	2,100	1.7	3.95
LVWPS-A2-MW15B	4/6/2021	N	EM06	Cross/Downgradient	200	Qal	70.3 - 90.0	2,900	9,800	25	2,200	1.7 J+	3.83
LVWPS-A2-MW15B	5/5/2021	N	EM07	Cross/Downgradient	200	Qal	70.3 - 90.0	4,000	10,000	25 J	2,200	1.8	6.42
LVWPS-A2-MW15B	6/11/2021	N	EM08	Cross/Downgradient	200	Qal	70.3 - 90.0	3,000	9,700	23	2,200	1.7 J+	3.96
LVWPS-A2-MW15B	7/8/2021	N	EM09	Cross/Downgradient	200	Qal	70.3 - 90.0	3,200	9,800 J+	22	2,200	1.7 J+	3.04
LVWPS-A2-MW16A	10/9/2020	N	BL04	Cross/Downgradient	350	Qal	35.8 - 55.5	3,500	5,800	22	2,100	1.6	5.17
LVWPS-A2-MW16A	12/22/2020	N	EM01	Cross/Downgradient	350	Qal	35.8 - 55.5	3,600	5,600	21	2,000	1.8	3.55
LVWPS-A2-MW16A	1/12/2021	N	EM02	Cross/Downgradient	350	Qal	35.8 - 55.5	2,900	5,300	21	2,300	1.7	3.87
LVWPS-A2-MW16A	1/25/2021	N	EM03	Cross/Downgradient	350	Qal	35.8 - 55.5	3,900	5,300	20	2,000	1.8 J+	3.87
LVWPS-A2-MW16A	2/9/2021	N	EM04	Cross/Downgradient	350	Qal	35.8 - 55.5	2,600	5,600	22	1,900	1.7 J-	3.35
LVWPS-A2-MW16A	3/12/2021	N	EM05	Cross/Downgradient	350	Qal	35.8 - 55.5	2,600	5,700	23	2,000	2.0 J+	3.86
LVWPS-A2-MW16A	4/6/2021	N	EM06	Cross/Downgradient	350	Qal	35.8 - 55.5	2,500	5,800	24	2,100	1.8 J+	4.41
LVWPS-A2-MW16A	5/5/2021	N	EM07	Cross/Downgradient	350	Qal	35.8 - 55.5	3,100	5,700	24 J	2,100	1.6	5.84
LVWPS-A2-MW16A	6/10/2021	N	EM08	Cross/Downgradient	350	Qal	35.8 - 55.5	2,600	6,600	5.0	2,100	1.8	4.48
LVWPS-A2-MW16A	7/8/2021	N	EM09	Cross/Downgradient	350	Qal	35.8 - 55.5	2,700	6,000	22	2,100	1.6 J+	4.40
LVWPS-A2-MW16B	10/9/2020	N	BL04	Cross/Downgradient	350	Qal	60.3 - 80.0	3,600	9,000	22	2,200	1.5	4.45
LVWPS-A2-MW16B	10/9/2020	FD	BL04	Cross/Downgradient	350	Qal	60.3 - 80.0	3,400	9,100	22	2,200	1.6	----

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-A2-MW16B	12/22/2020	N	EM01	Cross/Downgradient	350	Qal	60.3 - 80.0	4,100	7,800	22 J-	2,100	2.0	3.44
LVWPS-A2-MW16B	1/12/2021	N	EM02	Cross/Downgradient	350	Qal	60.3 - 80.0	3,000	9,200	22	2,300	1.7	3.57
LVWPS-A2-MW16B	1/25/2021	N	EM03	Cross/Downgradient	350	Qal	60.3 - 80.0	3,500	8,400	20	2,000	1.8 J+	3.63
LVWPS-A2-MW16B	2/9/2021	N	EM04	Cross/Downgradient	350	Qal	60.3 - 80.0	2,900	8,500	22	1,900	1.7 J-	2.68
LVWPS-A2-MW16B	3/12/2021	N	EM05	Cross/Downgradient	350	Qal	60.3 - 80.0	3,000	10,000	11	2,100	1.8 J+	8.61
LVWPS-A2-MW16B	4/6/2021	N	EM06	Cross/Downgradient	350	Qal	60.3 - 80.0	3,000	9,700	23	2,200	1.7 J+	4.10
LVWPS-A2-MW16B	5/5/2021	N	EM07	Cross/Downgradient	350	Qal	60.3 - 80.0	3,900	12,000	24 J	2,200	1.6	7.00
LVWPS-A2-MW16B	6/10/2021	N	EM08	Cross/Downgradient	350	Qal	60.3 - 80.0	2,900	8,000	23	2,100	1.5	2.96
LVWPS-A2-MW16B	7/8/2021	N	EM09	Cross/Downgradient	350	Qal	60.3 - 80.0	3,000	9,500	21	2,100	1.6 J+	2.75
LVWPS-U2-MW06	10/1/2020	N	BL04	Downgradient	25	UMCf	121.8 - 141.5	4,100	7,300	9.5	1,900	0.94	2.79
LVWPS-U2-MW06	1/11/2021	N	EM02	Downgradient	25	UMCf	121.8 - 141.5	4,200	5,700	7.0	2,000	<1.3	1.01
LVWPS-U2-MW06	2/8/2021	N	EM04	Downgradient	25	UMCf	121.8 - 141.5	3,900	5,500	8.0	2,000	1.3 J	1.45
LVWPS-U2-MW06	3/9/2021	N	EM05	Downgradient	25	UMCf	121.8 - 141.5	3,700	5,200	7.7	2,200	1.2 J	2.12
LVWPS-U2-MW06	4/6/2021	N	EM06	Downgradient	25	UMCf	121.8 - 141.5	3,700	5,500	10	2,000	1.4 J	1.53
LVWPS-U2-MW06	6/7/2021	N	EM08	Downgradient	25	UMCf	121.8 - 141.5	7,900	5,500	11	2,200	1.1 J	1.48
LVWPS-U2-MW18	10/5/2020	N	BL04	Downgradient	25	UMCf	88.3 - 113.0	8,400	10,000	18	2,200	1.3	4.49
LVWPS-U2-MW18	1/11/2021	N	EM02	Downgradient	25	UMCf	88.3 - 113.0	5,800	8,800	18	2,400	1.8 J	2.83
LVWPS-U2-MW18	2/8/2021	N	EM04	Downgradient	25	UMCf	88.3 - 113.0	6,000	8,800	18	2,000	<2.6 UJ	4.08
LVWPS-U2-MW18	3/9/2021	N	EM05	Downgradient	25	UMCf	88.3 - 113.0	5,100	9,500	17	2,400	1.8	3.15
LVWPS-U2-MW18	4/5/2021	N	EM06	Downgradient	25	UMCf	88.3 - 113.0	4,800	8,100	17	2,200	2.4	2.12
LVWPS-U2-MW18	6/8/2021	N	EM08	Downgradient	25	UMCf	88.3 - 113.0	4,800	6,700	15	2,200	2.0	2.17
LVWPS-A2-MW08A	9/30/2020	N	BL04	Downgradient	50	Qal	40.3 - 55.0	2,700	2,100	20	2,100	1.9 J+	5.27
LVWPS-A2-MW08A	12/23/2020	N	EM01	Downgradient	50	Qal	40.3 - 55.0	1,400	2,000	4.7	2,100	7.4	0.91
LVWPS-A2-MW08A	1/15/2021	N	EM02	Downgradient	50	Qal	40.3 - 55.0	750	1,300	3.2	2,200	25	1.84
LVWPS-A2-MW08A	1/26/2021	N	EM03	Downgradient	50	Qal	40.3 - 55.0	1,100	1,800	6.1	1,800	6.5	0.86
LVWPS-A2-MW08A	2/10/2021	N	EM04	Downgradient	50	Qal	40.3 - 55.0	1,800	3,400	11	2,000	2.7	0.61
LVWPS-A2-MW08A	3/10/2021	N	EM05	Downgradient	50	Qal	40.3 - 55.0	2,000	3,200	13	2,100	2.3	0.83
LVWPS-A2-MW08A	4/6/2021	N	EM06	Downgradient	50	Qal	40.3 - 55.0	2,000	4,300	16	2,000	2.1 J+	1.97
LVWPS-A2-MW08A	5/3/2021	N	EM07	Downgradient	50	Qal	40.3 - 55.0	21 J-	79 J	0.016 J	1,800	65	0.24
LVWPS-A2-MW08A	6/8/2021	N	EM08	Downgradient	50	Qal	40.3 - 55.0	200	200	0.60	1,400	3.1	0.08
LVWPS-A2-MW08A	7/7/2021	N	EM09	Downgradient	50	Qal	40.3 - 55.0	200 J+	520	1.1	1,400	2.9 J	1.35
LVWPS-A2-MW08B	10/1/2020	N	BL04	Downgradient	50	Qal	59.8 - 79.5	3,800	6,000	21	2,000	1.8	5.25
LVWPS-A2-MW08B	12/23/2020	N	EM01	Downgradient	50	Qal	59.8 - 79.5	2,400	4,900	18	2,000	2.4	1.45
LVWPS-A2-MW08B	1/15/2021	N	EM02	Downgradient	50	Qal	59.8 - 79.5	2,100	4,400	15	2,100	2.2	1.76
LVWPS-A2-MW08B	1/26/2021	N	EM03	Downgradient	50	Qal	59.8 - 79.5	2,500	4,600	16	1,900	2.4 J+	1.54
LVWPS-A2-MW08B	2/10/2021	N	EM04	Downgradient	50	Qal	59.8 - 79.5	2,600	4,700	20	2,200	2.3	1.96
LVWPS-A2-MW08B	3/10/2021	N	EM05	Downgradient	50	Qal	59.8 - 79.5	2,800	4,900	19	2,300	2.1	2.18
LVWPS-A2-MW08B	4/9/2021	N	EM06	Downgradient	50	Qal	59.8 - 79.5	2,600	5,600	22	2,200	1.9	3.78
LVWPS-A2-MW08B	5/3/2021	N	EM07	Downgradient	50	Qal	59.8 - 79.5	25	<49	0.042 J	1,900	140	0.24
LVWPS-A2-MW08B	6/8/2021	N	EM08	Downgradient	50	Qal	59.8 - 79.5	240	140	0.83	1,700	18	0.05
LVWPS-A2-MW08B	7/7/2021	N	EM09	Downgradient	50	Qal	59.8 - 79.5	200	130 J	0.68	1,600	4.2 J+	0.00
LVWPS-A2-MW08C	10/1/2020	N	BL04	Downgradient	50	Qal	86.3 - 106.0	4,100	7,200	21	2,200	1.7	4.92
LVWPS-A2-MW08C	12/23/2020	N	EM01	Downgradient	50	Qal	86.3 - 106.0	110	<10	<0.014	2,400	210	0.81
LVWPS-A2-MW08C	1/15/2021	N	EM02	Downgradient	50	Qal	86.3 - 106.0	<0.31	<10	<0.014	2,100	130	0.35
LVWPS-A2-MW08C	1/28/2021	N	EM03	Downgradient	50	Qal	86.3 - 106.0	<3.1	<10	<0.014	1,400	91	0.42
LVWPS-A2-MW08C	2/10/2021	N	EM04	Downgradient	50	Qal	86.3 - 106.0	140	39 J	<0.014	1,500	100	0.29
LVWPS-A2-MW08C	3/10/2021	N	EM05	Downgradient	50	Qal	86.3 - 106.0	130	<10	<0.014	1,300	53	0.23
LVWPS-A2-MW08C	4/9/2021	N	EM06	Downgradient	50	Qal	86.3 - 106.0	310	140	0.18	1,800	3.6	0.43

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Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-A2-MW08C	5/4/2021	N	EM07	Downgradient	50	Qal	86.3 - 106.0	230	210	0.53	2,100	13	0.27
LVWPS-A2-MW08C	6/8/2021	N	EM08	Downgradient	50	Qal	86.3 - 106.0	420	320	1.2	1,900	3.1	0.01
LVWPS-A2-MW08C	7/7/2021	N	EM09	Downgradient	50	Qal	86.3 - 106.0	750 J+	910	2.7	1,900	3.2 J+	-0.05
LVWPS-A2-MW09A	10/9/2020	N	BL04	Downgradient	50	Qal	34.8 - 54.5	3,400	5,500	17	2,500	1.4	5.63
LVWPS-A2-MW09A	12/22/2020	N	EM01	Downgradient	50	Qal	34.8 - 54.5	1,900	2,300	8.3 J-	2,000	1.7 J	4.92
LVWPS-A2-MW09A	1/11/2021	N	EM02	Downgradient	50	Qal	34.8 - 54.5	3,000	3,200	12	2,400	1.5	2.82
LVWPS-A2-MW09A	1/11/2021	FD	EM02	Downgradient	50	Qal	34.8 - 54.5	3,200	3,400	12	2,500	1.6	----
LVWPS-A2-MW09A	1/26/2021	N	EM03	Downgradient	50	Qal	34.8 - 54.5	2,200	2,700	8.7	2,400	2.1 J+	1.94
LVWPS-A2-MW09A	2/8/2021	N	EM04	Downgradient	50	Qal	34.8 - 54.5	2,100	3,000	11	2,300	1.4	4.10
LVWPS-A2-MW09A	2/8/2021	FD	EM04	Downgradient	50	Qal	34.8 - 54.5	2,200	3,100	11	2,300	1.5	----
LVWPS-A2-MW09A	3/8/2021	N	EM05	Downgradient	50	Qal	34.8 - 54.5	2,300	3,400	13	2,100	1.4	2.09
LVWPS-A2-MW09A	3/8/2021	FD	EM05	Downgradient	50	Qal	34.8 - 54.5	2,300	3,300	11	2,200	1.5	----
LVWPS-A2-MW09A	4/5/2021	N	EM06	Downgradient	50	Qal	34.8 - 54.5	1,000	3,200	11	2,300	1.5	2.30
LVWPS-A2-MW09A	4/5/2021	FD	EM06	Downgradient	50	Qal	34.8 - 54.5	1,000	3,200	11	2,300	1.7	----
LVWPS-A2-MW09A	5/4/2021	N	EM07	Downgradient	50	Qal	34.8 - 54.5	1,700	2,500	12	2,300	2.3	2.64
LVWPS-A2-MW09A	5/4/2021	FD	EM07	Downgradient	50	Qal	34.8 - 54.5	1,800	2,100	11	2,300	2.4	----
LVWPS-A2-MW09A	6/7/2021	N	EM08	Downgradient	50	Qal	34.8 - 54.5	2,100	3,100	14	2,300	1.4	0.52
LVWPS-A2-MW09A	6/7/2021	FD	EM08	Downgradient	50	Qal	34.8 - 54.5	2,100	3,000	13	2,200	1.4	----
LVWPS-A2-MW09A	7/8/2021	N	EM09	Downgradient	50	Qal	34.8 - 54.5	2,300	3,000 J+	11	4,600 J	1.5 J+	1.06
LVWPS-A2-MW09A	7/8/2021	FD	EM09	Downgradient	50	Qal	34.8 - 54.5	2,300	3,000 J+	13	2,300 J	1.6 J+	----
LVWPS-A2-MW09B	10/9/2020	N	BL04	Downgradient	50	Qal	58.8 - 78.5	1,600	2,100	8.8	2,000	0.60	7.44
LVWPS-A2-MW09B	12/22/2020	N	EM01	Downgradient	50	Qal	58.8 - 78.5	1,500	1,600	5.5	1,800	0.69	3.74
LVWPS-A2-MW09B	1/14/2021	N	EM02	Downgradient	50	Qal	58.8 - 78.5	1,300	1,700	6.1	1,900	0.59	3.90
LVWPS-A2-MW09B	1/27/2021	N	EM03	Downgradient	50	Qal	58.8 - 78.5	1,500	1,600	6.5	1,700	0.64	3.54
LVWPS-A2-MW09B	2/8/2021	N	EM04	Downgradient	50	Qal	58.8 - 78.5	1,500	1,800	7.2	1,800	0.71	4.12
LVWPS-A2-MW09B	3/8/2021	N	EM05	Downgradient	50	Qal	58.8 - 78.5	1,400	1,800	7.2	1,700	0.63	6.42
LVWPS-A2-MW09B	4/5/2021	N	EM06	Downgradient	50	Qal	58.8 - 78.5	720	2,000	8.5	1,900	0.64	6.05
LVWPS-A2-MW09B	5/4/2021	N	EM07	Downgradient	50	Qal	58.8 - 78.5	1,100	1,300	5.2	2,000	1.4	1.62
LVWPS-A2-MW09B	6/7/2021	N	EM08	Downgradient	50	Qal	58.8 - 78.5	1,600	2,000	8.1	2,100	0.79	0.26
LVWPS-A2-MW09B	7/7/2021	N	EM09	Downgradient	50	Qal	58.8 - 78.5	1,700	2,300	8.2	2,000	0.89 J+	0.15
LVWPS-A2-MW14A	10/6/2020	N	BL04	Downgradient	50	Qal	35.8 - 50.5	2,600	5,400	19	2,200	1.7	5.77
LVWPS-A2-MW14A	10/6/2020	FD	BL04	Downgradient	50	Qal	35.8 - 50.5	2,700	5,100	19	2,200	1.7	----
LVWPS-A2-MW14A	12/22/2020	N	EM01	Downgradient	50	Qal	35.8 - 50.5	130	240	0.58 J-	2,300	28	0.33
LVWPS-A2-MW14A	12/22/2020	FD	EM01	Downgradient	50	Qal	35.8 - 50.5	140	210	0.58 J-	2,200	29	----
LVWPS-A2-MW14A	1/13/2021	N	EM02	Downgradient	50	Qal	35.8 - 50.5	200	250	0.57	1,900	31	0.69
LVWPS-A2-MW14A	1/13/2021	FD	EM02	Downgradient	50	Qal	35.8 - 50.5	210	220	0.59	1,900	32	----
LVWPS-A2-MW14A	1/28/2021	N	EM03	Downgradient	50	Qal	35.8 - 50.5	50	65 J	0.24	950	59	1.02
LVWPS-A2-MW14A	1/28/2021	FD	EM03	Downgradient	50	Qal	35.8 - 50.5	59	52 J	0.25	960	61	----
LVWPS-A2-MW14A	2/9/2021	N	EM04	Downgradient	50	Qal	35.8 - 50.5	23	<10	0.053	890	41 J-	0.72
LVWPS-A2-MW14A	2/9/2021	FD	EM04	Downgradient	50	Qal	35.8 - 50.5	23	<10	0.038 J	890	41 J-	----
LVWPS-A2-MW14A	3/9/2021	N	EM05	Downgradient	50	Qal	35.8 - 50.5	13	12 J	<0.014	920	49	0.27
LVWPS-A2-MW14A	3/9/2021	FD	EM05	Downgradient	50	Qal	35.8 - 50.5	13	32 J	<0.014	910	50	----
LVWPS-A2-MW14A	4/6/2021	N	EM06	Downgradient	50	Qal	35.8 - 50.5	67	96 J	0.32 J+	1,100	4.2 J+	0.36
LVWPS-A2-MW14A	4/6/2021	FD	EM06	Downgradient	50	Qal	35.8 - 50.5	68	99 J	0.30 J+	1,100	4.0 J+	----
LVWPS-A2-MW14A	5/3/2021	N	EM07	Downgradient	50	Qal	35.8 - 50.5	58	42 J	0.047 J	800 J-	230	0.31
LVWPS-A2-MW14A	6/8/2021	N	EM08	Downgradient	50	Qal	35.8 - 50.5	62	85 J	0.18	140 J+	6.1	0.19
LVWPS-A2-MW14A	6/8/2021	FD	EM08	Downgradient	50	Qal	35.8 - 50.5	62	91 J	0.20	140 J+	5.5	----
LVWPS-A2-MW14A	7/6/2021	N	EM09	Downgradient	50	Qal	35.8 - 50.5	64	80	<0.014	380	7.2	0.12



**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-A2-MW14B	10/6/2020	N	BL04	Downgradient	50	Qal	54.8 - 74.5	2,800	5,400	18	2,300	1.6	5.42
LVWPS-A2-MW14B	12/22/2020	N	EM01	Downgradient	50	Qal	54.8 - 74.5	1,700	2,800	7.9	2,400	7.4	0.28
LVWPS-A2-MW14B	1/13/2021	N	EM02	Downgradient	50	Qal	54.8 - 74.5	1,800	3,800	10	2,300	3.1	0.70
LVWPS-A2-MW14B	1/25/2021	N	EM03	Downgradient	50	Qal	54.8 - 74.5	2,400	3,000	8.6	2,100	2.2 J+	0.98
LVWPS-A2-MW14B	2/9/2021	N	EM04	Downgradient	50	Qal	54.8 - 74.5	1,400	2,600	9.5	2,000	6.2 J-	0.73
LVWPS-A2-MW14B	3/10/2021	N	EM05	Downgradient	50	Qal	54.8 - 74.5	2,200	3,700	13	2,100	2.1	1.41
LVWPS-A2-MW14B	4/6/2021	N	EM06	Downgradient	50	Qal	54.8 - 74.5	2,200	4,000	15	2,300	2.1 J+	0.91
LVWPS-A2-MW14B	5/3/2021	N	EM07	Downgradient	50	Qal	54.8 - 74.5	1,600	1,800	4.7	3,200	4.3	0.31
LVWPS-A2-MW14B	6/8/2021	N	EM08	Downgradient	50	Qal	54.8 - 74.5	1,700	1,900	12	2,200	2.1 J+	0.32
LVWPS-A2-MW14B	7/6/2021	N	EM09	Downgradient	50	Qal	54.8 - 74.5	2,400	3,300	14	2,200	2.8	0.12
LVWPS-U2-MW08	10/1/2020	N	BL04	Downgradient	50	UMCf	113.2 - 133.0	4,600	8,100	17	2,100	1.5	2.63
LVWPS-U2-MW08	1/11/2021	N	EM02	Downgradient	50	UMCf	113.2 - 133.0	3,100	9,400	9.1	1,900	<0.26	0.54
LVWPS-U2-MW08	2/8/2021	N	EM04	Downgradient	50	UMCf	113.2 - 133.0	3,400	9,200	9.8	1,800	1.1 J	1.84
LVWPS-U2-MW08	3/8/2021	N	EM05	Downgradient	50	UMCf	113.2 - 133.0	4,600	14,000	10	1,500	0.50 J-	1.99
LVWPS-U2-MW08	4/5/2021	N	EM06	Downgradient	50	UMCf	113.2 - 133.0	5,000	10,000	11	1,800	0.51	1.95
LVWPS-U2-MW08	6/7/2021	N	EM08	Downgradient	50	UMCf	113.2 - 133.0	490 J-	9,000	11	1,800	<1.0	2.63
LVWPS-U2-MW09	10/9/2020	N	BL04	Downgradient	50	UMCf	84.9 - 104.7	12,000	18,000	17	2,200	1.1	2.06
LVWPS-U2-MW09	1/18/2021	N	EM02	Downgradient	50	UMCf	84.9 - 104.7	9,800	15,000	17	2,300	1.4 J	2.21
LVWPS-U2-MW09	2/8/2021	N	EM04	Downgradient	50	UMCf	84.9 - 104.7	10,000	15,000	16	1,900	2.6 J	3.42
LVWPS-U2-MW09	3/8/2021	N	EM05	Downgradient	50	UMCf	84.9 - 104.7	8,900	16,000	17	2,000	1.1	3.36
LVWPS-U2-MW09	4/5/2021	N	EM06	Downgradient	50	UMCf	84.9 - 104.7	2,000	11,000	17	1,900	1.5	2.69
LVWPS-U2-MW09	6/7/2021	N	EM08	Downgradient	50	UMCf	84.9 - 104.7	9,600	17,000	3.7	2,300	1.2 J	2.69
LVWPS-U2-MW14	10/6/2020	N	BL04	Downgradient	50	UMCf	83.2 - 108.0	11,000	360	17	2,000	0.78	5.18
LVWPS-U2-MW14	1/13/2021	N	EM02	Downgradient	50	UMCf	83.2 - 108.0	9,600	20,000	8.9	1,900	1.4 J	0.82
LVWPS-U2-MW14	2/9/2021	N	EM04	Downgradient	50	UMCf	83.2 - 108.0	7,300	12,000	13	1,900	2.1 J-	1.49
LVWPS-U2-MW14	3/10/2021	N	EM05	Downgradient	50	UMCf	83.2 - 108.0	9,200	11,000	11	1,800	1.1	1.26
LVWPS-U2-MW14	4/6/2021	N	EM06	Downgradient	50	UMCf	83.2 - 108.0	9,300	13,000	15	1,900	1.2 J+	0.95
LVWPS-U2-MW14	6/9/2021	N	EM08	Downgradient	50	UMCf	83.2 - 108.0	10,000	18,000	15	1,900	0.89	1.89
LVWPS-A2-MW12A	10/6/2020	N	BL04	Downgradient	100	Qal	34.9 - 44.5	4,400	5,300	18	2,100	1.7	4.83
LVWPS-A2-MW12A	12/22/2020	N	EM01	Downgradient	100	Qal	34.9 - 44.5	32	50 J	<0.014	2,500	120	0.56
LVWPS-A2-MW12A	12/22/2020	FD	EM01	Downgradient	100	Qal	34.9 - 44.5	40	48 J	<0.014	2,400	120	----
LVWPS-A2-MW12A	1/11/2021	N	EM02	Downgradient	100	Qal	34.9 - 44.5	<0.31	<4.0	<0.014	2,100	92	0.74
LVWPS-A2-MW12A	1/27/2021	N	EM03	Downgradient	100	Qal	34.9 - 44.5	<0.31	<10	<0.014	200	8.0	0.45
LVWPS-A2-MW12A	2/8/2021	N	EM04	Downgradient	100	Qal	34.9 - 44.5	<0.31	<10	0.023 J	14	33	1.34
LVWPS-A2-MW12A	3/8/2021	N	EM05	Downgradient	100	Qal	34.9 - 44.5	0.47 J	<10	<0.014	290	4.0	0.18
LVWPS-A2-MW12A	4/5/2021	N	EM06	Downgradient	100	Qal	34.9 - 44.5	<0.31	<10	<0.014	650	3.4	0.70
LVWPS-A2-MW12A	5/5/2021	N	EM07	Downgradient	100	Qal	34.9 - 44.5	<0.31	<24	<0.014	2.6	140	0.40
LVWPS-A2-MW12A	5/5/2021	FD	EM07	Downgradient	100	Qal	34.9 - 44.5	<0.31	<24	<0.014	3.0	140	----
LVWPS-A2-MW12A	6/7/2021	N	EM08	Downgradient	100	Qal	34.9 - 44.5	<0.31	<24	<0.014	23	6.0	0.64
LVWPS-A2-MW12A	7/9/2021	N	EM09	Downgradient	100	Qal	34.9 - 44.5	<0.31	<9.8	<0.014	370	4.5	0.46
LVWPS-A2-MW12A	7/9/2021	FD	EM09	Downgradient	100	Qal	34.9 - 44.5	<0.31	<9.8	<0.014	380	4.7	----
LVWPS-A2-MW12B	10/7/2020	N	BL04	Downgradient	100	Qal	49.3 - 69.0	4,000	5,600	19	2,300	1.6	4.82
LVWPS-A2-MW12B	12/22/2020	N	EM01	Downgradient	100	Qal	49.3 - 69.0	12	<10	<0.014	2,100	45	0.53
LVWPS-A2-MW12B	1/12/2021	N	EM02	Downgradient	100	Qal	49.3 - 69.0	170	130	0.036 J	2,300	11	0.68
LVWPS-A2-MW12B	1/27/2021	N	EM03	Downgradient	100	Qal	49.3 - 69.0	220	140	<0.014	1,900	2.8	0.57
LVWPS-A2-MW12B	1/27/2021	FD	EM03	Downgradient	100	Qal	49.3 - 69.0	220	150	<0.014	2,000	2.9	----
LVWPS-A2-MW12B	2/8/2021	N	EM04	Downgradient	100	Qal	49.3 - 69.0	20	28 J	<0.014	2,100	2.8	1.31
LVWPS-A2-MW12B	3/8/2021	N	EM05	Downgradient	100	Qal	49.3 - 69.0	340	490	1.1	1,900	2.4	0.23

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-A2-MW12B	4/5/2021	N	EM06	Downgradient	100	Qal	49.3 - 69.0	1,200	1,700	4.6	2,100	2.7	0.75
LVWPS-A2-MW12B	5/5/2021	N	EM07	Downgradient	100	Qal	49.3 - 69.0	40	54 J	<0.014	2,000	14 J-	0.36
LVWPS-A2-MW12B	6/7/2021	N	EM08	Downgradient	100	Qal	49.3 - 69.0	510	460	0.78	2,000	2.3	0.55
LVWPS-A2-MW12B	7/9/2021	N	EM09	Downgradient	100	Qal	49.3 - 69.0	1,000	1,600	4.1	2,000	2.1	0.39
LVWPS-A2-MW13A	10/1/2020	N	BL04	Downgradient	100	Qal	41.3 - 61.0	1,200	2,100	10	1,800	0.76	6.60
LVWPS-A2-MW13A	12/22/2020	N	EM01	Downgradient	100	Qal	41.3 - 61.0	1,100	1,300	7.3	1,900	1.4	6.32
LVWPS-A2-MW13A	1/11/2021	N	EM02	Downgradient	100	Qal	41.3 - 61.0	1,100	1,100	5.9	2,300	1.7	0.85
LVWPS-A2-MW13A	1/27/2021	N	EM03	Downgradient	100	Qal	41.3 - 61.0	1,700	1,900	8.9	2,000	1.6	1.12
LVWPS-A2-MW13A	2/10/2021	N	EM04	Downgradient	100	Qal	41.3 - 61.0	2,000	2,300	12	2,000	1.4	1.87
LVWPS-A2-MW13A	3/11/2021	N	EM05	Downgradient	100	Qal	41.3 - 61.0	1,400	1,900	8.5	1,900	1.1 J	4.82
LVWPS-A2-MW13A	4/7/2021	N	EM06	Downgradient	100	Qal	41.3 - 61.0	2,000	2,900	14	2,300	1.3 J+	1.89
LVWPS-A2-MW13A	5/4/2021	N	EM07	Downgradient	100	Qal	41.3 - 61.0	69	90 J	0.29	2,200	84	1.46
LVWPS-A2-MW13A	6/9/2021	N	EM08	Downgradient	100	Qal	41.3 - 61.0	490	650	2.9	2,300	1.7	0.47
LVWPS-A2-MW13A	7/7/2021	N	EM09	Downgradient	100	Qal	41.3 - 61.0	300 J+	370	1.6	2,400	1.7 J+	0.09
LVWPS-A2-MW13B	10/1/2020	N	BL04	Downgradient	100	Qal	66.4 - 86.1	2,200	4,300	15	2,200	1.2	5.76
LVWPS-A2-MW13B	12/22/2020	N	EM01	Downgradient	100	Qal	66.4 - 86.1	610	830	3.5	2,200	32	2.43
LVWPS-A2-MW13B	1/12/2021	N	EM02	Downgradient	100	Qal	66.4 - 86.1	38	58 J	0.11 J	2,100	21	0.49
LVWPS-A2-MW13B	1/27/2021	N	EM03	Downgradient	100	Qal	66.4 - 86.1	52	26 J	0.71	1,700	9.6	0.44
LVWPS-A2-MW13B	2/10/2021	N	EM04	Downgradient	100	Qal	66.4 - 86.1	170	240	0.76	1,600	3.6	0.85
LVWPS-A2-MW13B	3/11/2021	N	EM05	Downgradient	100	Qal	66.4 - 86.1	520	380	3.3	1,800	1.8	1.19
LVWPS-A2-MW13B	4/7/2021	N	EM06	Downgradient	100	Qal	66.4 - 86.1	230	170 J+	0.58 J+	2,000	1.9 J+	0.90
LVWPS-A2-MW13B	5/4/2021	N	EM07	Downgradient	100	Qal	66.4 - 86.1	65	86 J	0.13 J+	1,400	4.5	0.94
LVWPS-A2-MW13B	6/10/2021	N	EM08	Downgradient	100	Qal	66.4 - 86.1	120	91 J	0.34	1,700	2.0	0.44
LVWPS-A2-MW13B	7/7/2021	N	EM09	Downgradient	100	Qal	66.4 - 86.1	190 J+	130	0.53	1,800	1.8 J+	0.20
LVWPS-A2-MW17A	10/1/2020	N	BL04	Downgradient	100	Qal	40.3 - 60.0	2,500	5,300	19	2,100	1.7	4.90
LVWPS-A2-MW17A	12/22/2020	N	EM01	Downgradient	100	Qal	40.3 - 60.0	2,100	2,100	6.4	2,200	2.8	0.37
LVWPS-A2-MW17A	1/11/2021	N	EM02	Downgradient	100	Qal	40.3 - 60.0	2,100	3,000	8.7	2,200	2.0	0.67
LVWPS-A2-MW17A	1/26/2021	N	EM03	Downgradient	100	Qal	40.3 - 60.0	2,700	3,700	14	1,900	2.4 J+	1.77 E
LVWPS-A2-MW17A	2/8/2021	N	EM04	Downgradient	100	Qal	40.3 - 60.0	2,400	3,600	13	2,000	1.9	1.18
LVWPS-A2-MW17A	3/8/2021	N	EM05	Downgradient	100	Qal	40.3 - 60.0	1,900	3,500	14	1,900	2.0	3.86
LVWPS-A2-MW17A	4/5/2021	N	EM06	Downgradient	100	Qal	40.3 - 60.0	2,400	4,400	18	2,100	2.0	1.84
LVWPS-A2-MW17A	5/3/2021	N	EM07	Downgradient	100	Qal	40.3 - 60.0	1,800	2,400	8.4	2,200	4.1	1.40 E
LVWPS-A2-MW17A	6/7/2021	N	EM08	Downgradient	100	Qal	40.3 - 60.0	1,800	2,800	12	1,800	1.8	1.48
LVWPS-A2-MW17A	7/6/2021	N	EM09	Downgradient	100	Qal	40.3 - 60.0	2,100	2,800	14	2,000	1.9	0.59
LVWPS-A2-MW17B	10/1/2020	N	BL04	Downgradient	100	Qal	65.3 - 85.0	2,700	5,700	21	2,100	1.7	4.83
LVWPS-A2-MW17B	12/22/2020	N	EM01	Downgradient	100	Qal	65.3 - 85.0	560	350	1.2	2,200	7.6	0.37
LVWPS-A2-MW17B	1/11/2021	N	EM02	Downgradient	100	Qal	65.3 - 85.0	790	1,200	3.2	2,200	6.8	0.26
LVWPS-A2-MW17B	1/26/2021	N	EM03	Downgradient	100	Qal	65.3 - 85.0	870	1,300	3.3	1,700	4.5	7.06 E
LVWPS-A2-MW17B	2/8/2021	N	EM04	Downgradient	100	Qal	65.3 - 85.0	1,100	1,400	4.5	1,800	3.5	4.10
LVWPS-A2-MW17B	3/8/2021	N	EM05	Downgradient	100	Qal	65.3 - 85.0	530	560	3.1	1,700	3.2	3.35
LVWPS-A2-MW17B	4/5/2021	N	EM06	Downgradient	100	Qal	65.3 - 85.0	1,600	2,900	13	2,100	2.4	1.01
LVWPS-A2-MW17B	5/3/2021	N	EM07	Downgradient	100	Qal	65.3 - 85.0	1,200	1,900	4.9	1,900	10	1.30 E
LVWPS-A2-MW17B	6/7/2021	N	EM08	Downgradient	100	Qal	65.3 - 85.0	2,100	5,600	16	2,000	1.9	1.02
LVWPS-A2-MW17B	7/6/2021	N	EM09	Downgradient	100	Qal	65.3 - 85.0	2,200	9,100	16	2,100	1.9	0.29
LVWPS-A2-MW17C	10/1/2020	N	BL04	Downgradient	100	Qal	90.3 - 110.0	2,200	3,700	14	2,100	1.1	5.67
LVWPS-A2-MW17C	12/22/2020	N	EM01	Downgradient	100	Qal	90.3 - 110.0	2,000	1,700	4.3	1,900	4.8	2.30
LVWPS-A2-MW17C	1/11/2021	N	EM02	Downgradient	100	Qal	90.3 - 110.0	660	920	2.6	2,100	3.6	0.91
LVWPS-A2-MW17C	1/26/2021	N	EM03	Downgradient	100	Qal	90.3 - 110.0	720	1,000	2.5	1,800	2.9	3.80 E

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-A2-MW17C	2/8/2021	N	EM04	Downgradient	100	Qal	90.3 - 110.0	570	760	2.1	1,200	62	3.93
LVWPS-A2-MW17C	3/8/2021	N	EM05	Downgradient	100	Qal	90.3 - 110.0	1,300	2,100	6.7	1,700	1.4	7.18
LVWPS-A2-MW17C	4/5/2021	N	EM06	Downgradient	100	Qal	90.3 - 110.0	920	970	4.8	1,800	3.0	0.34
LVWPS-A2-MW17C	5/3/2021	N	EM07	Downgradient	100	Qal	90.3 - 110.0	370	440	1.1	1,500	4.7	2.22 E
LVWPS-A2-MW17C	6/8/2021	N	EM08	Downgradient	100	Qal	90.3 - 110.0	440	690	2.8	1,500	2.7	1.35
LVWPS-A2-MW17C	7/6/2021	N	EM09	Downgradient	100	Qal	90.3 - 110.0	<0.31	<9.8	<0.014	1,400	3.5	0.20
LVWPS-U2-MW12	10/7/2020	N	BL04	Downgradient	100	UMCf	83.2 - 108.0	8,800	12,000	18	2,000	1.1	4.13
LVWPS-U2-MW12	1/12/2021	N	EM02	Downgradient	100	UMCf	83.2 - 108.0	7,000	11,000	16	1,900	1.4 J	3.9
LVWPS-U2-MW12	2/8/2021	N	EM04	Downgradient	100	UMCf	83.2 - 108.0	7,500	11,000	15	2,000	1.0 J-	3.80
LVWPS-U2-MW12	3/8/2021	N	EM05	Downgradient	100	UMCf	83.2 - 108.0	6,100	14,000	13	1,900	1.1	2.73
LVWPS-U2-MW12	4/7/2021	N	EM06	Downgradient	100	UMCf	83.2 - 108.0	6,200	11,000	15	2,000	1.4 J+	3.05
LVWPS-U2-MW12	6/7/2021	N	EM08	Downgradient	100	UMCf	83.2 - 108.0	6,700	11,000	15	2,100	1.0	2.70
LVWPS-U2-MW17	10/1/2020	N	BL04	Downgradient	100	UMCf	117.0 - 136.5	4,500	10,000	11	1,700	0.66	2.28
LVWPS-U2-MW17	1/12/2021	N	EM02	Downgradient	100	UMCf	117.0 - 136.5	1,800	800	<0.14	2,200	6.1	0.64
LVWPS-U2-MW17	1/12/2021	FD	EM02	Downgradient	100	UMCf	117.0 - 136.5	2,100	810	0.036 J	2,200	6.6	----
LVWPS-U2-MW17	2/8/2021	N	EM04	Downgradient	100	UMCf	117.0 - 136.5	2,000	3,900	3.9	2,000	2.0	2.19
LVWPS-U2-MW17	2/8/2021	FD	EM04	Downgradient	100	UMCf	117.0 - 136.5	2,200	3,800	3.9	2,000	1.9 J	----
LVWPS-U2-MW17	3/9/2021	N	EM05	Downgradient	100	UMCf	117.0 - 136.5	3,400	6,500	6.2	2,100	2.0	2.52
LVWPS-U2-MW17	3/9/2021	FD	EM05	Downgradient	100	UMCf	117.0 - 136.5	3,400	6,600	6.6	2,100	2.0	----
LVWPS-U2-MW17	4/6/2021	N	EM06	Downgradient	100	UMCf	117.0 - 136.5	3,700	7,600	9.6	2,000	1.9 J	1.51
LVWPS-U2-MW17	4/6/2021	FD	EM06	Downgradient	100	UMCf	117.0 - 136.5	3,700	7,600	9.7	2,100	2.2 J+	----
LVWPS-U2-MW17	6/9/2021	N	EM08	Downgradient	100	UMCf	117.0 - 136.5	4,100	6,300	12	2,000	1.8 J	2.12
LVWPS-U2-MW17	6/9/2021	FD	EM08	Downgradient	100	UMCf	117.0 - 136.5	3,900	4,700	12	2,000	2.1	----
LVWPS-MW223A	10/6/2020	N	BL04	Downgradient	200	Qal	45.3 - 65.0	3,300	5,900	17	2,400	1.4	4.57
LVWPS-MW223A	10/6/2020	FD	BL04	Downgradient	200	Qal	45.3 - 65.0	3,900	5,800	17	2,400	1.4	----
LVWPS-MW223A	12/22/2020	N	EM01	Downgradient	200	Qal	45.3 - 65.0	4,100	370	0.54	2,700	11	0.33
LVWPS-MW223A	1/11/2021	N	EM02	Downgradient	200	Qal	45.3 - 65.0	730	820	1.4	2,600	<21	1.14
LVWPS-MW223A	1/26/2021	N	EM03	Downgradient	200	Qal	45.3 - 65.0	2,700	3,700	9.1	2,600	1.4 J+	1.03 E
LVWPS-MW223A	2/8/2021	N	EM04	Downgradient	200	Qal	45.3 - 65.0	2,700	3,500	9.6	2,500	1.5	0.24
LVWPS-MW223A	3/8/2021	N	EM05	Downgradient	200	Qal	45.3 - 65.0	2,900	4,400	12	2,400	1.5	0.78
LVWPS-MW223A	4/5/2021	N	EM06	Downgradient	200	Qal	45.3 - 65.0	3,100	5,000	14	2,500	1.4	0.73
LVWPS-MW223A	5/5/2021	N	EM07	Downgradient	200	Qal	45.3 - 65.0	1,200	1,700	5.5	2,500	1.5	0.65
LVWPS-MW223A	6/7/2021	N	EM08	Downgradient	200	Qal	45.3 - 65.0	1,600	4,500	13	2,500	1.3	0.16
LVWPS-MW223A	7/8/2021	N	EM09	Downgradient	200	Qal	45.3 - 65.0	2,900	4,000 J+	13	2,400	1.5 J+	0.11
LVWPS-MW223B	10/6/2020	N	BL04	Downgradient	200	Qal	70.3 - 90.0	3,300	6,100	20	2,100	1.8	4.26
LVWPS-MW223B	12/22/2020	N	EM01	Downgradient	200	Qal	70.3 - 90.0	2,100	2,800	6.7 J-	2,100	3.5	0.44
LVWPS-MW223B	1/11/2021	N	EM02	Downgradient	200	Qal	70.3 - 90.0	1,700	2,100	6.6	2,300	30 J	0.75
LVWPS-MW223B	1/28/2021	N	EM03	Downgradient	200	Qal	70.3 - 90.0	330	470 J-	1.8	1,700	10	7.53 E
LVWPS-MW223B	2/8/2021	N	EM04	Downgradient	200	Qal	70.3 - 90.0	270	240	0.51	1,600	2.4	0.38
LVWPS-MW223B	3/8/2021	N	EM05	Downgradient	200	Qal	70.3 - 90.0	390	1,300	3.0	1,200	2.2	0.62
LVWPS-MW223B	4/5/2021	N	EM06	Downgradient	200	Qal	70.3 - 90.0	1,500	3,700	11	1,600	2.1	1.02
LVWPS-MW223B	5/5/2021	N	EM07	Downgradient	200	Qal	70.3 - 90.0	560	350 J	0.99	1,200	1.5	0.56
LVWPS-MW223B	6/7/2021	N	EM08	Downgradient	200	Qal	70.3 - 90.0	420	880	2.8	1,000	1.5	0.26
LVWPS-MW223B	7/8/2021	N	EM09	Downgradient	200	Qal	70.3 - 90.0	690	1,900 J+	4.6	1,300	1.8 J+	0.14
LVWPS-MW223C	10/7/2020	N	BL04	Downgradient	200	UMCf	95.5 - 110.0	5,700	7,700	14	2,100	1.1	2.77
LVWPS-MW223C	1/11/2021	N	EM02	Downgradient	200	UMCf	95.5 - 110.0	46	64	0.10	270	<21	0.92
LVWPS-MW223C	2/8/2021	N	EM04	Downgradient	200	UMCf	95.5 - 110.0	2,600	4,300	9.2	2,000	1.1	1.08
LVWPS-MW223C	3/8/2021	N	EM05	Downgradient	200	UMCf	95.5 - 110.0	2,700	5,300	8.8	1,900	1.1	1.47

**Table 2**  
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 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-MW223C	4/6/2021	N	EM06	Downgradient	200	UMCf	95.5 - 110.0	2,800	4,700	8.3	2,000	1.1 J+	1.76
LVWPS-MW223C	6/8/2021	N	EM08	Downgradient	200	UMCf	95.5 - 110.0	2,500	3,800	8.1	2,000	0.99 J+	0.34
LVWPS-MW208A	10/9/2020	N	BL04	Downgradient	250	Qal	39.9 - 59.5	1,900	2,900	12	2,100	0.93	5.77
LVWPS-MW208A	12/23/2020	N	EM01	Downgradient	250	Qal	39.9 - 59.5	2,200	2,300	9.4	1,900	0.81	4.14
LVWPS-MW208A	1/13/2021	N	EM02	Downgradient	250	Qal	39.9 - 59.5	13,000 J	2,600	11	2,000	0.88	5
LVWPS-MW208A	1/27/2021	N	EM03	Downgradient	250	Qal	39.9 - 59.5	2,200	2,600	11	2,000	0.92	5.82 E
LVWPS-MW208A	2/10/2021	N	EM04	Downgradient	250	Qal	39.9 - 59.5	2,400	2,500	11	2,100	0.96	5.07
LVWPS-MW208A	3/10/2021	N	EM05	Downgradient	250	Qal	39.9 - 59.5	1,800 J+	2,800	10 J-	1,900	0.91	4.85
LVWPS-MW208A	4/6/2021	N	EM06	Downgradient	250	Qal	39.9 - 59.5	1,600	2,500	12	2,000	0.90 J+	4.64
LVWPS-MW208A	5/4/2021	N	EM07	Downgradient	250	Qal	39.9 - 59.5	1,800	2,500	12	2,000	1.0	5.36
LVWPS-MW208A	6/7/2021	N	EM08	Downgradient	250	Qal	39.9 - 59.5	0.99 J	2,800	14	2,200	1.0	2.30
LVWPS-MW208A	7/7/2021	N	EM09	Downgradient	250	Qal	39.9 - 59.5	2,100	2,600	14	2,200	1.2 J+	0.19
LVWPS-MW208B	10/9/2020	N	BL04	Downgradient	250	Qal	65.3 - 85.0	2,100	3,200	12	2,000	1.0	5.90
LVWPS-MW208B	12/23/2020	N	EM01	Downgradient	250	Qal	65.3 - 85.0	870	42 J	0.23	1,900	11	0.31
LVWPS-MW208B	12/23/2020	FD	EM01	Downgradient	250	Qal	65.3 - 85.0	810	39 J	0.23	1,900	11	----
LVWPS-MW208B	1/13/2021	N	EM02	Downgradient	250	Qal	65.3 - 85.0	63	46	0.33	1,800	8.4	0.83
LVWPS-MW208B	1/27/2021	N	EM03	Downgradient	250	Qal	65.3 - 85.0	74	56 J	0.25	1,600	9.9	3.35 E
LVWPS-MW208B	1/27/2021	FD	EM03	Downgradient	250	Qal	65.3 - 85.0	63	55 J	0.28	1,600	10	----
LVWPS-MW208B	2/11/2021	N	EM04	Downgradient	250	Qal	65.3 - 85.0	150	180	0.83 J-	1,400 J-	1.4	1.54
LVWPS-MW208B	3/10/2021	N	EM05	Downgradient	250	Qal	65.3 - 85.0	330	380	2.3	1,900	1.2	0.44
LVWPS-MW208B	4/6/2021	N	EM06	Downgradient	250	Qal	65.3 - 85.0	340	430	2.4	1,900	1.1 J+	0.61
LVWPS-MW208B	5/4/2021	N	EM07	Downgradient	250	Qal	65.3 - 85.0	310	370	2.3	1,900	1.7	1.44
LVWPS-MW208B	6/9/2021	N	EM08	Downgradient	250	Qal	65.3 - 85.0	750	880	4.3	1,900	1.2 J	0.95
LVWPS-MW208B	7/7/2021	N	EM09	Downgradient	250	Qal	65.3 - 85.0	790 J+	980	5.0	2,000	1.1 J+	1.29
LVWPS-MW221A	10/6/2020	N	BL04	Far Cross/Downgradient	300	Qal	50.3 - 70.0	990 J-	710	8.4	1,500 J+	0.51 J-	7.60
LVWPS-MW221A	12/22/2020	N	EM01	Far Cross/Downgradient	300	Qal	50.3 - 70.0	610	710	8.2	1,500	1.7 J	6.85
LVWPS-MW221A	1/12/2021	N	EM02	Far Cross/Downgradient	300	Qal	50.3 - 70.0	710	740	8.3	1,600	0.46 J	6.62
LVWPS-MW221A	1/28/2021	N	EM03	Far Cross/Downgradient	300	Qal	50.3 - 70.0	720	750	8.2	1,500	0.48 J	7.82 E
LVWPS-MW221A	2/8/2021	N	EM04	Far Cross/Downgradient	300	Qal	50.3 - 70.0	700	780	8.4	1,600	0.61	6.41
LVWPS-MW221A	3/9/2021	N	EM05	Far Cross/Downgradient	300	Qal	50.3 - 70.0	720	800	8.2	1,700	0.49 J	6.92
LVWPS-MW221A	4/6/2021	N	EM06	Far Cross/Downgradient	300	Qal	50.3 - 70.0	720	1,000	8.7	1,700	0.56 J+	6.98
LVWPS-MW221A	5/3/2021	N	EM07	Far Cross/Downgradient	300	Qal	50.3 - 70.0	510	530	8.1	1,600	0.51	9.43 E
LVWPS-MW221A	6/8/2021	N	EM08	Far Cross/Downgradient	300	Qal	50.3 - 70.0	700	830	8.8	1,700	0.54 J+	6.39
LVWPS-MW221A	7/6/2021	N	EM09	Far Cross/Downgradient	300	Qal	50.3 - 70.0	760	970	8.1	1,700	0.63	3.54
LVWPS-MW207	9/28/2020	N	BL04	Far Cross/Downgradient	425	Qal	68.1 - 87.8	2,200	14,000	18	1,800	1.5	1.55
LVWPS-MW207	12/22/2020	N	EM01	Far Cross/Downgradient	425	Qal	68.1 - 87.8	4,900	13,000	17	1,900	1.6	1.27
LVWPS-MW207	1/29/2021	N	EM03	Far Cross/Downgradient	425	Qal	68.1 - 87.8	2,500	14,000	14	1,800	1.7	1.09
LVWPS-MW207	3/12/2021	N	EM05	Far Cross/Downgradient	425	Qal	68.1 - 87.8	3,000	14,000	19	1,800	1.6 J+	2.38
LVWPS-MW207	6/15/2021	N	EM08	Far Cross/Downgradient	425	Qal	68.1 - 87.8	2,800	14,000	18	1,800	1.5	1.04
LVWPS-MW212A	10/5/2020	N	BL04	Far Cross/Downgradient	450	Qal	34.3 - 54.0	390	460	8.5	1,200	0.47 J	6.73
LVWPS-MW212A	12/21/2020	N	EM01	Far Cross/Downgradient	450	Qal	34.3 - 54.0	400	510	8.9	1,200	0.43 J	6.56
LVWPS-MW212A	1/27/2021	N	EM03	Far Cross/Downgradient	450	Qal	34.3 - 54.0	400	470	8.7	1,200	0.45 J	8.10 E
LVWPS-MW212A	3/12/2021	N	EM05	Far Cross/Downgradient	450	Qal	34.3 - 54.0	380	460	8.6	1,200	0.41 J	6.60
LVWPS-MW212A	6/14/2021	N	EM08	Far Cross/Downgradient	450	Qal	34.3 - 54.0	310	440	9.4	1,300	0.42 J	6.19
LVWPS-MW212B	10/5/2020	N	BL04	Far Cross/Downgradient	450	Qal	59.8 - 79.5	170	200	7.7	980	0.32 J	6.48
LVWPS-MW212B	12/22/2020	N	EM01	Far Cross/Downgradient	450	Qal	59.8 - 79.5	150	190	7.8	1,100	0.29 J	6.57
LVWPS-MW212B	1/27/2021	N	EM03	Far Cross/Downgradient	450	Qal	59.8 - 79.5	210	200	8.1	1,100	<1.0	9.04 E
LVWPS-MW212B	3/12/2021	N	EM05	Far Cross/Downgradient	450	Qal	59.8 - 79.5	180	180	8.2	1,100	<2.6	6.95

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Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-MW212B	6/14/2021	N	EM08	Far Cross/Downgradient	450	Qal	59.8 - 79.5	180	240	8.8	1,100	0.40 J	4.80
LVWPS-MW211	9/30/2020	N	BL04	Far Cross/Downgradient	650	Qal	50.0 - 69.7	2,000	3,200	14	2,100	1.1	6.33
LVWPS-MW211	12/21/2020	N	EM01	Far Cross/Downgradient	650	Qal	50.0 - 69.7	2,100	3,000	13	1,900	0.99	5.52
LVWPS-MW211	1/29/2021	N	EM03	Far Cross/Downgradient	650	Qal	50.0 - 69.7	850	1,300	4.4	1,800	1.3 J	1.20
LVWPS-MW211	3/12/2021	N	EM05	Far Cross/Downgradient	650	Qal	50.0 - 69.7	950	1,300	6.0	1,800	1.4 J	1.24
LVWPS-MW211	6/9/2021	N	EM08	Far Cross/Downgradient	650	Qal	50.0 - 69.7	1,200	1,400	6.0	1,800	1.1	0.62
LVWPS-MW220A	10/5/2020	N	BL04	Far Downgradient	500	Qal	60.3 - 80.0	3,100	9,400	21	2,100	1.6	3.77
LVWPS-MW220A	12/21/2020	N	EM01	Far Downgradient	500	Qal	60.3 - 80.0	3,100	7,000	20	2,200	1.8	3.31
LVWPS-MW220A	1/28/2021	N	EM03	Far Downgradient	500	Qal	60.3 - 80.0	3,500	9,000	22	2,200	1.6	3.77 E
LVWPS-MW220A	3/11/2021	N	EM05	Far Downgradient	500	Qal	60.3 - 80.0	2,800	9,800	20	2,000	1.7	2.54
LVWPS-MW220A	6/10/2021	N	EM08	Far Downgradient	500	Qal	60.3 - 80.0	2,900	12,000	4.7	2,100	1.6	2.76
LVWPS-MW209	10/6/2020	N	BL04	Far Downgradient	625	Qal	71.3 - 91.0	2,700	8,500	22	2,200	1.6	4.40
LVWPS-MW209	10/6/2020	FD	BL04	Far Downgradient	625	Qal	71.3 - 91.0	2,800	9,000	22	2,200	1.6	----
LVWPS-MW209	12/21/2020	N	EM01	Far Downgradient	625	Qal	71.3 - 91.0	3,000	7,600	18	2,200	1.8	2.38
LVWPS-MW209	1/27/2021	N	EM03	Far Downgradient	625	Qal	71.3 - 91.0	2,600	7,800	19	2,000	1.8	2.94 E
LVWPS-MW209	3/11/2021	N	EM05	Far Downgradient	625	Qal	71.3 - 91.0	2,700	8,500	18	2,100	1.7	2.66
LVWPS-MW209	6/10/2021	N	EM08	Far Downgradient	625	Qal	71.3 - 91.0	2,800	11,000	21 J+	2,000	1.7	2.09
LVWPS-MW209A	10/6/2020	N	BL04	Far Downgradient	625	Qal	35.3 - 55.0	2,800	6,800	21	2,200	1.7	4.72
LVWPS-MW209A	12/21/2020	N	EM01	Far Downgradient	625	Qal	35.3 - 55.0	3,000	5,300	20	2,300	1.6	3.96
LVWPS-MW209A	1/27/2021	N	EM03	Far Downgradient	625	Qal	35.3 - 55.0	2,300	3,700	14	2,100	2.4	2.59 E
LVWPS-MW209A	3/11/2021	N	EM05	Far Downgradient	625	Qal	35.3 - 55.0	1,800	3,500	11	2,000	1.8	2.25
LVWPS-MW209A	6/10/2021	N	EM08	Far Downgradient	625	Qal	35.3 - 55.0	2,100	2,400	15	1,800	1.6	5.96
LVWPS-MW218A	10/5/2020	N	BL04	Far Downgradient	625	Qal	35.3 - 55.0	5,100	14,000	20	1,900	1.4	4.72
LVWPS-MW218A	12/21/2020	N	EM01	Far Downgradient	625	Qal	35.3 - 55.0	3,200	14,000	21	2,000	1.5	3.89
LVWPS-MW218A	1/26/2021	N	EM03	Far Downgradient	625	Qal	35.3 - 55.0	3,400	12,000	19	1,800	1.5 J+	4.61 E
LVWPS-MW218A	3/15/2021	N	EM05	Far Downgradient	625	Qal	35.3 - 55.0	2,900	12,000	20	1,800	1.5	4.05
LVWPS-MW218A	6/11/2021	N	EM08	Far Downgradient	625	Qal	35.3 - 55.0	2,700	13,000	20	2,000	1.6 J+	3.52
LVWPS-MW210A	10/6/2020	N	BL04	Far Downgradient	850	Qal	35.3 - 55.0	2,600	12,000	20	1,800	1.5	2.44
LVWPS-MW210A	12/21/2020	N	EM01	Far Downgradient	850	Qal	35.3 - 55.0	3,100	13,000	21	2,000	1.6	2.04
LVWPS-MW210A	1/29/2021	N	EM03	Far Downgradient	850	Qal	35.3 - 55.0	2,900	11,000	17	1,800	1.6	2.66
LVWPS-MW210A	3/12/2021	N	EM05	Far Downgradient	850	Qal	35.3 - 55.0	2,900	11,000	9.7	1,900	1.7 J+	2.78
LVWPS-MW210A	6/10/2021	N	EM08	Far Downgradient	850	Qal	35.3 - 55.0	2,700	10,000	21	1,800	1.4	2.06
LVWPS-MW210B	10/6/2020	N	BL04	Far Downgradient	850	Qal	70.1 - 89.8	2,800	9,700	22	2,100	1.6	3.60
LVWPS-MW210B	12/21/2020	N	EM01	Far Downgradient	850	Qal	70.1 - 89.8	2,800	8,300	15	2,100	1.9	1.48
LVWPS-MW210B	1/29/2021	N	EM03	Far Downgradient	850	Qal	70.1 - 89.8	2,400	7,800	14	2,000	1.8	1.62
LVWPS-MW210B	3/12/2021	N	EM05	Far Downgradient	850	Qal	70.1 - 89.8	2,500	9,600	8.5	2,000	1.9 J+	1.48
LVWPS-MW210B	6/10/2021	N	EM08	Far Downgradient	850	Qal	70.1 - 89.8	3,000	8,600	20	2,000	1.6	1.21
LVWPS-MW224A	10/7/2020	N	BL04	Far Upgradient	-225	Qal	55.3 - 75.0	2,300	2,900	11	2,000	0.90	6.09
LVWPS-MW224A	12/23/2020	N	EM01	Far Upgradient	-225	Qal	55.3 - 75.0	2,700	2,800	11	2,200	1.4 J	6.34
LVWPS-MW224A	1/29/2021	N	EM03	Far Upgradient	-225	Qal	55.3 - 75.0	1,900	3,000	9.9	1,900	1.5 J	5.75
LVWPS-MW224A	3/11/2021	N	EM05	Far Upgradient	-225	Qal	55.3 - 75.0	2,000	3,700	9.6	2,200	0.87	6.39
LVWPS-MW224A	6/15/2021	N	EM08	Far Upgradient	-225	Qal	55.3 - 75.0	2,000	3,000 J+	13	2,100	1.2	5.79
LVWPS-A2-IW01A	10/1/2020	N	BL04	Injection Well Transect	0	Qal	41.3 - 66.0	3,300	5,100	19	----	----	4.10
LVWPS-A2-IW01A	10/1/2020	FD	BL04	Injection Well Transect	0	Qal	41.3 - 66.0	3,300	5,000	19	----	----	----
LVWPS-A2-IW01B	10/1/2020	N	BL04	Injection Well Transect	0	Qal	72.8 - 97.5	2,300	5,400	20	----	----	4.23
LVWPS-A2-IW02A	10/1/2020	N	BL04	Injection Well Transect	0	Qal	38.8 - 68.5	2,900	5,200	18	----	----	4.29
LVWPS-A2-IW02B	10/2/2020	N	BL04	Injection Well Transect	0	Qal	75.3 - 100.0	3,800	6,100	20	----	----	4.44
LVWPS-A2-IW03A	10/2/2020	N	BL04	Injection Well Transect	0	Qal	37.3 - 67.0	3,300	5,400	20	----	----	4.44

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-A2-IW03B	10/2/2020	N	BL04	Injection Well Transect	0	Qal	73.8 - 103.5	3,400	5,500	18	----	----	4.30
LVWPS-A2-IW03B	10/2/2020	FD	BL04	Injection Well Transect	0	Qal	73.8 - 103.5	2,700	5,400	18	----	----	----
LVWPS-A2-IW04A	10/2/2020	N	BL04	Injection Well Transect	0	Qal	36.3 - 71.0	2,700	5,600	20	----	----	4.43
LVWPS-A2-IW04B	10/2/2020	N	BL04	Injection Well Transect	0	Qal	77.3 - 112.0	3,200	5,000	18	----	----	5.05
LVWPS-A2-IW05A	10/2/2020	N	BL04	Injection Well Transect	0	Qal	37.8 - 62.5	4,800	6,200	19	----	----	4.44
LVWPS-A2-IW05B	10/2/2020	N	BL04	Injection Well Transect	0	Qal	68.8 - 93.5	4,400	5,300	19	----	----	4.47
LVWPS-A2-IW06A	10/5/2020	N	BL04	Injection Well Transect	0	Qal	36.8 - 51.5	3,700	5,900	18	----	----	5.36
LVWPS-A2-IW06B	10/5/2020	N	BL04	Injection Well Transect	0	Qal	57.8 - 77.5	4,600	4,900	18	----	----	4.75
LVWPS-A2-IW07A	10/5/2020	N	BL04	Injection Well Transect	0	Qal	35.3 - 50.0	3,100	5,500	21	----	----	4.76
LVWPS-A2-IW07A	10/5/2020	FD	BL04	Injection Well Transect	0	Qal	35.3 - 50.0	2,800	5,600	20	----	----	----
LVWPS-A2-IW07B	10/5/2020	N	BL04	Injection Well Transect	0	Qal	56.3 - 76.0	2,700	4,500	16	----	----	5.14
LVWPS-A2-IW08A	10/5/2020	N	BL04	Injection Well Transect	0	Qal	35.8 - 55.5	3,500	4,800	20	----	----	4.79
LVWPS-A2-IW08B	10/5/2020	N	BL04	Injection Well Transect	0	Qal	61.8 - 81.5	2,100	3,600	13	----	----	5.54
LVWPS-A2-IW09A	10/5/2020	N	BL04	Injection Well Transect	0	Qal	36.8 - 51.5	2,000	3,000	13	----	----	5.36
LVWPS-A2-IW09B	10/6/2020	N	BL04	Injection Well Transect	0	Qal	58.8 - 73.5	1,500	2,300	9.1	----	----	6.22
LVWPS-U2-IW01	10/8/2020	N	BL04	Injection Well Transect	0	UMCf	121.2 - 141.0	8,100	12,000	9.0	----	----	3.48
LVWPS-U2-IW01	10/8/2020	FD	BL04	Injection Well Transect	0	UMCf	121.2 - 141.0	6,900	11,000	8.6	----	----	----
LVWPS-U2-IW02	10/8/2020	N	BL04	Injection Well Transect	0	UMCf	116.2 - 141.0	8,100	12,000	8.7	----	----	3.80
LVWPS-U2-IW03	10/8/2020	N	BL04	Injection Well Transect	0	UMCf	99.2 - 124.0	7,100	11,000	12	----	----	2.66
LVWPS-U2-IW04	10/8/2020	N	BL04	Injection Well Transect	0	UMCf	83.7 - 108.5	3,900	6,500	19	----	----	4.10
LVWPS-U2-IW05	10/8/2020	N	BL04	Injection Well Transect	0	UMCf	87.7 - 117.5	8,500	14,000	12	----	----	4.95
LVWPS-U2-IW06	10/8/2020	N	BL04	Injection Well Transect	0	UMCf	89.2 - 104.0	10,000	17,000	14	----	----	3.46
LVWPS-U2-IW07	10/6/2020	N	BL04	Injection Well Transect	0	UMCf	91.2 - 106.0	6,000	8,700	5.7	----	----	1.85
LVWPS-U2-IW08	10/6/2020	N	BL04	Injection Well Transect	0	UMCf	83.7 - 108.5	12,000	20,000	17	----	----	5.08
LVWPS-U2-IW09	10/6/2020	N	BL04	Injection Well Transect	0	UMCf	103.2 - 128.0	35	63 J	0.11	----	----	2.85
LVWPS-U2-IW10	10/6/2020	N	BL04	Injection Well Transect	0	UMCf	109.3 - 129.0	400	150	<0.014	----	----	3.48
LVWPS-U2-IW11	10/6/2020	N	BL04	Injection Well Transect	0	UMCf	108.9 - 133.7	1,400	2,400	2.6	----	----	3.31
LVWPS-U2-IW12	10/8/2020	N	BL04	Injection Well Transect	0	UMCf	112.8 - 137.5	5,900	8,300	11	----	----	4.65
LVWPS-A2-MW01A	10/8/2020	N	BL04	Upgradient	-50	Qal	40.3 - 60.0	2,900	5,500	20	2,200	1.8	4.48
LVWPS-A2-MW01A	10/8/2020	FD	BL04	Upgradient	-50	Qal	40.3 - 60.0	2,900	5,600	19	2,200	1.8	----
LVWPS-A2-MW01A	12/23/2020	N	EM01	Upgradient	-50	Qal	40.3 - 60.0	3,600	5,100	19	2,200	2.1	3.69
LVWPS-A2-MW01A	1/13/2021	N	EM02	Upgradient	-50	Qal	40.3 - 60.0	2,700	6,300	19	2,100	1.9	3.75
LVWPS-A2-MW01A	1/25/2021	N	EM03	Upgradient	-50	Qal	40.3 - 60.0	2,900	5,100	18	2,100	1.9 J+	3.46
LVWPS-A2-MW01A	2/10/2021	N	EM04	Upgradient	-50	Qal	40.3 - 60.0	2,800	4,900	19	2,000	2.0	3.68
LVWPS-A2-MW01A	3/10/2021	N	EM05	Upgradient	-50	Qal	40.3 - 60.0	3,100	5,200	20	2,100	1.9	3.70
LVWPS-A2-MW01A	4/7/2021	N	EM06	Upgradient	-50	Qal	40.3 - 60.0	3,200	5,100	20	2,200	2.4 J+	4.01
LVWPS-A2-MW01A	5/6/2021	N	EM07	Upgradient	-50	Qal	40.3 - 60.0	2,900	5,100 J	21	2,300	1.7 J-	3.34
LVWPS-A2-MW01A	6/9/2021	N	EM08	Upgradient	-50	Qal	40.3 - 60.0	2,700	4,800	19	2,100	1.7	0.70
LVWPS-A2-MW01A	7/8/2021	N	EM09	Upgradient	-50	Qal	40.3 - 60.0	2,700	3,500 J+	19	2,100	2.1 J+	1.07
LVWPS-A2-MW01B	10/8/2020	N	BL04	Upgradient	-50	Qal	70.3 - 90.0	3,100	5,200	18	2,100	1.7	4.49
LVWPS-A2-MW01B	12/23/2020	N	EM01	Upgradient	-50	Qal	70.3 - 90.0	3,000	5,000	18	2,200	1.7	4.16
LVWPS-A2-MW01B	1/13/2021	N	EM02	Upgradient	-50	Qal	70.3 - 90.0	2,800	6,700	18	2,200	2.1	3.97
LVWPS-A2-MW01B	1/25/2021	N	EM03	Upgradient	-50	Qal	70.3 - 90.0	3,200	5,200	18	2,100	2.4 J+	3.44
LVWPS-A2-MW01B	2/10/2021	N	EM04	Upgradient	-50	Qal	70.3 - 90.0	2,800	4,800	19	2,300	1.8	4.13
LVWPS-A2-MW01B	3/10/2021	N	EM05	Upgradient	-50	Qal	70.3 - 90.0	3,400	5,000	20	2,100	1.8	4.43
LVWPS-A2-MW01B	4/7/2021	N	EM06	Upgradient	-50	Qal	70.3 - 90.0	4,200	5,100	19	2,300	1.7 J+	4.33
LVWPS-A2-MW01B	5/6/2021	N	EM07	Upgradient	-50	Qal	70.3 - 90.0	2,800	5,000	22	2,200	1.7	1.26
LVWPS-A2-MW01B	6/9/2021	N	EM08	Upgradient	-50	Qal	70.3 - 90.0	2,800	5,200	20	2,200	1.7	0.40

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 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-A2-MW01B	7/8/2021	N	EM09	Upgradient	-50	Qal	70.3 - 90.0	2,800	5,000 J+	20	2,200	1.7 J+	0.38
LVWPS-A2-MW02A	10/8/2020	N	BL04	Upgradient	-50	Qal	40.3 - 60.0	3,700	6,500	18	2,600	1.3	4.19
LVWPS-A2-MW02A	10/8/2020	FD	BL04	Upgradient	-50	Qal	40.3 - 60.0	3,800	6,600	18	2,600	1.3	----
LVWPS-A2-MW02A	12/23/2020	N	EM01	Upgradient	-50	Qal	40.3 - 60.0	3,800	8,100	18	2,700	1.2	5.28
LVWPS-A2-MW02A	1/12/2021	N	EM02	Upgradient	-50	Qal	40.3 - 60.0	3,900	6,300	18	2,600	1.2	4.46
LVWPS-A2-MW02A	1/25/2021	N	EM03	Upgradient	-50	Qal	40.3 - 60.0	4,200	7,100	20	2,500	1.3 J+	3.93
LVWPS-A2-MW02A	2/9/2021	N	EM04	Upgradient	-50	Qal	40.3 - 60.0	3,900	6,200	17	1,900	1.2 J-	4.61
LVWPS-A2-MW02A	3/9/2021	N	EM05	Upgradient	-50	Qal	40.3 - 60.0	3,700	6,100	17	2,800	1.4	3.99
LVWPS-A2-MW02A	4/7/2021	N	EM06	Upgradient	-50	Qal	40.3 - 60.0	3,700	5,700	17	2,600	1.5 J+	4.05
LVWPS-A2-MW02A	5/5/2021	N	EM07	Upgradient	-50	Qal	40.3 - 60.0	4,200	5,200	17	3,000	1.2	4.44
LVWPS-A2-MW02A	6/11/2021	N	EM08	Upgradient	-50	Qal	40.3 - 60.0	3,600	4,200	17	2,600	1.5 J+	3.74
LVWPS-A2-MW02A	7/9/2021	N	EM09	Upgradient	-50	Qal	40.3 - 60.0	3,600	6,100	17	2,600	1.5	3.64
LVWPS-A2-MW02B	10/8/2020	N	BL04	Upgradient	-50	Qal	70.3 - 90.0	2,300	3,900	14	2,100	1.2	5.81
LVWPS-A2-MW02B	12/23/2020	N	EM01	Upgradient	-50	Qal	70.3 - 90.0	2,200	4,900	15	2,300	1.3	5.57
LVWPS-A2-MW02B	1/13/2021	N	EM02	Upgradient	-50	Qal	70.3 - 90.0	2,100	3,600	14	2,100	1.2	5.79
LVWPS-A2-MW02B	1/25/2021	N	EM03	Upgradient	-50	Qal	70.3 - 90.0	3,700	4,000	13	2,000	1.3 J+	5.11
LVWPS-A2-MW02B	2/10/2021	N	EM04	Upgradient	-50	Qal	70.3 - 90.0	2,300	3,900	15	2,200	1.3	5.77
LVWPS-A2-MW02B	3/10/2021	N	EM05	Upgradient	-50	Qal	70.3 - 90.0	2,500	3,800	16	2,300	1.4	5.43
LVWPS-A2-MW02B	4/9/2021	N	EM06	Upgradient	-50	Qal	70.3 - 90.0	2,200	4,100	16	2,600	1.4	5.78
LVWPS-A2-MW02B	5/5/2021	N	EM07	Upgradient	-50	Qal	70.3 - 90.0	2,400	3,700	15	2,200	1.3	6.27
LVWPS-A2-MW02B	6/8/2021	N	EM08	Upgradient	-50	Qal	70.3 - 90.0	2,100	3,000	16	2,200	1.2 J+	5.38
LVWPS-A2-MW02B	7/9/2021	N	EM09	Upgradient	-50	Qal	70.3 - 90.0	2,400	3,600	15	2,200	1.4	5.36
LVWPS-A2-MW03A	10/9/2020	N	BL04	Upgradient	-50	Qal	38.3 - 58.0	1,300	2,000	9.2	1,800	0.63	6.82
LVWPS-A2-MW03A	10/9/2020	FD	BL04	Upgradient	-50	Qal	38.3 - 58.0	1,300	2,000	9.1	1,800	0.70	----
LVWPS-A2-MW03A	12/23/2020	N	EM01	Upgradient	-50	Qal	38.3 - 58.0	1,100	7,500	7.3	1,700	0.47 J	6.86
LVWPS-A2-MW03A	1/14/2021	N	EM02	Upgradient	-50	Qal	38.3 - 58.0	1,100	1,600	7.8	1,900	0.54	7.34
LVWPS-A2-MW03A	1/25/2021	N	EM03	Upgradient	-50	Qal	38.3 - 58.0	2,500	3,300	9.2	1,800	0.77 J+	5.88
LVWPS-A2-MW03A	2/10/2021	N	EM04	Upgradient	-50	Qal	38.3 - 58.0	1,200	1,600	8.3	1,900	0.52	7.08
LVWPS-A2-MW03A	3/10/2021	N	EM05	Upgradient	-50	Qal	38.3 - 58.0	1,300	1,500	8.1	1,900	0.49 J	6.92
LVWPS-A2-MW03A	4/5/2021	N	EM06	Upgradient	-50	Qal	38.3 - 58.0	1,300	1,700	8.5	1,800	0.60	6.80
LVWPS-A2-MW03A	5/5/2021	N	EM07	Upgradient	-50	Qal	38.3 - 58.0	1,400	1,900	8.3	1,900	0.60	7.00
LVWPS-A2-MW03A	6/9/2021	N	EM08	Upgradient	-50	Qal	38.3 - 58.0	1,500	1,900	8.4	1,800	1.3	3.00
LVWPS-A2-MW03A	7/8/2021	N	EM09	Upgradient	-50	Qal	38.3 - 58.0	1,600	2,400 J+	8.6	2,000	1.4 J+	0.63
LVWPS-A2-MW03B	10/9/2020	N	BL04	Upgradient	-50	Qal	64.3 - 84.0	2,000	3,700	12	2,000	0.92	6.21
LVWPS-A2-MW03B	12/23/2020	N	EM01	Upgradient	-50	Qal	64.3 - 84.0	3,600	3,500	12	2,100	0.87 J-	5.56
LVWPS-A2-MW03B	1/14/2021	N	EM02	Upgradient	-50	Qal	64.3 - 84.0	2,100	3,600	12	2,100	0.96	6.03
LVWPS-A2-MW03B	1/26/2021	N	EM03	Upgradient	-50	Qal	64.3 - 84.0	2,300	3,400	9.8	1,900	1.0 J+	5.24
LVWPS-A2-MW03B	2/10/2021	N	EM04	Upgradient	-50	Qal	64.3 - 84.0	2,200	3,500	13	2,200	1.0	5.86
LVWPS-A2-MW03B	3/10/2021	N	EM05	Upgradient	-50	Qal	64.3 - 84.0	2,300	3,500	13	2,200	1.1	5.40
LVWPS-A2-MW03B	4/6/2021	N	EM06	Upgradient	-50	Qal	64.3 - 84.0	2,200	3,600	16	2,100	1.0 J+	5.50
LVWPS-A2-MW03B	5/5/2021	N	EM07	Upgradient	-50	Qal	64.3 - 84.0	2,300	3,800	14	2,200	1.1	5.70
LVWPS-A2-MW03B	6/9/2021	N	EM08	Upgradient	-50	Qal	64.3 - 84.0	2,400	4,000	15	2,100	1.1	5.46
LVWPS-A2-MW03B	7/8/2021	N	EM09	Upgradient	-50	Qal	64.3 - 84.0	2,600	3,800 J+	14	2,200	1.3 J+	5.39
LVWPS-U2-MW01	10/8/2020	N	BL04	Upgradient	-50	UMCf	97.3 - 117.0	360	450	0.89	2,500	0.36 J	1.63
LVWPS-U2-MW01	1/14/2021	N	EM02	Upgradient	-50	UMCf	97.3 - 117.0	85	93 J	0.11	2,600	<1.0	2.76
LVWPS-U2-MW01	2/10/2021	N	EM04	Upgradient	-50	UMCf	97.3 - 117.0	200	260	0.98	2,500	0.46 J	1.94
LVWPS-U2-MW01	3/10/2021	N	EM05	Upgradient	-50	UMCf	97.3 - 117.0	26	<10	<0.014	2,100	2.2	0.43
LVWPS-U2-MW01	4/7/2021	N	EM06	Upgradient	-50	UMCf	97.3 - 117.0	250	330 J+	0.51 J+	2,400	0.26 J	1.55

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-U2-MW01	6/9/2021	N	EM08	Upgradient	-50	UMCf	97.3 - 117.0	160	210	0.28	2,400	<1.0	1.83
LVWPS-U2-MW02	10/8/2020	N	BL04	Upgradient	-50	UMCf	100.3 - 125.0	5,200	8,300	6.2	1,800	0.64	8.10
LVWPS-U2-MW02	1/12/2021	N	EM02	Upgradient	-50	UMCf	100.3 - 125.0	7,100	9,600	9.1	1,900	<1.3	2.13
LVWPS-U2-MW02	2/9/2021	N	EM04	Upgradient	-50	UMCf	100.3 - 125.0	5,600	13,000	7.7	1,800	<1.0 UJ	2.93
LVWPS-U2-MW02	3/9/2021	N	EM05	Upgradient	-50	UMCf	100.3 - 125.0	6,600	10,000	7.0	1,900	<1.0	3.38
LVWPS-U2-MW02	4/5/2021	N	EM06	Upgradient	-50	UMCf	100.3 - 125.0	6,500	11,000	7.2	1,800	0.42 J	3.23
LVWPS-U2-MW02	6/8/2021	N	EM08	Upgradient	-50	UMCf	100.3 - 125.0	6,400	10,000	7.9	1,900	<1.0	3.74
LVWPS-U2-MW03	10/9/2020	N	BL04	Upgradient	-50	UMCf	90.3 - 110.0	2,100	3,400	11	2,000	0.98	3.53
LVWPS-U2-MW03	1/14/2021	N	EM02	Upgradient	-50	UMCf	90.3 - 110.0	1,800	3,300	12	2,100	1.4 J	3.53
LVWPS-U2-MW03	2/10/2021	N	EM04	Upgradient	-50	UMCf	90.3 - 110.0	2,200	3,500	13	2,100	1.2	5.49
LVWPS-U2-MW03	3/10/2021	N	EM05	Upgradient	-50	UMCf	90.3 - 110.0	2,200	3,400	13	2,200	1.3 J	5.02
LVWPS-U2-MW03	4/6/2021	N	EM06	Upgradient	-50	UMCf	90.3 - 110.0	2,200	3,800	16	2,100	1.7 J	5.14
LVWPS-U2-MW03	6/9/2021	N	EM08	Upgradient	-50	UMCf	90.3 - 110.0	2,500	3,900	16	2,200	1.5 J	4.99
<b>Zone 3</b>													
LVWPS-MW222A	10/2/2020	N	BL04	Cross Gradient	N/A	UMCf/UMCf-cg	80.3 - 100.0	2,900	3,800	4.1	----	----	2.97
LVWPS-MW222B	10/7/2020	N	BL04	Cross Gradient	N/A	UMCf-cg	150.3 - 170.0	1,500	1,200	1.6	----	----	3.10
LVWPS-MW222C	10/2/2020	N	BL04	Cross Gradient	N/A	UMCf-cg	214.0 - 233.5	1,500	1,300	2.4	----	----	2.25
LVWPS-U3-MW01B	10/5/2020	N	BL04	Cross Gradient	N/A	UMCf-cg	83.8 - 103.3	2,000	1,800	0.24	1,700	6.3	2.06
LVWPS-U3-MW01B	1/15/2021	N	EM02	Cross Gradient	N/A	UMCf-cg	83.8 - 103.3	1,900	2,700	0.79	1,800	3.9	1.26
LVWPS-U3-MW01B	2/11/2021	N	EM04	Cross Gradient	N/A	UMCf-cg	83.8 - 103.3	2,300	2,500	1.8	1,800	3.6	1.35
LVWPS-U3-MW01B	3/15/2021	N	EM05	Cross Gradient	N/A	UMCf-cg	83.8 - 103.3	2,200	2,700	1.3	1,700	3.0	0.98
LVWPS-U3-MW01B	4/9/2021	N	EM06	Cross Gradient	N/A	UMCf-cg	83.8 - 103.3	2,200	2,800	1.5	1,800	2.5	1.18
LVWPS-U3-MW01B	6/11/2021	N	EM08	Cross Gradient	N/A	UMCf-cg	83.8 - 103.3	2,300	2,100	1.6	1,800	2.2 J+	2.41
LVWPS-U3-MW04B	10/2/2020	N	BL04	Cross Gradient	N/A	UMCf-cg	78.2 - 97.7	120	67 J	<0.014	1,600	6.8	2.03
LVWPS-U3-MW03A	10/2/2020	N	BL04	Downgradient	25	UMCf-cg	86.3 - 111.0	3,300	4,500	7.5	2,800	0.57 J-	6.40
LVWPS-U3-MW03A	10/2/2020	FD	BL04	Downgradient	25	UMCf-cg	86.3 - 111.0	3,500	4,500	7.5	2,800	0.62 J-	----
LVWPS-U3-MW03A	1/14/2021	N	EM02	Downgradient	25	UMCf-cg	86.3 - 111.0	3,400	5,500	7.4	2,900	<2.1	4.38
LVWPS-U3-MW03A	2/11/2021	N	EM04	Downgradient	25	UMCf-cg	86.3 - 111.0	3,400	4,800	7.5	2,800	0.37 J	5.40
LVWPS-U3-MW03A	3/11/2021	N	EM05	Downgradient	25	UMCf-cg	86.3 - 111.0	3,100	4,900	7.2	3,000	<1.0	5.31
LVWPS-U3-MW03A	4/6/2021	N	EM06	Downgradient	25	UMCf-cg	86.3 - 111.0	2,800	4,600	7.7	2,800	<1.0	5.30
LVWPS-U3-MW03A	6/10/2021	N	EM08	Downgradient	25	UMCf-cg	86.3 - 111.0	3,100	3,400	7.4	2,600	<1.0	5.28
LVWPS-U3-MW03B	10/2/2020	N	BL04	Downgradient	25	UMCf-cg	151.1 - 175.7	3,800	13,000	9.1	1,900	0.41 J	3.23
LVWPS-U3-MW03B	1/14/2021	N	EM02	Downgradient	25	UMCf-cg	151.1 - 175.7	100	<10	<0.014	1,900 J-	61	0.23
LVWPS-U3-MW03B	2/11/2021	N	EM04	Downgradient	25	UMCf-cg	151.1 - 175.7	86	21 J	<0.014	1,900	38	0.57
LVWPS-U3-MW03B	3/12/2021	N	EM05	Downgradient	25	UMCf-cg	151.1 - 175.7	430	93 J	<0.028	1,600	48	0.49
LVWPS-U3-MW03B	4/12/2021	N	EM06	Downgradient	25	UMCf-cg	151.1 - 175.7	320	<10	<0.014	1,500	33	0.46
LVWPS-U3-MW03B	6/14/2021	N	EM08	Downgradient	25	UMCf-cg	151.1 - 175.7	110	<24	<0.014	1,600	1.1	1.06
LVWPS-U3-MW03C	10/1/2020	N	BL04	Downgradient	25	UMCf-cg	117.8 - 142.5	4,900	12,000	7.7	1,900	0.32 J	2.96
LVWPS-U3-MW03C	1/14/2021	N	EM02	Downgradient	25	UMCf-cg	117.8 - 142.5	4,800	4,300	1.6	2,000	2.6	0.43
LVWPS-U3-MW03C	2/11/2021	N	EM04	Downgradient	25	UMCf-cg	117.8 - 142.5	5,700	6,800	3.4	2,000	3.9	0.46
LVWPS-U3-MW03C	3/11/2021	N	EM05	Downgradient	25	UMCf-cg	117.8 - 142.5	6,000	8,600	4.2	2,100	1.3	0.62
LVWPS-U3-MW03C	4/13/2021	N	EM06	Downgradient	25	UMCf-cg	117.8 - 142.5	6,100	12,000	5.6	2,000	0.39 J	1.06
LVWPS-U3-MW03C	6/11/2021	N	EM08	Downgradient	25	UMCf-cg	117.8 - 142.5	6,600	12,000	6.2	1,900	0.31 J	0.62
LVWPS-U3-MW09	10/7/2020	N	BL04	Downgradient	25	UMCf-cg	82.8 - 107.5	3,500	6,100	4.8	1,300	<0.26	4.35
LVWPS-U3-MW09	1/15/2021	N	EM02	Downgradient	25	UMCf-cg	82.8 - 107.5	14	<10	<0.014	1,100	300	0.52
LVWPS-U3-MW09	2/10/2021	N	EM04	Downgradient	25	UMCf-cg	82.8 - 107.5	90	<10	<0.014	1,100	97	0.72
LVWPS-U3-MW09	3/12/2021	N	EM05	Downgradient	25	UMCf-cg	82.8 - 107.5	130	<10	<0.014 UJ	610	76	0.33
LVWPS-U3-MW09	4/8/2021	N	EM06	Downgradient	25	UMCf-cg	82.8 - 107.5	75	<10	<0.014	740	50	0.41



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 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-U3-MW09	6/11/2021	N	EM08	Downgradient	25	UMCf-cg	82.8 - 107.5	<0.31	<24	<0.014	63	10	0.23
LVWPS-U3-MW13A	10/7/2020	N	BL04	Downgradient	25	UMCf-cg	96.3 - 121.0	3,900	7,200	11	2,000	0.45 J	5.44
LVWPS-U3-MW13A	1/15/2021	N	EM02	Downgradient	25	UMCf-cg	96.3 - 121.0	3,900	7,400	10	2,100	<1.0	4.84
LVWPS-U3-MW13A	2/11/2021	N	EM04	Downgradient	25	UMCf-cg	96.3 - 121.0	4,200	6,300	10	2,000	0.45 J	5.32
LVWPS-U3-MW13A	3/12/2021	N	EM05	Downgradient	25	UMCf-cg	96.3 - 121.0	4,100	6,500	9.9 J-	1,900	<1.0	4.53
LVWPS-U3-MW13A	4/8/2021	N	EM06	Downgradient	25	UMCf-cg	96.3 - 121.0	3,800	6,400	9.0	2,000	0.37 J	5.70
LVWPS-U3-MW13A	6/11/2021	N	EM08	Downgradient	25	UMCf-cg	96.3 - 121.0	3,500	5,700	9.7	1,900	<1.0	5.64
LVWPS-U3-MW13B	10/7/2020	N	BL04	Downgradient	25	UMCf-cg	132.8 - 147.5	350	550	6.8	1,500	0.45 J	5.92
LVWPS-U3-MW13B	1/15/2021	N	EM02	Downgradient	25	UMCf-cg	132.8 - 147.5	<0.31	<10	<0.014	910	65	0.2
LVWPS-U3-MW13B	1/15/2021	FD	EM02	Downgradient	25	UMCf-cg	132.8 - 147.5	<0.31	<10	<0.014	920	65	----
LVWPS-U3-MW13B	2/12/2021	N	EM04	Downgradient	25	UMCf-cg	132.8 - 147.5	<0.31	<10	<0.014	830	130	0.47
LVWPS-U3-MW13B	2/12/2021	FD	EM04	Downgradient	25	UMCf-cg	132.8 - 147.5	<0.31	<10	<0.014	850	130	----
LVWPS-U3-MW13B	3/15/2021	N	EM05	Downgradient	25	UMCf-cg	132.8 - 147.5	<0.31	<10	<0.014	880	22	0.38
LVWPS-U3-MW13B	3/15/2021	FD	EM05	Downgradient	25	UMCf-cg	132.8 - 147.5	<0.31	<10	<0.014	900	25	----
LVWPS-U3-MW13B	4/14/2021	N	EM06	Downgradient	25	UMCf-cg	132.8 - 147.5	<0.31	<10	<0.014	1,200	11	0.47
LVWPS-U3-MW13B	4/14/2021	FD	EM06	Downgradient	25	UMCf-cg	132.8 - 147.5	<0.31	<10	<0.014	1,200	12	----
LVWPS-U3-MW13B	6/17/2021	N	EM08	Downgradient	25	UMCf-cg	132.8 - 147.5	<0.31	<24	<0.014	1,200	7.9	0.45
LVWPS-U3-MW13B	6/17/2021	FD	EM08	Downgradient	25	UMCf-cg	132.8 - 147.5	<0.31	<24	<0.014	1,200	7.2	----
LVWPS-A3-MW02	10/5/2020	N	BL04	Downgradient	45	Qal	52.8 - 72.5	100	150	7.0	900	0.29 J	6.42
LVWPS-A3-MW02	1/14/2021	N	EM02	Downgradient	45	Qal	52.8 - 72.5	100	140	7.2	1,000	0.35 J	6.18
LVWPS-A3-MW02	2/11/2021	N	EM04	Downgradient	45	Qal	52.8 - 72.5	130	130	7.4 J-	920	0.28 J	6.68
LVWPS-A3-MW02	3/11/2021	N	EM05	Downgradient	45	Qal	52.8 - 72.5	120	140	7.3	1,000	0.29 J	6.17
LVWPS-A3-MW02	4/9/2021	N	EM06	Downgradient	45	Qal	52.8 - 72.5	120	150	7.4	980	0.35 J	6.30
LVWPS-A3-MW02	6/10/2021	N	EM08	Downgradient	45	Qal	52.8 - 72.5	160	190 J+	7.4	970	0.27 J	6.05
LVWPS-U3-MW02A	10/5/2020	N	BL04	Downgradient	45	UMCf-cg	82.3 - 97.0	3,000	770	5.7	1,400	0.54	2.01
LVWPS-U3-MW02A	1/14/2021	N	EM02	Downgradient	45	UMCf-cg	82.3 - 97.0	1,900	3,200	6.0	1,500	0.37 J	3.75
LVWPS-U3-MW02A	1/14/2021	FD	EM02	Downgradient	45	UMCf-cg	82.3 - 97.0	2,300	3,300	6.1	1,500	0.41 J	----
LVWPS-U3-MW02A	2/11/2021	N	EM04	Downgradient	45	UMCf-cg	82.3 - 97.0	2,700	4,200	5.2 J-	1,400	0.41 J	2.51
LVWPS-U3-MW02A	2/11/2021	FD	EM04	Downgradient	45	UMCf-cg	82.3 - 97.0	2,900	4,200	5.3 J-	1,300	0.46 J	----
LVWPS-U3-MW02A	3/11/2021	N	EM05	Downgradient	45	UMCf-cg	82.3 - 97.0	2,400	3,600	5.6	1,500	0.48 J	2.93
LVWPS-U3-MW02A	3/11/2021	FD	EM05	Downgradient	45	UMCf-cg	82.3 - 97.0	2,500	3,700	6.3	1,500	0.44 J	----
LVWPS-U3-MW02A	4/9/2021	N	EM06	Downgradient	45	UMCf-cg	82.3 - 97.0	2,300	3,400	6.0	1,400	0.45 J	3.12
LVWPS-U3-MW02A	4/9/2021	FD	EM06	Downgradient	45	UMCf-cg	82.3 - 97.0	2,300	3,400	6.0	1,400	0.41 J	----
LVWPS-U3-MW02A	6/10/2021	N	EM08	Downgradient	45	UMCf-cg	82.3 - 97.0	2,200	2,200 J+	6.3	1,400	0.39 J	3.67
LVWPS-U3-MW02A	6/10/2021	FD	EM08	Downgradient	45	UMCf-cg	82.3 - 97.0	2,200	2,600 J+	6.4	1,400	0.40 J	----
LVWPS-U3-MW02B	10/5/2020	N	BL04	Downgradient	45	UMCf-cg	103.0 - 122.5	8,400	12,000	10	2,000	2.1	1.70
LVWPS-U3-MW02B	1/14/2021	N	EM02	Downgradient	45	UMCf-cg	103.0 - 122.5	190	370	0.29	1,800	14	0.49
LVWPS-U3-MW02B	2/11/2021	N	EM04	Downgradient	45	UMCf-cg	103.0 - 122.5	6,100	9,800	9.2 J-	1,900	2.7	1.42
LVWPS-U3-MW02B	3/11/2021	N	EM05	Downgradient	45	UMCf-cg	103.0 - 122.5	7,200	12,000	7.4	2,100	3.4	0.73
LVWPS-U3-MW02B	4/12/2021	N	EM06	Downgradient	45	UMCf-cg	103.0 - 122.5	5,700	9,800	9.3 J-	2,000	2.1	1.20
LVWPS-U3-MW02B	6/10/2021	N	EM08	Downgradient	45	UMCf-cg	103.0 - 122.5	6,100	8,700	9.4	2,000	1.5	1.22
LVWPS-A3-MW06	10/5/2020	N	BL04	Downgradient	50	Qal	55.3 - 75.0	110	150	9.0	1,300	0.45 J	7.24
LVWPS-A3-MW06	1/15/2021	N	EM02	Downgradient	50	Qal	55.3 - 75.0	100	160	8.6	1,400	0.61 J-	6.47
LVWPS-A3-MW06	2/10/2021	N	EM04	Downgradient	50	Qal	55.3 - 75.0	120	140	8.9	1,300	0.48 J	6.27
LVWPS-A3-MW06	3/12/2021	N	EM05	Downgradient	50	Qal	55.3 - 75.0	140	150 J+	8.2	1,200	0.43 J	6.28
LVWPS-A3-MW06	4/9/2021	N	EM06	Downgradient	50	Qal	55.3 - 75.0	96	150	8.1	1,300	0.43 J	6.32
LVWPS-A3-MW06	6/11/2021	N	EM08	Downgradient	50	Qal	55.3 - 75.0	110	160	8.2	1,200	0.58 J+	6.38
LVWPS-U3-MW06A	10/5/2020	N	BL04	Downgradient	50	UMCf-cg	90.3 - 115.0	9,900	15,000	13	1,700	0.48 J	5.05
LVWPS-U3-MW06A	1/15/2021	N	EM02	Downgradient	50	UMCf-cg	90.3 - 115.0	<6,300	13,000	12	1,800 J-	<1.0	4.12

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Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-U3-MW06A	2/12/2021	N	EM04	Downgradient	50	UMCf-cg	90.3 - 115.0	9,400	15,000	12	1,700	0.50	3.39
LVWPS-U3-MW06A	3/15/2021	N	EM05	Downgradient	50	UMCf-cg	90.3 - 115.0	15,000	25,000	17	1,800	<1.0	2.72
LVWPS-U3-MW06A	4/9/2021	N	EM06	Downgradient	50	UMCf-cg	90.3 - 115.0	15,000	24,000	16	2,000	<1.0	3.16
LVWPS-U3-MW06A	6/11/2021	N	EM08	Downgradient	50	UMCf-cg	90.3 - 115.0	11,000	18,000	10	1,900	<1.0	1.16
LVWPS-U3-MW06B	10/7/2020	N	BL04	Downgradient	50	UMCf-cg	125.3 - 149.9	630	1,200	6.6	1,500	0.43 J	4.23
LVWPS-U3-MW06B	1/14/2021	N	EM02	Downgradient	50	UMCf-cg	125.3 - 149.9	820	1,500	6.1	1,600	0.58	2.37
LVWPS-U3-MW06B	2/11/2021	N	EM04	Downgradient	50	UMCf-cg	125.3 - 149.9	1,100	1,600	5.9	1,500	0.58	2.68
LVWPS-U3-MW06B	3/11/2021	N	EM05	Downgradient	50	UMCf-cg	125.3 - 149.9	1,400	2,000	6.1	1,600	0.56	2.96
LVWPS-U3-MW06B	4/13/2021	N	EM06	Downgradient	50	UMCf-cg	125.3 - 149.9	680	1,400	6.5	1,500	0.57	1.02
LVWPS-U3-MW06B	6/16/2021	N	EM08	Downgradient	50	UMCf-cg	125.3 - 149.9	1,500	2,100 J+	6.7	1,500	0.57	2.82
LVWPS-U3-MW05B	10/2/2020	N	BL04	Downgradient	75	UMCf-cg	85.2 - 104.7	9.4	<10	<0.014	1,900	8.4	2.07
LVWPS-U3-MW05B	1/15/2021	N	EM02	Downgradient	75	UMCf-cg	85.2 - 104.7	96 J	39 J	<0.014	1,900	7.3	1.11
LVWPS-U3-MW05B	2/11/2021	N	EM04	Downgradient	75	UMCf-cg	85.2 - 104.7	460	130	<0.014	1,800	5.9	0.42
LVWPS-U3-MW05B	3/11/2021	N	EM05	Downgradient	75	UMCf-cg	85.2 - 104.7	510	250	0.11	1,900	4.9	1.18
LVWPS-U3-MW05B	4/8/2021	N	EM06	Downgradient	75	UMCf-cg	85.2 - 104.7	590	440	0.12 J+	2,000	4.3	0.88
LVWPS-U3-MW05B	6/10/2021	N	EM08	Downgradient	75	UMCf-cg	85.2 - 104.7	790	710	0.23	1,700	3.3	0.75
LVWPS-A3-MW10	10/5/2020	N	BL04	Downgradient	100	Qal	56.3 - 76.0	200	200	7.5	870	0.26 J	7.31
LVWPS-A3-MW10	1/14/2021	N	EM02	Downgradient	100	Qal	56.3 - 76.0	190	220	7.7	930	0.44 J	6.97
LVWPS-A3-MW10	2/11/2021	N	EM04	Downgradient	100	Qal	56.3 - 76.0	180	180	7.9 J-	950	<0.26	6.84
LVWPS-A3-MW10	3/11/2021	N	EM05	Downgradient	100	Qal	56.3 - 76.0	170	200	8.4	910	0.34 J	6.76
LVWPS-A3-MW10	4/9/2021	N	EM06	Downgradient	100	Qal	56.3 - 76.0	160	200	8.0	980	0.26 J	6.59
LVWPS-A3-MW10	6/10/2021	N	EM08	Downgradient	100	Qal	56.3 - 76.0	170	210	8.8	1,000	0.43 J	1.19
LVWPS-A3-MW11	10/7/2020	N	BL04	Downgradient	100	Qal	53.8 - 73.5	78	160	9.2	1,600	0.96	8.50
LVWPS-A3-MW11	1/15/2021	N	EM02	Downgradient	100	Qal	53.8 - 73.5	55 J	140	8.4	1,700	0.72	6.84
LVWPS-A3-MW11	2/11/2021	N	EM04	Downgradient	100	Qal	53.8 - 73.5	68	150	7.6	1,600	0.65	6.69
LVWPS-A3-MW11	3/11/2021	N	EM05	Downgradient	100	Qal	53.8 - 73.5	63	140	7.8	1,700	0.82	6.40
LVWPS-A3-MW11	4/8/2021	N	EM06	Downgradient	100	Qal	53.8 - 73.5	55	150	8.2	1,600	0.60	6.23
LVWPS-A3-MW11	6/10/2021	N	EM08	Downgradient	100	Qal	53.8 - 73.5	52	160	8.1	1,400	0.62	6.41
LVWPS-U3-MW10A	10/5/2020	N	BL04	Downgradient	100	UMCf-cg	85.3 - 95.0	2,600	3,200	3.0	1,800	0.77	0.99
LVWPS-U3-MW10A	1/14/2021	N	EM02	Downgradient	100	UMCf-cg	85.3 - 95.0	0.96 J	<10	<0.014	1,200	310	0.76
LVWPS-U3-MW10A	2/11/2021	N	EM04	Downgradient	100	UMCf-cg	85.3 - 95.0	8.4 J	<10	<0.014 UJ	1,100	4.6	0.89
LVWPS-U3-MW10A	3/11/2021	N	EM05	Downgradient	100	UMCf-cg	85.3 - 95.0	11	<10	<0.014	1,100	5.7	0.28
LVWPS-U3-MW10A	4/8/2021	N	EM06	Downgradient	100	UMCf-cg	85.3 - 95.0	<0.31	<10	<0.014	1,300	1.8	0.33
LVWPS-U3-MW10A	6/10/2021	N	EM08	Downgradient	100	UMCf-cg	85.3 - 95.0	43 J	51 J	0.035 J	1,400	<1.0	2.68
LVWPS-U3-MW10A	6/10/2021	FD	EM08	Downgradient	100	UMCf-cg	85.3 - 95.0	110 J	130 J	0.082	1,300	1.0 J	----
LVWPS-U3-MW10B	10/5/2020	N	BL04	Downgradient	100	UMCf-cg	101.3 - 121.0	3,200	4,200	6.5	1,600	0.32 J	6.76
LVWPS-U3-MW10B	1/14/2021	N	EM02	Downgradient	100	UMCf-cg	101.3 - 121.0	0.69 J	<10	<0.014	1,500	280	0.54
LVWPS-U3-MW10B	2/11/2021	N	EM04	Downgradient	100	UMCf-cg	101.3 - 121.0	<0.31	<10	<0.014 UJ	98	42	0.76
LVWPS-U3-MW10B	3/11/2021	N	EM05	Downgradient	100	UMCf-cg	101.3 - 121.0	<0.31	<10	<0.014	190	42	0.34
LVWPS-U3-MW10B	4/9/2021	N	EM06	Downgradient	100	UMCf-cg	101.3 - 121.0	<0.31	<10	<0.014	49	45	0.34
LVWPS-U3-MW10B	6/9/2021	N	EM08	Downgradient	100	UMCf-cg	101.3 - 121.0	<0.31	<24	<0.014	140	9.6	0.26
LVWPS-U3-MW11A	10/7/2020	N	BL04	Downgradient	100	UMCf-cg	86.3 - 106.0	10,000	16,000	9.8	2,000	0.42 J	2.55
LVWPS-U3-MW11A	1/15/2021	N	EM02	Downgradient	100	UMCf-cg	86.3 - 106.0	11,000	18,000	11	2,000	<1.0	3.02
LVWPS-U3-MW11A	2/12/2021	N	EM04	Downgradient	100	UMCf-cg	86.3 - 106.0	11,000	18,000	12	2,000	0.30 J	3.14
LVWPS-U3-MW11A	3/11/2021	N	EM05	Downgradient	100	UMCf-cg	86.3 - 106.0	12,000	17,000	11	2,200	<1.0	2.34
LVWPS-U3-MW11A	4/9/2021	N	EM06	Downgradient	100	UMCf-cg	86.3 - 106.0	9,900	15,000	11	2,100	0.40 J	3.71
LVWPS-U3-MW11A	6/10/2021	N	EM08	Downgradient	100	UMCf-cg	86.3 - 106.0	20,000	15,000	12	2,000	0.43 J	3.00
LVWPS-U3-MW11B	10/7/2020	N	BL04	Downgradient	100	UMCf-cg	112.3 - 137.0	4,100	9,600	5.2	1,900	0.33 J	1.23
LVWPS-U3-MW11B	1/18/2021	N	EM02	Downgradient	100	UMCf-cg	112.3 - 137.0	5,400	7,600	4.9	2,100	<1.0	2.13
LVWPS-U3-MW11B	2/12/2021	N	EM04	Downgradient	100	UMCf-cg	112.3 - 137.0	3,800	7,000	4.9	1,800	<0.26	1.44

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-U3-MW11B	3/12/2021	N	EM05	Downgradient	100	UMCf-cg	112.3 - 137.0	4,200	7,500	4.6	1,800	<1.0	0.51
LVWPS-U3-MW11B	4/14/2021	N	EM06	Downgradient	100	UMCf-cg	112.3 - 137.0	3,800	7,200	4.8	1,900	<1.0	2.78
LVWPS-U3-MW11B	6/16/2021	N	EM08	Downgradient	100	UMCf-cg	112.3 - 137.0	4,300	4,000	5.0	2,000	<1.0	1.13
LVWPS-U3-MW11C	10/8/2020	N	BL04	Downgradient	100	UMCf-cg	143.3 - 163.0	5,300	7,100	8.5	2,000	0.46 J	4.73
LVWPS-U3-MW11C	1/18/2021	N	EM02	Downgradient	100	UMCf-cg	143.3 - 163.0	6,500	6,800	8.1	2,000	<1.0	4.03
LVWPS-U3-MW11C	2/12/2021	N	EM04	Downgradient	100	UMCf-cg	143.3 - 163.0	3,800	6,200	8.3	1,700	0.34 J	2.92
LVWPS-U3-MW11C	3/12/2021	N	EM05	Downgradient	100	UMCf-cg	143.3 - 163.0	4,200	6,700	7.8	1,700	<1.0	3.34
LVWPS-U3-MW11C	4/14/2021	N	EM06	Downgradient	100	UMCf-cg	143.3 - 163.0	4,100	7,500	7.8	1,900	<1.0	2.80
LVWPS-U3-MW11C	6/17/2021	N	EM08	Downgradient	100	UMCf-cg	143.3 - 163.0	4,100	5,100	7.2	1,800	<1.0	2.81
LVWPS-A3-MW12	10/5/2020	N	BL04	Downgradient	150	Qal	59.3 - 79.0	200	270	7.2	1,200	0.40 J	6.48
LVWPS-A3-MW12	1/13/2021	N	EM02	Downgradient	150	Qal	59.3 - 79.0	230	260	7.1	1,200	0.35 J	5.84
LVWPS-A3-MW12	2/12/2021	N	EM04	Downgradient	150	Qal	59.3 - 79.0	190	280	7.6	1,200	0.41 J	8.24
LVWPS-A3-MW12	3/12/2021	N	EM05	Downgradient	150	Qal	59.3 - 79.0	140	190	5.8	1,100	0.45 J	4.29
LVWPS-A3-MW12	4/14/2021	N	EM06	Downgradient	150	Qal	59.3 - 79.0	140	190	5.4	1,100	0.41 J	3.69
LVWPS-A3-MW12	6/11/2021	N	EM08	Downgradient	150	Qal	59.3 - 79.0	140	210	5.5	1,100	0.50 J+	2.31
LVWPS-U3-MW12A	10/6/2020	N	BL04	Downgradient	150	UMCf-cg	88.3 - 108.0	2,700	4,200	5.1	1,800	0.38 J	2.67
LVWPS-U3-MW12A	1/15/2021	N	EM02	Downgradient	150	UMCf-cg	88.3 - 108.0	2,300	3,200	3.3	1,800	0.60	1.07
LVWPS-U3-MW12A	2/12/2021	N	EM04	Downgradient	150	UMCf-cg	88.3 - 108.0	2,000	2,800	2.5	1,600	3.7	1.79
LVWPS-U3-MW12A	3/12/2021	N	EM05	Downgradient	150	UMCf-cg	88.3 - 108.0	1,700	2,500	2.0	1,600	<1.0	0.63
LVWPS-U3-MW12A	4/15/2021	N	EM06	Downgradient	150	UMCf-cg	88.3 - 108.0	2,100 J-	3,300 J-	1.6 J-	1,600 J-	<1.0 UJ	1.12
LVWPS-U3-MW12A	6/11/2021	N	EM08	Downgradient	150	UMCf-cg	88.3 - 108.0	3,900	5,500	5.1	1,900	<1.0	2.06
LVWPS-U3-MW12B	10/6/2020	N	BL04	Downgradient	150	UMCf-cg	113.3 - 138.0	6,000	4,900	6.6	1,700	0.27 J	5.94
LVWPS-U3-MW12B	1/15/2021	N	EM02	Downgradient	150	UMCf-cg	113.3 - 138.0	1,900	2,600	2.7	2,000	0.45 J	1.79
LVWPS-U3-MW12B	2/12/2021	N	EM04	Downgradient	150	UMCf-cg	113.3 - 138.0	830	980	0.99	1,500	27	0.94
LVWPS-U3-MW12B	3/12/2021	N	EM05	Downgradient	150	UMCf-cg	113.3 - 138.0	820	1,100	1.3	1,500	1.8 J+	1.28
LVWPS-U3-MW12B	4/15/2021	N	EM06	Downgradient	150	UMCf-cg	113.3 - 138.0	7.6 J-	1,200 J-	1.4 J-	1,500 J-	0.41 J	1.38
LVWPS-U3-MW12B	6/14/2021	N	EM08	Downgradient	150	UMCf-cg	113.3 - 138.0	1,000	1,500	1.6	1,500	0.64	1.39
LVWPS-MW212C	10/5/2020	N	BL04	Downgradient	260	UMCf-cg	100.3 - 120.0	7,800	11,000	8.4	----	----	4.32
LVWPS-MW212C	4/14/2021	N	EM06	Downgradient	260	UMCf-cg	100.3 - 120.0	6,700	12,000	8.4	2,100	0.37 J	3.77
LVWPS-MW212C	6/15/2021	N	EM08	Downgradient	260	UMCf-cg	100.3 - 120.0	6,200	8,800	7.7	2,100	<1.0	7.47
LVWPS-MW212D	10/8/2020	N	BL04	Downgradient	260	UMCf-cg	125.5 - 145.0	6,800	11,000	10	----	----	5.60
LVWPS-MW212D	4/14/2021	N	EM06	Downgradient	260	UMCf-cg	125.5 - 145.0	6,000	11,000	9.9	2,500	0.41 J	4.36
LVWPS-MW212D	6/16/2021	N	EM08	Downgradient	260	UMCf-cg	125.5 - 145.0	5,900	7,500	10	2,500	0.41 J	4.04
LVWPS-U3-IW01	10/9/2020	N	BL04	Injection Well Transect	0	UMCf-cg	80.2 - 115.0	3,100	4,900	8.3	----	----	5.57
LVWPS-U3-IW02A	10/6/2020	N	BL04	Injection Well Transect	0	UMCf-cg	79.3 - 99.0	10,000	15,000	14	----	----	4.02
LVWPS-U3-IW02B	10/6/2020	N	BL04	Injection Well Transect	0	UMCf-cg	104.8 - 124.5	5,200	9,700	9.4	----	----	3.61
LVWPS-U3-IW03A	10/6/2020	N	BL04	Injection Well Transect	0	UMCf-cg	77.8 - 102.5	1,800	3,500	8.3	----	----	3.56
LVWPS-U3-IW03B	10/6/2020	N	BL04	Injection Well Transect	0	UMCf-cg	109.3 - 139.0	1,600	3,200	7.9	----	----	4.91
LVWPS-U3-IW04A	10/7/2020	N	BL04	Injection Well Transect	0	UMCf-cg	93.3 - 123.0	210	390	7.7	----	----	5.74
LVWPS-U3-IW04B	10/7/2020	N	BL04	Injection Well Transect	0	UMCf-cg	129.3 - 159.0	680	1,100	5.8	----	----	3.71
LVWPS-U3-IW05A	10/7/2020	N	BL04	Injection Well Transect	0	UMCf-cg	91.3 - 126.0	230	380	7.8	----	----	5.74
LVWPS-U3-IW05B	10/7/2020	N	BL04	Injection Well Transect	0	UMCf-cg	132.8 - 167.5	530	870	7.4	----	----	5.83
LVWPS-U3-IW06A	10/7/2020	N	BL04	Injection Well Transect	0	UMCf-cg	86.3 - 111.0	340	540	7.6	----	----	5.89
LVWPS-U3-IW06B	10/8/2020	N	BL04	Injection Well Transect	0	UMCf-cg	117.8 - 142.5	5,700	1,800	7.6	----	----	4.72
LVWPS-U3-IW06C	10/8/2020	N	BL04	Injection Well Transect	0	UMCf-cg	149.3 - 174.0	3,800	4,100	8.1	----	----	5.71
LVWPS-U3-IW07A	10/8/2020	N	BL04	Injection Well Transect	0	UMCf-cg	86.3 - 111.0	1,400	2,000	7.1	----	----	3.57
LVWPS-U3-IW07B	10/8/2020	N	BL04	Injection Well Transect	0	UMCf-cg	117.8 - 142.5	9,400	15,000	9.0	----	----	0.80
LVWPS-U3-IW07C	10/9/2020	N	BL04	Injection Well Transect	0	UMCf-cg	149.3 - 174.0	7,300	14,000	8.0	----	----	0.73

**Table 2**  
**Groundwater Analytical Results**  
 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-U3-IW08A	10/8/2020	N	BL04	Injection Well Transect	0	UMCf-cg	86.3 - 111.0	1,900	2,600	5.8	----	----	0.79
LVWPS-U3-IW08A	10/8/2020	FD	BL04	Injection Well Transect	0	UMCf-cg	86.3 - 111.0	1,900	2,600	5.5	----	----	----
LVWPS-U3-IW08B	10/8/2020	N	BL04	Injection Well Transect	0	UMCf-cg	117.8 - 142.5	15,000	21,000	12	----	----	0.94
LVWPS-U3-IW08C	10/9/2020	N	BL04	Injection Well Transect	0	UMCf-cg	149.3 - 174.0	2,400	3,500	2.3	----	----	0.66
LVWPS-A3-MW08	10/8/2020	N	BL04	Upgradient	-60	Qal	84.8 - 104.5	120	180	8.5	1,600	0.81	4.73
LVWPS-A3-MW08	1/14/2021	N	EM02	Upgradient	-60	Qal	84.8 - 104.5	71	160	8.4	1,700	1.1 J	6.42
LVWPS-A3-MW08	2/11/2021	N	EM04	Upgradient	-60	Qal	84.8 - 104.5	83	170	8.1 J-	1,600	0.80	6.32
LVWPS-A3-MW08	3/10/2021	N	EM05	Upgradient	-60	Qal	84.8 - 104.5	66	150	8.4	1,500	<1.0	5.94
LVWPS-A3-MW08	4/9/2021	N	EM06	Upgradient	-60	Qal	84.8 - 104.5	61	150	7.8	1,600	<1.0	6.86
LVWPS-A3-MW08	6/9/2021	N	EM08	Upgradient	-60	Qal	84.8 - 104.5	68	140	8.2	1,500	<1.0	6.40
LVWPS-U3-MW08A	10/8/2020	N	BL04	Upgradient	-60	UMCf-cg	117.8 - 142.5	15,000	22,000	14	2,300	0.47 J	5.05
LVWPS-U3-MW08A	1/15/2021	N	EM02	Upgradient	-60	UMCf-cg	117.8 - 142.5	14,000	20,000	14	2,400	<1.0	4.22
LVWPS-U3-MW08A	2/12/2021	N	EM04	Upgradient	-60	UMCf-cg	117.8 - 142.5	14,000	20,000	13	2,300	0.40 J	4.55
LVWPS-U3-MW08A	3/12/2021	N	EM05	Upgradient	-60	UMCf-cg	117.8 - 142.5	12,000	19,000	12	2,200	0.40 J	4.31
LVWPS-U3-MW08A	4/9/2021	N	EM06	Upgradient	-60	UMCf-cg	117.8 - 142.5	14,000	20,000	13	2,400	0.33 J	4.90
LVWPS-U3-MW08A	6/16/2021	N	EM08	Upgradient	-60	UMCf-cg	117.8 - 142.5	13,000	17,000	14	2,500	<1.0	4.41
LVWPS-U3-MW08B	10/8/2020	N	BL04	Upgradient	-60	UMCf-cg	149.3 - 174.0	6,100	8,100	4.9	2,200	2.6	2.46
LVWPS-U3-MW08B	1/15/2021	N	EM02	Upgradient	-60	UMCf-cg	149.3 - 174.0	7,400	8,100	5.3	2,200	1.0 J	0.86
LVWPS-U3-MW08B	2/12/2021	N	EM04	Upgradient	-60	UMCf-cg	149.3 - 174.0	5,700	8,100	5.5	2,000	0.68	1.04
LVWPS-U3-MW08B	3/12/2021	N	EM05	Upgradient	-60	UMCf-cg	149.3 - 174.0	5,200	8,500	5.6	2,000	<1.0	0.97
LVWPS-U3-MW08B	4/15/2021	N	EM06	Upgradient	-60	UMCf-cg	149.3 - 174.0	5,000 J-	8,700 J-	4.9 J-	2,100 J-	0.81 J-	0.80
LVWPS-U3-MW08B	6/16/2021	N	EM08	Upgradient	-60	UMCf-cg	149.3 - 174.0	5,500	7,200	6.2	2,200	<1.0	0.90
LVWPS-A3-MW07	10/8/2020	N	BL04	Upgradient	-55	Qal	54.8 - 74.5	100	210	6.4	1,100	0.45 J	6.98
LVWPS-A3-MW07	1/15/2021	N	EM02	Upgradient	-55	Qal	54.8 - 74.5	130	230	7.1	1,200	<1.0	6.70
LVWPS-A3-MW07	2/11/2021	N	EM04	Upgradient	-55	Qal	54.8 - 74.5	130	200	7.5 J-	1,100	0.34 J	6.71
LVWPS-A3-MW07	3/11/2021	N	EM05	Upgradient	-55	Qal	54.8 - 74.5	160	250	7.1	1,200	0.37 J	5.93
LVWPS-A3-MW07	4/8/2021	N	EM06	Upgradient	-55	Qal	54.8 - 74.5	120	150	7.0	1,100	<1.0	6.42
LVWPS-A3-MW07	6/10/2021	N	EM08	Upgradient	-55	Qal	54.8 - 74.5	120	180 J	7.5	1,100	0.33 J	6.28
LVWPS-U3-MW07A	10/9/2020	N	BL04	Upgradient	-55	UMCf-cg	82.8 - 97.5	250	540	5.9	1,200	0.39 J	5.45
LVWPS-U3-MW07A	1/15/2021	N	EM02	Upgradient	-55	UMCf-cg	82.8 - 97.5	260	530	6.1	1,200	0.37 J	6.37
LVWPS-U3-MW07A	2/11/2021	N	EM04	Upgradient	-55	UMCf-cg	82.8 - 97.5	300	440	6.6 J-	1,100	0.27 J	6.50
LVWPS-U3-MW07A	3/11/2021	N	EM05	Upgradient	-55	UMCf-cg	82.8 - 97.5	260	430	5.9	1,200	<1.0	6.23
LVWPS-U3-MW07A	4/8/2021	N	EM06	Upgradient	-55	UMCf-cg	82.8 - 97.5	250	470	5.8	1,200	0.32 J	6.50
LVWPS-U3-MW07A	6/10/2021	N	EM08	Upgradient	-55	UMCf-cg	82.8 - 97.5	220	410 J+	6.3	1,100	0.34 J	6.20
LVWPS-U3-MW07B	10/9/2020	N	BL04	Upgradient	-55	UMCf-cg	104.8 - 124.5	4,800	8,500	9.2	2,100	0.41 J	6.07
LVWPS-U3-MW07B	1/14/2021	N	EM02	Upgradient	-55	UMCf-cg	104.8 - 124.5	4,600	7,900	9.5	2,100	<2.1	6.26
LVWPS-U3-MW07B	2/12/2021	N	EM04	Upgradient	-55	UMCf-cg	104.8 - 124.5	4,900	7,400	9.4	1,800	0.41 J	6.51
LVWPS-U3-MW07B	3/12/2021	N	EM05	Upgradient	-55	UMCf-cg	104.8 - 124.5	4,500	7,400	9.3	2,700	<1.0	7.04
LVWPS-U3-MW07B	4/13/2021	N	EM06	Upgradient	-55	UMCf-cg	104.8 - 124.5	4,400	7,400	9.5	2,000	0.35 J	6.13
LVWPS-U3-MW07B	6/11/2021	N	EM08	Upgradient	-55	UMCf-cg	104.8 - 124.5	4,500	7,700	9.3	1,800	0.38 J	6.29
<b>Extraction</b>													
LVWPS-EW01	9/29/2020	N	BL04	N/A	N/A	Qal	44.8 - 84.5	2,900	13,000	23	2,200	1.6	2.76
LVWPS-EW01	3/12/2021	N	EM05	N/A	N/A	Qal	44.8 - 84.5	3,400	14,000	23	2,000	1.7 J+	2.34
LVWPS-EW02	9/29/2020	N	BL04	N/A	N/A	Qal	28.3 - 58.0	2,900	5,500	20	2,100	1.9	4.29
LVWPS-EW02	3/12/2021	N	EM05	N/A	N/A	Qal	28.3 - 58.0	2,900	7,000	23	2,000	1.9 J+	4.54
LVWPS-EW03	9/30/2020	N	BL04	N/A	N/A	Qal	40.3 - 70.0	3,100	5,000	18	2,100	1.7	4.09
LVWPS-EW03	3/12/2021	N	EM05	N/A	N/A	Qal	40.3 - 70.0	2,900	5,300	21	2,000	2.2 J+	3.92
LVWPS-EW03	3/12/2021	FD	EM05	N/A	N/A	Qal	40.3 - 70.0	3,000	5,500	22	2,100	2.1 J+	----

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 Las Vegas Wash Bioremediation Pilot Study

Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-EW04	9/30/2020	N	BL04	N/A	N/A	Qal	26.3 - 46.0	2,800	5,200	20	2,100	2.0	4.35
LVWPS-EW04	3/12/2021	N	EM05	N/A	N/A	Qal	26.3 - 46.0	2,900	5,600	23	2,100	2.1 J+	4.68
LVWPS-EW05	9/29/2020	N	BL04	N/A	N/A	Qal	50.3 - 80.0	2,800	11,000	23	2,100	1.8	2.32
LVWPS-EW05	9/29/2020	FD	BL04	N/A	N/A	Qal	50.3 - 80.0	2,800	11,000	23	2,100	1.7	----
LVWPS-EW05	3/15/2021	N	EM05	N/A	N/A	Qal	50.3 - 80.0	3,100	12,000	24	2,100	1.8	2.22
LVWPS-MW206A	9/30/2020	N	BL04	N/A	N/A	Qal	39.8 - 59.5	3,400 J-	8,500	23	----	----	3.77
LVWPS-MW206B	9/30/2020	N	BL04	N/A	N/A	Qal	69.9 - 89.5	2,800	16,000	10	----	----	1.84
LVWPS-MW206C	9/30/2020	N	BL04	N/A	N/A	UMCf	100.3 - 120.0	4,900 J-	6,000	3.4	----	----	2.70
LVWPS-MW206D	10/6/2020	N	BL04	N/A	N/A	UMCf	125.3 - 145.0	9.5	<10	<0.014	----	----	2.08
<b>General Vicinity</b>													
LVWPS-MW224B	10/7/2020	N	BL04	N/A	-225	UMCf	106.8 - 126.5	200	220	0.63	----	----	1.48
LVWPS-U2-MW19	10/2/2020	N	BL04	N/A	0	UMCf	91.2 - 111.0	12,000	14,000	14	2,100	1.0	3.29
LVWPS-U2-MW20	10/2/2020	N	BL04	N/A	0	UMCf	88.2 - 108.0	6,000	13,000	12	2,200	1.5	1.38
LVWPS-U2-MW07	10/2/2020	N	BL04	N/A	25	UMCf	88.2 - 108.0	1,600	2,600	10	1,900	0.74	5.79
LVWPS-U2-MW10	10/2/2020	N	BL04	N/A	50	UMCf	90.2 - 110.0	6,000	8,900	15	2,200	1.1	4.16
LVWPS-U2-MW13	10/2/2020	N	BL04	N/A	105	UMCf	94.7 - 109.5	5,400	11,000	17	2,100	1.2	3.58
LVWPS-U2-MW13	10/2/2020	FD	BL04	N/A	105	UMCf	94.7 - 109.5	5,800	11,000	17	2,300	1.4	----
LVWPS-MW201A	9/28/2020	N	BL04	N/A	N/A	Qal	28.2 - 47.8	1,800	11,000	13	----	----	0.59
LVWPS-MW201B	9/28/2020	N	BL04	N/A	N/A	UMCf	60.1 - 79.8	610	560	0.55	----	----	1.13
LVWPS-MW202	9/29/2020	N	BL04	N/A	N/A	Qal	41.8 - 61.5	1,100	6,000	12	----	----	0.80
LVWPS-MW203A	9/30/2020	N	BL04	N/A	N/A	Qal	34.8 - 54.5	120	<40	9.3	----	----	0.74
LVWPS-MW203A	9/30/2020	FD	BL04	N/A	N/A	Qal	34.8 - 54.5	120	<40	9.3	----	----	----
LVWPS-MW203B	9/30/2020	N	BL04	N/A	N/A	UMCf	75.1 - 94.7	2.6 J-	<40	<0.014	----	----	0.88
LVWPS-MW203C	9/30/2020	N	BL04	N/A	N/A	UMCf (Semi-Cons)	100.3 - 120.0	<0.31	<20	<0.014	----	----	0.65
LVWPS-MW204C	10/7/2020	N	BL04	N/A	N/A	UMCf (Semi-Cons)	150.5 - 170.0	46	<100	<0.028	----	----	2.40
LVWPS-MW205B	9/28/2020	N	BL04	N/A	N/A	Qal	64.9 - 84.6	1,300	6,300	12	----	----	0.50
LVWPS-MW205C	9/29/2020	N	BL04	N/A	N/A	Qal	100.3 - 120.0	790	2,700	11	----	----	0.87
LVWPS-MW206E	10/5/2020	N	BL04	N/A	N/A	UMCf (Semi-Cons)	195.5 - 205.0	39	<100	<0.014	----	----	2.11
LVWPS-MW209B	10/6/2020	N	BL04	N/A	N/A	UMCf-cg	110.3 - 130.0	2,700	8,300	21	----	----	4.30
LVWPS-MW209C	10/7/2020	N	BL04	N/A	N/A	UMCf-cg	151.0 - 170.5	8,500	12,000	14	----	----	2.44
LVWPS-MW210C	10/1/2020	N	BL04	N/A	N/A	UMCf-cg	100.3 - 120.0	10,000 J-	17,000	15	----	----	2.59
LVWPS-MW210D	10/7/2020	N	BL04	N/A	N/A	UMCf-cg	130.4 - 140.0	8,500	10,000	3.8	----	----	3.24
LVWPS-MW210E	10/7/2020	N	BL04	N/A	N/A	UMCf-cg	145.5 - 165.0	4,400	7,100	2.2	----	----	2.19
LVWPS-MW213	10/1/2020	N	BL04	N/A	N/A	Qal	40.1 - 59.8	170	260	3.2	----	----	4.96
LVWPS-MW213	10/1/2020	FD	BL04	N/A	N/A	Qal	40.1 - 59.8	140	270	3.2	----	----	----
LVWPS-MW214	10/7/2020	N	BL04	N/A	N/A	Qal	34.4 - 44.0	2,500	3,700	14	----	----	5.16
LVWPS-MW215A	10/8/2020	N	BL04	N/A	N/A	Qal	13.5 - 33.2	2,600 J-	9,700	17	----	----	1.26
LVWPS-MW215B	10/9/2020	N	BL04	N/A	N/A	Horse Springs	40.7 - 45.3	2,600	6,700	11	----	----	1.46
LVWPS-MW216	10/7/2020	N	BL04	N/A	N/A	Qal	10.4 - 20.0	1,100	930	4.0	----	----	0.66
LVWPS-MW216	10/7/2020	FD	BL04	N/A	N/A	Qal	10.4 - 20.0	1,100	940	4.1	----	----	----
LVWPS-MW218B	10/2/2020	N	BL04	N/A	N/A	UMCf/UMCf-cg	100.3 - 120.0	8,400	13,000	16	----	----	5.83
LVWPS-MW218C	10/2/2020	N	BL04	N/A	N/A	UMCf/UMCf-cg	136.0 - 155.5	5,300	7,200	4.3	----	----	1.78
LVWPS-MW219A	10/9/2020	N	BL04	N/A	N/A	Qal	35.1 - 49.8	3,500	8,500	19	----	----	5.78
LVWPS-MW219B	10/9/2020	N	BL04	N/A	N/A	UMCf/Horse Springs	75.3 - 95.0	2.2	<100	<0.014	----	----	3.23
LVWPS-MW219C	10/9/2020	N	BL04	N/A	N/A	UMCf/Horse Springs	115.5 - 135.0	53	<10	0.045 J	----	----	2.43
LVWPS-MW220B	10/7/2020	N	BL04	N/A	N/A	UMCf-cg	134.5 - 154.0	4,200	10,000	12	----	----	2.66
LVWPS-MW221B	10/6/2020	N	BL04	N/A	N/A	UMCf/UMCf-cg	83.7 - 103.2	6,600	11,000	5.8	1,500 J+	0.54	3.09
LVWPS-MW224C	10/8/2020	N	BL04	N/A	N/A	UMCf (Semi-Cons)	174.5 - 194.0	30	<100	0.068	----	----	2.10

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Well	Sample Date	QC Type	Event	Location	Distance from Injection Transect	Screened Lithology	Screened Interval	Perchlorate by USEPA Method 314.0	Chlorate by USEPA Method 300.1B	Nitrate (as N) by USEPA Method 300.0	Sulfate by USEPA Method 300.0	Total Organic Carbon by SM 5310B	Dissolved Oxygen Field Measurement
					feet		ft bgs	µg/L	µg/L	mg/L	mg/L	mg/L	mg/L
LVWPS-MW225A	10/7/2020	N	BL04	N/A	N/A	Qal	49.3 - 69.0	2,300	5,200	22	----	----	4.35
LVWPS-MW225A	10/7/2020	FD	BL04	N/A	N/A	Qal	49.3 - 69.0	2,300	5,200	22	----	----	----
LVWPS-MW225B	10/7/2020	N	BL04	N/A	N/A	UMCf	90.5 - 110.0	4,000	5,100	3.3	----	----	1.92
LVWPS-MW226A	10/1/2020	N	BL04	N/A	N/A	Qal	40.3 - 55.0	2,800	5,100	19	----	----	3.71
LVWPS-MW226A	10/1/2020	FD	BL04	N/A	N/A	Qal	40.3 - 55.0	2,300	4,900	19	----	----	----
LVWPS-MW226B	10/1/2020	N	BL04	N/A	N/A	UMCf (Semi-Cons)	77.5 - 97.0	37	<100	<0.014	----	----	0.79

Notes:

- Not tested.
- J- The result is an estimated quantity, but the result may be biased low.
- J The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
- J+ The result is an estimated quantity, but the result may be biased high.
- < The analyte was analyzed for, but was not detected above the level of the reported sample quantitation limit.
- R The data are unusable. The sample results are rejected due to serious deficiencies in meeting QC criteria. The analyte may or may not be present in the sample.
- Transect Distance Approximate distance from Injection Well Transect in feet.
- N/A Not Applicable.