

TECHNICAL MEMORANDUM

To: Steve Clough – Nevada Environmental Response Trust

From: Arul Ayyaswami, Mike Kovacich, and Dan Pastor - Tetra Tech

Date: July 26, 2017

Subject: RI Phase 2 Modification No. 7
Nevada Environmental Response Trust Site
Henderson, Nevada

At the direction of the Nevada Environmental Response Trust (NERT or Trust), Tetra Tech, Inc. (Tetra Tech) has prepared this Technical Memorandum presenting a recommended Modification No. 6 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.

Analytical results from the installation of the injection wells and six downgradient, dual-nested monitoring wells installed within the In-Situ Chromium Treatability Study Area by Tetra Tech indicate significant concentrations of perchlorate (up to 1,200 mg/kg), chlorate (up to 4,000 mg/kg), and hexavalent chromium (up to 14 mg/kg) are present at 60 feet below ground surface (bgs), the maximum depth of the borings advanced.

Based on these results, Tetra Tech recommends installing one shallow monitoring well (CTMW-07S) and one deep monitoring well (CTMW-07D) adjacent to the existing In-Situ Chromium Treatability Study wells in order to better understand the vertical distribution of perchlorate and other chemicals of potential concern (COPC) in the Upper Muddy Creek Formation within the Central Retention Basin (Figure 1). The soil boring for the deep well would be advanced up to 130 feet bgs and soil samples would be collected every 10 feet from 60 to 130 feet bgs and analyzed for perchlorate, chlorate, hexavalent chromium, total chromium, and chloroform (see Table 1 below) to provide additional data for the RI and Feasibility Study. The deep boring would be backfilled with bentonite pellets to approximately 115 feet bgs before installing a permanent 2-inch Schedule 80 PVC monitoring well screened from approximately 100 to 115 feet bgs (Figure 2). The soil boring for the shallow well would be advanced adjacent to the deep well and would be advanced up to 25 feet bgs. No soil samples would be collected from the shallow boring. Once the shallow boring is complete, a permanent 2-inch Schedule 80 PVC monitoring well screened from approximately 20 to 25 feet bgs. During drilling, temporary groundwater wells would be constructed at approximately 50 feet and 70 feet bgs to assess groundwater conditions within those intervals. The permanent shallow and deep wells would be developed after installation following the protocols outlined in the In-Situ Chromium Treatability Study Work Plan. Groundwater samples collected from the wells (shallow, temporary, and deep) would be analyzed for perchlorate, chlorate, hexavalent chromium, total chromium, and chloroform (Table 2).

Please contact us should have any questions about the recommended groundwater monitoring wells in the Central Retention Basin.

Attachments

Figure 1 Proposed Well Locations

Figure 2 Well Construction Diagrams

Table 1: Soil Sampling Matrix

Sample Depth (ft bgs)	Perchlorate	Chlorate	Hexavalent Chromium	Total Chromium	Chloroform
60	X	X	X	X	X
70	X	X	X	X	X
80	X	X	X	X	X
90	X	X	X	X	X
100	X	X	X	X	X
110	X	X	X	X	X
120	X	X	X	X	X
130	X	X	X	X	X

Table 2: Groundwater Sampling Matrix

Sample Depth (ft bgs)	Perchlorate	Chlorate	Hexavalent Chromium	Total Chromium	Chloroform
20 to 25 (Shallow Well)	X	X	X	X	X
50 (Temporary Well)	X	X	X	X	X
70 (Temporary Well)	X	X	X	X	X
100 to 115 (Deep Well)	X	X	X	X	X

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Legend	
	AP Area Boundary
	Groundwater Barrier Wall
	M-175 Existing Monitoring Well
	UFIW-01 Existing Injection Well
	I-AC Existing Extraction Well
	M-66D Planned Deeper Shallow WBZ Well (Ramboll Environ)
	M-222 Planned Middle WBZ Well (Ramboll Environ)
	CTMW-07S Proposed Monitoring Well
	WBZ Water-bearing zone
	ft bgs Feet below ground surface

Notes:
 1. Imagery Source: Aerotech Mapping, August 2016.
 2. Monitoring well, extraction well, and groundwater barrier wall locations based on Figures 1A/B and Plates 1, 2, 6, 7, and 8 in 2015-2016 Annual Performance Report (Ramboll Environ, 2016).



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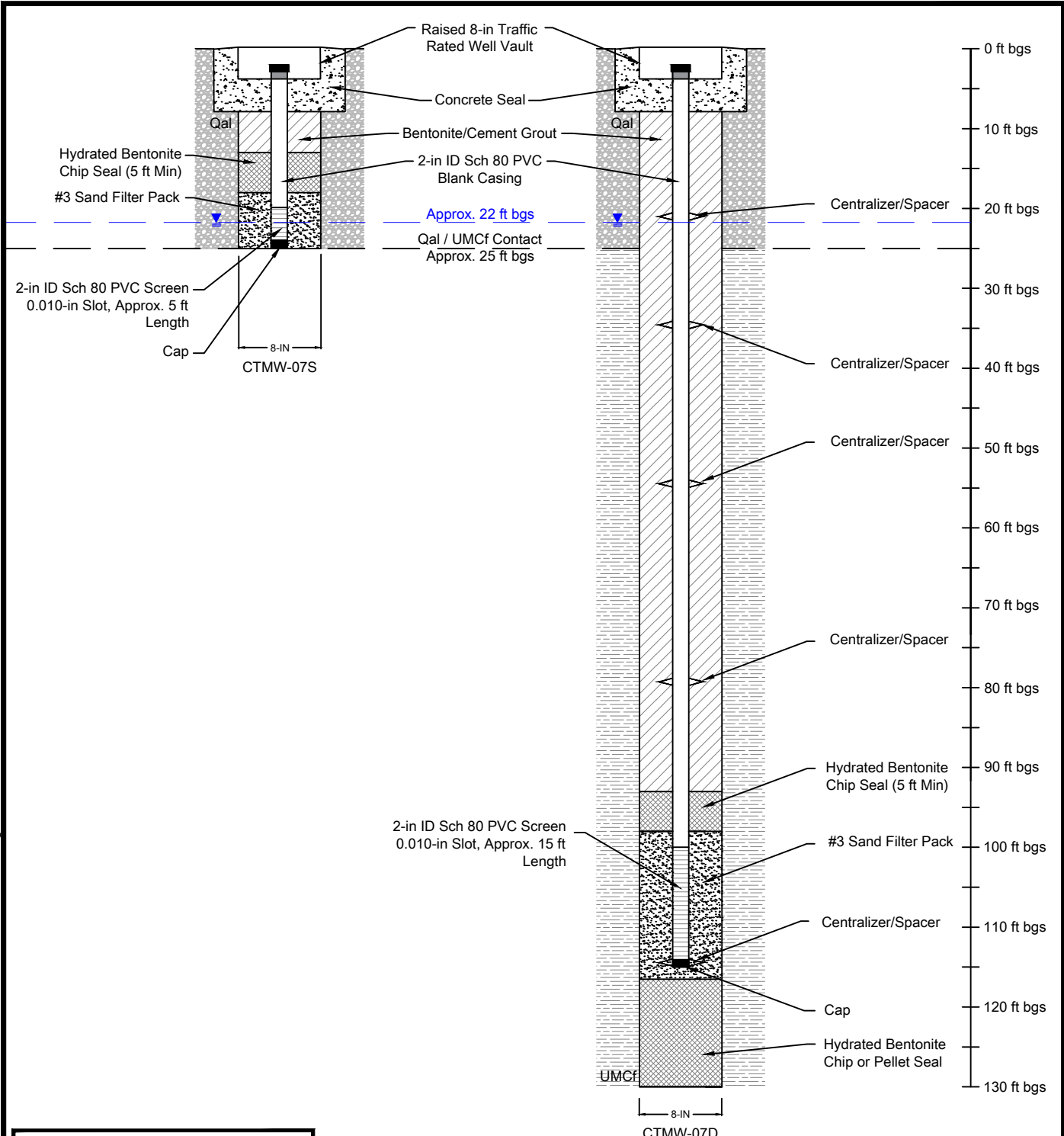
NEVADA ENVIRONMENTAL RESPONSE TRUST SITE

IN-SITU CHROMIUM TREATABILITY STUDY

PROPOSED WELL LOCATIONS

Project No:	87600014
Date:	JULY 26, 2017
Designed By:	MC
Figure No.	1

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Legend	
	Groundwater Level
Qal	Quaternary Alluvium
UMCf	Upper Muddy Creek Formation
ft bgs	Feet below ground surface
S	Shallow well (~25 ft bgs)
D	Deep well (~115 ft bgs)

Notes:

1. Actual borehole size, well casing/screen depth, seal intervals, etc. to be determined based on field data and conditions.
2. Portion of PVC blank casing above bentonite chip seal in each injection well to be sanded with sandpaper to roughen the contact surface of PVC adjacent to the neat cement grout.
3. Scaled to approximate depth.

<p>TETRA TECH</p> <p>www.tetratech.com</p> <p>150 S. 4th Street, Unit A Henderson, Nevada 89015 Phone: (702) 854-2293</p>	<p>NEVADA ENVIRONMENTAL RESPONSE TRUST SITE</p> <p>IN-SITU CHROMIUM TREATABILITY STUDY</p> <p>WELL CONSTRUCTION DIAGRAMS</p>	<p>Project No: 87600014</p> <p>Date: JULY 26, 2017</p> <p>Designed By: MC</p>
	<p>Figure No.</p> <p>2</p>	