# MEMO

| | |
|---|---|
| Date | **June 3, 2019** |
| To | **Nevada Environmental Response Trust** |
| From | **John Pekala, Scott Warner, and Chris Ritchie** |
| Copy to | **Nevada Division of Environmental Protection**<br>**United States Environmental Protection Agency** |
| Subject | **Galleria Drive ZVI-Enhanced Bioremediation Treatability Study Monthly Progress Report** |

## TASK PROGRESS UPDATE: APRIL 2019

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Ramboll US Corporation (Ramboll) has prepared this memorandum which summarizes Ramboll's progress during April 2019 toward successfully implementing the Galleria Drive Zero-Valent Iron (ZVI)-Enhanced Bioremediation Treatability Study.

## TASK M18 – GALLERIA DRIVE ZVI-ENHANCED BIOREMEDIATION TREATABILITY STUDY.

- Task Leaders – Scott Warner / Chris Ritchie
- Current Status
  - Phase 1 of the treatability study is on-going. The pre-design field investigation is complete and is described more in the following section; bench-scale testing is in progress and described more in the following sections. Bench-scale testing is anticipated to conclude in May 2019. Phase 2 (design and implementation of a field test) is anticipated to be proposed in Q3 2019 as part of a forthcoming Work Plan Addendum.
- Pre-Design Field Investigation
  - Additional pre-design field investigation activities were conducted in January and February 2019. Five additional monitoring wells were installed throughout the test area adjacent to prior installed monitoring wells. Four of these additional locations were designed to target the deeper UMCf. The fifth location as installed in the shallow alluvium targeting a previously observed organic layer (40 to 50 feet below ground surface). Monitoring well locations, groundwater elevations, and groundwater analytical data are presented in Figures 1 through 4.
  - Analytical results for soil samples collected during 2019 well installations were generally consistent with previous sampling efforts in the test area. Perchlorate contamination is generally limited to the vadose zone (unsaturated alluvium) and the upper 30-40 feet saturated UMCf, with concentrations ranging from non-detect to 5.8 mg/kg. Soil depth profiles are presented in Figures 5 through 9.

- Perchlorate was detected in groundwater at concentrations ranging from non-detect to 0.13 mg/l in newly installed wells ES-40 through ES-43 (screened from 90-110 feet bgs). The groundwater sample collected from the new shallow well ES-44 (screened to 55 feet bgs) contained perchlorate at 8.5 mg/l. These groundwater results are consistent with saturated soil sample results from the previous round of sampling, suggesting that perchlorate contamination in soil and groundwater is generally limited to less than 70 feet bgs in the ZVI test area.
- The lithology encountered during 2019 drilling activities was generally consistent with the previous round of investigation performed in the ZVI test area and is summarized in previous progress reports.

- Bench-Scale Testing
  - Column testing is on-going; experimental columns are described in the table below.

**Summary of Column Tests**

| Column ID | Test Conditions | Length | Start Date | Status |
|---|---|---|---|---|
| A1 | ZVI only (abiotic) | 2 feet | October 2018 | Completed |
| B1 | ZVI + nutrients | 2 feet | October 2018 | Operating with increased flowrate |
| A2 | ZVI + nutrients | 5 feet | November 2018 | Operating with increased flowrate |
| B2 | ZVI + carbon + nutrients | 5 feet | November 2018 | Operating with increased flowrate |
| Pc | Peroxychem commercial ZVI + carbon + nutrients | 5 feet | November 2018 | Operating |

Notes:
1. The "nutrients" are diammonium phosphate (DAP) and vitamin B-12. DAP has a formula of (NH4)2HPO4 and is a common nutrient for biomass.
2. The "carbon" is supplied as Emulsified Oil Substrate (EOS) in column B2 and as an integrated solid carbon substrate in column Pc.

  - As previously reported, UNLV's ion chromatograph (IC) instrument experienced difficulties with analyzing the effluent samples for perchlorate. During the reporting period, the majority of effluent perchlorate data that were previously on-hold are now available and are presented on Figures 10 through 12 while the remainder of analytical data is expected to be received in May and presented in subsequent progress reports.
  - As previously reported, samples were collected from Column A1 and Column A2 in January 2019 to evaluate the presence of perchlorate and nitrate degrading genes. The results revealed that the Column A2 contained $3.09x10^2$ copies of the perchlorate reduction gene (pcrA gene), indicating low levels of perchlorate reducing bacteria. Column A1 did not contain detectable concentrations of the perchlorate reduction gene, but did have detectable concentrations of nitrate reduction genes. Following this evaluation, the Column A1 feed was supplemented with nutrients (DAP, vitamin B12) to foster microbial growth and thereby perchlorate degradation. The column was allowed

to run for approximately one month post-amendment and then stopped after running 145 days total. Samples collected from Column A1 post-amendment were analyzed during the reported period and indicate an increase in perchlorate reducing bacteria in the bottom of the column. This finding will be compared to the perchlorate effluent data for Column A1 in subsequent progress reports.

  - In order to determine the minimum hydraulic residence time that will allow for the degradation of all contaminants, the flow rate of the A2 and B2 columns was increased twice in March and April. In response to increases in flowrate, results indicate that Column A2 experienced increases in effluent concentrations of nitrate, chlorate, and perchlorate before stabilizing at low-level effluent concentrations. Results indicate that Column B2 continues to achieve contaminant removal in response to increases in flowrate with no impact on effluent concentrations. Additionally, sample results at depth intervals within the columns indicate that Column B2 effectively removed perchlorate within the first 12 inches of the column, regardless of increases in flow rate. Flowrates will continually be increased until the performance-limiting flow rates are determined, after which the columns will be stopped. Further discussion and results will be outlined in upcoming progress reports.
  - As previously reported, Column Pc previously experienced an issue with flow through the column. After replacing the tubing and clearing the clogged material during the reporting period, the column returned to normal operation, though with a reduced flow-rate, with analytical results indicating nitrate, chlorate, and perchlorate removal.
  - Hydrogen generation by ZVI was tested in a batch apparatus. Samples containing 30g ZVI/L of granular ZVI (Connelly GPM ETI-CC 1004) and half the granular ZVI/L concentration (15g) were tested for hydrogen production. Results indicate greater variation in hydrogen yield for the 30g ZVI/L samples compared to the 15g ZVI/L samples. Due to the high variability in grain size and surface area of the coarse, granular ZVI, the differences in hydrogen generation between batches was expected.

- Schedule and Progress Updates
  - The testing of hydrogen generation from ZVI will continue through May. Column testing is expected to be completed in early June.
  - A work plan addendum is anticipated to be submitted in Q3 2019 provided that the data continue to support moving forward with a field test.
- Health and Safety
  - There were no safety incidents during April 2019.

## ATTACHMENTS

Figure 1: Pre-Design Field Investigation UMCf Contact (Preliminary)

Figure 2: Pre-Design Field Investigation Shallow Groundwater Elevation Contours (Preliminary)

Figure 3: Pre-Design Field Investigation Deep Groundwater Elevation (Preliminary)

Figure 4: Pre-Design Field Investigation Groundwater Sampling Results (Preliminary)

Figure 5: Soil Concentration Profile in Boring ES-33/ES-40 (Preliminary)

Figure 6: Soil Concentration Profile in Boring ES-34/ES-41 (Preliminary)

Figure 7: Soil Concentration Profile in Boring ES-35 (Preliminary)

Figure 8: Soil Concentration Profile in Boring ES-36/ES-42 (Preliminary)

Figure 9: Soil Concentration Profile in Boring ES-43 (Preliminary)

Figure 10: Influent and effluent concentrations of nitrate, chlorate, and perchlorate in column containing ZVI only (Column A2) through April 2019 (Preliminary)

Figure 11: Influent and effluent concentrations of nitrate, chlorate, and perchlorate in column containing ZVI and organic carbon (Column B2) through April 2019 (Preliminary)

Figure 12: Influent and effluent concentrations of nitrate, chlorate, and perchlorate in column containing PeroxyChem EHC® (Column Pc) through April 2019 (Preliminary)

Table 1: Pre-Design Field Groundwater Elevations

Table 2: Pre-Design Field Investigation Soil Sampling Results

Table 3: Pre-Design Field Investigation Groundwater Sampling Results

# Galleria Drive ZVI-Enhanced Bioremediation Treatability Study Progress Update

**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

**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:** 6/3/19

**Galleria Drive ZVI-Enhanced Bioremediation Treatability Study Progress Update**

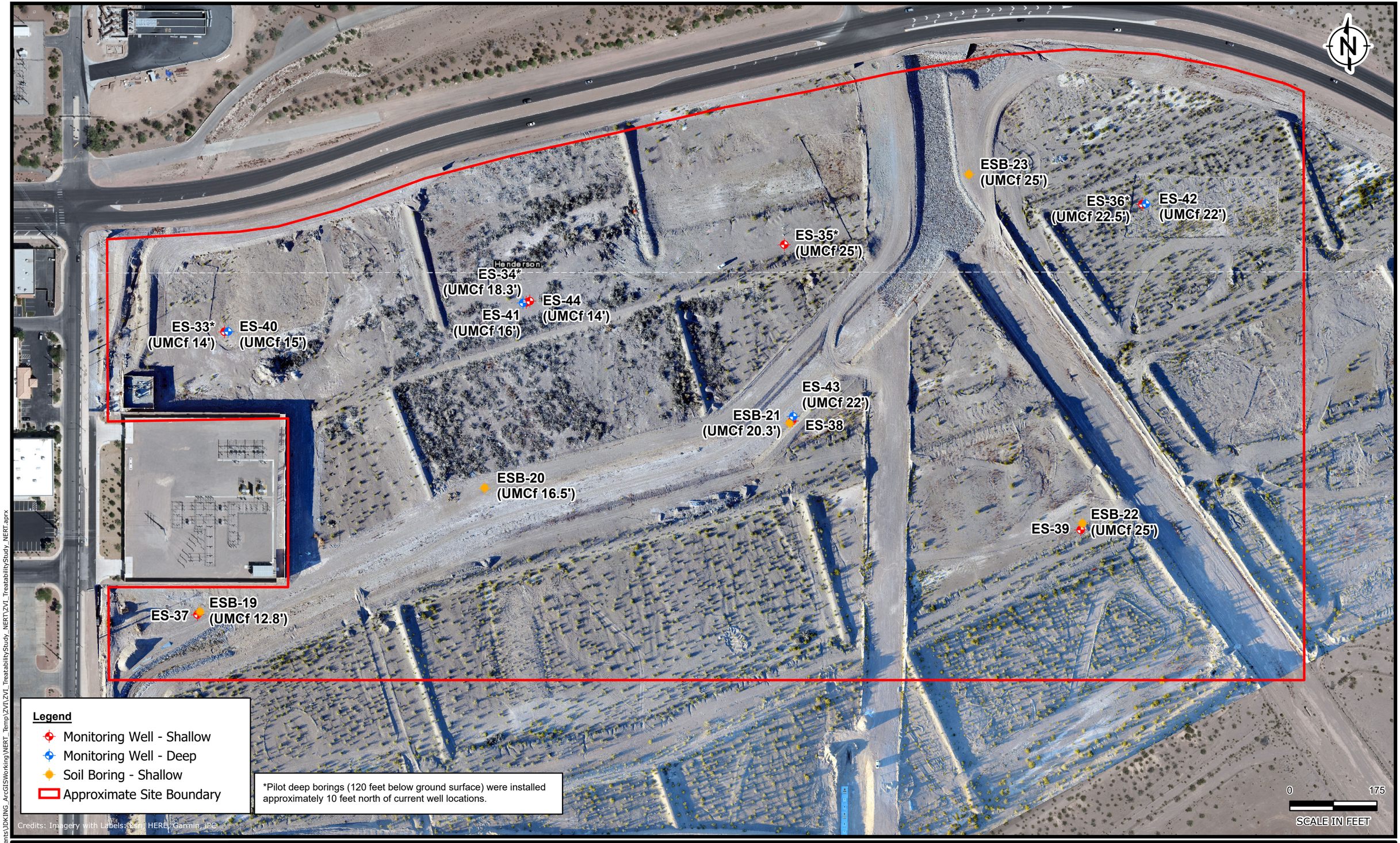
**Nevada Environmental Response Trust Site**
**(Former Tronox LLC Site)**
**Henderson, Nevada**

**Responsible Certified Environmental Manager (CEM) for this project**
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 provided 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.

June 3, 2019

**John M. Pekala, PG** **Date**
**Principal**

Certified Environmental Manager
Ramboll US Corporation
CEM Certificate Number: 2347
CEM Expiration Date: September 20, 2020




C:\Users\JDKing\Documents\JDKING_ArcGISWorking\NERT_Temp\ZVI\ZVI_TreatabilityStudy_NERT\ZVI_TreatabilityStudy_NERT.aprx

RAMBOLL

DRAFTED BY : JDKING | DATE: 4/10/2019

**Pre-Design Field Investigation UMCf Contact (Preliminary)**

ZVI-Enhanced Bioremediation Treatability Study
Nevada Environmental Response Trust
Henderson, Nevada

FIGURE
**1**

PROJECT: 1690011200-046

ES-10
1587.36

DBMW-3
1592.99

DBMW-1
1590.42

AA-20
1597.66

ES-35*
1597.63

ES-36*
1594.56

ES-41

ES-34*
1597.48

ES-33*
1598.71

ES-38
1599.76

ES-39
1596.63

ES-37
1604.47

ES-31
1601.08

1587
1588
1589
1590
1591
1592
1593
1594
1595
1596
1597
1598
1599
1600
1601
1602
1603
1604
1605
1606

N

0 175
SCALE IN FEET

Legend
- Monitoring Well - Shallow
- Existing Monitoring Well - Shallow
- Groundwater Elevation Contour
- Approximate Site Boundary

Note:
Groundwater elevations presented as feet above mean sea level. Additional contemporaneous groundwater elevation measurements collected from outside of the field test area boundary were used to produce the potentiometric surface contours shown.

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RAMBOLL

DRAFTED BY : JDKING | DATE: 4/12/2019

# Pre-Design Field Investigation Shallow Groundwater Elevation Contours (Preliminary)

ZVI-Enhanced Bioremediation Treatability Study
Nevada Environmental Response Trust
Henderson, Nevada

FIGURE
**2**

PROJECT: 1690011200-046


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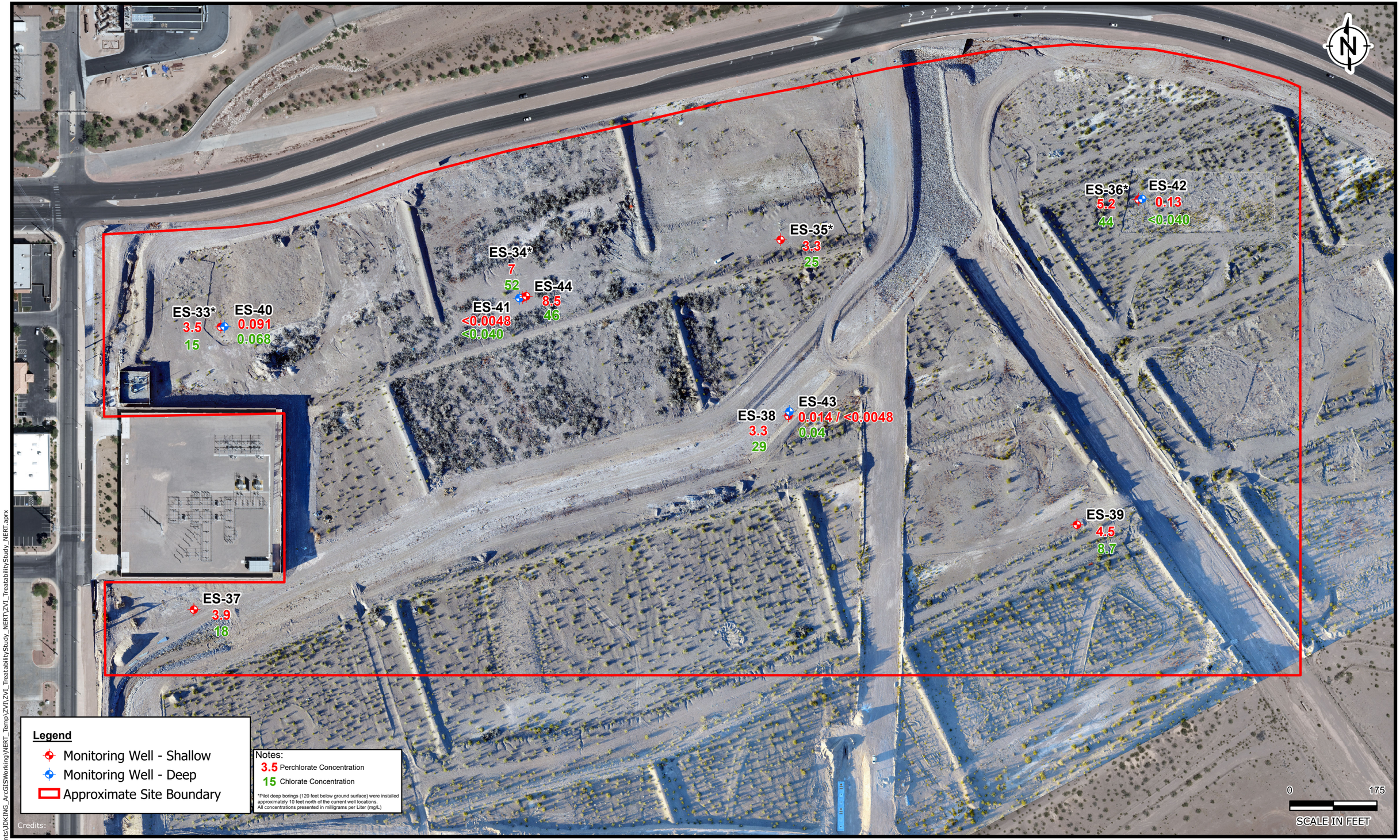
DRAFTED BY : JDKING | DATE: 4/16/2019

**Pre-Design Field Investigation Deep Groundwater Elevation (Preliminary)**

ZVI-Enhanced Bioremediation Treatability Study
Nevada Environmental Response Trust
Henderson, Nevada

FIGURE
**3**

PROJECT: 1690011200-046

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DRAFTED BY : JDKING | DATE: 4/16/2019

**Pre-Design Field Investigation Groundwater Sampling Results (Preliminary)**

ZVI-Enhanced Bioremediation Treatability Study
Nevada Environmental Response Trust
Henderson, Nevada

FIGURE
**4**

PROJECT: 16911200-046

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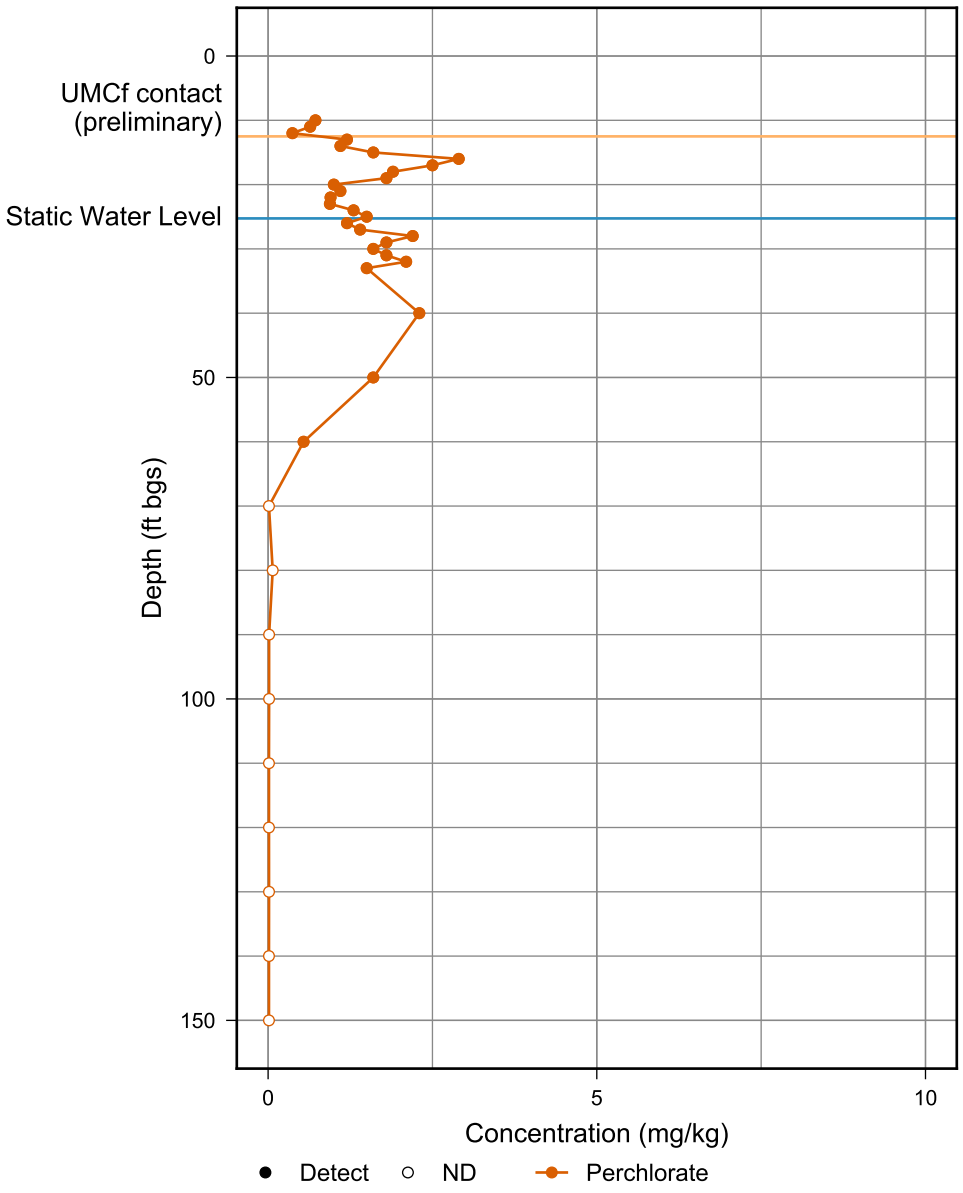


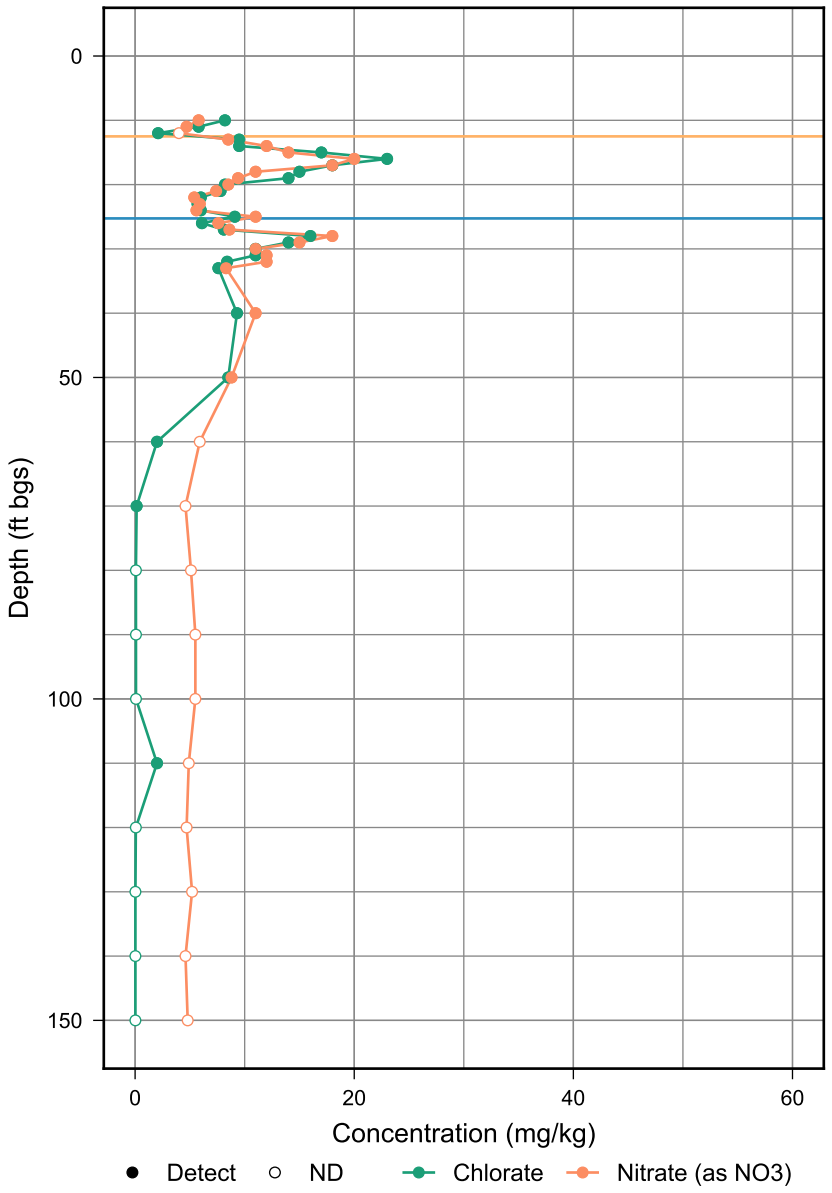


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**Soil Concentration Profile in Boring ES-33/ES-40 (Preliminary)**
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
**5**

| Drafter: JH | Date: 05/31/19 | Contract Number: 1690011200 | Approved: | Revised: |
|---|---|---|---|---|

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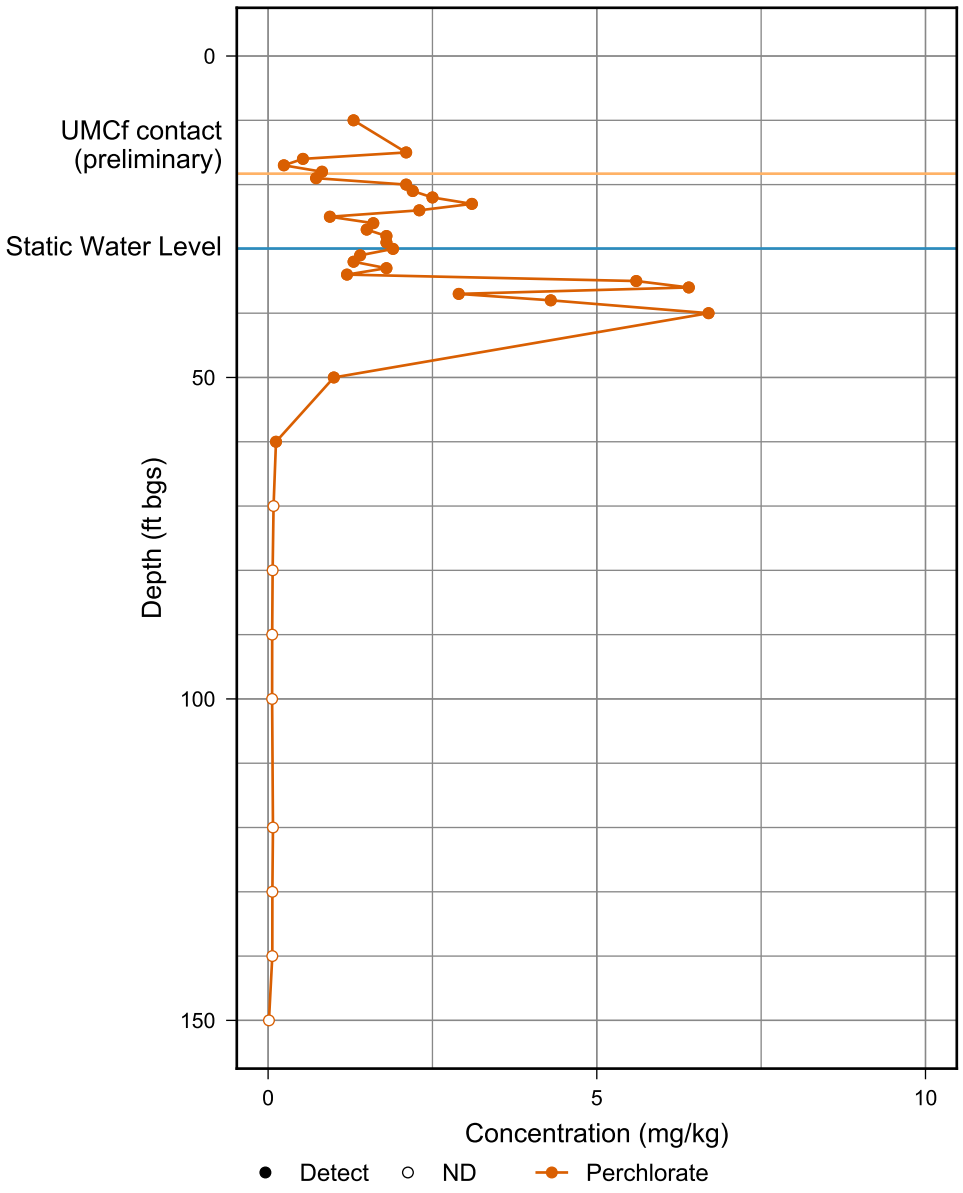


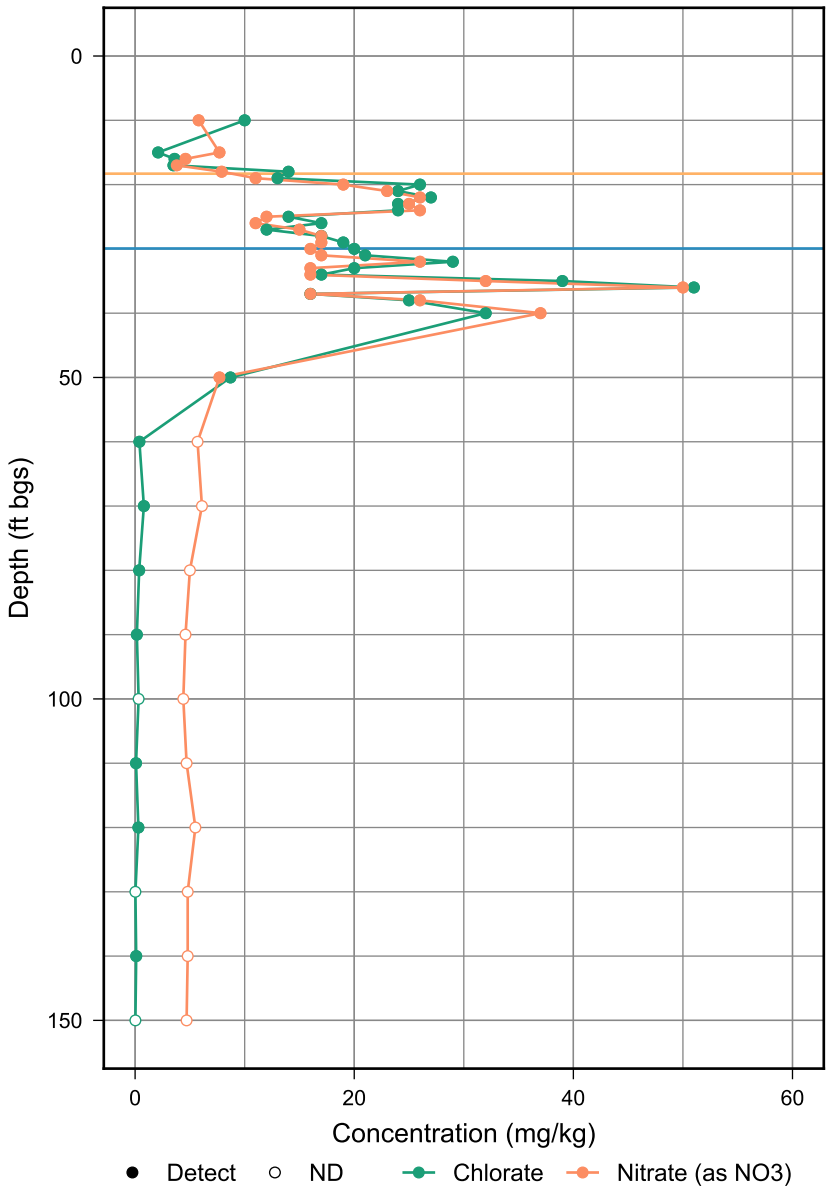


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**Soil Concentration Profile in Boring ES-34/ES-41 (Preliminary)**
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
**6**

| Drafter: JH | Date: 05/31/19 | Contract Number: 1690011200 | Approved: | Revised: |
|---|---|---|---|---|

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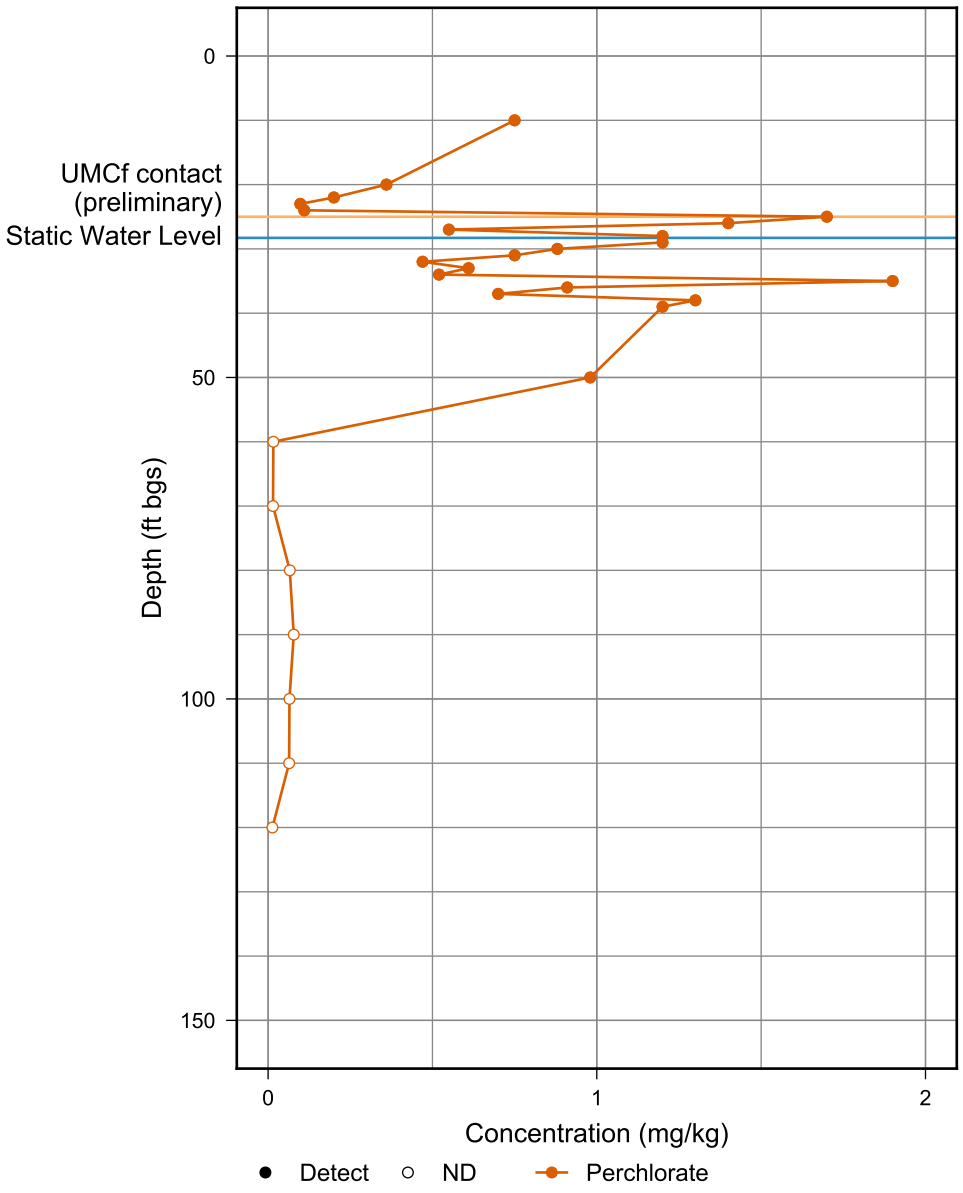


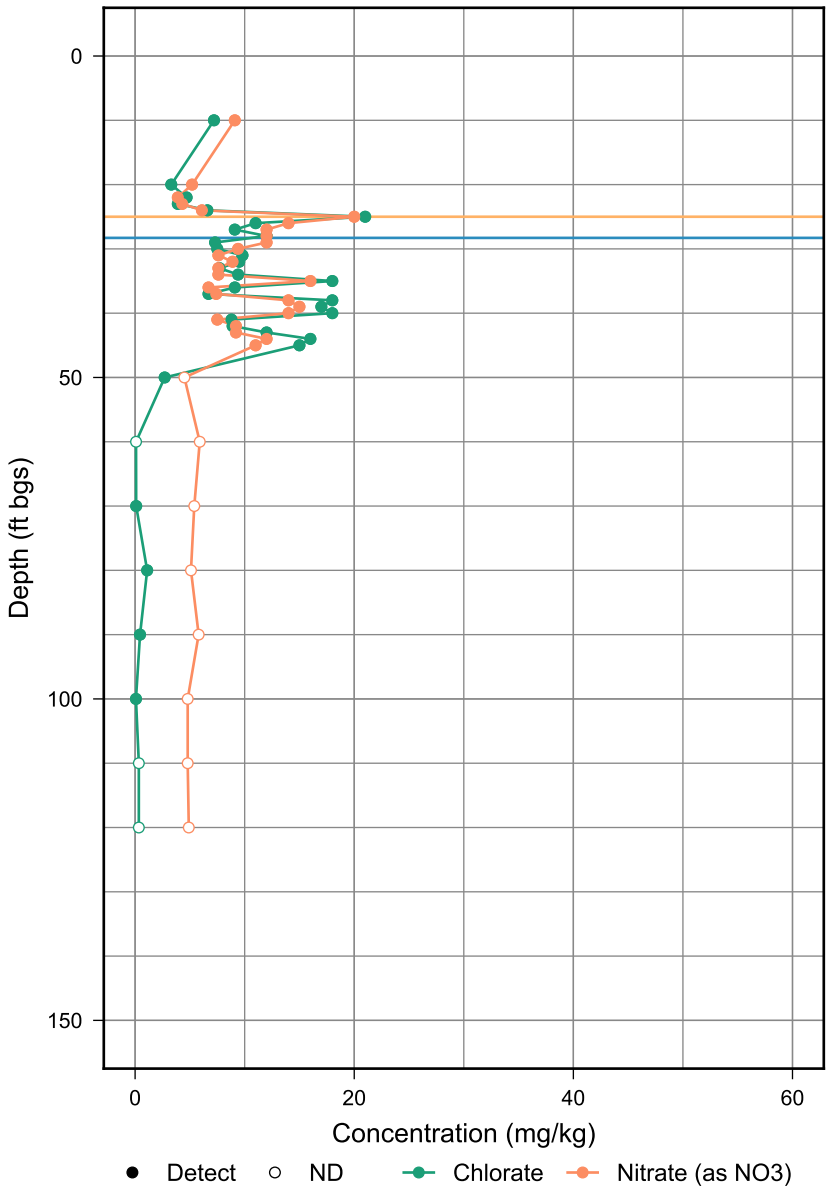


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**Soil Concentration Profile in Boring ES-35 (Preliminary)**
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
**7**

| Drafter: JH | Date: 05/31/19 | Contract Number: 1690011200 | Approved: | Revised: |
|---|---|---|---|---|

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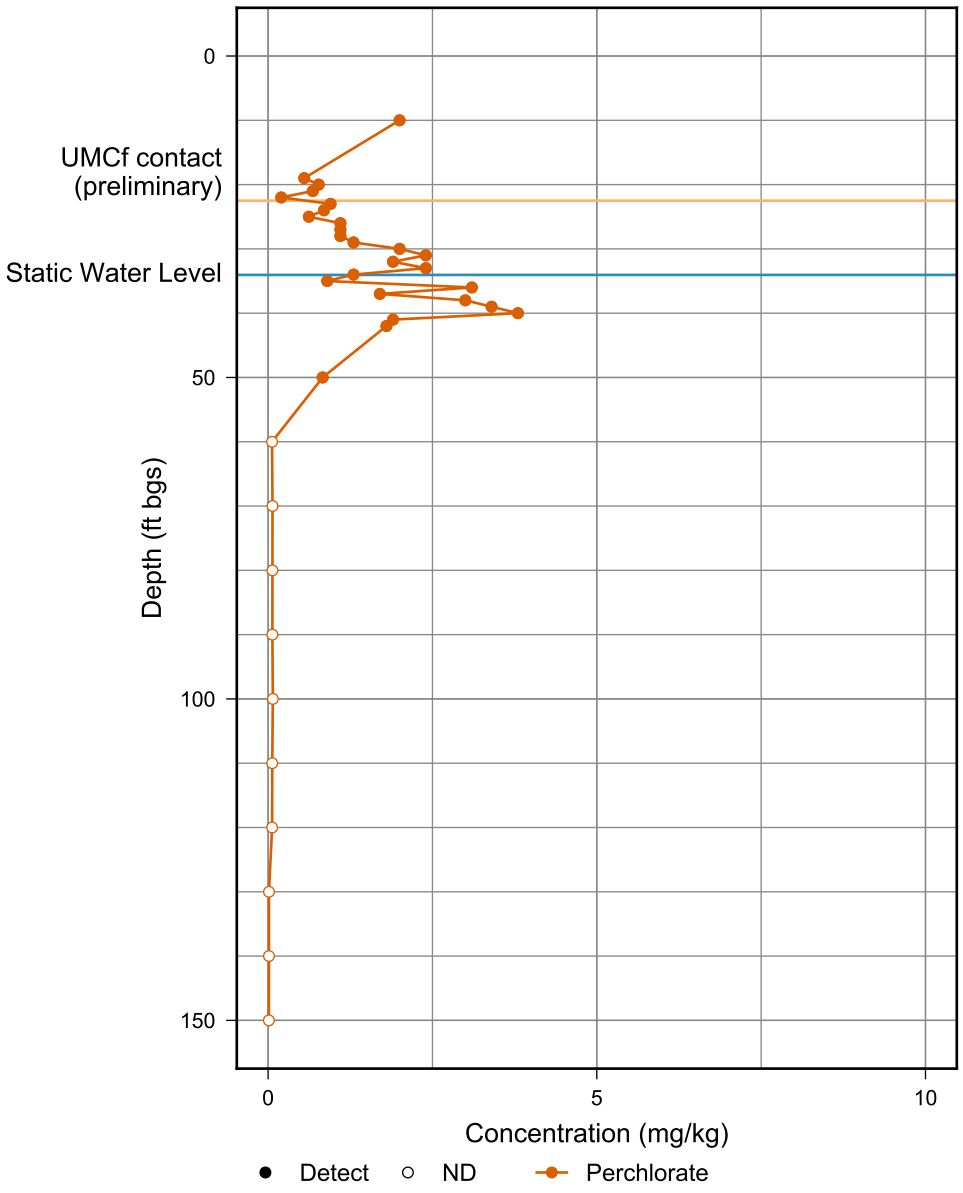


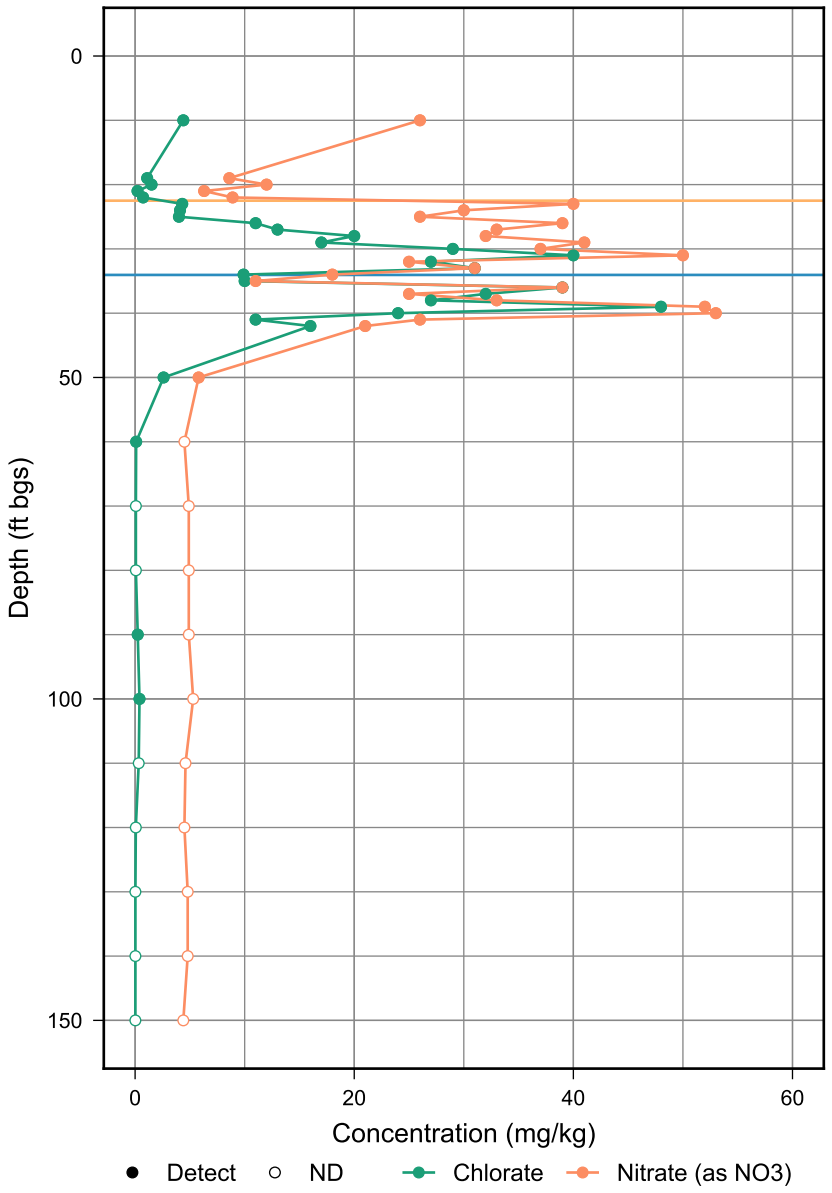


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**Soil Concentration Profile in Boring ES-36/ES-42 (Preliminary)**
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
**8**

| Drafter: JH | Date: 05/31/19 | Contract Number: 1690011200 | Approved: | Revised: |
|---|---|---|---|---|

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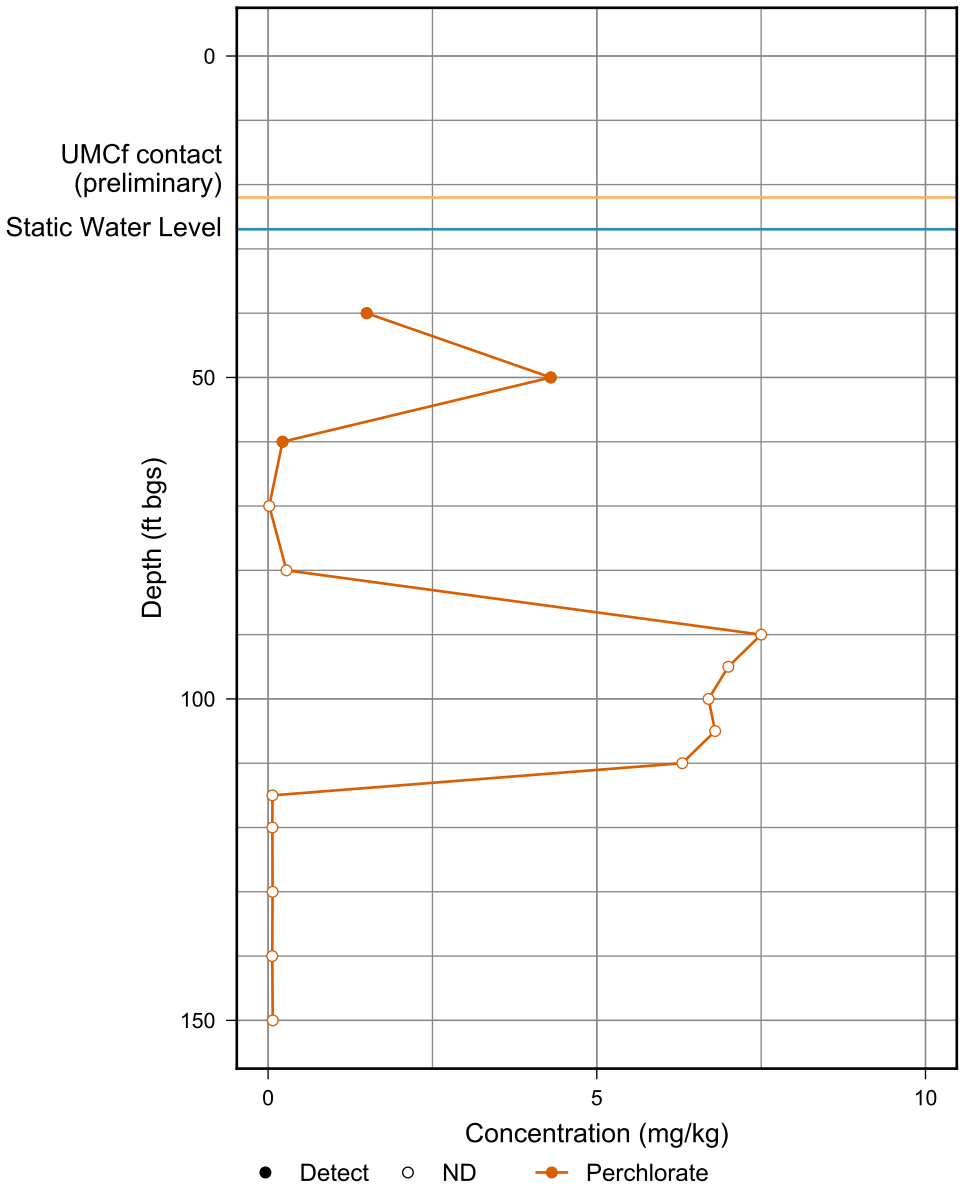


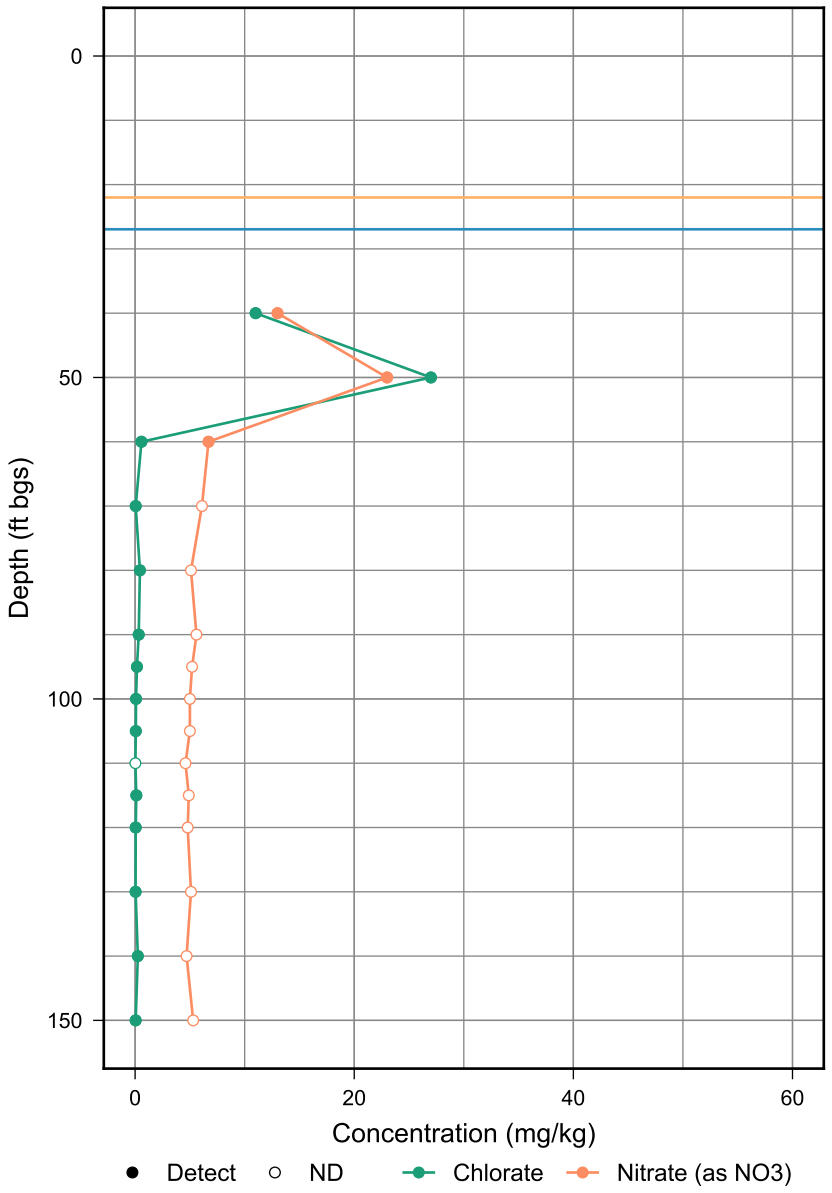


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**Soil Concentration Profile in Boring ES-43 (Preliminary)**
Nevada Environmental Response Trust Site
Henderson, Nevada

Figure
**9**

| Drafter: JH | Date: 05/31/19 | Contract Number: 1690011200 | Approved: | Revised: |
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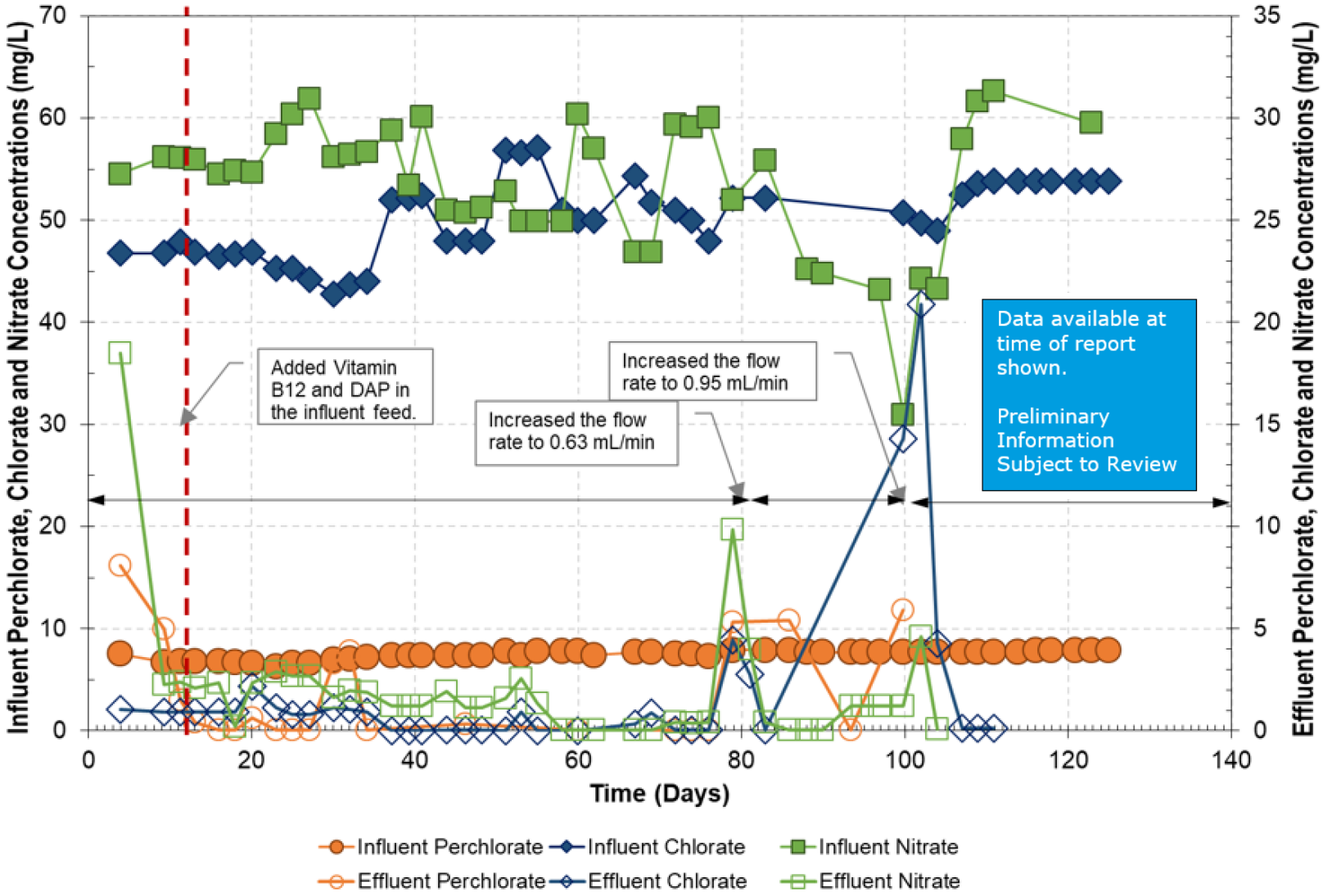


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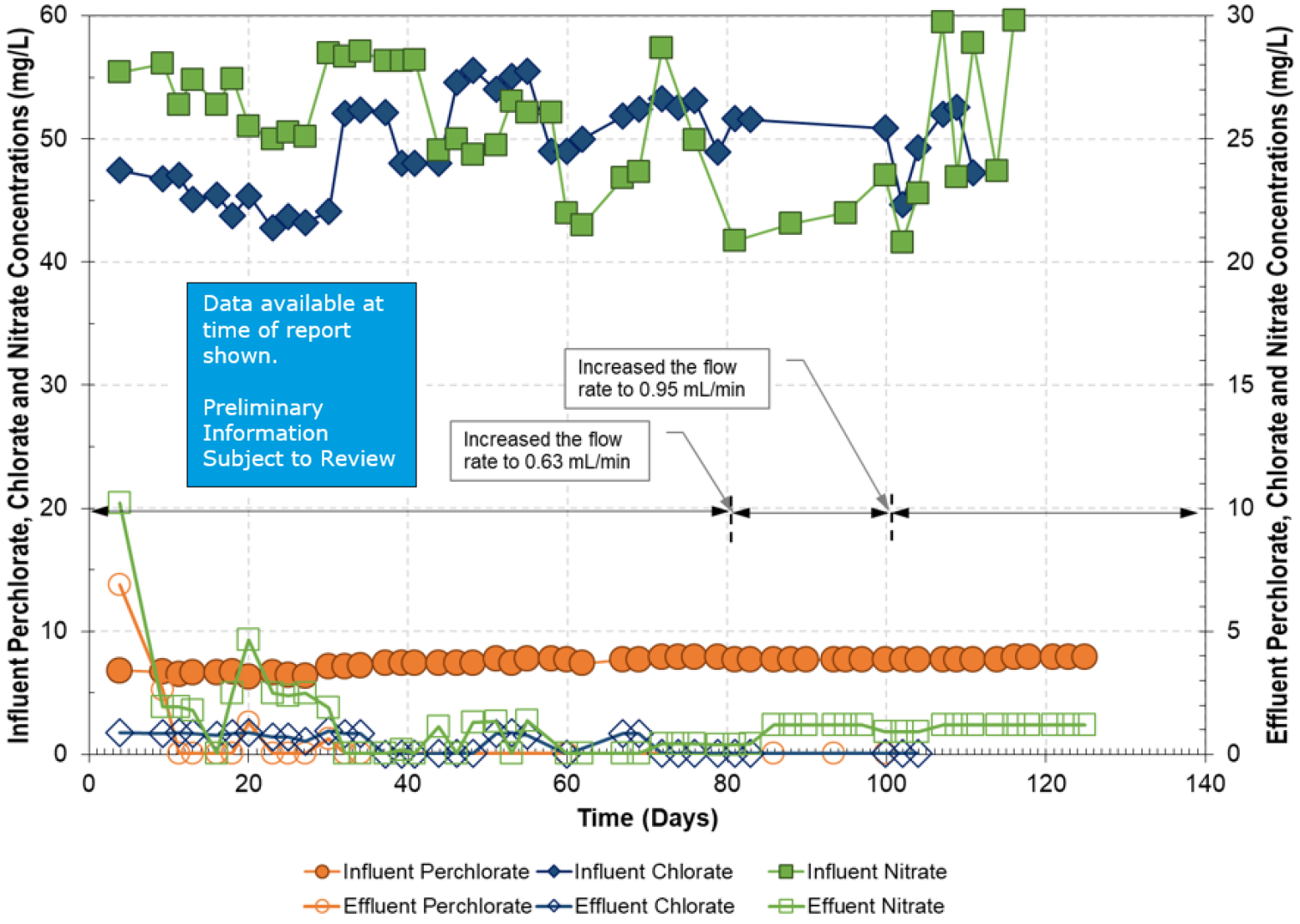
**Influent and effluent concentrations of nitrate, chlorate, and perchlorate in column containing ZVI only (Column A2) through April 2019 (Preliminary)**

Figure **10**

Drafter: RZ | Date: 05/17/19 | Contract Number: 1690011200-046 | Approved: | Revised:

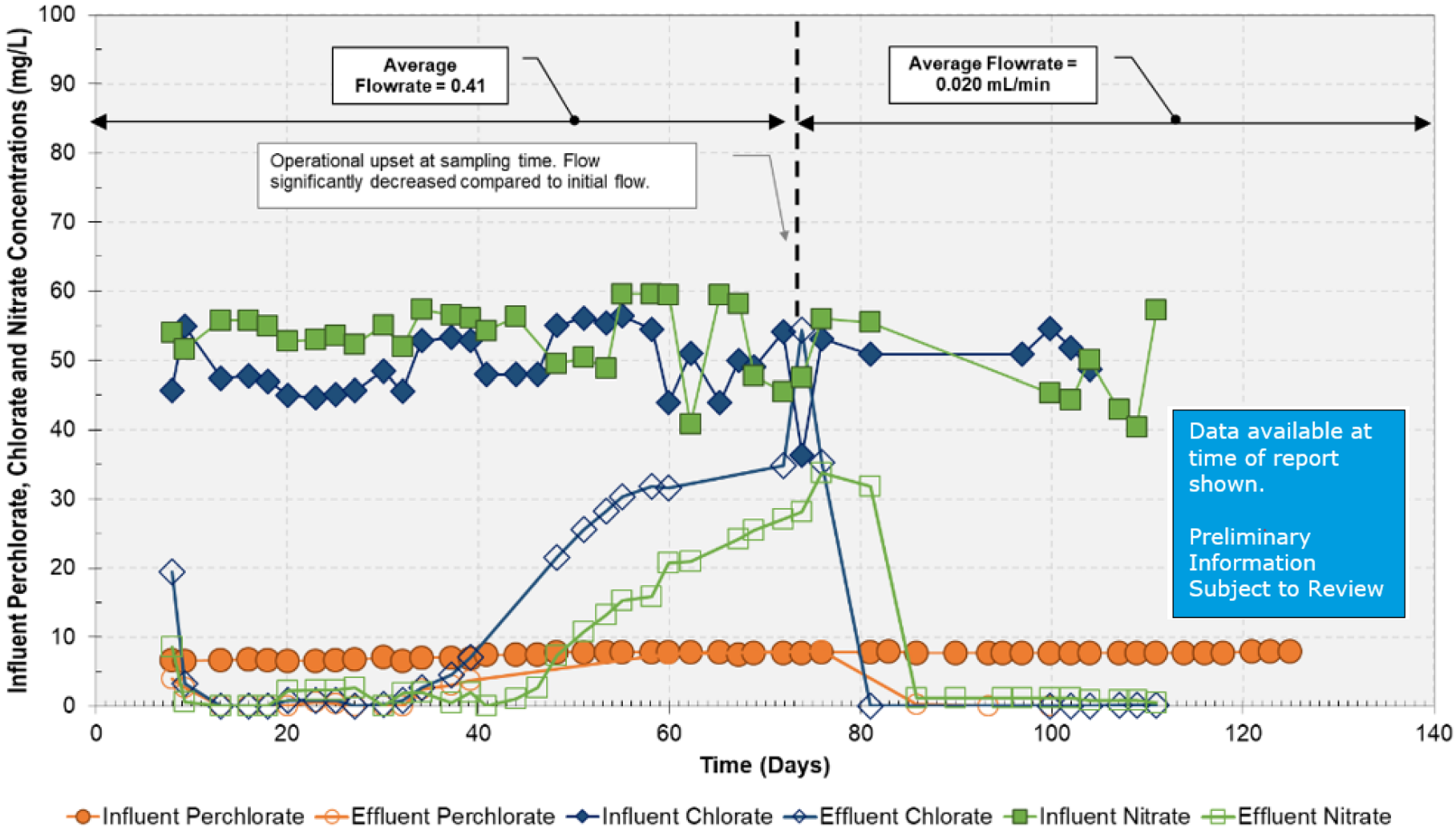



RAMBOLL

**Influent and effluent concentrations of nitrate, chlorate, and perchlorate in column containing ZVI and organic carbon (Column B2) through April 2019 (Preliminary)**

Figure 11

Drafter: RZ | Date: 05/17/19 | Contract Number: 1690011200-046 | Approved: | Revised:

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**Influent and effluent concentrations of nitrate, chlorate, and perchlorate in column containing PeroxyChem EHC® (Column Pc) through April 2019 (Preliminary)**

Figure 12

Drafter: RZ | Date: 05/17/19 | Contract Number: 1690011200-046 | Approved: | Revised:

## TABLE 1: PRE-DESIGN FIELD INVESTIGATION GROUNDWATER ELEVATIONS

**ZVI-Enhanced Bioremediation Treatability Study Work Plan Addendum**

**Nevada Environmental Response Trust Site**

**Henderson, Nevada**

| Location Name | Measurement Date | Top of Casing Elevation (ft amsl) | Water Level Depth (ft bTOC) | Groundwater Level Elevation (ft amsl) |
|---|---|---|---|---|
| ES-33 | 05/23/2018 | 1626.39 | 27.68 | 1598.71 |
| ES-34 | 05/23/2018 | 1630.03 | 32.55 | 1597.48 |
| ES-35 | 05/22/2018 | 1628.35 | 30.72 | 1597.63 |
| ES-36 | 05/22/2018 | 1630.83 | 36.27 | 1594.56 |
| ES-37 | 05/22/2018 | 1634.21 | 29.74 | 1604.47 |
| ES-38 | 05/23/2018 | 1628.11 | 28.35 | 1599.76 |
| ES-39 | 05/23/2018 | 1637.87 | 41.24 | 1596.63 |
| ES-40 | 2/19/2019 | 1626.51 | 27.13 | 1599.38 |
| ES-41 | 2/20/2019 | 1629.54 | 32.62 | 1596.92 |
| ES-42 | 2/21/2019 | 1631.53 | 37.55 | 1593.98 |
| ES-43 | 2/20/2019 | 1628.25 | 28.21 | 1600.04 |
| ES-44 | 2/19/2019 | 1630.16 | 33.43 | 1596.73 |

**Notes:**

ft amsl = feet above mean sea level

ft bTOC = feet below top of casing

**TABLE 2: PRE-DESIGN FIELD INVESTIGATION SOIL SAMPLING RESULTS**
**ZVI-Enhanced Bioremediation Treatability Study Work Plan Addendum**
**Nevada Environmental Response Trust Site**
**Henderson, Nevada**

| Location Name | Sample Date | Start Depth (ft bgs) | End Depth (ft bgs) | Carbon (mg/kg) | Chlorate (mg/kg) | Chromium (total) (mg/kg) | Nitrate as N (mg/kg) | Nitrate as NO3 (mg/kg) | Perchlorate (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|
| ES-33 | 04/11/2018 | 10.0 | 10.5 | NA | 8.2 | NA | 1.3 | 5.8 | 0.72 J- |
| | | 11.0 | 11.5 | NA | 5.8 | NA | 1.1 J | 4.7 J | 0.64 J- |
| | | 12.0 | 12.5 | NA | 2.1 | NA | <0.91 | <4.0 | 0.37 J- |
| | | 13.0 | 13.5 | NA | 9.5 | NA | 1.9 | 8.5 | 1.2 J- |
| | | 14.0 | 14.5 | NA | 9.5 | NA | 2.7 | 12 | 1.1 J- |
| | | 15.0 | 15.5 | NA | 17 | NA | 3.2 | 14 | 1.6 |
| | | 16.0 | 16.5 | NA | 23 | NA | 4.4 | 20 | 2.9 J- |
| | | 17.0 | 17.5 | NA | 18 | NA | 4.1 | 18 | 2.5 J- |
| | | 18.0 | 18.5 | NA | 15 | NA | 2.4 | 11 | 1.9 J- |
| | | (FD) | (FD) | NA | 15 | NA | 2.3 | 10 | 1.5 |
| | | 19.0 | 19.5 | NA | 14 | NA | 2.1 | 9.4 | 1.8 J- |
| | | 20.0 | 20.5 | NA | 8.2 | NA | 1.9 | 8.5 | 1.0 J- |
| | | 21.0 | 21.5 | NA | 7.8 | NA | 1.7 | 7.4 | 1.1 J- |
| | | 22.0 | 22.5 | NA | 6.0 | NA | 1.2 J | 5.4 J | 0.95 J- |
| | | 23.0 | 23.5 | NA | 5.7 J+ | NA | 1.3 J | 5.9 J | 0.94 J- |
| | | 24.0 | 24.5 | NA | 6.0 | NA | 1.3 J | 5.6 J | 1.3 |
| | | 25.0 | 25.5 | NA | 9.1 | NA | 2.6 | 11 | 1.5 |
| | | 26.0 | 26.5 | NA | 6.1 | NA | 1.7 | 7.6 | 1.2 |
| | | 27.0 | 27.5 | NA | 8.1 | NA | 1.9 | 8.6 | 1.4 |
| | | 28.0 | 28.5 | NA | 16 | NA | 4.1 | 18 | 2.2 |
| | | 29.0 | 29.5 | NA | 14 | NA | 3.3 | 15 | 1.8 |
| | | 30.0 | 30.5 | NA | 11 | NA | 2.4 | 11 | 1.6 |
| | | 31.0 | 31.5 | NA | 11 | NA | 2.7 | 12 | 1.8 |
| | | 32.0 | 32.5 | NA | 8.4 | NA | 2.8 | 12 | 2.1 |
| | | 33.0 | 33.5 | NA | 7.6 | NA | 1.9 | 8.3 | 1.5 |
| | | 40.0 | 40.5 | NA | 9.3 | NA | 2.4 | 11 | 2.3 |
| | | 50.0 | 50.5 | NA | 8.5 | NA | 2.0 J | 8.8 J | 1.6 |
| | | (FD) | (FD) | NA | 8.0 | NA | 1.9 J | 8.3 J | 1.6 |
| | | 60.0 | 60.5 | NA | 2.0 | NA | <1.4 | <5.9 | 0.54 |
| | | 70.0 | 70.5 | NA | 0.14 J | NA | <1.1 | <4.6 | <0.013 |
| | | 80.0 | 80.5 | NA | <0.074 | NA | <1.2 | <5.1 | <0.070 |
| | | 90.0 | 90.5 | NA | <0.078 | NA | <1.2 | <5.5 | <0.015 |
| | | 100.0 | 100.5 | NA | <0.080 | NA | <1.3 | <5.5 | <0.015 |
| | | 110.0 | 110.5 | NA | 2.0 | NA | <1.1 | <4.9 | <0.013 |
| | | (FD) | (FD) | NA | 2.0 | NA | <1.1 | <4.9 | <0.013 |
| | | 120.0 | 120.5 | NA | <0.067 | NA | <1.1 | <4.7 | <0.013 |
| ES-34 | 04/12/2018 | 10.0 | 10.5 | NA | 10 | NA | 1.3 | 5.8 | 1.3 |
| | | 20.0 | 20.5 | NA | 17 | NA | 2.8 | 12 | 1.4 |
| | | 15.0 | 15.5 | NA | 2.1 | NA | 1.7 | 7.7 | 2.1 |
| | | 16.0 | 16.5 | NA | 3.6 | NA | 1.0 J | 4.6 J | 0.53 J- |
| | | 17.0 | 17.5 | NA | 3.5 | NA | <0.86 | 3.8 J | 0.24 J- |
| | | 18.0 | 18.5 | NA | 14 | NA | 1.8 | 7.9 | 0.82 J- |
| | | 19.0 | 19.5 | NA | 13 | NA | 2.4 | 11 | 0.73 J- |
| | | 25.0 | 25.5 | NA | 14 | NA | 2.7 | 12 | 0.94 |
| | | 26.0 | 26.5 | NA | 17 | NA | 2.5 | 11 | 1.6 |
| | | 27.0 | 27.5 | NA | 12 | NA | 3.4 | 15 | 1.5 |
| | | 28.0 | 28.5 | NA | 17 | NA | 3.9 | 17 | 1.8 |
| | | 29.0 | 29.5 | NA | 19 | NA | 3.9 | 17 | 1.8 |
| | | 30.0 | 30.5 | NA | 20 | NA | 3.6 | 16 | 1.9 |
| | | (FD) | (FD) | NA | 19 | NA | 3.6 | 16 | 1.8 |
| | | 31.0 | 31.5 | NA | 21 | NA | 3.9 | 17 | 1.4 J+ |
| | | 32.0 | 32.5 | NA | 29 | NA | 5.8 | 26 | 1.3 |

**TABLE 2: PRE-DESIGN FIELD INVESTIGATION SOIL SAMPLING RESULTS**
**ZVI-Enhanced Bioremediation Treatability Study Work Plan Addendum**
**Nevada Environmental Response Trust Site**
**Henderson, Nevada**

| Location Name | Sample Date | Start Depth (ft bgs) | End Depth (ft bgs) | Carbon (mg/kg) | Chlorate (mg/kg) | Chromium (total) (mg/kg) | Nitrate as N (mg/kg) | Nitrate as NO3 (mg/kg) | Perchlorate (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|
| ES-34 | 04/12/2018 | 33.0 | 33.5 | NA | 20 | NA | 3.6 | 16 | 1.8 J+ |
| | | 34.0 | 34.5 | NA | 17 | NA | 3.5 | 16 | 1.2 |
| | | 35.0 | 35.5 | NA | 39 | NA | 7.3 | 32 | 5.6 J+ |
| | | 36.0 | 36.5 | NA | 51 | NA | 11 | 50 | 6.4 J+ |
| | | 37.0 | 37.5 | NA | 16 | NA | 3.7 | 16 | 2.9 J+ |
| | | 38.0 | 38.5 | NA | 25 | NA | 5.8 | 26 | 4.3 J+ |
| | | 40.0 | 40.5 | NA | 32 | NA | 8.4 | 37 | 6.7 J+ |
| | | 50.0 | 50.5 | NA | 8.7 | NA | 1.7 | 7.7 | 1.0 |
| | | 60.0 | 60.5 | NA | 0.39 | NA | <1.3 | <5.7 | 0.12 |
| | | (FD) | (FD) | NA | 0.39 | NA | <1.2 | <5.4 | 0.093 |
| | | 70.0 | 70.5 | NA | 0.80 | NA | <1.4 | <6.1 | <0.083 |
| | | 80.0 | 80.5 | NA | 0.37 | NA | <1.1 | <5.0 | <0.069 |
| | | 90.0 | 90.5 | NA | 0.16 J | NA | <1.0 | <4.6 | <0.062 |
| | | 100.0 | 100.5 | NA | <0.32 | NA | <1.0 | <4.4 | <0.061 |
| | | (FD) | (FD) | NA | <0.31 | NA | <1.0 | <4.4 | <0.059 |
| | | 110.0 | 110.5 | NA | 0.084 J | NA | <1.1 | <4.7 | NA |
| | | 120.0 | 120.5 | NA | 0.30 J | NA | <1.3 | <5.5 | <0.074 |
| | 04/17/2018 | 20.0 | 20.5 | NA | 26 | NA | 4.4 | 19 | 2.1 |
| | | 21.0 | 21.5 | NA | 24 | NA | 5.2 | 23 | 2.2 |
| | | 22.0 | 22.5 | NA | 27 | NA | 5.8 | 26 | 2.5 |
| | | 23.0 | 23.5 | NA | 24 | NA | 5.8 | 25 | 3.1 |
| | | 24.0 | 24.5 | NA | 24 | NA | 5.8 | 26 | 2.3 |
| ES-35 | 04/12/2018 | 10.0 | 10.5 | NA | 7.2 | NA | 2.0 | 9.1 | 0.75 |
| | | 20.0 | 20.5 | NA | 3.3 | NA | 1.2 | 5.2 J | 0.36 J |
| | | 22.0 | 22.5 | NA | 4.7 | NA | 0.87 J | 3.9 J | 0.20 J |
| | | 23.0 | 23.5 | NA | 3.9 | NA | 0.98 J | 4.3 J | 0.098 J |
| | | 24.0 | 24.5 | NA | 6.6 | NA | 1.4 | 6.1 | 0.11 J |
| | | 25.0 | 25.5 | NA | 21 | NA | 4.4 | 20 | 1.7 J+ |
| | | 26.0 | 26.5 | NA | 11 | NA | 3.2 | 14 | 1.4 J |
| | | 30.0 | 30.5 | NA | 7.5 | NA | 2.1 | 9.4 | 0.88 J |
| | | (FD) | (FD) | NA | 11 | NA | 3.0 | 13 | 1.3 J |
| | | 27.0 | 27.5 | NA | 9.1 | NA | 2.6 | 12 | 0.55 J |
| | | 28.0 | 28.5 | NA | 12 | NA | 2.6 | 12 | 1.2 J |
| | | 29.0 | 29.5 | NA | 7.3 | NA | 2.7 | 12 | 1.2 J |
| | | 31.0 | 31.5 | NA | 9.8 | NA | 1.7 | 7.6 | 0.75 J |
| | | 32.0 | 32.5 | NA | 9.5 | NA | 2.0 | 8.9 | 0.47 J |
| | | 33.0 | 33.5 | NA | 7.7 | NA | 1.7 | 7.6 | 0.61 J |
| | | 34.0 | 34.5 | NA | 9.4 | NA | 1.7 | 7.6 | 0.52 J |
| | | 35.0 | 35.5 | NA | 18 | NA | 3.6 | 16 | 1.9 J+ |
| | | 36.0 | 36.5 | NA | 9.1 | NA | 1.5 | 6.7 | 0.91 J |
| | | 37.0 | 37.5 | NA | 6.7 | NA | 1.7 | 7.4 | 0.70 J |
| | | 38.0 | 38.5 | NA | 18 | NA | 3.1 | 14 | 1.3 J+ |
| | | 39.0 | 39.5 | NA | 17 | NA | 3.4 | 15 | 1.2 J |
| | | 40.0 | 40.5 | NA | 18 | NA | 2.9 | 13 | NA |
| | | (FD) | (FD) | NA | 17 | NA | 3.1 | 14 | NA |
| | | 41.0 | 41.5 | NA | 8.8 | NA | 1.7 | 7.5 | NA |
| | | 42.0 | 42.5 | NA | 8.9 | NA | 2.1 | 9.2 | NA |
| | | 43.0 | 43.5 | NA | 12 | NA | 2.1 | 9.2 | NA |
| | | 44.0 | 44.5 | NA | 16 J | NA | 2.7 | 12 | NA |
| | | 45.0 | 45.5 | NA | 15 | NA | 2.6 | 11 | NA |
| | | 50.0 | 50.5 | NA | 2.7 | NA | <1.0 | <4.5 | 0.98 J+ |
| | | 60.0 | 60.5 | NA | <0.086 | NA | <1.4 | <5.9 | <0.016 |

**TABLE 2: PRE-DESIGN FIELD INVESTIGATION SOIL SAMPLING RESULTS**
**ZVI-Enhanced Bioremediation Treatability Study Work Plan Addendum**
**Nevada Environmental Response Trust Site**
**Henderson, Nevada**

| Location Name | Sample Date | Start Depth (ft bgs) | End Depth (ft bgs) | Carbon (mg/kg) | Chlorate (mg/kg) | Chromium (total) (mg/kg) | Nitrate as N (mg/kg) | Nitrate as NO3 (mg/kg) | Perchlorate (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|
| ES-35 | 04/12/2018 | (FD) | (FD) | NA | <0.081 | NA | <1.3 | <5.7 | <0.015 |
| | | 70.0 | 70.5 | NA | 0.098 J | NA | <1.2 | <5.4 | <0.015 |
| | 04/13/2018 | 80.0 | 80.5 | NA | 1.0 | NA | <1.1 | <4.9 | <0.066 |
| | | (FD) | (FD) | NA | 1.1 | NA | <1.2 | <5.1 | <0.014 |
| | | 90.0 | 90.5 | NA | 0.45 | NA | <1.3 | <5.8 | <0.078 |
| | | 100.0 | 100.5 | NA | 0.078 J | NA | <1.1 | <4.8 | <0.065 |
| | | 110.0 | 110.5 | NA | <0.34 | NA | <1.1 | <4.8 | <0.064 |
| | | 120.0 | 120.5 | NA | <0.34 | NA | <1.1 | <4.9 | <0.013 |
| ES-36 | 04/16/2018 | 10.0 | 10.5 | NA | 4.4 | NA | 5.8 | 26 | 2.0 |
| | | 20.0 | 20.5 | NA | 1.5 | NA | 2.7 | 12 | 0.77 |
| | | 19.0 | 19.5 | NA | 1.1 | NA | 1.9 | 8.6 | 0.55 |
| | | 21.0 | 21.5 | NA | 0.22 | NA | 1.4 | 6.3 | 0.68 |
| | | 22.0 | 22.5 | NA | 0.73 | NA | 2.0 | 8.9 | 0.20 |
| | | 23.0 | 23.5 | NA | 4.3 | NA | 8.9 | 40 | 0.95 |
| | | 24.0 | 24.5 | NA | 4.1 | NA | 6.8 | 30 | 0.85 |
| | | 25.0 | 25.5 | NA | 4.0 | NA | 5.8 | 26 | 0.62 |
| | | 26.0 | 26.5 | NA | 11 | NA | 8.7 | 39 | 1.1 |
| | | 27.0 | 27.5 | NA | 13 | NA | 7.4 | 33 | 1.1 |
| | | 28.0 | 28.5 | NA | 20 | NA | 7.2 | 32 | 1.1 |
| | | 29.0 | 29.5 | NA | 17 | NA | 9.3 | 41 | 1.3 |
| | | 30.0 | 30.5 | NA | 29 | NA | 8.4 | 37 | 1.8 |
| | | (FD) | (FD) | NA | 29 | NA | 8.1 | 36 | 2.0 |
| | | 31.0 | 31.5 | NA | 40 | NA | 11 | 50 | 2.4 |
| | | 32.0 | 32.5 | NA | 27 | NA | 5.5 | 25 | 1.9 |
| | | 33.0 | 33.5 | NA | 31 | NA | 7.0 | 31 | 2.4 |
| | | 34.0 | 34.5 | NA | 9.9 | NA | 4.1 | 18 | 1.3 |
| | | 35.0 | 35.5 | NA | 10 | NA | 2.5 | 11 | 0.90 |
| | | 36.0 | 36.5 | NA | 39 | NA | 8.8 | 39 | 3.1 |
| | | 37.0 | 37.5 | NA | 32 | NA | 5.6 | 25 | 1.7 J- |
| | | 38.0 | 38.5 | NA | 27 | NA | 7.4 | 33 | 3.0 J- |
| | | 39.0 | 39.5 | NA | 48 | NA | 12 | 52 | 3.4 J- |
| | | 40.0 | 40.5 | NA | 24 | NA | 12 | 53 | 3.7 J- |
| | | (FD) | (FD) | NA | 24 | NA | 11 | 49 | 3.8 J- |
| | | 41.0 | 41.5 | NA | 11 | NA | 5.9 | 26 | 1.9 J- |
| | | 42.0 | 42.5 | NA | 16 | NA | 4.8 | 21 | 1.8 J- |
| | | 50.0 | 50.5 | NA | 2.6 | NA | 1.3 J | 5.8 J | 0.83 J- |
| | | 60.0 | 60.5 | NA | 0.097 J | NA | <1.0 | <4.5 | 0.060 UJ |
| | | (FD) | (FD) | NA | 0.079 J | NA | <1.0 | <4.4 | 0.060 UJ |
| | | 70.0 | 70.5 | NA | <0.071 | NA | <1.1 | <4.9 | 0.067 UJ |
| | | 80.0 | 80.5 | NA | <0.070 | NA | <1.1 | <4.9 | 0.066 UJ |
| | | 90.0 | 90.5 | NA | 0.18 J | NA | <1.1 | <4.9 | 0.065 UJ |
| | | (FD) | (FD) | NA | 0.24 J | NA | <1.1 | <4.8 | 0.065 UJ |
| | | 100.0 | 100.5 | NA | 0.40 | NA | <1.2 | <5.3 | 0.072 UJ |
| | | 110.0 | 110.5 | NA | <0.33 | NA | <1.1 | <4.6 | 0.063 UJ |
| | | 120.0 | 120.5 | NA | <0.064 | NA | <1.0 | <4.5 | 0.061 UJ |
| ES-40 | 01/14/2019 | 40.0 | 40.5 | 540 | 13 | 28 | NA | 15 | 3.1 |
| | | 50.0 | 50.5 | 1,000 | 6.7 | 26 | NA | 9.7 | 1.6 |
| | | (FD) | (FD) | 270 | 7.4 | 15 | NA | 11 | 2.1 |
| | | 60.0 | 60.5 | 14,000 | <0.030 | 27 | NA | <5.1 | <0.070 |
| | | 70.0 | 70.5 | 6,300 | <0.031 | 12 | NA | <5.3 | <0.073 |
| | | 80.0 | 80.5 | 380 | <0.028 | 14 | NA | <4.8 | <0.013 |
| | | 90.0 | 90.5 | 940 | 0.078 | 27 | NA | <5.0 | <0.014 |

**TABLE 2: PRE-DESIGN FIELD INVESTIGATION SOIL SAMPLING RESULTS**
**ZVI-Enhanced Bioremediation Treatability Study Work Plan Addendum**
**Nevada Environmental Response Trust Site**
**Henderson, Nevada**

| Location Name | Sample Date | Start Depth (ft bgs) | End Depth (ft bgs) | Carbon (mg/kg) | Chlorate (mg/kg) | Chromium (total) (mg/kg) | Nitrate as N (mg/kg) | Nitrate as NO3 (mg/kg) | Perchlorate (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|
| ES-40 | 01/14/2019 | 95.0 | 95.5 | 500 | <0.027 | 5.2 | NA | <4.7 | <0.013 |
| | | 100.0 | 100.5 | 780 | <0.031 | 19 | NA | <5.4 | <0.015 |
| | | 105.0 | 105.5 | <77 | <0.027 | 7.4 | NA | <4.8 | <0.013 |
| | | 110.0 | 110.5 | 5,500 | <0.027 | 11 | NA | <4.8 | <0.064 |
| | | 115.0 | 115.5 | 5,400 | 0.37 | 8.3 | NA | <5.0 | <0.068 |
| | | 120.0 | 120.5 | 750 | <0.030 | 21 | NA | <5.2 | <0.014 |
| | | 130.0 | 130.5 | 860 | <0.029 | 12 | NA | <5.2 | <0.014 |
| | | 140.0 | 140.5 | 460 | <0.027 | 12 | NA | <4.6 | <0.013 |
| | | 150.0 | 150.5 | 750 | <0.027 | 11 | NA | <4.8 | <0.013 |
| ES-41 | 01/17/2019 | 40.0 | 40.5 | 2,300 | 38 | 41 | NA | 38 | 5.8 |
| | | 50.0 | 50.5 | 100 | 12 | 22 | NA | 14 | 1.8 |
| | | (FD) | (FD) | 200 | 13 | 19 | NA | 14 | 1.8 |
| | | 60.0 | 60.5 | 450 | 0.85 | 26 | NA | <5.8 | 0.38 |
| | | 70.0 | 70.5 | 1,100 | <0.037 | 25 | NA | <6.4 | <0.086 |
| | | (FD) | (FD) | 930 | <0.035 | 23 | NA | <6.1 | <0.082 |
| | | 80.0 | 80.5 | 17,000 | 0.11 | 14 | NA | <4.9 | <0.066 |
| | | 90.0 | 90.5 | 6,500 | 0.072 | 13 | NA | <4.8 | <0.065 |
| | | 95.0 | 95.5 | 2,200 | <0.026 | 4.9 | NA | <4.5 | <0.062 |
| | | 100.0 | 100.5 | 560 | <0.027 | 8.2 | NA | <4.8 | <0.065 |
| | | 105.0 | 105.5 | 280 | <0.025 | 19 | NA | <4.3 | <0.059 |
| | | 110.0 | 110.5 | 1,300 | <0.027 | 19 | NA | <4.7 | <0.064 |
| | | 115.0 | 115.5 | 920 | <0.028 | 18 | NA | <4.8 | <0.066 |
| | | 120.0 | 120.5 | 3,800 | <0.027 | 16 | NA | <4.8 | <0.013 |
| | | 130.0 | 130.5 | 130 | <0.027 | 10 | NA | <4.8 | <0.065 |
| | | 140.0 | 140.5 | 8,200 | 0.10 | 12 | NA | <4.8 | <0.064 |
| | | 150.0 | 150.5 | 690 | <0.027 | 18 | NA | <4.7 | <0.013 |
| ES-42 | 01/15/2019 | 40.0 | 40.5 | 820 | 54 | 25 | NA | 58 | 3.7 |
| | | (FD) | (FD) | 840 | 55 | 25 | NA | 60 | 3.4 |
| | | 50.0 | 50.5 | 280 | 1.5 | 18 | NA | 9.2 | 0.80 |
| | | 60.0 | 60.5 | 470 | 0.068 | 22 | NA | 4.5 | <0.012 |
| | | 70.0 | 70.5 | 560 | <0.027 | 20 | NA | <4.8 | <0.013 |
| | | 74.0 | 74.5 | 460 | 0.049 | 3.4 | NA | <4.7 | <0.013 |
| | | 80.0 | 80.5 | 1,200 | 0.33 | 11 | NA | <5.5 | <0.015 |
| | | 90.0 | 90.5 | 750 | <0.028 | 19 | NA | <4.9 | <0.013 |
| | | 95.0 | 95.5 | 6,900 | <0.028 | 8.5 | NA | <4.8 | <0.066 |
| | 01/16/2019 | 100.0 | 100.5 | 8,700 | <0.029 | 11 | NA | <5.2 | <0.070 |
| | | 105.0 | 105.5 | 24,000 | <0.036 | 11 | NA | <6.2 | <0.085 |
| | | 110.0 | 110.5 | 7,600 | <0.026 | 6.1 | NA | <4.6 | <0.062 |
| | | 115.0 | 115.5 | 15,000 | 0.10 | 8.8 | NA | <5.1 | <0.069 |
| | | 120.0 | 120.5 | 720 | <0.030 | 20 | NA | <5.1 | <0.070 |
| | | 130.0 | 130.5 | 880 | <0.027 | 23 | NA | <4.7 | <0.013 |
| | | (FD) | (FD) | 670 | <0.027 | 22 | NA | <4.8 | <0.013 |
| | | 140.0 | 140.5 | <77 | <0.028 | 8.5 | NA | <4.8 | <0.013 |
| | | 150.0 | 150.5 | 8,200 | <0.025 | 9.2 | NA | <4.4 | <0.012 |
| ES-43 | 01/21/2019 | 40.0 | 40.5 | 220 | 11 | 33 | NA | 13 | 1.5 |
| | | 50.0 | 50.5 | 420 | 27 | 27 | NA | 23 | 4.3 |
| | | 60.0 | 60.5 | <77 | 0.58 | 24 | NA | 6.7 | 0.22 |
| | | (FD) | (FD) | 710 | 0.58 | 24 | NA | 5.5 | 0.22 |
| | | 70.0 | 70.5 | 620 | 0.055 | 21 | NA | <6.1 | <0.017 |
| | | 80.0 | 80.5 | 3,500 | 0.44 | 12 | NA | <5.1 | <0.28 |
| | | 90.0 | 90.5 | 17,000 | 0.33 | 14 | NA | <5.6 | <7.5 |
| | | 95.0 | 95.5 | 5,000 | 0.17 | 14 | NA | <5.2 | <7.0 |

**TABLE 2: PRE-DESIGN FIELD INVESTIGATION SOIL SAMPLING RESULTS**
**ZVI-Enhanced Bioremediation Treatability Study Work Plan Addendum**
**Nevada Environmental Response Trust Site**
**Henderson, Nevada**

| Location Name | Sample Date | Start Depth (ft bgs) | End Depth (ft bgs) | Carbon (mg/kg) | Chlorate (mg/kg) | Chromium (total) (mg/kg) | Nitrate as N (mg/kg) | Nitrate as NO3 (mg/kg) | Perchlorate (mg/kg) |
|---|---|---|---|---|---|---|---|---|---|
| ES-43 | 01/21/2019 | 100.0 | 100.5 | 5,100 | 0.084 | 6.9 | NA | <5.0 | <6.7 |
| | | 105.0 | 105.5 | 9,100 | 0.066 | 7.3 | NA | <5.0 | <6.8 |
| | | 110.0 | 110.5 | 140 | <0.027 | 14 | NA | <4.6 | <6.3 |
| | | 115.0 | 115.5 | 370 | 0.11 | 14 | NA | <4.9 | <0.066 |
| | | 120.0 | 120.5 | 1,900 | 0.055 | 28 | NA | <4.8 | <0.065 |
| | | 130.0 | 130.5 | 94 | 0.045 | 13 | NA | <5.1 | <0.068 |
| | | 140.0 | 140.5 | 9,700 | 0.25 | 4.4 | NA | <4.7 | <0.063 |
| | | 150.0 | 150.5 | 790 | 0.051 | 23 | NA | <5.3 | <0.071 |
| ES-44 | 01/18/2019 | 46.0 | 46.5 | 530 | 20 | 28 | NA | 24 | 4.0 |
| | | (FD) | (FD) | 390 | 21 | 27 | NA | 23 | 3.8 |
| | | 52.0 | 52.5 | 270 | 15 | 18 | NA | 13 | 1.7 |
| ESB-19 | 04/11/2018 | 10.0 | 10.5 | NA | 1.8 | NA | <0.89 | <3.9 | 2.3 |
| | | 20.0 | 20.5 | NA | 6.1 | NA | 1.2 J | 5.4 J | 2.0 J- |
| | | 30.0 | 30.5 | NA | 4.0 | NA | <1.0 | <4.4 | 0.18 J- |
| ESB-20 | 04/10/2018 | 10.0 | 10.5 | NA | 26 | NA | 3.0 | 13 | 5.8 |
| | | 20.0 | 20.5 | NA | 20 | NA | 3.1 | 14 | 1.6 |
| | | 30.0 | 30.5 | NA | 11 | NA | 3.5 | 16 | 1.4 J- |
| | | 40.0 | 40.5 | NA | 15 | NA | 2.7 | 12 | 1.3 J- |
| ESB-21 | 04/10/2018 | 10.0 | 10.5 | NA | 3.7 | NA | 2.1 | 9.1 | 0.62 |
| | | 20.0 | 20.5 | NA | 18 | NA | 3.4 | 15 | 1.1 |
| | | 30.0 | 30.5 | NA | 8.6 | NA | 1.8 | 8.1 | 1.0 |
| | | 40.0 | 40.5 | NA | 4.1 | NA | 1.2 J | 5.5 J | 0.81 |
| ESB-22 | 04/10/2018 | 10.0 | 10.5 | NA | 0.75 | NA | 3.9 | 17 | 2.0 |
| | | 20.0 | 20.5 | NA | 2.9 | NA | 1.9 | 8.5 | 2.8 |
| | | (FD) | (FD) | NA | 2.8 | NA | 1.8 | 8.1 | 3.3 |
| | | 30.0 | 30.5 | NA | 5.2 | NA | 8.5 | 38 | 6.4 |
| | | 40.0 | 40.5 | NA | 13 | NA | 1.7 | 7.4 | 0.52 |
| ESB-23 | 04/13/2018 | 10.0 | 10.5 | NA | 3.4 | NA | 1.9 | 8.6 | 1.5 J+ |
| | | 20.0 | 20.5 | NA | 1.5 | NA | 0.90 J | 4.0 J | 0.24 J+ |
| | | (FD) | (FD) | NA | 1.5 | NA | 0.87 J | 3.9 J | 0.27 J+ |
| | | 30.0 | 30.5 | NA | 16 | NA | 2.6 | 12 | 0.97 J+ |
| | | 40.0 | 40.5 | NA | 18 | NA | 3.9 | 17 | 1.5 J+ |

**Notes:**
ft bgs = feet below ground surface
mg/kg = milligrams per kilogram

**TABLE 3: PRE-DESIGN FIELD INVESTIGATION GROUNDWATER SAMPLING RESULTS**
**ZVI-Enhanced Bioremediation Treatability Study Work Plan Addendum**
**Nevada Environmental Response Trust Site**
**Henderson, Nevada**

| Location Name | Sample Date | Bicarbonate as HCO3 (mg/L) | Calcium (mg/L) | Carbon (mg/L) | Carbonate as CO3 (mg/L) | Chlorate (mg/L) | Chloride (mg/L) | Chromium (total) (mg/L) | Chromium VI (mg/L) | Dissolved Solids (total) (mg/L) | Hydroxide (mg/L) | Iron (mg/L) | Iron, Ferric (mg/L) | Iron, Ferrous (mg/L) | Magnesium (mg/L) | Nitrate as N (mg/L) | Nitrate as NO3 (mg/L) | Perchlorate (mg/L) | Potassium (mg/L) | Sodium (mg/L) | Sulfate (mg/L) | Total Alkalinity as CaCO3 (mg/L) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ES-33 | 05/23/2018 | 130 | 570 | 0.87 J | <2.4 | 15 | 890 | NA | 0.0085 J- | 6,000 | <1.4 | 0.25 UJ | 0.10 UJ | 0.10 UJ | 320 | NA | NA | 3.5 | 75 | 860 | 2,700 | 110 |
| ES-34 | 05/23/2018 | 74 | 630 | <0.65 | <2.4 | 52 | 1,400 | NA | 0.064 J- | 8,400 | <1.4 | 0.25 UJ | 0.10 UJ | 0.10 UJ | 630 | NA | NA | 7.0 | 230 | 1,300 | 3,900 | 60 |
| | (FD) | 73 | 590 | 0.67 J | <2.4 | 52 | 1,400 | NA | 0.064 J- | 8,400 | <1.4 | 0.25 UJ | 0.10 UJ | 0.10 UJ | 580 | NA | NA | 6.9 | 210 | 1,200 | 3,800 | 60 |
| ES-35 | 05/22/2018 | 90 | 540 | 0.89 J | <2.4 | 25 | 860 | NA | 0.028 | 5,900 | <1.4 | <0.050 | 0.10 UJ | 0.10 UJ | 230 | NA | NA | 3.3 | 40 | 620 | 2,500 | 74 |
| ES-36 | 05/22/2018 | 76 | 530 | 2.1 | <2.4 | 44 | 1,200 | NA | 0.060 | 6,800 | <1.4 | <0.050 | 0.10 UJ | 0.10 UJ | 270 | NA | NA | 5.2 | 280 | 760 | 2,700 | 62 |
| ES-37 | 05/22/2018 | 76 | 500 | <0.65 | <2.4 | 18 | 890 | NA | 0.017 | 6,400 | <1.4 | 0.15 | 0.15 J- | 0.10 UJ | 290 | NA | NA | 3.9 | 110 | 750 | 3,000 | 62 |
| ES-38 | 05/23/2018 | 91 | 630 | 0.75 J | <2.4 | 29 | 880 | NA | 0.027 J- | 5,900 | <1.4 | 0.25 UJ | 0.10 UJ | 0.10 UJ | 290 | NA | NA | 3.3 | 54 | 780 | 2,600 | 75 |
| ES-39 | 05/23/2018 | 110 | 670 | 0.90 J | <2.4 | 8.7 | 920 | NA | 0.060 | 5,700 | <1.4 | 0.25 UJ | 0.10 UJ | 0.10 UJ | 260 | NA | NA | 4.5 | 41 | 760 | 2,300 | 87 |
| ES-40 | 02/26/2019 | 130 | 490 | >1 Value | <2.4 | 0.068 | 1,500 | <0.013 | <0.00025 | 11,000 | <1.4 | <0.25 | NA | <0.10 | 810 | <2.8 | <13 | 0.091 | 290 | 1,200 | 5,100 | 110 |
| ES-41 | 02/27/2019 | 69 | 510 | >1 Value | <2.4 | <0.040 | 5,100 | <0.050 | <0.00025 | 25,000 | <1.4 | <1.0 | <0.10 | <0.10 | 1,900 | <5.5 | <25 | <0.0048 | 1,900 | 3,200 | 11,000 | 56 |
| ES-42 | 02/27/2019 | 130 | 520 | >1 Value | <2.4 | <0.040 | 6,700 | <0.050 | <0.00025 | 35,000 | <1.4 | <1.0 | <0.10 | <0.10 | 3,500 | <5.5 | <25 | 0.13 | 2,200 | 4,100 | 18,000 | 100 |
| ES-43 | 02/27/2019 | 100 | 510 | >1 Value | <2.4 | <0.040 | 5,000 | <0.050 | <0.00025 | 30,000 | <1.4 | <1.0 | <0.10 | <0.10 | 2,700 | <5.5 | <25 | 0.014 | 2,100 | 3,400 | 15,000 | 86 |
| | (FD) | 100 | 510 | >1 Value | <2.4 | <0.040 | 4,800 | <0.050 | <0.00025 | 29,000 | <1.4 | <1.0 | <0.10 | <0.10 | 2,700 | <5.5 | <25 | <0.0048 | 2,200 | 3,400 | 15,000 | 85 |
| ES-44 | 02/26/2019 | 88 | 530 | >1 Value | <2.4 | 46 | 2,200 | 0.060 | 0.064 | 12,000 | <1.4 | <0.25 | NA | <0.10 | 850 | 12 | 51 | 8.5 | 470 | 1,400 | 5,400 | 72 |

**Notes:**
mg/L = milligrams per Liter