

FREMONT ENVIRONMENTAL INC.

August 10, 2020

Mr. Jacob Evans
Noble Energy
2115 117th Avenue
Greeley, CO 80634

Subject: **Remediation and Groundwater Sampling Report**
 Wiedeman PM J28-2, 28-7
 API # 05-123-14002 (J28-2)
 NWSW Sec 28, T5N, R66W
 Weld County, Colorado
 Fremont Project No. C016-093
 Facility #327010, Remediation #10028

Dear Mr. Evans:

Enclosed please find a copy of the above referenced Remediation and Groundwater Sampling Report for the Wiedeman PM J28-2, 28-7 release site in Weld County, Colorado. The enclosed report describes remedial actions to address impacted groundwater as well as the recent quarterly groundwater monitoring at the site.

Please contact me at (303) 956- 8714 if you require any additional information.

Fremont appreciates the opportunity to provide this service.

Sincerely,
FREMONT ENVIRONMENTAL INC.



Paul V. Henahan, P.E.
Senior Consultant

Enclosure

REMEDATION AND GROUNDWATER SAMPLING REPORT

NOBLE ENERGY INC.

WIEDEMAN PM J28-2, 28-7

WELD COUNTY, COLORADO

FREMONT PROJECT NO. C016-110

FACILITY #327010, REMEDIATION #10028

Prepared by:

**Fremont Environmental Inc.
1759 Redwing Lane
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(303) 956-8714**

August 10, 2020

TABLE OF CONTENTS

1.0 INTRODUCTION	1
2.0 BACKGROUND INFORMATION	1
2.1 Site Location	1
2.2 Site History	1
3.0 GROUNDWATER MONITORING AND REMEDIATION ACTIVITIES	2
3.1 Groundwater Level Measurements	2
3.2 Groundwater Sampling and Analysis.....	3
3.3 Groundwater Remediation System.....	3
4.0 DISCUSSION	4
5.0 REMARKS.....	4

Table

Table 1: Summary of Petroleum Constituents in Groundwater Chemistry Data

Figures

Figure 1: Site Location Map
Figure 2: Site Map
Figure 3: Groundwater Contour Map
Figure 4: Groundwater Chemistry
Figure 5: Groundwater Chemistry and Benzene Isoconcentration Map
Figure 6: Groundwater Chemistry and Xylenes Isoconcentration Map
Figure 7: Remediation System Layout

Appendix

Appendix A: Laboratory Documentation

REMEDICATION AND GROUNDWATER SAMPLING REPORT

NOBLE ENERGY INC.

WIEDEMAN PM J28-2, 28-7

WELD COUNTY, COLORADO

FREMONT PROJECT NO. C016-110

FACILITY #327010, REMEDIATION #10028

1.0 INTRODUCTION

The purpose of this document is to present information collected during the remediation of petroleum-impacted groundwater at the Wiedeman PM J28-2, 28-7 former water vault release location in Weld County, Colorado. A solar-powered groundwater remediation system consisting of a soil vapor extraction (SVE) bubbler unit was installed and activated at the site in June 2018. This remediation system has been deactivated following the removal of light non-aqueous phase liquid (LNAPL) in MW-2.

A new propane powered system consisting of five air sparge (AS) wells and two passive SVE wells was installed December 2019 to replace the previous solar-powered system and address the remaining soil and dissolved phase groundwater impacts.

2.0 BACKGROUND INFORMATION

2.1 Site Location

The Wiedeman PM J28-2, 28-7 site is in Evans, Weld County, Colorado as shown on Figure 1. The site is located on cultivated land approximately 0.3 miles southeast of the intersection of West 37th St. and 65th Ave. The location is further described as the NE ¼ of the SW ¼ of Section 28, Township 5N, Range 66W.

2.2 Site History

The site consists of the area adjacent to and beneath the former water vault for the Wiedeman PM J28-2 natural gas well. The Wiedeman PM J28-2 well was drilled in 1988

to a total vertical depth of 7,501 feet. Soil impacts were identified adjacent to the former water vault during its removal.

Light nonaqueous phase liquid (LNAPL) was observed in one of the seven monitoring wells initially installed following the October 2016 site investigation. A solar-powered soil vapor extraction/bubbler system (SVE) was activated in June 2018 and tied to MW-2 to remove LNAPL from the well. The solar-powered SVE/bubbler system was effective in removing LNAPL within MW-2; however, dissolved phase constituents remain.

On March 25, 2019, seven additional soil borings were advanced utilizing a Geoprobe rig to define the remaining extent of impacts onsite. The soil boring logs and data from the investigation were used to establish a target area for the installation of a combined AS/passive SVE remediation system with a larger radius of influence. A monitoring well (MW-8) was also installed during this investigation to establish a point of compliance to the north. As noted above, the solar-powered remediation system has since been deactivated and replaced by the combined AS/passive SVE system.

3.0 GROUNDWATER MONITORING AND REMEDIATION ACTIVITIES

3.1 Groundwater Level Measurements

Groundwater levels were measured in eight monitoring wells on July 17, 2020. The data are summarized in Table 1.

Water table contours inferred from the July 17, 2020 data are illustrated on Figure 3. Based on these data, groundwater is inferred to flow to the northwest. The water table gradient was calculated at approximately 0.066 feet per foot (ft/ft) for the July 2020 data.

3.2 Groundwater Sampling and Analysis

Groundwater samples were collected from the eight monitoring wells on July 17, 2020 to monitor the magnitude and extent of groundwater impacts at the site.

The groundwater samples were submitted to Summit Scientific Inc. in Golden, Colorado for analyses of benzene, toluene, ethylbenzene and xylenes (BTEX) by EPA Method 8260B. The groundwater chemistry data is illustrated on Figure 4.

The laboratory data indicate that the BTEX constituents were below their respective laboratory detection limits in seven of the eight wells for the July 2020 sampling event. However, benzene and xylenes concentrations in MW-2R were 990 ug/L and 2,700 ug/L, respectively. The groundwater analytical data are summarized in Table 1. A copy of the laboratory reports, quality control data, and chain-of-custody documentation are presented in Appendix A.

3.3 Groundwater Remediation System

As a result of groundwater impacts in monitoring well MW-2R, Noble installed a solar-powered soil vapor extraction (SVE) bubbler system at this site in June 2018. The remediation system was effective in removal of LNAPL and has been deactivated.

To address remaining impacts in the vadose zone and dissolved phase groundwater impacts, a propane powered remediation system consisting of five AS and two passive SVE wells was installed. The AS wells are manifolded directly to the propane powered remediation trailer. Figure 7 illustrates the layout of the remediation system.

The recent quarterly groundwater sampling event, which was conducted on July 17, 2020, indicates that LNAPL remediation was effective. As of October 7, 2019, LNAPL was removed and remains absent in MW-2R. Concentrations of dissolved phase constituents in monitoring well MW-2R are decreasing but remain above the COGCC Table 910-1 limits.

Large variations in the water table depth are common onsite due to irrigation activities coupled with seasonal changes in the hydrologic cycle. The July 2020 data shows a significant decrease in benzene, toluene and xylenes concentrations despite the water table fluctuations. Impacts to the saturated and unsaturated zone continue to be addressed by the continuous operation of the AS/passive SVE remediation system, which operates for 24 hours, seven days a week.

4.0 DISCUSSION

As demonstrated by soil sampling and analyses, the petroleum-impacted soil was removed from the site by excavation in September 2017.

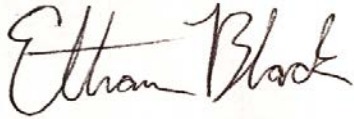
The previous SVE remediation system effectively removed LNAPL from MW-2/2R over the life of its operation and has since been deactivated. That system was replaced by a propane powered remediation system installed to address the remaining impacts in the saturated and unsaturated zones. A reduction in dissolved phased BTEX concentrations has been observed during the operation of the propane powered AS/passive SVE system.

Noble will sample the groundwater on a quarterly basis to evaluate the BTEX concentrations relative to COGCC's Table 910-1 requirements. After four consecutive quarters of COGCC-compliant BTEX concentrations, Noble will request closure of this site.

5.0 REMARKS

The discussion and conclusions contained in this report represent our professional opinions. These opinions are based on currently available information and are arrived at in accordance with currently accepted hydrogeologic and engineering practices at this time and location. No warranty is implied or intended.

This report was prepared by **FREMONT ENVIRONMENTAL INC.**



8/10/20

Date _____

Ethan Black

Geologist

Reviewed by:



8/10/20

Date _____

Paul V. Henehan, P.E.

Senior Consultant

TABLE

TABLE 1
SUMMARY OF GROUND WATER ELEVATION DATA AND CHEMISTRY DATA
NOBLE ENERGY INC.
WIEDEMAN PMJ 28-2, WELD COUNTY, COLORADO
FREMONT PROJECT NO. C016-110

SAMPLE LOCATION	DATE	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	TOC ELEVATION (feet)	DEPTH TO GROUND WATER (ft)	GROUND WATER ELEVATION (ft)	FREE PRODUCT THICKNESS (ft)
MW-1	10/12/16	<1.0	1.5	<1.0	<1.0	98.19	12.67	85.52	NP
	01/06/17	<1.0	<1.0	<1.0	<1.0		15.87	82.32	NP
	04/05/17	<1.0	<1.0	<1.0	<1.0		18.19	80.00	NP
	08/14/17	<1.0	<1.0	<1.0	<1.0		9.36	88.83	NP
	10/11/17	<1.0	<1.0	<1.0	<1.0		12.43	85.76	NP
	01/11/18	<1.0	<1.0	<1.0	<1.0		15.46	82.73	NP
	04/27/18	<1.0	<1.0	<1.0	<2.0		17.85	80.34	NP
	07/27/18	<1.0	<1.0	<1.0	<2.0		8.79	89.40	NP
	08/23/18	NS	NS	NS	NS		8.12	90.07	NP
	10/17/18	<1.0	<1.0	<1.0	<2.0		13.58	84.61	NP
	01/21/19	<1.0	<1.0	<1.0	<2.0		16.55	81.64	NP
	04/23/19	<1.0	<1.0	<1.0	<2.0		18.76	79.43	NP
	07/09/19	<1.0	<1.0	<1.0	<2.0		18.41	79.78	NP
	10/07/19	<1.0	<1.0	<1.0	<2.0		11.49	86.70	NP
	01/13/20	<1.0	<1.0	<1.0	<2.0		15.41	82.78	NP
04/06/20	<1.0	<1.0	<1.0	<2.0	17.72	80.47	NP		
07/17/20	<1.0	<1.0	<1.0	<2.0	9.58	88.61	NP		
MW-2	10/12/16	20000	32000	1400	19000	97.58	12.43	85.15	NP
	01/06/17	NS	NS	NS	NS		15.95	81.63	0.34
	04/05/17	NS	NS	NS	NS		18.42	79.16	1.00
	08/14/17	NS	NS	NS	NS		9.03	88.55	0.13
	10/11/17	NS	NS	NS	NS		12.11	98.19	0.25
	01/11/18	NS	NS	NS	NS		15.39	82.19	0.24

SAMPLE LOCATION	DATE	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	TOC ELEVATION (feet)	DEPTH TO GROUND WATER (ft)	GROUND WATER ELEVATION (ft)	FREE PRODUCT THICKNESS (ft)
MW-2 MW-2R	04/27/18	NS	NS	NS	NS	97.58	18.82	78.76	1.66
	07/27/18	1900	41	27	81000		8.05	89.53	NP
	08/23/18	NS	NS	NS	NS		7.61	89.97	NP
	10/17/18	4200	4800	150	26000	97.99	13.06	84.52	NP
	01/21/19	DRY	DRY	DRY	DRY		DRY	DRY	DRY
	04/23/19	IW	IW	IW	IW		18.97	79.02	IW
	07/09/19	1200	1700	20	5200		17.59	80.40	NP
	10/07/19	300	270	36	2700		11.48	86.51	NP
	01/13/20	5000	9000	630	8400		15.62	82.37	NP
04/06/20	5800	1500	10	7100	17.65		80.34	NP	
07/17/20	990	180	99	2700	9.56	88.43	NP		
MW-3 MW-3R	10/12/16	260	640	150	2600	97.52	12.53	84.99	NP
	01/06/17	1400	1900	310	6700		15.99	81.53	NP
	04/05/17	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	08/14/17	<1.0	<1.0	<1.0	2.2	97.55	7.61	89.91	NP
	10/11/17	2.7	2.0	7.6	280		12.18	98.19	NP
	01/11/18	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	04/27/18	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	07/27/18	<1.0	<1.0	<1.0	<2.0		97.55	97.55	NP
	08/23/18	NS	NS	NS	NS		5.64	91.91	NP
	10/17/18	<1.0	2.7	4.9	12		13.45	84.10	NP
	01/21/19	8.6	<1.0	<1.0	390		16.65	80.90	NP
	04/23/19	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	07/09/19	<1.0	<1.0	<1.0	<2.0		9.37	88.18	NP
	10/07/19	<1.0	<1.0	<1.0	<2.0		10.91	86.64	NP
	01/13/20	<1.0	<1.0	<1.0	<2.0		15.43	82.12	NP
04/06/20	1.3	<1.0	<1.0	35	17.29		80.26	NP	
07/17/20	<1.0	<1.0	<1.0	<2.0	4.84		92.71	NP	
MW-4	10/12/16	<1.0	<1.0	<1.0	<1.0		96.80	12.38	84.42
	01/06/17	<1.0	<1.0	<1.0	<1.0	15.62		81.18	NP

SAMPLE LOCATION	DATE	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	TOC ELEVATION (feet)	DEPTH TO GROUND WATER (ft)	GROUND WATER ELEVATION (ft)	FREE PRODUCT THICKNESS (ft)
MW-4	04/05/17	Dry	Dry	Dry	Dry	96.80	Dry	Dry	Dry
	08/14/17	<1.0	<1.0	<1.0	<1.0		7.84	88.96	NP
	12/23/17	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	01/11/18	<1.0	<1.0	<1.0	<1.0		15.22	81.58	NP
	04/27/18	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	07/27/18	<1.0	<1.0	<1.0	<2.0		5.90	90.90	NP
	08/23/18	NS	NS	NS	NS		6.22	90.58	NP
	10/17/18	<1.0	<1.0	<1.0	<2.0		13.02	83.78	NP
	01/21/19	<1.0	<1.0	<1.0	<2.0		16.22	80.58	NP
	04/23/19	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	07/09/19	<1.0	<1.0	<1.0	<1.0		13.40	83.40	NP
	10/07/19	<1.0	<1.0	<1.0	<2.0		10.55	86.25	NP
	01/13/20	<1.0	<1.0	<1.0	<2.0		14.98	81.82	NP
	04/06/20	<1.0	<1.0	<1.0	<2.0		16.83	79.97	NP
07/17/20	<1.0	<1.0	<1.0	<2.0	6.57	90.23	NP		
MW-5	10/12/16	<1.0	<1.0	<1.0	2.9	95.98	11.50	84.48	NP
	01/06/17	<1.0	<1.0	<1.0	2.8		15.24	80.74	NP
	04/05/17	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	08/14/17	<1.0	<1.0	<1.0	<1.0		5.74	90.24	NP
	10/11/17	<1.0	<1.0	<1.0	<1.0		11.13	84.85	NP
	01/11/18	<1.0	<1.0	<1.0	<1.0		14.70	81.28	NP
	04/27/18	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	07/27/18	<1.0	<1.0	<1.0	<2.0		4.03	91.95	NP
	08/23/18	NS	NS	NS	NS		4.72	91.26	NP
	10/17/18	<1.0	<1.0	<1.0	<2.0		12.39	83.59	NP
	01/21/19	<1.0	<1.0	<1.0	<2.0		15.77	80.21	NP
	04/23/19	Dry	Dry	Dry	Dry		Dry	Dry	Dry
07/09/19	<1.0	<1.0	<1.0	<2.0	5.20	90.78	NP		
10/07/19	<1.0	<1.0	<1.0	<2.0	9.79	86.19	NP		

SAMPLE LOCATION	DATE	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	TOC ELEVATION (feet)	DEPTH TO GROUND WATER (ft)	GROUND WATER ELEVATION (ft)	FREE PRODUCT THICKNESS (ft)	
MW-5	01/13/20	<1.0	<1.0	<1.0	<2.0	95.98	14.47	81.51	NP	
	04/06/20	NS	NS	NS	NS		16.32	79.66	NP	
	07/17/20	<1.0	<1.0	<1.0	<2.0		3.97	92.01	NP	
MW-6	10/12/16	<1.0	<1.0	<1.0	<1.0	100.00	14.63	85.37	NP	
	01/06/17	<1.0	<1.0	<1.0	<1.0		18.27	81.73	NP	
	04/05/17	Dry	Dry	Dry	Dry		Dry	Dry	Dry	
	08/14/17	<1.0	<1.0	<1.0	<1.0		9.23	90.77	NP	
	10/11/17	<1.0	<1.0	<1.0	<1.0		14.31	85.69	NP	
	01/11/18	<1.0	<1.0	<1.0	<1.0		18.33	81.67	NP	
	04/27/18	Dry	Dry	Dry	Dry		Dry	Dry	Dry	
	07/27/18	<1.0	<1.0	<1.0	<2.0		7.26	92.74	NP	
	08/23/18	NS	NS	NS	NS		7.58	92.42	NP	
	10/17/18	<1.0	<1.0	<1.0	<2.0		15.68	84.32	NP	
	01/21/19	Dry	Dry	Dry	Dry		Dry	Dry	Dry	
	04/23/19	Dry	Dry	Dry	Dry		Dry	Dry	Dry	
	07/09/19	<1.0	<1.0	<1.0	<2.0		12.00	88.00	NP	
	10/07/19	<1.0	<1.0	<1.0	<2.0		13.08	86.92	NP	
	01/13/20	<1.0	<1.0	<1.0	<2.0		17.73	82.27	NP	
04/06/20	Dry	Dry	Dry	Dry	Dry	Dry	Dry			
07/17/20	<1.0	<1.0	<1.0	<2.0	6.8	93.20	NP			
MW-7	10/12/16	<1.0	<1.0	<1.0	<1.0	97.02	11.80	85.22	NP	
	01/06/17	<1.0	<1.0	<1.0	<1.0		14.91	82.11	NP	
	04/05/17	Dry	Dry	Dry	Dry		Dry	Dry	Dry	
	08/14/17	<1.0	<1.0	<1.0	<1.0		9.55	87.47	NP	
	10/11/17	Dry	Dry	Dry	Dry		Dry	Dry	Dry	
	01/11/18	Dry	Dry	Dry	Dry		Dry	Dry	Dry	
	04/27/18	Dry	Dry	Dry	Dry		Dry	Dry	Dry	
	07/27/18	<1.0	<1.0	<1.0	<2.0		96.91		96.91	NP
	08/23/18	NS	NS	NS	NS			8.08	88.83	NP
10/17/18	<1.0	<1.0	<1.0	<2.0		12.38	84.53	NP		

SAMPLE LOCATION	DATE	BENZENE (µg/L)	TOLUENE (µg/L)	ETHYL BENZENE (µg/L)	TOTAL XYLENES (µg/L)	TOC ELEVATION (feet)	DEPTH TO GROUND WATER (ft)	GROUND WATER ELEVATION (ft)	FREE PRODUCT THICKNESS (ft)
MW-7R	01/21/19	<1.0	<1.0	<1.0	<2.0	96.91	15.49	81.42	NP
	04/23/19	<1.0	<1.0	<1.0	<2.0		17.72	79.19	NP
	07/09/19	<1.0	<1.0	<1.0	<2.0		18.13	78.78	NP
	10/07/19	<1.0	<1.0	<1.0	<2.0		11.57	85.34	NP
	01/13/20	<1.0	<1.0	<1.0	<2.0		14.29	82.62	NP
	04/06/20	<1.0	<1.0	<1.0	<2.0		18.31	78.60	NP
	07/17/20	<1.0	<1.0	<1.0	<2.0		10.52	86.39	NP
MW-8	04/23/19	Dry	Dry	Dry	Dry	99.30	Dry	Dry	Dry
	07/09/19	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	10/07/19	3.3	<1.0	<1.0	<2.0		12.98	86.32	NP
	01/13/20	<1.0	<1.0	<1.0	<2.0		16.75	82.55	NP
	04/06/20	Dry	Dry	Dry	Dry		Dry	Dry	Dry
	07/17/20	<1.0	<1.0	<1.0	<2.0		12.02	87.28	NP
Table 910-1 Limits		5	560	700	1,400				

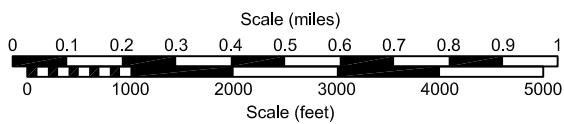
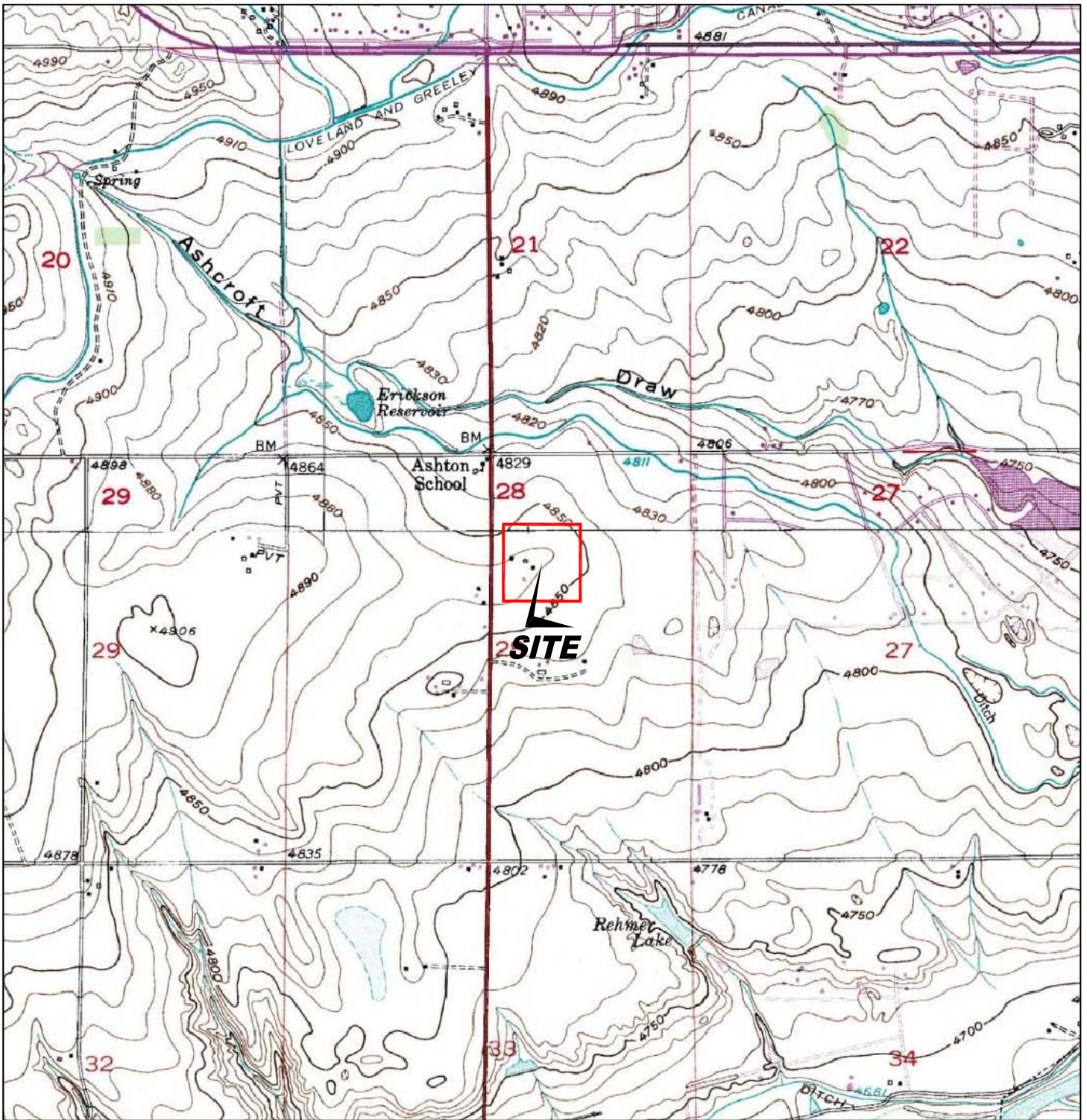
Bold face values exceed the COGCC limits

NP - No Free Product

NS - Not Sampled

IW - Insufficient Water

FIGURES



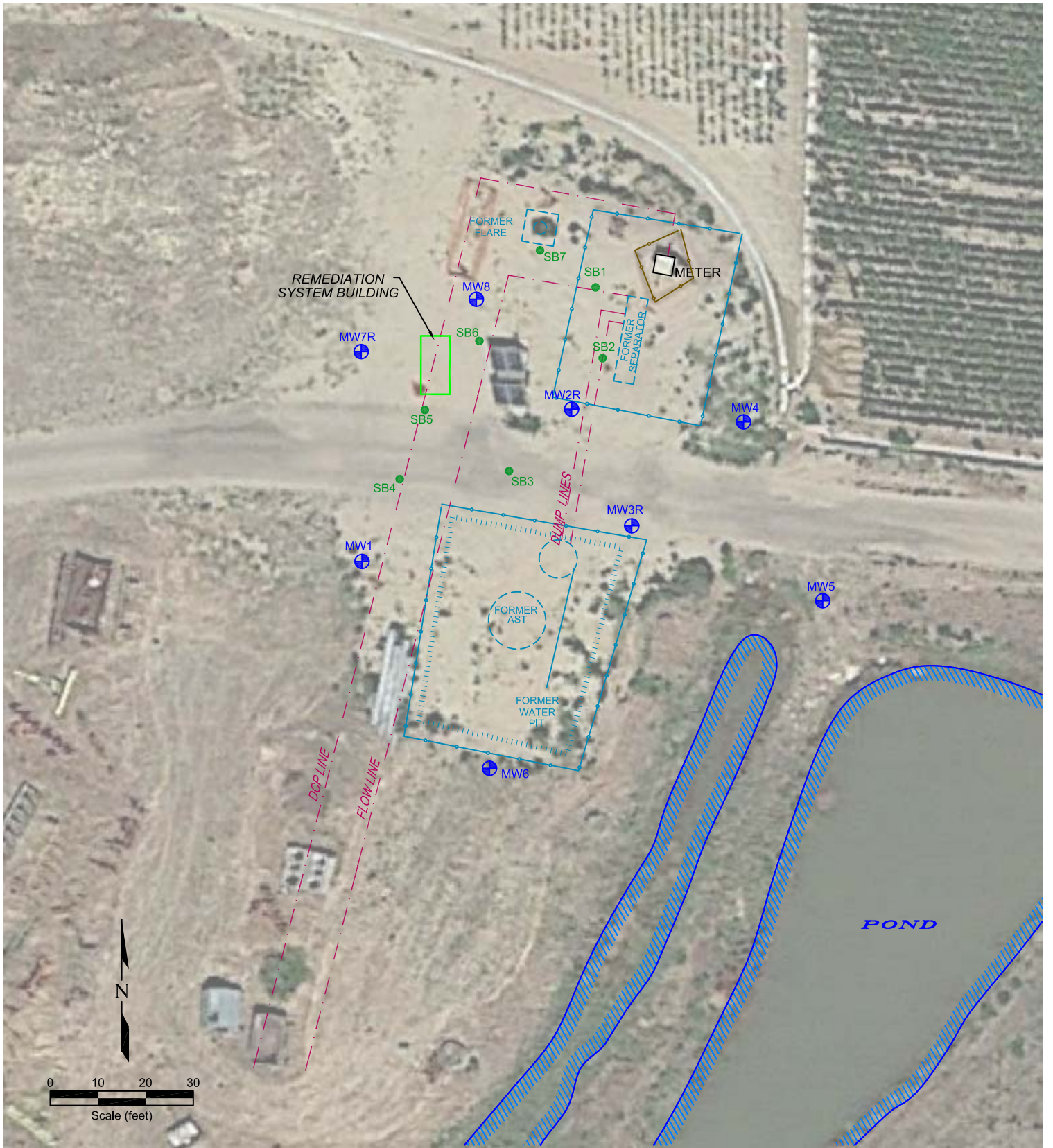
USGS 7.5 MINUTE SERIES (TOPOGRAPHIC)

Figure 1
SITE LOCATION MAP

Noble Wiedeman PM J28-2, 28-7
 NE SW Section 28, T5N, R66W
 Weld County, Colorado

Project No. C016-110	Prepared by	Drawn by TA
Date 8/6/20	Reviewed by EB	Filename 16110T





LEGEND

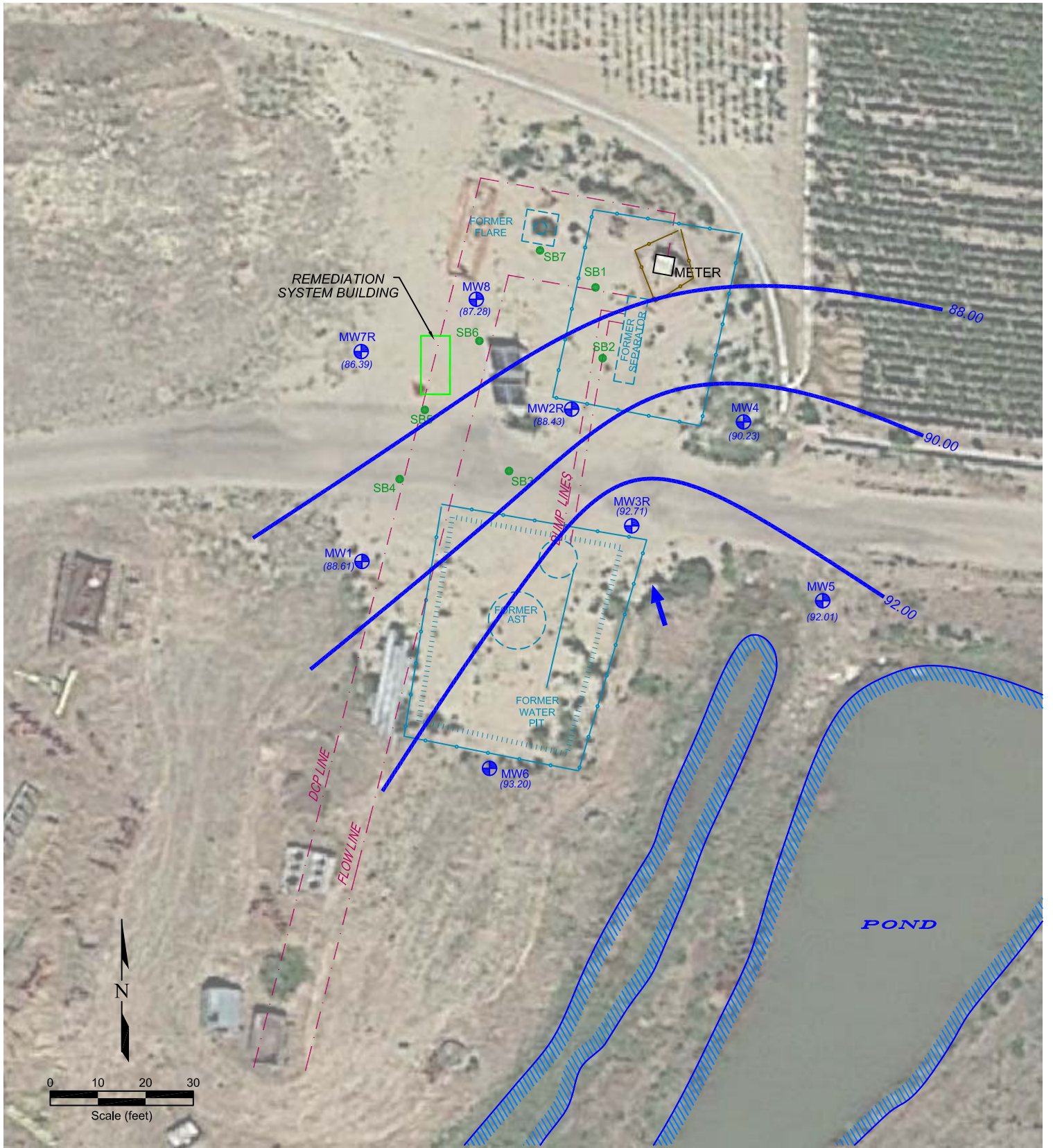
- SOIL BORING
- ⊕ MONITORING WELL
- ABOVE GROUND STORAGE TANK
- FORMER FORMER FACILITY
- BUILDING BUILDING
- FENCE LINE
- CONTAINMENT BERM
- PIPELINE

**Figure 2
SITE MAP**

Noble Wiedeman PM J28-2, 28-7
 NE SW Section 28, T5N, R66W
 Weld County, Colorado

Project No. C016-110	Prepared by	Drawn by TA
Date 8/6/20	Reviewed by EB	Filename 16110Q





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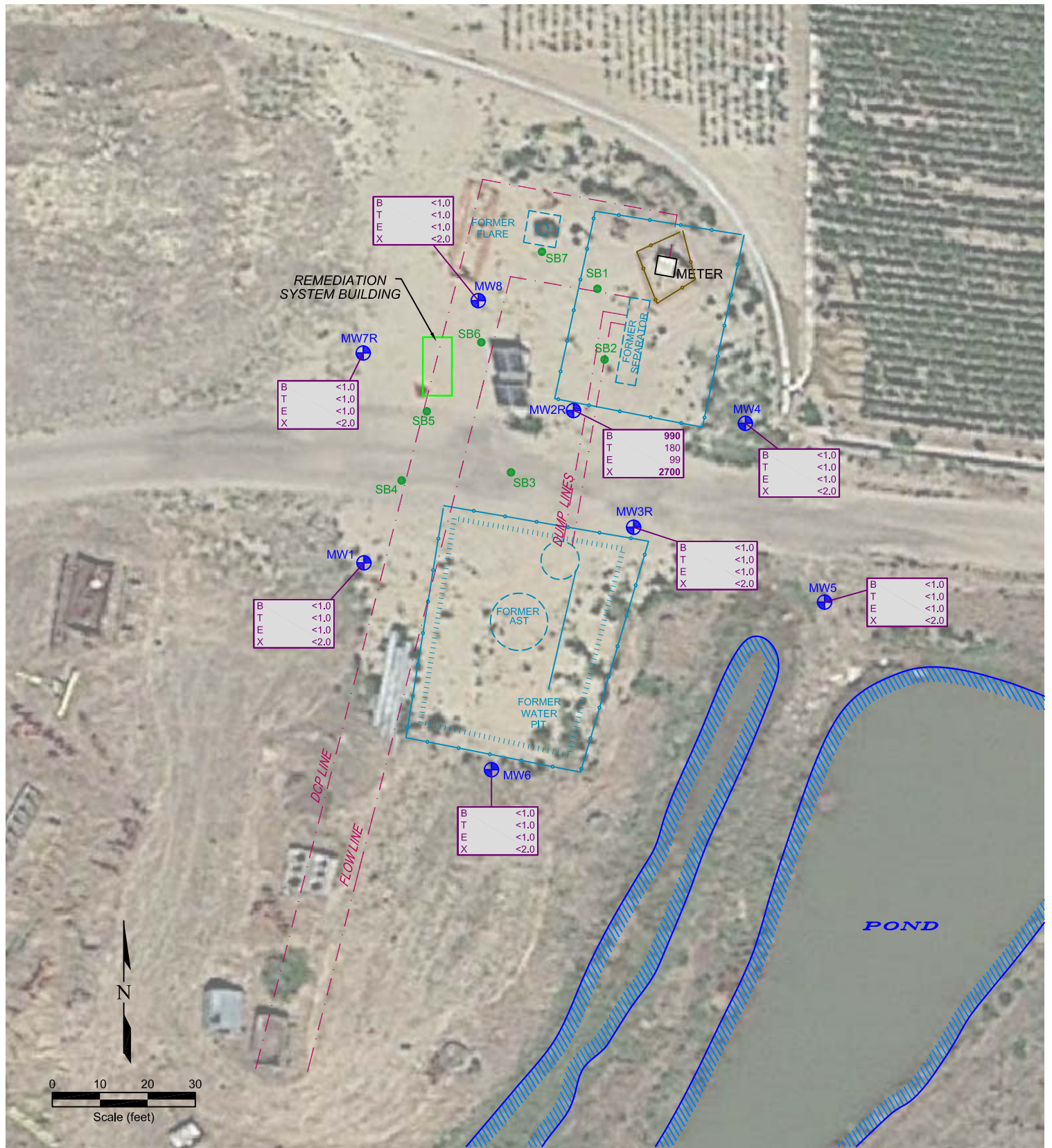
- SOIL BORING
- ⊕ MONITORING WELL
- ABOVE GROUND STORAGE TANK
- FENCE LINE
- CONTAINMENT BERM
- PIPELINE
- FORMER FACILITY
- BUILDING
- (82.78) GROUND WATER ELEVATION (ft above arbitrary datum)
- ~ WATER TABLE CONTOUR
- GROUND WATER FLOW DIRECTION

Figure 3
INFERRED GROUNDWATER CONTOUR MAP
 July 17, 2020

Noble Wiedeman PM J28-2, 28-7
 NE SW Section 28, T5N, R66W
 Weld County, Colorado

Project No. C016-110	Prepared by	Drawn by TA
Date 8/6/20	Reviewed by EB	Filename 16110Q





LEGEND

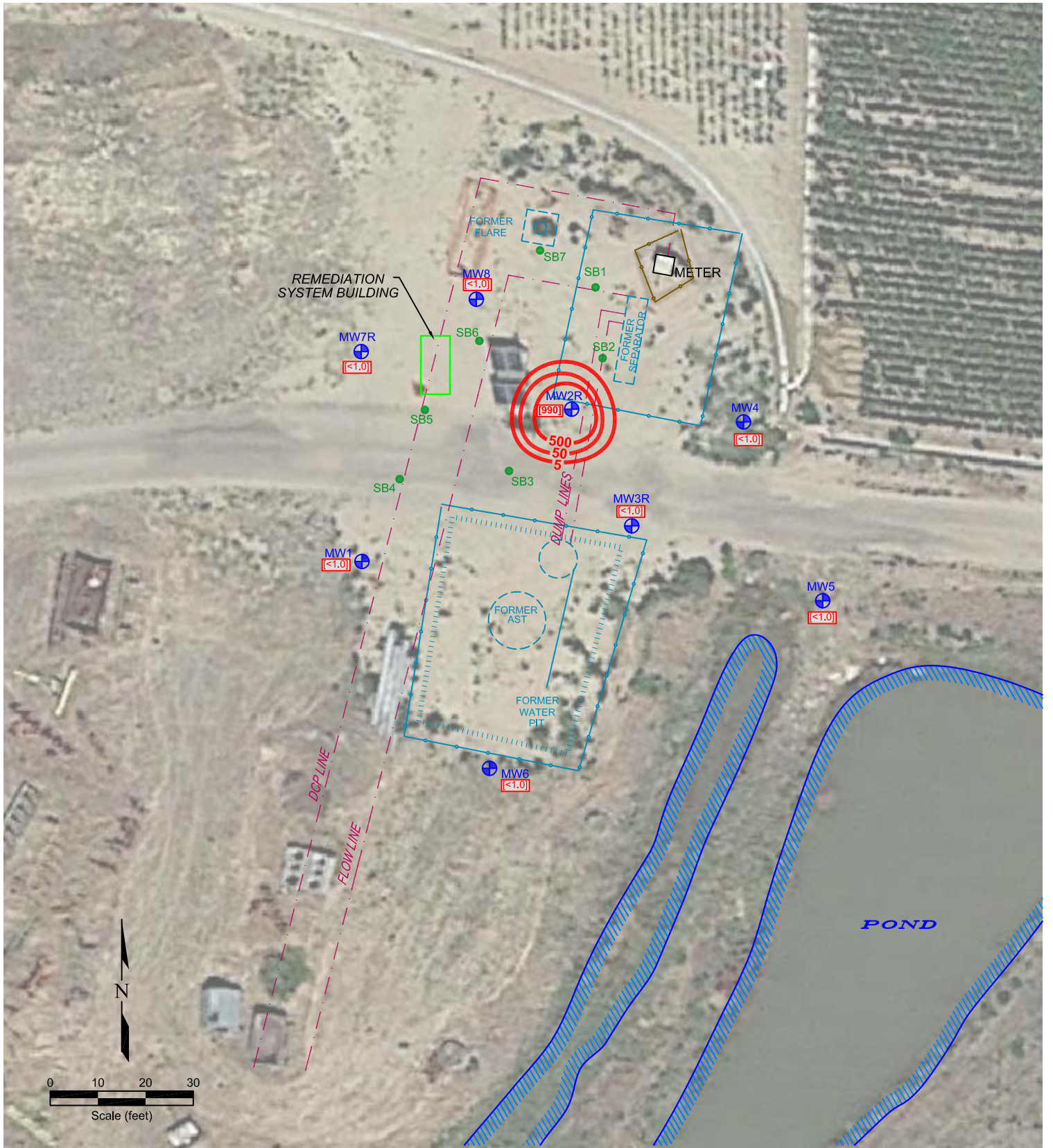
- SOIL BORING
 - ⊕ MONITORING WELL
 - ABOVE GROUND STORAGE TANK
 - FENCE LINE
 - CONTAINMENT BERM
 - PIPELINE
 - FORMER FORMER FACILITY
 - BUILDING BUILDING
- | | | |
|---|------|----------------------|
| B | <1.0 | BENZENE (ug/L) |
| T | <1.0 | TOLUENE (ug/L) |
| E | <1.0 | ETHYLBENZENE (ug/L) |
| X | <2.0 | TOTAL XYLENES (ug/L) |
- [NS] NOT SAMPLED

Figure 4
GROUNDWATER CHEMISTRY MAP
 July 17, 2020

Noble Wiedeman PM J28-2, 28-7
 NE SW Section 28, T5N, R66W
 Weld County, Colorado

Project No. C016-110	Prepared by	Drawn by TA
Date 8/6/20	Reviewed by EB	Filename 16110Q





LEGEND

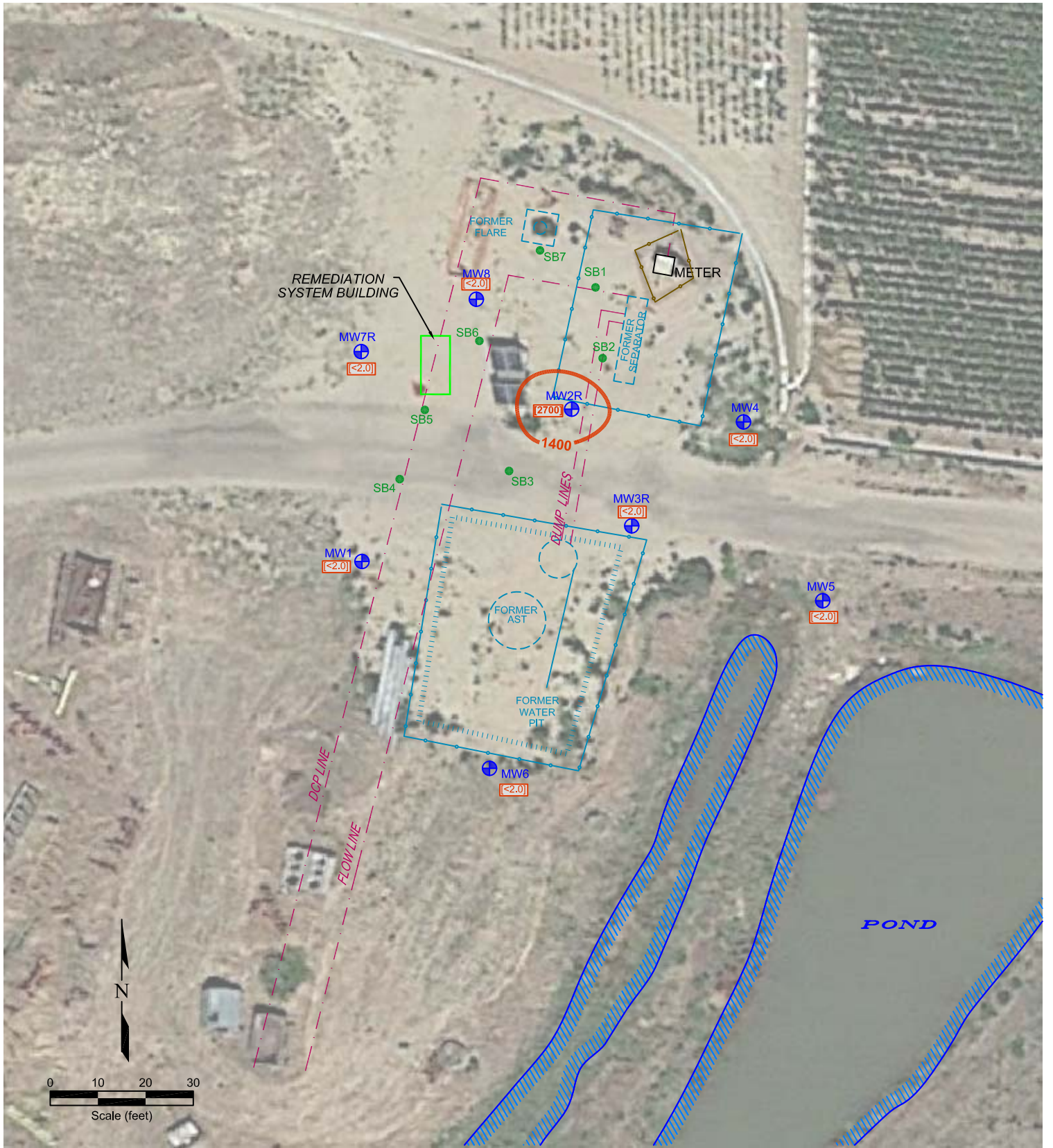
- SOIL BORING
- ⊕ MONITORING WELL
- ABOVE GROUND STORAGE TANK
- FENCE LINE
- CONTAINMENT BERM
- PIPELINE
- FORMER FACILITY
- BUILDING
- 5 BENZENE ISOCONCENTRATION (ug/L)
Dashed where inferred
- <1.0 BENZENE ISO-CONCENTRATION

Figure 5
BENZENE ISO-CONCENTRATION MAP
 July 17, 2020

Noble Wiedeman PM J28-2, 28-7
 NE SW Section 28, T5N, R66W
 Weld County, Colorado

Project No. C016-110	Prepared by	Drawn by TA
Date 8/6/20	Reviewed by EB	Filename 16110Q





LEGEND

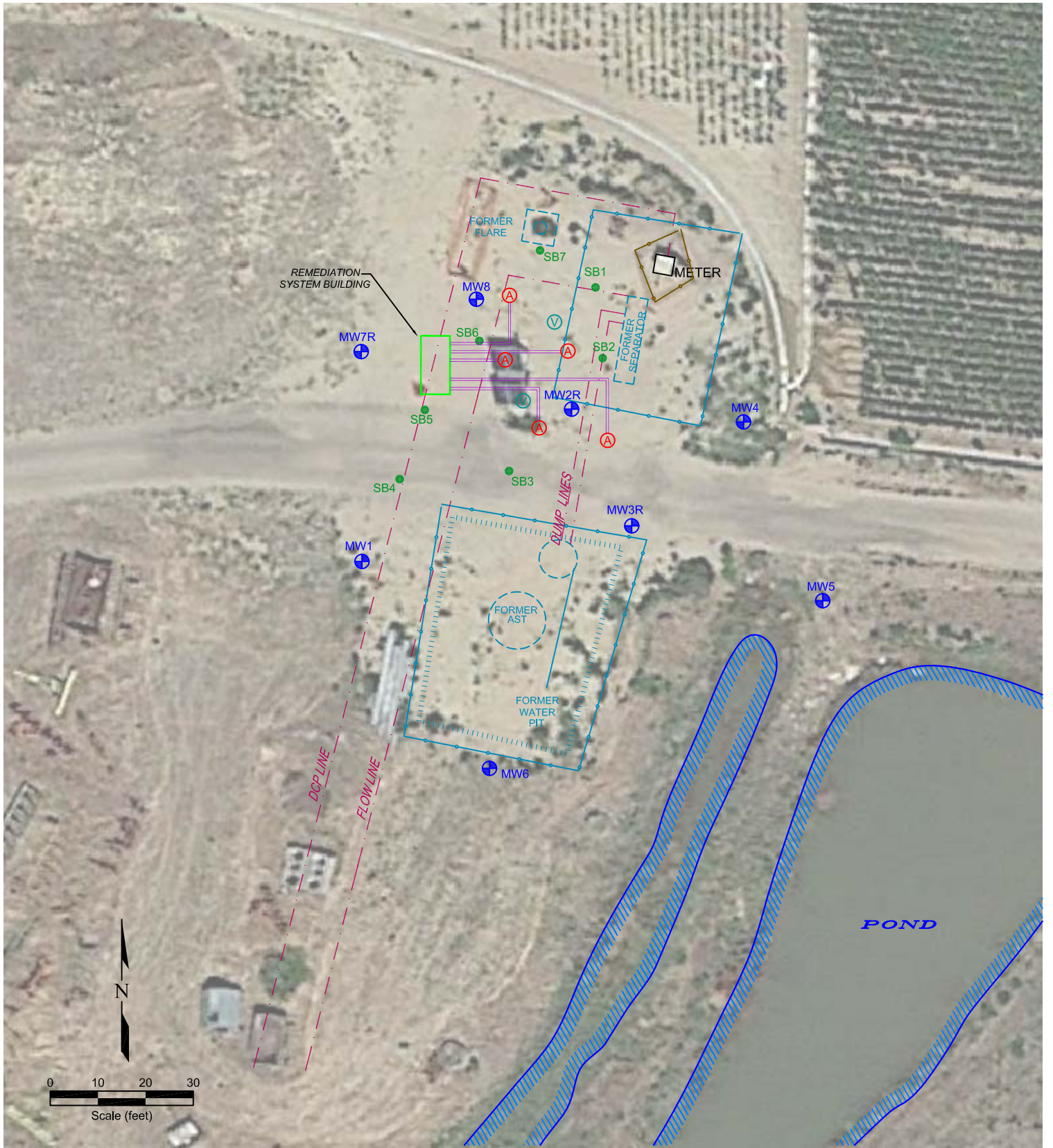
- SOIL BORING
- ⊕ MONITORING WELL
- ABOVE GROUND STORAGE TANK
- FENCE LINE
- CONTAINMENT BERM
- PIPELINE
- 1400 XYLENES ISOCONCENTRATION (ug/L)
Dashed where inferred
- <2.0 INEFFICIENT WATER SUPPLY
- FORMER FORMER FACILITY
- BUILDING BUILDING

Figure 6
XYLENES ISO-CONCENTRATION MAP
 July 17, 2020

Noble Wiedeman PM J28-2, 28-7
 NE SW Section 28, T5N, R66W
 Weld County, Colorado

Project No. C016-110	Prepared by	Drawn by TA
Date 8/6/20	Reviewed by EB	Filename 16110Q





LEGEND

- SOIL BORING
- ⊕ MONITORING WELL
- Ⓐ AIR SPARGE WELL
- Ⓥ PASSIVE SOIL VAPOR EXTRACTION WELL
- ABOVE GROUND STORAGE TANK
- ▭ FORMER FACILITY
- ▭ BUILDING
- FENCE LINE
- ▬ CONTAINMENT BERM
- ▬ PIPELINE
- ▬ SYSTEM TRENCH

Figure 7
AS-BUILT REMEDIATION SYSTEM

Noble Wiedeman PM J28-2, 28-7
 NE SW Section 28, T5N, R66W
 Weld County, Colorado

Project No. C016-110	Prepared by	Drawn by TA
Date 8/6/20	Reviewed by EB	Filename 16110Q



APPENDIX A

LABORATORY DOCUMENTATION

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

July 23, 2020

Paul Henchan

Fremont Environmental

PO Box 1289

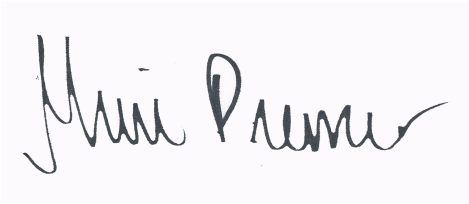
Wellington, CO 80549

RE: Noble - Wiedeman PMJ 28-2,7

Work Order #2007165

Enclosed are the results of analyses for samples received by Summit Scientific on 07/17/20 16:00. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Muri Premer". The signature is written in a cursive style with a large initial "M" and a long, sweeping underline.

Muri Premer For Paul Shrewsbury
President



Fremont Environmental
PO Box 1289
Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
Project Manager: Paul Henchan

Reported:
07/23/20 15:52

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	2007165-01	Water	07/17/20 00:00	07/17/20 16:00
MW-2R	2007165-02	Water	07/17/20 00:00	07/17/20 16:00
MW-3	2007165-03	Water	07/17/20 00:00	07/17/20 16:00
MW-4	2007165-04	Water	07/17/20 00:00	07/17/20 16:00
MW-5	2007165-05	Water	07/17/20 00:00	07/17/20 16:00
MW-6	2007165-06	Water	07/17/20 00:00	07/17/20 16:00
MW-7	2007165-07	Water	07/17/20 00:00	07/17/20 16:00
MW-8	2007165-08	Water	07/17/20 00:00	07/17/20 16:00

Summit Scientific

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Summit Scientific

2007165

S₂

4653 Table Mountain Drive ♦ Golden, Colorado 80403

303-277-9310 ♦ 303-374-5933 (f)

Page 1 of 1

Client: Fremont Environmental

Project Manager: Paul Henehan

Address: P.O Box 1289

E-Mail: paulh@fremontenv.com, ethanb@fremontenv.com

City/State/Zip: Wellington, CO 80549

Bill to: Noble Wiedeman Michael Jacob

Phone: 303-956-8714

Project Name: Noble - Wiedeman PM J 28-2, 7

Sampler Name: Black

Project Number:

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested							Special Instructions		
					HCl	HNO3	None	Other	Water	Soil	Air-Canister #	Other	BTEX	Naphthalene	GRO	DRO	SAR	EC	pH			
1	MW-1	7/17/20		2			X		X					X								
2	MW-2R																					
3	MW-3																					
4	MW-4																					
5	MW-5																					
6	MW-6																					
7	MW-7																					
8	MW-8																					
9																						
10																						

Relinquished by: <u>Ethan Black</u>	Date/Time: <u>7/17/2008</u>	Received by: <u>[Signature]</u>	Date/Time: <u>07/17/2008 1000</u>	Turn Around Time (Check)	Notes:
Relinquished by:	Date/Time:	Received by:	Date/Time:	Same Day <input type="checkbox"/>	72 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/>
Relinquished by:	Date/Time:	Received by:	Date/Time:	24 hours <input type="checkbox"/>	
Relinquished by:	Date/Time:	Received by:	Date/Time:	48 hours <input type="checkbox"/>	
				Sample Integrity:	
				Temperature Upon Receipt: <u>3.4</u>	
				Samples Intact: <input checked="" type="radio"/> Yes <input type="radio"/> No	

Sample Receipt Checklist

S2 Work Order 2007165

Client: Framont Environmental Client Project ID: Nolde - Wiedeman PMJ

Shipped Via: (H.D.) P.U./FedEx/UPS/USPS/Other Airbill #: 28-2,7

Matrix (check all that apply): Air Soil/Solid Water Other: _____ (Describe)

Temp (°C)	3.4
-----------	-----

Thermometer ID: 61857155-K

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C ⁽¹⁾ ? NOTE: If samples are delivered the same day of sampling, this requirement is met provided that there is evidence that cooling has begun.	X			
Were all samples received intact ⁽¹⁾ ?	X			
Was adequate sample volume provided ⁽¹⁾ ?	X			
If custody seals are present, are they intact ⁽¹⁾ ?			X	
Are samples with holding times due within 48 hours sample due within 48 hours present?		X		
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	X			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	X			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	X			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	X			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		X		
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect			X	
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? Record the pH in Comments.			X	
If dissolved metals are requested, were samples field filtered?			X	

Additional Comments (if any):

⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.

FB
Custodian Printed Name or Initials

[Signature]
Signature of Custodian

01/17/2020
Date/Time



Fremont Environmental
 PO Box 1289
 Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
 Project Manager: Paul Henchan

Reported:
 07/23/20 15:52

MW-1
2007165-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	1.0	ug/l	1	2007210	07/21/20	07/22/20	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		54.8 %		23-173	"	"	"	"	
Surrogate: Toluene-d8		101 %		20-170	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.7 %		21-167	"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Fremont Environmental
 PO Box 1289
 Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
 Project Manager: Paul Henchan

Reported:
 07/23/20 15:52

MW-2R
2007165-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	990	10		ug/l	10	2007210	07/21/20	07/22/20	EPA 8260B	
Toluene	180	1.0		"	1	"	"	"	"	
Ethylbenzene	99	1.0		"	"	"	"	"	"	
Xylenes (total)	2700	20		"	10	"	"	"	"	

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		81.8 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		88.6 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		109 %		21-167		"	"	"	"	

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The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Fremont Environmental
 PO Box 1289
 Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
 Project Manager: Paul Henchan

Reported:
 07/23/20 15:52

MW-3
2007165-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2007210	07/21/20	07/22/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		59.1 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		109 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		93.8 %		21-167		"	"	"	"	

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Fremont Environmental
 PO Box 1289
 Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
 Project Manager: Paul Henchan

Reported:
 07/23/20 15:52

MW-4
2007165-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2007210	07/21/20	07/22/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		56.8 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		106 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		92.6 %		21-167		"	"	"	"	

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Fremont Environmental
 PO Box 1289
 Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
 Project Manager: Paul Henchan

Reported:
 07/23/20 15:52

MW-5
2007165-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2007210	07/21/20	07/22/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		58.0 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		106 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		97.7 %		21-167		"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Fremont Environmental
 PO Box 1289
 Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
 Project Manager: Paul Henchan

Reported:
 07/23/20 15:52

MW-6
2007165-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2007210	07/21/20	07/22/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		52.1 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		105 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		90.8 %		21-167		"	"	"	"	

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Fremont Environmental
 PO Box 1289
 Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
 Project Manager: Paul Henchan

Reported:
 07/23/20 15:52

MW-7
2007165-07 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2007210	07/21/20	07/22/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		56.0 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		104 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.6 %		21-167		"	"	"	"	

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Fremont Environmental
 PO Box 1289
 Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
 Project Manager: Paul Henchan

Reported:
 07/23/20 15:52

MW-8
2007165-08 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	2007210	07/21/20	07/22/20	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **07/17/20 00:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		64.3 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		114 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.7 %		21-167		"	"	"	"	

Summit Scientific

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Fremont Environmental
 PO Box 1289
 Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
 Project Manager: Paul Henchan

Reported:
 07/23/20 15:52

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

Analyte	Reporting			Spike	Source	%REC		RPD		Notes
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch 2007210 - EPA 5030 Water MS

Blank (2007210-BLK1)

Prepared: 07/21/20 Analyzed: 07/22/20

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	8.79		"	13.3		65.9	23-173			
Surrogate: Toluene-d8	13.8		"	13.3		103	20-170			
Surrogate: 4-Bromofluorobenzene	12.4		"	13.3		92.9	21-167			

LCS (2007210-BS1)

Prepared: 07/21/20 Analyzed: 07/22/20

Benzene	29.1	1.0	ug/l	33.3		87.4	51-132			
Toluene	35.7	1.0	"	33.3		107	51-138			
Ethylbenzene	37.8	1.0	"	33.3		114	58-146			
m,p-Xylene	75.3	2.0	"	66.7		113	57-144			
o-Xylene	35.8	1.0	"	33.3		107	53-146			
Surrogate: 1,2-Dichloroethane-d4	7.69		"	13.3		57.7	23-173			
Surrogate: Toluene-d8	13.6		"	13.3		102	20-170			
Surrogate: 4-Bromofluorobenzene	12.6		"	13.3		94.7	21-167			

Matrix Spike (2007210-MS1)

Source: 2007165-01

Prepared: 07/21/20 Analyzed: 07/22/20

Benzene	30.2	1.0	ug/l	33.3	ND	90.6	34-141			
Toluene	32.8	1.0	"	33.3	ND	98.5	27-151			
Ethylbenzene	39.7	1.0	"	33.3	ND	119	29-160			
m,p-Xylene	77.6	2.0	"	66.7	ND	116	20-166			
o-Xylene	36.8	1.0	"	33.3	ND	110	33-159			
Surrogate: 1,2-Dichloroethane-d4	8.27		"	13.3		62.0	23-173			
Surrogate: Toluene-d8	12.8		"	13.3		96.3	20-170			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		96.1	21-167			

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Fremont Environmental
 PO Box 1289
 Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
 Project Manager: Paul Henchan

Reported:
 07/23/20 15:52

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

Analyte	Result	Reporting		Spike	Source	%REC		RPD		Notes
		Limit	Units	Level	Result	%REC	Limits	RPD	Limit	

Batch 2007210 - EPA 5030 Water MS

Matrix Spike Dup (2007210-MSD1)

Source: 2007165-01

Prepared: 07/21/20 Analyzed: 07/22/20

Benzene	30.0	1.0	ug/l	33.3	ND	90.1	34-141	0.531	30	
Toluene	31.8	1.0	"	33.3	ND	95.4	27-151	3.22	30	
Ethylbenzene	36.9	1.0	"	33.3	ND	111	29-160	7.13	30	
m,p-Xylene	72.5	2.0	"	66.7	ND	109	20-166	6.70	30	
o-Xylene	35.1	1.0	"	33.3	ND	105	33-159	4.62	30	
Surrogate: 1,2-Dichloroethane-d4	10.4		"	13.3		78.4	23-173			
Surrogate: Toluene-d8	12.3		"	13.3		92.6	20-170			
Surrogate: 4-Bromofluorobenzene	12.4		"	13.3		93.3	21-167			

Summit Scientific

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Fremont Environmental
PO Box 1289
Wellington CO, 80549

Project: Noble - Wiedeman PMJ 28-2,7

Project Number: [none]
Project Manager: Paul Henchan

Reported:
07/23/20 15:52

Notes and Definitions

DET Analyte DETECTED
ND Analyte NOT DETECTED at or above the reporting limit
NR Not Reported
dry Sample results reported on a dry weight basis
RPD Relative Percent Difference