

**KNAUS 28-8**  
**FLOWLINE RELEASE**  
**API #: 05-123-17596**  
**Spill / Release Point ID #: 445476**  
**Remediation Project #: 9767**

**FIRST QUARTER 2018**  
**Analytical Tables, Figures,**  
**and Laboratory Report**

April 2, 2018



Image: Google

**PREPARED ON BEHALF OF**

Noble Energy, Inc.  
2115 117th Avenue  
Greeley, CO 80631



**PREPARED BY**

Tasman Geosciences, Inc.  
6899 Pecos Street, Unit C  
Denver, CO 80221



**TABLE 1**  
**GROUNDWATER ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - KNAUS 28-8 FLOWLINE RELEASE**

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
<b>COGCC Standard</b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>
BH01	04/15/16	<1.0	<1.0	<1.0	<1.0
BH01	06/21/16	<1.0	<1.0	<1.0	<1.0
BH01	09/02/16	<b>380</b>	1.4	<1.0	340
BH01	12/20/16	<b>32</b>	<1.0	<1.0	1.3
BH01	06/23/17	<1.0	<1.0	<1.0	<2.0
BH01	09/22/17	<1.0	<1.0	<1.0	<2.0
BH01	12/07/17	<1.0	<1.0	<1.0	<2.0
BH01	03/21/18	<1.0	<1.0	<1.0	<2.0
BH02	04/15/16	<b>5,300</b>	<b>3,900</b>	130	1,200
BH02	06/21/16	<b>7,300</b>	<b>1,500</b>	97	<b>2,300</b>
BH02 <sup>1</sup>	09/12/16	<b>9,700</b>	<b>3,800</b>	<1.0	<b>3,400</b>
BH02	12/20/16	<b>7,700</b>	14	<1.0	1,000
BH02	02/07/17	Monitoring Well Destroyed Due to Excavation			
BH02R	06/23/17	<1.0	<1.0	<1.0	<2.0
BH02R	09/22/17	<1.0	<1.0	<1.0	<2.0
BH02R	12/07/17	<1.0	<1.0	<1.0	<2.0
BH02R	03/21/18	<b>130</b>	<1.0	<1.0	9.6
BH03	04/15/16	Not Sampled - LNAPL Present			
BH03	06/21/16	Not Sampled - LNAPL Present			
BH03	09/02/16	Not Sampled - LNAPL Present			
BH03	12/20/16	Not Sampled - LNAPL Present			
BH03	06/23/17	Not Sampled - LNAPL Present			
BH03 <sup>1</sup>	09/22/17	<b>500</b>	46	33	<b>2,300</b>
BH03	12/07/17	Not Sampled - LNAPL Present			
BH03	03/21/18	<b>45</b>	<1.0	1.9	810
BH04	04/15/16	<b>1,700</b>	<b>2,600</b>	130	1,200
BH04	06/21/16	Not Sampled - LNAPL Present			
BH04 <sup>1</sup>	09/02/16	<b>14,000</b>	<b>12,000</b>	240	<b>5,600</b>
BH04	12/20/16	Not Sampled - LNAPL Present			
BH04	02/07/17	Monitoring Well Destroyed Due to Excavation			
BH04R	06/23/17	<1.0	<1.0	<1.0	12
BH04R	09/22/17	<b>1400</b>	<1.0	<1.0	13
BH04R	12/07/17	<b>190</b>	<1.0	9.2	4.0
BH04R	03/21/18	<b>2,000</b>	<1.0	8.7	3.1
BH05	04/15/16	Not Sampled - LNAPL Present			
BH05	06/21/16	Not Sampled - LNAPL Present			
BH05	09/02/16	Not Sampled - LNAPL Present			
BH05	12/20/16	Not Sampled - LNAPL Present			
BH05	02/07/17	Monitoring Well Destroyed Due to Excavation			
BH05R	06/23/17	<b>2,800</b>	<b>860</b>	<1.0	1,000
BH05R <sup>1</sup>	09/22/17	<b>9,800</b>	<b>3,300</b>	140	<b>12,000</b>
BH05R	12/07/17	Not Sampled - LNAPL Present			

**TABLE 1**  
**GROUNDWATER ANALYTICAL DATA**  
**NOBLE ENERGY, INC. - KNAUS 28-8 FLOWLINE RELEASE**

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
<b>COGCC Standard</b>		<b>5</b>	<b>560</b>	<b>700</b>	<b>1,400</b>
BH05R	03/21/18	<b>1,700</b>	1.4	45	900
BH06	04/15/16	<1.0	8.0	<1.0	<1.0
BH06	06/21/16	<1.0	<1.0	<1.0	<1.0
BH06	09/02/16	<1.0	1.4	<1.0	<1.0
BH06	12/20/16	3.1	<1.0	<1.0	6.7
BH06	02/07/17	Monitoring Well Destroyed Due to Excavation			
BH06R	06/23/17	1.9	<1.0	<1.0	<2.0
BH06R	09/22/17	<1.0	<1.0	<1.0	6.5
BH06R	12/07/17	<1.0	<1.0	<1.0	<2.0
BH06R	03/21/18	<1.0	<1.0	<1.0	<2.0
BH07	04/15/16	<1.0	<1.0	<1.0	<1.0
BH07	06/21/16	<1.0	<1.0	<1.0	<1.0
BH07	09/02/16	<b>1,600</b>	6.6	<1.0	200
BH07	12/20/16	<b>9,000</b>	24	<1.0	630
BH07	06/23/17	<b>9,100</b>	1.5	<1.0	260
BH07	09/22/17	<b>240</b>	<1.0	<1.0	<2.0
BH07	12/07/17	<b>3,900</b>	<1.0	11	<2.0
BH07	03/21/18	<b>690</b>	<1.0	19	3.9
BH08	06/21/16	<1.0	<1.0	<1.0	<1.0
BH08	09/02/16	<1.0	1.4	<1.0	<1.0
BH08	12/20/16	<1.0	<1.0	<1.0	<1.0
BH08	06/23/17	<1.0	<1.0	<1.0	<2.0
BH08	09/22/17	<1.0	<1.0	<1.0	<2.0
BH08	12/07/17	<1.0	<1.0	<1.0	<2.0
BH08	03/21/18	<1.0	<1.0	<1.0	<2.0
BH09	06/23/17	<1.0	<1.0	<1.0	<2.0
BH09	09/22/17	<1.0	<1.0	<1.0	<2.0
BH09	12/07/17	<1.0	<1.0	<1.0	<2.0
BH09	03/21/18	<1.0	<1.0	<1.0	<2.0
BH10	06/23/17	<1.0	<1.0	<1.0	<2.0
BH10	09/22/17	<1.0	<1.0	<1.0	<2.0
BH10	12/07/17	<1.0	<1.0	<1.0	<2.0
BH10	03/21/18	<1.0	<1.0	<1.0	<2.0

COGCC = Colorado Oil and Gas Conservation Commission

µg/L = Micrograms per liter

< = Analytical result is less than the indicated laboratory reporting limit

Groundwater standards referenced from COGCC Table 910-1

**Highlighted results are equal to or exceed the COGCC Table 910-1 standard**

<sup>1</sup> Sheen present on groundwater sample.

**TABLE 2**  
**GROUNDWATER ELEVATION DATA**  
**NOBLE ENERGY, INC. - KNAUS 28-8 FLOWLINE RELEASE**

Monitoring Well ID	Date	Top of Casing Elevation (ft. AMSL)	Total Depth (ft. BTOC)	Depth to Water (ft. BTOC)	Depth to LNAPL (ft. BTOC)	LNAPL Thickness (ft.)	Groundwater Elevation* (ft. AMSL)	
BH01	04/15/16	4660.12	16.81	14.29	ND	ND	4645.83	
BH01	06/21/16	4660.12	16.24	13.63	ND	ND	4646.49	
BH01	07/08/16	4658.07 <sup>1</sup>	NM	10.71	ND	ND	4647.36	
BH01	09/02/16	4658.07	14.18	9.24	ND	ND	4648.83	
BH01	12/20/16	4660.19 <sup>4</sup>	16.30	14.03	ND	ND	4646.16	
BH01	06/23/17	4660.13	16.33	14.35	ND	ND	4645.78	
BH01	09/22/17	4660.13	16.31	11.82	ND	ND	4648.31	
BH01	12/07/17	4660.13	16.59	13.60	ND	ND	4646.53	
BH01	03/21/18	4660.13	16.56	14.80	ND	ND	4645.33	
BH02	04/15/16	4660.56	17.71	17.13	ND	ND	4643.43	
BH02	06/21/16	4660.56	17.71	13.99	ND	ND	4646.57	
BH02	07/08/16	4660.56	NM	13.04	ND	ND	4647.52	
BH02	09/02/16		Well Casing Damaged - Elevation Control Lost					
BH02 <sup>3</sup>	09/12/16	NS	14.69	8.98	ND	ND	NS	
BH02	12/20/16	NS	17.58	14.20	ND	ND	NS	
BH02	02/07/17		Well Destroyed During Excavation					
BH02R	06/23/17	4661.34	22.39	15.45	ND	ND	4645.89	
BH02R	09/22/17	4661.34	22.40	12.96	ND	ND	4648.38	
BH02R	12/07/17	4661.34	22.40	14.74	ND	ND	4646.60	
BH02R	03/21/18	4661.34	22.39	15.95	ND	ND	4645.39	
BH03	04/15/16	4660.75	17.41	14.66	Trace	<0.01	4646.09	
BH03	06/21/16	4660.75	17.41	16.42	13.54	2.88	4646.49	
BH03	07/08/16	4660.75	NM	13.32	13.24	0.08	4647.49	
BH03	09/02/16	4660.75	16.99	11.95	11.76	0.19	4648.94	
BH03	12/20/16	4660.75	16.93	14.77	14.43	0.34	4646.24	
BH03	06/23/17	4660.83	NM	15.07	14.84	0.23	4645.93	
BH03	09/22/17	4660.83	17.12	12.39	12.36	0.03	4648.46	
BH03	12/07/17	4660.83	NM	14.21	14.15	0.06	4646.67	
BH03	03/21/18	4660.83	17.36	15.37	ND	ND	4645.46	
BH04	04/15/16	4659.97	17.24	14.47	ND	ND	4645.50	
BH04	06/21/16	4659.97	17.24	14.76	13.12	1.64	4646.44	
BH04	07/08/16	4659.97	NM	12.75	12.60	0.15	4647.33	
BH04	09/02/16	4659.97	17.26	11.12	ND	ND	4648.85	
BH04	12/20/16	4659.97	17.24	14.00	13.77	0.23	4646.14	
BH04	02/07/17		Well Destroyed During Excavation					
BH04R	06/23/17	4661.01	21.83	15.21	ND	ND	4645.80	
BH04R	09/22/17	4661.01	21.81	12.78	ND	ND	4648.23	
BH04R	12/07/17	4661.01	21.89	14.49	ND	ND	4646.52	
BH04R	03/21/18	4661.01	21.88	15.71	ND	ND	4645.30	
BH05	04/15/16	4661.14	17.11	15.06	Trace	<0.01	4646.08	
BH05	06/21/16	4661.14	16.81	14.60	14.56	0.04	4646.57	
BH05	07/08/16	4661.14	NM	13.74	13.72	0.02	4647.42	
BH05	09/02/16	4661.14	16.88	12.29	12.28	0.01	4648.86	
BH05	12/20/16	4661.14	17.22	15.29	14.83	0.46	4646.20	
BH05	02/07/17		Well Destroyed During Excavation					

**TABLE 2**  
**GROUNDWATER ELEVATION DATA**  
**NOBLE ENERGY, INC. - KNAUS 28-8 FLOWLINE RELEASE**

Monitoring Well ID	Date	Top of Casing Elevation (ft. AMSL)	Total Depth (ft. BTOC)	Depth to Water (ft. BTOC)	Depth to LNAPL (ft. BTOC)	LNAPL Thickness (ft.)	Groundwater Elevation* (ft. AMSL)	
BH05R	06/23/17	4660.88	21.49	15.05	ND	ND	4645.83	
BH05R	09/22/17	4660.88	21.49	12.52	ND	ND	4648.36	
BH05R	12/07/17	4660.88	21.49	14.29	14.28	0.01	4646.60	
BH05R	03/21/18	4660.88	21.50	15.46	ND	ND	4645.42	
BH06	04/15/16	4660.85	16.65	14.77	ND	ND	4646.08	
BH06	06/21/16	4660.85	16.62	14.24	ND	ND	4646.61	
BH06	07/08/16	4660.85	NM	13.39	ND	ND	4647.46	
BH06	09/02/16	4660.85	16.78	11.92	ND	ND	4648.93	
BH06	12/20/16	4660.85	16.81	14.61	ND	ND	4646.24	
BH06	02/07/17	Well Destroyed During Excavation						
BH06R	06/23/17	4660.56	19.43	14.62	ND	ND	4645.94	
BH06R	09/22/17	4660.56	19.40	12.16	ND	ND	4648.40	
BH06R	12/07/17	4660.56	19.58	13.91	ND	ND	4646.65	
BH06R	03/21/18	4660.56	19.60	15.12	ND	ND	4645.44	
BH07	04/15/16	4660.84	17.20	14.90	ND	ND	4645.94	
BH07	06/21/16	4660.84	16.91	14.38	ND	ND	4646.46	
BH07	07/08/16	4660.84	NM	13.56	ND	ND	4647.28	
BH07	09/02/16	4660.84	16.90	12.13	ND	ND	4648.71	
BH07	12/20/16	4660.84	16.88	14.77	ND	ND	4646.07	
BH07	06/23/17	4660.82	16.95	15.05	ND	ND	4645.77	
BH07	09/22/17	4660.82	16.93	12.61	ND	ND	4648.21	
BH07	12/07/17	4660.82	16.59	14.33	ND	ND	4646.49	
BH07	03/21/18	4660.82	16.88	15.56	ND	ND	4645.26	
BH08	06/21/16	4661.26	22.25	14.62	ND	ND	4646.64	
BH08	07/08/16	4661.26	NM	13.71	ND	ND	4647.55	
BH08	09/02/16	4658.51 <sup>2</sup>	19.50	9.28	ND	ND	4649.23	
BH08	12/20/16	4661.45 <sup>5</sup>	22.44	14.98	ND	ND	4646.47	
BH08	06/23/17	4661.26	22.43	15.32	ND	ND	4645.94	
BH08	09/22/17	4661.26	22.42	12.76	ND	ND	4648.50	
BH08	12/07/17	4661.26	22.54	14.54	ND	ND	4646.72	
BH08	03/21/18	4661.26	22.48	15.75	ND	ND	4645.51	
BH09	06/23/17	4660.51	21.60	14.76	ND	ND	4645.75	
BH09	09/22/17	4660.51	21.61	12.32	ND	ND	4648.19	
BH09	12/07/17	4660.51	21.59	14.05	ND	ND	4646.46	
BH09	03/21/18	4660.51	21.60	15.26	ND	ND	4645.25	
BH10	06/23/17	4660.28	19.65	14.43	ND	ND	4645.85	
BH10	09/22/17	4660.28	19.62	11.99	ND	ND	4648.29	
BH10	12/07/17	4660.28	19.75	13.75	ND	ND	4646.53	
BH10	03/21/18	4660.28	19.71	14.96	ND	ND	4645.32	

**Notes:**

ft. = Feet

AMSL = Above mean sea level

BTOC = Below top of casing

LNAPL = Light non-aqueous phase liquid

**TABLE 2**  
**GROUNDWATER ELEVATION DATA**  
**NOBLE ENERGY, INC. - KNAUS 28-8 FLOWLINE RELEASE**

Monitoring Well ID	Date	Top of Casing Elevation (ft. AMSL)	Total Depth (ft. BTOC)	Depth to Water (ft. BTOC)	Depth to LNAPL (ft. BTOC)	LNAPL Thickness (ft.)	Groundwater Elevation* (ft. AMSL)
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ND = No LNAPL detected

NM = Not Measured

NS = Not Surveyed

\* Groundwater elevation was corrected for product thickness (when present) using the following calculation:

Groundwater elevation = (TOC Elevation - Measured Depth to Water)+(LNAPL Thickness in Well x LNAPL Relative Density)

LNAPL relative density was estimated to be approximately 0.75

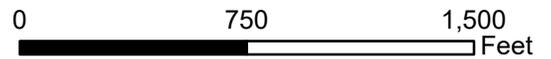
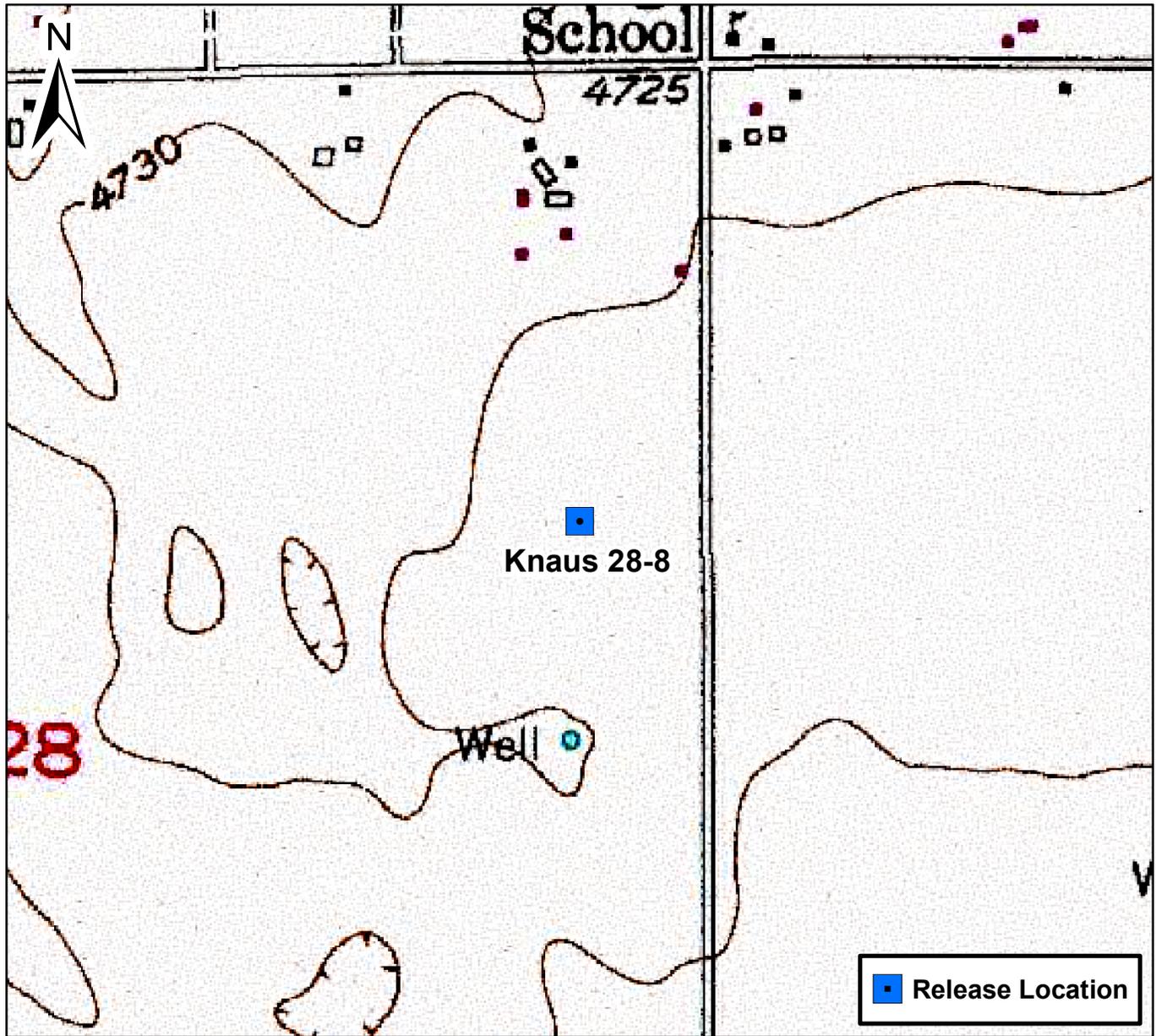
<sup>1</sup> Approximately 2.05 ft of casing broken off of BH01 prior to gauging on 7/8/16. Top of casing elevation is estimated, not surveyed.

<sup>2</sup> Approximately 2.75 ft of casing broken off of BH08 prior to gauging on 9/2/16. Top of casing elevation is estimated, not surveyed.

<sup>3</sup> Damaged casing cut off just below ground surface, repaired with new stick up casing after sampling.

<sup>4</sup> BH01 damaged, well repaired with approximately 2.12 ft of casing. Top of casing elevation is estimated, not surveyed.

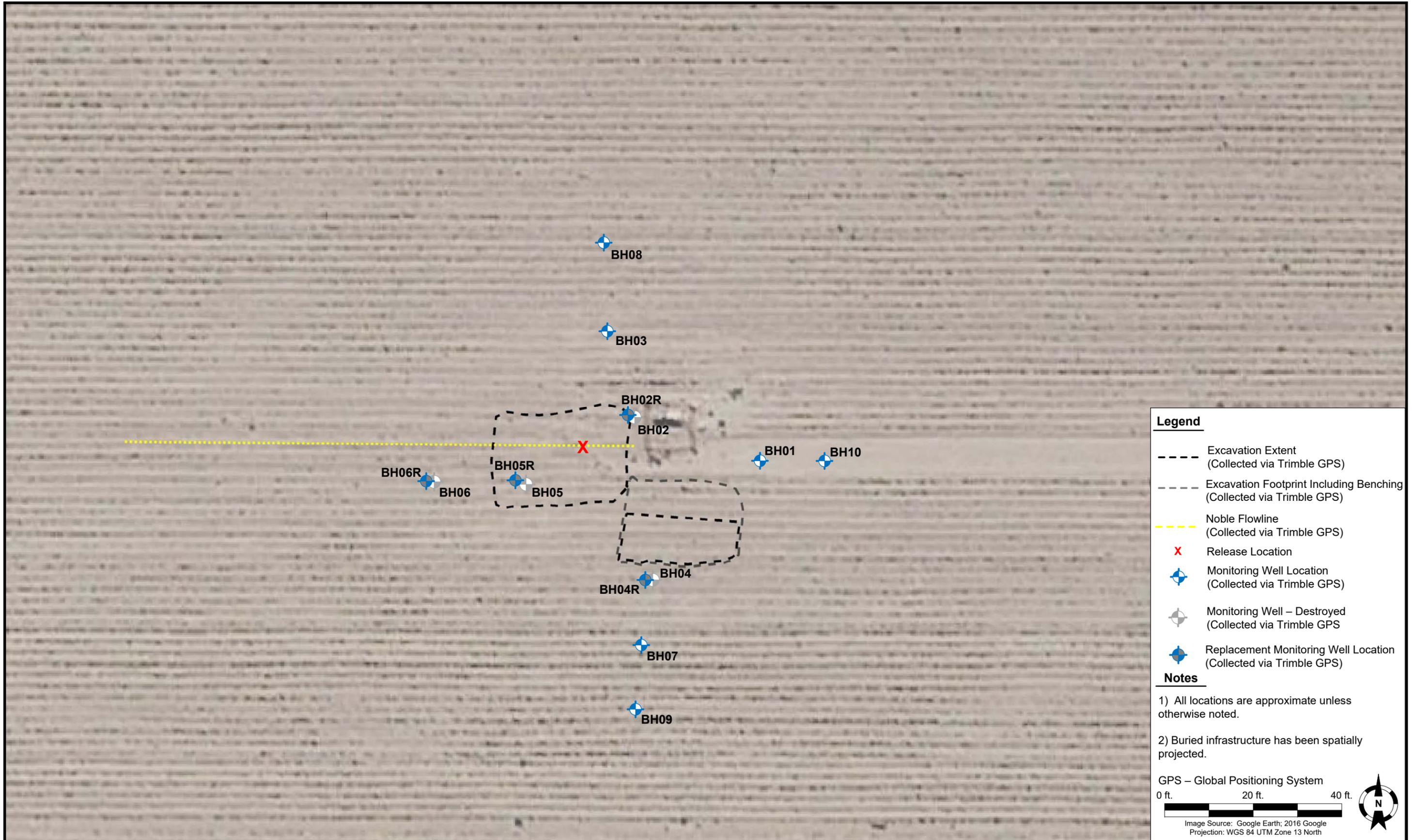
<sup>5</sup> BH08 damaged, well repaired with approximately 2.94 ft of casing. Top of casing elevation is estimated, not surveyed.



### Figure 1

Site Location Map  
 Knaus 28-8 Flowline Release  
 SENE S28 T6N R66W Weld  
 County, Colorado





**Legend**

- Excavation Extent (Collected via Trimble GPS)
- Excavation Footprint Including Benching (Collected via Trimble GPS)
- - - Noble Flowline (Collected via Trimble GPS)
- X Release Location
- ◆ Monitoring Well Location (Collected via Trimble GPS)
- ⊕ Monitoring Well – Destroyed (Collected via Trimble GPS)
- ◆ Replacement Monitoring Well Location (Collected via Trimble GPS)

**Notes**

- 1) All locations are approximate unless otherwise noted.
- 2) Buried infrastructure has been spatially projected.

GPS – Global Positioning System  
 0 ft. 20 ft. 40 ft.

Image Source: Google Earth; 2016 Google  
 Projection: WGS 84 UTM Zone 13 North

DATE:	08/07/2017
DESIGNED BY:	JW
DRAWN BY:	JW

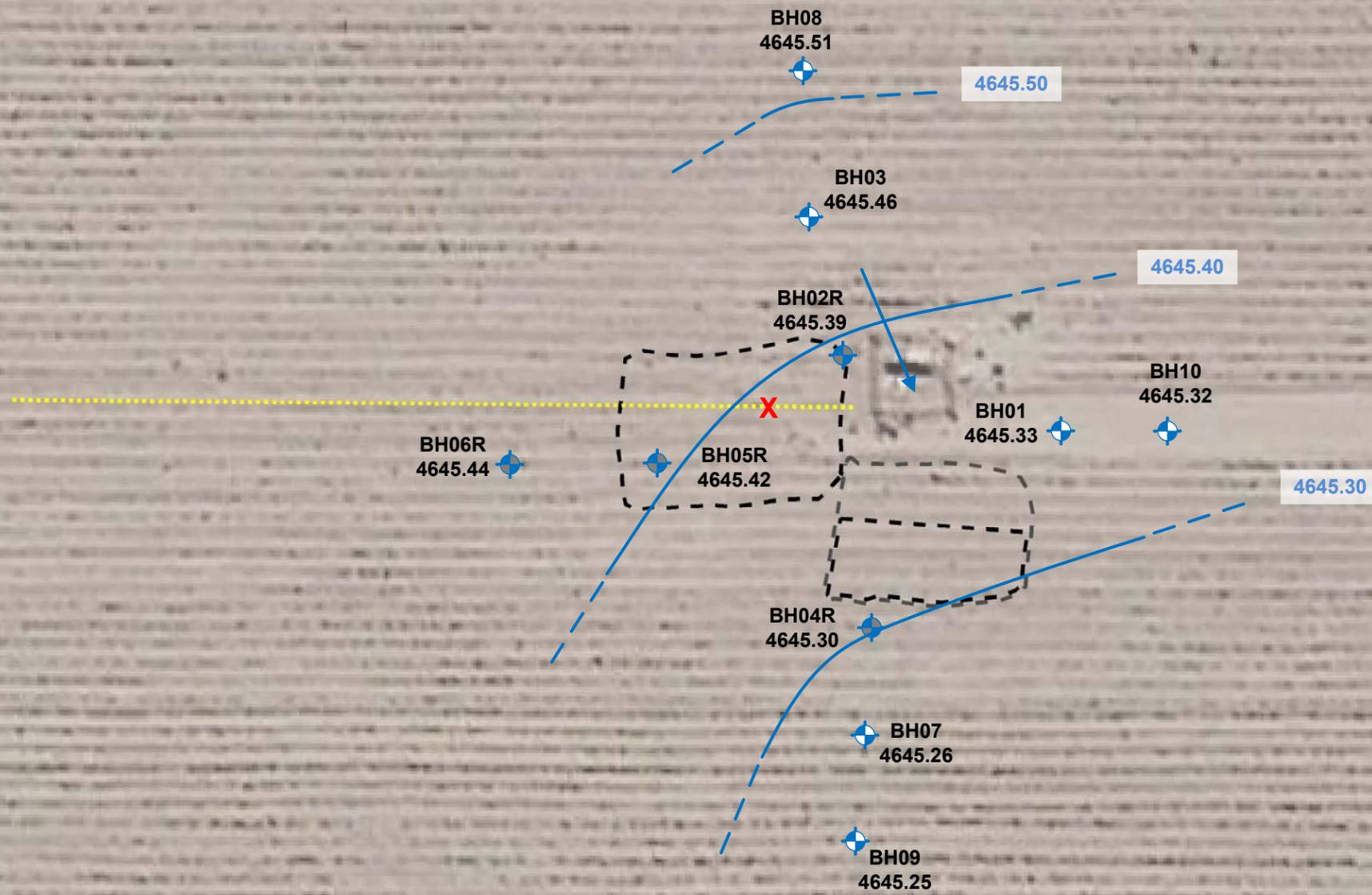
**TASMAN**  
 GEOSCIENCES

Tasman Geosciences, Inc.  
 6899 Pecos Street – Unit C  
 Denver, CO 80221

**Noble Energy, Inc. – DJ Basin**  
**Knaus 28-8 Flowline Release**  
 SENW, Section 28, Township 6 North, Range 66 West  
 Weld County, Colorado

Site Overview Map

FIGURE  
 2



**Legend**

- Monitoring Well (Collected via Trimble GPS)
- Replacement Monitoring Well Location (Collected via Trimble GPS)
- Excavation Extent - 2017 (Collected via Trimble GPS)
- Excavation Footprint Including Benching - 2017 (Collected via Trimble GPS)
- Noble Flowline (Collected via Trimble GPS)
- Groundwater Elevation Contour (Dashed Where Inferred)
- Release Location
- 4818.39** Measured Groundwater Elevation—Ft. AMSL
- Approximate Groundwater Flow Direction

**Notes:**

- 1) All locations are approximate, unless otherwise noted.
- 2) Underground facilities have been spatially projected.
- 3) Site infrastructure has been removed; shown for illustrative purposes only.

GPS – Global Positioning System  
 Ft. AMSL – Feet Above Mean Sea Level



Image Source: Google Earth; 2016 Google  
 Projection: WGS 84 UTM Zone 13 North



DATE:	04/02/2018
DESIGNED BY:	DA
DRAWN BY:	GB

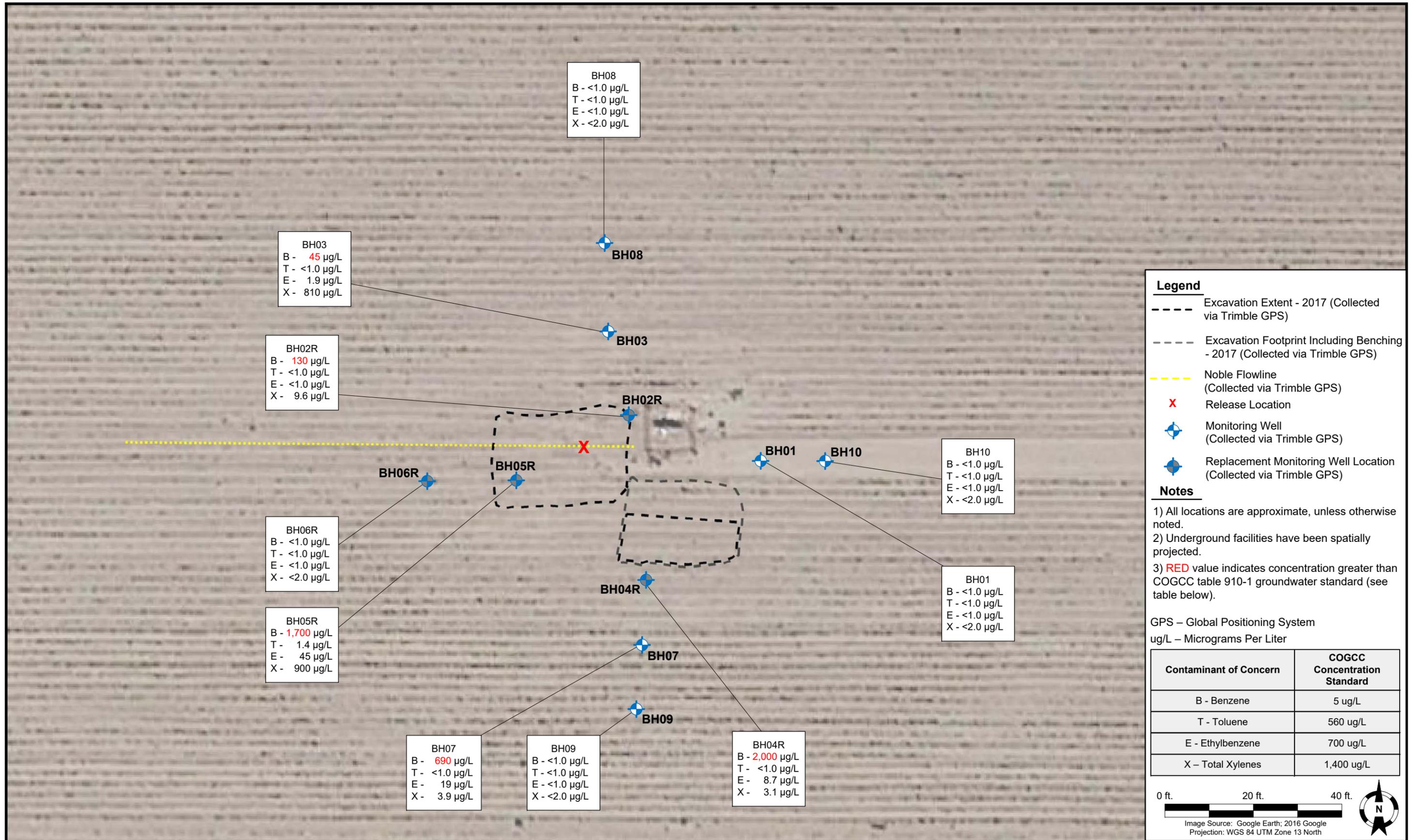
**TASMAN**  
 GEOSCIENCES

Tasman Geosciences, Inc.  
 6899 Pecos Street – Unit C  
 Denver, CO 80221

**Noble Energy, Inc. – DJ Basin**  
**Knaus 28-8 Flowline Release**  
 SENW, Section 28, Township 6 North, Range 66 West  
 Weld County, Colorado

Groundwater Potentiometric  
 Surface Contour Map  
 (03/21/2018)

**FIGURE**  
**3**



DATE: 04/02/2018

DESIGNED BY: DA

DRAWN BY: GB



**Noble Energy, Inc. – DJ Basin**  
**Knaus 28-8 Flowline Release**  
SENW, Section 28, Township 6 North, Range 66 West  
Weld County, Colorado

Groundwater Analytical  
Results Map  
(03/21/2018)

FIGURE  
4

# Summit Scientific

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741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

March 29, 2018

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Noble - Knaus 28-8

Enclosed are the results of analyses for samples received by Summit Scientific on 03/21/18 16:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury  
President



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
03/29/18 14:55

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1803269-01	Water	03/21/18 11:40	03/21/18 16:30
BH02R	1803269-02	Water	03/21/18 12:10	03/21/18 16:30
BH03	1803269-03	Water	03/21/18 12:30	03/21/18 16:30
BH04R	1803269-04	Water	03/21/18 12:20	03/21/18 16:30
BH05R	1803269-05	Water	03/21/18 12:40	03/21/18 16:30
BH06R	1803269-06	Water	03/21/18 12:00	03/21/18 16:30
BH07	1803269-07	Water	03/21/18 12:15	03/21/18 16:30
BH08	1803269-08	Water	03/21/18 11:55	03/21/18 16:30
BH09	1803269-09	Water	03/21/18 11:50	03/21/18 16:30
BH10	1803269-10	Water	03/21/18 11:30	03/21/18 16:30

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.*



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
03/29/18 14:55

# Summit Scientific

1803269

741 Corporate Circle Suite I ♦ Golden, Colorado 80401  
303-277-9310 ♦ 303-374-5933 Fax

Page 1 of 1

Client: Noble/Tasman  
Address: 6899 Pecos St. Unit C  
City/State/Zip: Denver, CO 80221  
Phone: 720-626-6362 Fax:  
Sampler Name: Branson Fields

Project Manager: Brandon Bruns, Invoice: Jacob Evans (Noble)  
E-Mail: bbruns@tasman-geo.com; jacob.evans@nblenergy.com  
Project Name: Knaus 28-8  
Project Number: 1

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:				Special Instructions		
				HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260B GBTEXN	8015 DRO		pH, EC, SAR	
BH01	3/21/18	1140	3			X						X					
BH02R		1210	3			X						X					
BH03		1230	2			X						X					
BH04R		1220	3			X						X					
BH05R		1240	3			X						X					
BH06R		1200	3			X						X					
BH07		1215	3			X						X					
BH08		1155	3			X						X					
BH09		1150	3			X						X					
BH10		1130	3			X						X					
Relinquished by:		Date/Time: 3/21/18 1630	Received by:		Date/Time: 3/21/18 1630	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 in Lab by:		Date/Time:	24 Hours	<input type="checkbox"/>	48 Hours	<input type="checkbox"/>	Sample Integrity: 5.1°C							
Relinquished by:		Date/Time:	Received in Lab by:		Date/Time:	Intact: Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>										

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
03/29/18 14:55

**BH01**  
**1803269-01 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/21/18 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **03/21/18 11:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		84.4 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		92.2 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.1 %	45-146		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
03/29/18 14:55

**BH02R**  
**1803269-02 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/21/18 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>130</b>	1.0	ug/l	1	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>9.6</b>	2.0	"	"	"	"	"	"	

Date Sampled: **03/21/18 12:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		87.8 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		91.1 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		94.1 %	45-146		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
03/29/18 14:55

**BH03**  
**1803269-03 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/21/18 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>45</b>	1.0	ug/l	1	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
<b>Ethylbenzene</b>	<b>1.9</b>	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>810</b>	2.0	"	"	"	"	"	"	

Date Sampled: **03/21/18 12:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		117 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		94.2 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		114 %	45-146		"	"	"	"	

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
03/29/18 14:55

**BH04R**  
**1803269-04 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/21/18 12:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>2000</b>	100	ug/l	100	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	1	"	"	"	"	
<b>Ethylbenzene</b>	<b>8.7</b>	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>3.1</b>	2.0	"	"	"	"	"	"	

Date Sampled: **03/21/18 12:20**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		89.8 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		93.6 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		94.1 %	45-146		"	"	"	"	

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6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
03/29/18 14:55

**BH05R**  
**1803269-05 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/21/18 12:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>1700</b>	10	ug/l	10	1803255	03/24/18	03/24/18	EPA 8260B	
<b>Toluene</b>	<b>1.4</b>	1.0	"	1	"	"	"	"	
<b>Ethylbenzene</b>	<b>45</b>	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>900</b>	2.0	"	"	"	"	"	"	

Date Sampled: **03/21/18 12:40**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		90.8 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		94.1 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		98.9 %	45-146		"	"	"	"	

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6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
03/29/18 14:55

**BH06R**  
**1803269-06 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/21/18 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **03/21/18 12:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		90.5 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		91.7 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.1 %	45-146		"	"	"	"	

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6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
03/29/18 14:55

**BH07**  
**1803269-07 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/21/18 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<b>Benzene</b>	<b>690</b>	10	ug/l	10	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	1	"	"	"	"	
<b>Ethylbenzene</b>	<b>19</b>	1.0	"	"	"	"	"	"	
<b>Xylenes (total)</b>	<b>3.9</b>	2.0	"	"	"	"	"	"	

Date Sampled: **03/21/18 12:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: 1,2-Dichloroethane-d4</i>		84.3 %	37-154		"	"	"	"	
<i>Surrogate: Toluene-d8</i>		94.1 %	45-149		"	"	"	"	
<i>Surrogate: 4-Bromofluorobenzene</i>		97.3 %	45-146		"	"	"	"	

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6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
03/29/18 14:55

**BH08**  
**1803269-08 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/21/18 11:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **03/21/18 11:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		87.8 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		90.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		95.0 %	45-146		"	"	"	"	

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6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
03/29/18 14:55

**BH09**  
**1803269-09 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/21/18 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **03/21/18 11:50**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		88.0 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		90.8 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.6 %	45-146		"	"	"	"	

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6899 Pecos Street  
Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
03/29/18 14:55

**BH10**  
**1803269-10 (Water)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **03/21/18 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	1.0	ug/l	1	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	ND	2.0	"	"	"	"	"	"	

Date Sampled: **03/21/18 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		89.0 %	37-154		"	"	"	"	
Surrogate: Toluene-d8		91.2 %	45-149		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.6 %	45-146		"	"	"	"	

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Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

Reported:  
03/29/18 14:55

### 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 1803255 - EPA 5030 Water MS

##### Blank (1803255-BLK1)

Prepared & Analyzed: 03/24/18

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	11.7		"	13.3		87.7	37-154			
Surrogate: Toluene-d8	12.6		"	13.3		94.1	45-149			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		96.3	45-146			

##### LCS (1803255-BS1)

Prepared & Analyzed: 03/24/18

Benzene	32.6	1.0	ug/l	33.3		97.8	51-132			
Toluene	33.4	1.0	"	33.3		100	51-138			
Ethylbenzene	37.7	1.0	"	33.1		114	58-146			
m,p-Xylene	69.4	2.0	"	66.5		104	57-144			
o-Xylene	34.4	1.0	"	32.7		105	53-146			
Surrogate: 1,2-Dichloroethane-d4	11.6		"	13.3		87.1	37-154			
Surrogate: Toluene-d8	12.8		"	13.3		95.9	45-149			
Surrogate: 4-Bromofluorobenzene	12.5		"	13.3		93.9	45-146			

##### Matrix Spike (1803255-MS1)

Source: 1803269-01

Prepared & Analyzed: 03/24/18

Benzene	33.3	1.0	ug/l	33.3	ND	99.9	34-141			
Toluene	32.7	1.0	"	33.3	ND	98.2	27-151			
Ethylbenzene	37.9	1.0	"	33.1	ND	115	29-160			
m,p-Xylene	69.8	2.0	"	66.5	ND	105	20-166			
o-Xylene	34.4	1.0	"	32.7	ND	105	33-159			
Surrogate: 1,2-Dichloroethane-d4	12.0		"	13.3		90.4	37-154			
Surrogate: Toluene-d8	12.6		"	13.3		94.2	45-149			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		96.2	45-146			

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Denver CO, 80221

Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
03/29/18 14:55

**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 1803255 - EPA 5030 Water MS**

<b>Matrix Spike Dup (1803255-MSD1)</b>	<b>Source: 1803269-01</b>			<b>Prepared &amp; Analyzed: 03/24/18</b>						
Benzene	34.0	1.0	ug/l	33.3	ND	102	34-141	1.99	32	
Toluene	33.2	1.0	"	33.3	ND	99.5	27-151	1.27	25	
Ethylbenzene	37.8	1.0	"	33.1	ND	114	29-160	0.370	50	
m,p-Xylene	70.5	2.0	"	66.5	ND	106	20-166	0.955	36	
o-Xylene	34.4	1.0	"	32.7	ND	105	33-159	0.0290	26	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>13.6</i>		<i>"</i>	<i>13.3</i>		<i>102</i>	<i>37-154</i>			
<i>Surrogate: Toluene-d8</i>	<i>12.6</i>		<i>"</i>	<i>13.3</i>		<i>94.7</i>	<i>45-149</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>12.8</i>		<i>"</i>	<i>13.3</i>		<i>96.2</i>	<i>45-146</i>			

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6899 Pecos Street  
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Project: Noble - Knaus 28-8

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
03/29/18 14:55

### 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