

April 26, 2017

## TECHNICAL MEMORANDUM

To: Steve Clough  
Nevada Environmental Response Trust

From: Jessica Donovan, Ramboll Environ

Re: **RI Phase 2 Modification No. 1  
Nevada Environmental Response Trust Site  
Henderson, Nevada  
Ramboll Environ Project No. 21-41400C, M03B**

This Technical Memorandum presents Ramboll Environ's recommended Modification No. 1 to the scope of work for the Remedial Investigation (RI) Phase 2 Investigation currently in progress at the Nevada Environmental Response Trust Site (the "Site") located in Henderson, Nevada. Based on the investigation results to date, we are recommending the installation of four additional on-site groundwater monitoring wells in the area west of the GW-11 pond, shown on Figure 1. As part of the RI Phase 2, several volatile organic compounds (VOCs) were detected in soil samples collected from the saturated Upper Muddy Creek formation (UMCf) in borings RIDB-6 and RIDB-7. The purpose of the additional wells is to provide information needed to characterize the presence of these VOCs and other Site-related chemicals in groundwater in this area of the Site.

The findings related to the presence of VOCs in soil at borings RIDB-6 and RIDB-7 are summarized below. Field PID readings were obtained from the retrieved soil core at 2 to 3 feet intervals for screening purposes, and soil samples were collected for chemical analysis at depths of 1, 3, 5, 10, and then at 10 feet intervals to the total boring depth. The soil samples were tested for VOCs and other chemicals in accordance with the approved RI work plan. The VOC results presented in this Technical Memorandum are considered preliminary since third party data validation is currently in progress and the validated data are not yet available. In this area of the Site, the contact between the alluvium and the UMCf occurs at about 26 feet below ground surface (ft bgs), and first groundwater was encountered at a depth of about 28 ft bgs in the UMCf.

### Boring RIDB-6

Boring RIDB-6 was drilled and sampled on February 25, 2017. This boring was terminated at 70 feet (instead of the planned depth of 90 feet) after odor and vapors were noted during drilling. During logging of the retrieved soil core, chemical odor was noted in the interval between approximately 30 and 70 feet, with the strongest odor present in the core interval between about 49 and 52 feet.

- Unsaturated alluvium (0 to ~26 ft bgs): PID readings were low (0.2-1.8 ppm), and VOCs were not detected in the soil samples collected from 1, 5, 10, and 20 ft bgs.

- UMCf between 30-52 ft bgs: PID readings ranged between 15 and 55 ppm. Eight VOCs were detected in one or more of the soil samples collected from 30, 40, and 50 feet, including benzene, chlorobenzene, 1,2-dichlorobenzene, 1,3-dichlorobenzene, 1,4-dichlorobenzene, 1,1-dichloroethane (1,1-DCA), and 1,2-dichloroethane (1,2-DCA). Detected concentrations ranged from 0.0037 to 2.0 mg/kg. In addition, TCE was detected at a low concentration in one sample. The highest concentrations were found in the soil samples from 40 and 50 feet.
- UMCf below 50 ft bgs: The PID readings were lower, ranging between 8 and 23 ppm. However, the highest PID reading was measured in the deepest tested interval at 68 ft bgs. Five VOCs, including benzene, chlorobenzene, 1,1-DCA, 1,2-DCA, and chloroform, were detected in the soil samples collected from 60 ft bgs at concentrations ranging 0.0047 to 0.43 mg/kg.

Three clustered groundwater monitoring wells are recommended adjacent to RIDB-6. Two wells (M-242 and M-243) will assess groundwater concentrations in depth intervals where VOCs have been found in saturated soil. Well M-242 will be screened from 38-53 ft bgs, and well M-243 will be screened from 60-70 ft bgs. Both wells will be screened in the UMCf. In order to further delineate the vertical extent of VOCs in the UMCf, a third deeper well (M-244) will also be installed at this location. The pilot boring for well M-244 will be drilled to a depth of 130 ft bgs, and PID readings will be recorded during drilling for screening purposes. Soil samples will be collected for chemical analysis from depths of 60, 70, 80, 90, 100, 110, 120, and 130 ft bgs. Similar to RIDB-6, the soil samples will be tested for perchlorate, chlorate, total chromium, nitrate, nitrite, VOCs, and moisture content. Well M-244 will be screened below 70 ft bgs in the depth interval where the highest PID readings are recorded, or from 80-90 ft bgs if PID readings decrease to 0 ppm below 70 feet.

### **Boring RIDB-7**

Boring RIDB-7 was drilled and sampled to the planned total depth of 90 ft bgs on March 12, 2017. The PID screening results and the soil VOC analytical results are summarized below.

- Unsaturated alluvium (0 to ~26 ft bgs): PID readings were low (0-1.6 ppm). Except for one trace level detection, VOCs were not detected in the soil samples collected from 1, 5, 10, and 20 ft bgs.
- UMCf between 30-50 ft bgs: PID readings in this depth interval were all 0 ppm. However, five VOCs (benzene, chlorobenzene, 1,2-dichlorobenzene, 1,4-dichlorobenzene, and chloroform) were detected in soil at RIDB-7 in one or more of the soil samples collected from 30, 40, and 50 feet. Detected concentrations ranged from 0.00089 mg/kg to 0.26 mg/kg (chloroform at 50 feet). In addition, PCE was detected in one sample at a concentration of 0.018 mg/kg.
- UMCf between 60-70 ft bgs: PID readings ranged between 0.8 and 2.6 ppm. Five VOCs were detected in the soil samples collected from 60 and 70 ft bgs at concentrations ranging 0.00061 to 0.21 mg/kg (benzene at 70 feet). Chloroform was detected in soil at 60 feet (0.10 mg/kg) and 70 feet (0.086 mg/kg).
- UMCf below 70 ft bgs: The PID readings between 72 and 88 feet were all 0 ppm, and no VOCs were detected in the soil samples collected from 80 and 90 ft bgs.

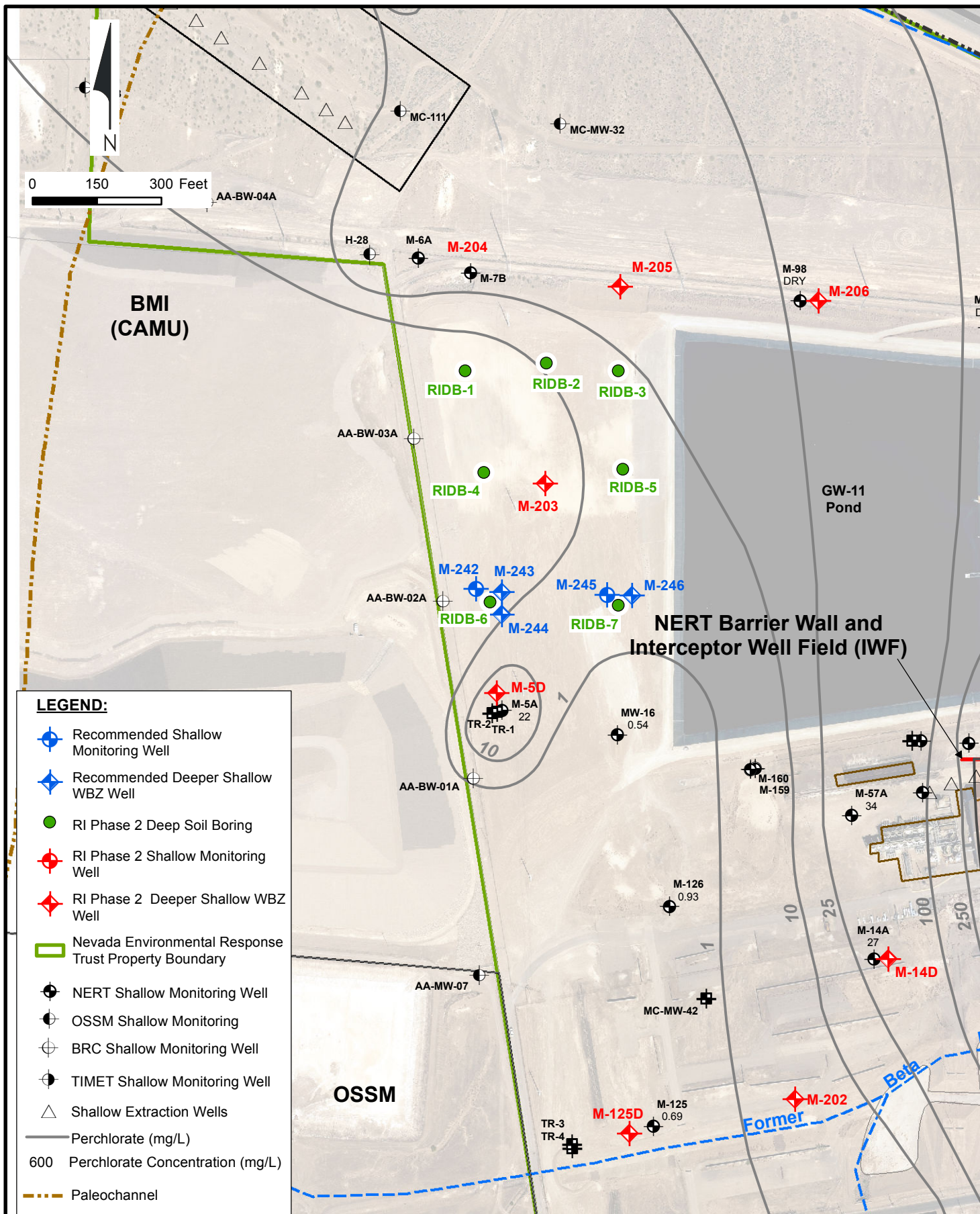
Based on these findings, two clustered groundwater monitoring wells are recommended adjacent to RIDB-7. Well M-245 will be screened from 35-50 ft bgs, and well M-246 will be screened from 60-70 ft bgs. Both wells will be screened in the UMCf.

The five new wells will be installed, developed, and sampled in accordance with the procedures in the approved Field Sampling Plan (FSP).

Please contact us should you have any questions about the recommended additional monitoring wells in the area west of the GW-11 Pond.

**Attachment**

Figure 1 RI Phase 2 Modification No. 1



**LEGEND:**

- ◆ Recommended Shallow Monitoring Well
- ◆ Recommended Deeper Shallow WBZ Well
- RI Phase 2 Deep Soil Boring
- ◆ RI Phase 2 Shallow Monitoring Well
- ◆ RI Phase 2 Deeper Shallow WBZ Well
- Nevada Environmental Response Trust Property Boundary
- NERT Shallow Monitoring Well
- OSSM Shallow Monitoring
- BRC Shallow Monitoring Well
- TIMET Shallow Monitoring Well
- △ Shallow Extraction Wells
- Perchlorate (mg/L)
- 600  Perchlorate Concentration (mg/L)
- Paleochannel



**RI Phase 2 Modification No.1**  
 Nevada Environmental Response Trust Site  
 Henderson, Nevada

Figure  
**1**

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