

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)
COGCC Standard		5	560	700	1,400
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	380	1.4	<1.0	340
BH01	12/20/16	32	<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	5,300	3,900	130	1,200
BH02	06/21/16	7,300	1,500	97	2,300
BH02 ¹	09/12/16	9,700	3,800	<1.0	3,400
BH02	12/20/16	7,700	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	130	<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 ¹	09/22/17	500	46	33	2,300
BH03	12/07/17	Not Sampled - LNAPL Present			
BH03	03/21/18	45	<1.0	1.9	810
BH04	04/15/16	1,700	2,600	130	1,200
BH04	06/21/16	Not Sampled - LNAPL Present			
BH04 ¹	09/02/16	14,000	12,000	240	5,600
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	1400	<1.0	<1.0	13
BH04R	12/07/17	190	<1.0	9.2	4.0
BH04R	03/21/18	2,000	<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	2,800	860	<1.0	1,000
BH05R ¹	09/22/17	9,800	3,300	140	12,000
BH05R	12/07/17	Not Sampled - LNAPL Present			

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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)
COGCC Standard		5	560	700	1,400
BH05R	03/21/18	1,700	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	1,600	6.6	<1.0	200
BH07	12/20/16	9,000	24	<1.0	630
BH07	06/23/17	9,100	1.5	<1.0	260
BH07	09/22/17	240	<1.0	<1.0	<2.0
BH07	12/07/17	3,900	<1.0	11	<2.0
BH07	03/21/18	690	<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

¹ 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 ¹	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 ⁴	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 ³	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 ²	19.50	9.28	ND	ND	4649.23
BH08	12/20/16	4661.45 ⁵	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

¹ 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.

² 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.

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

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

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

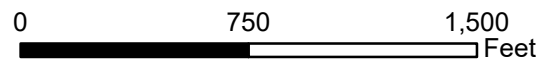
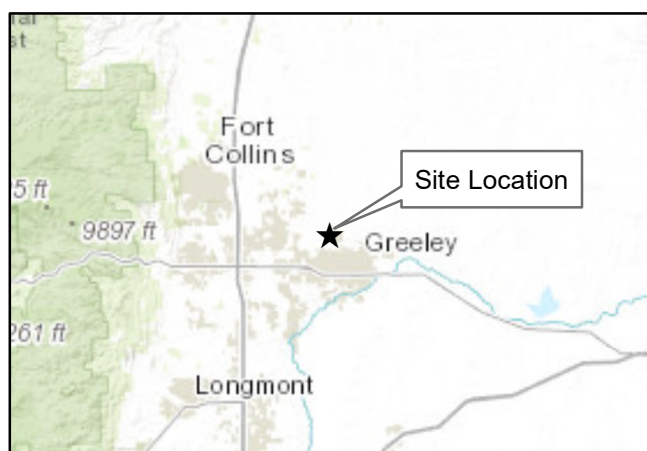
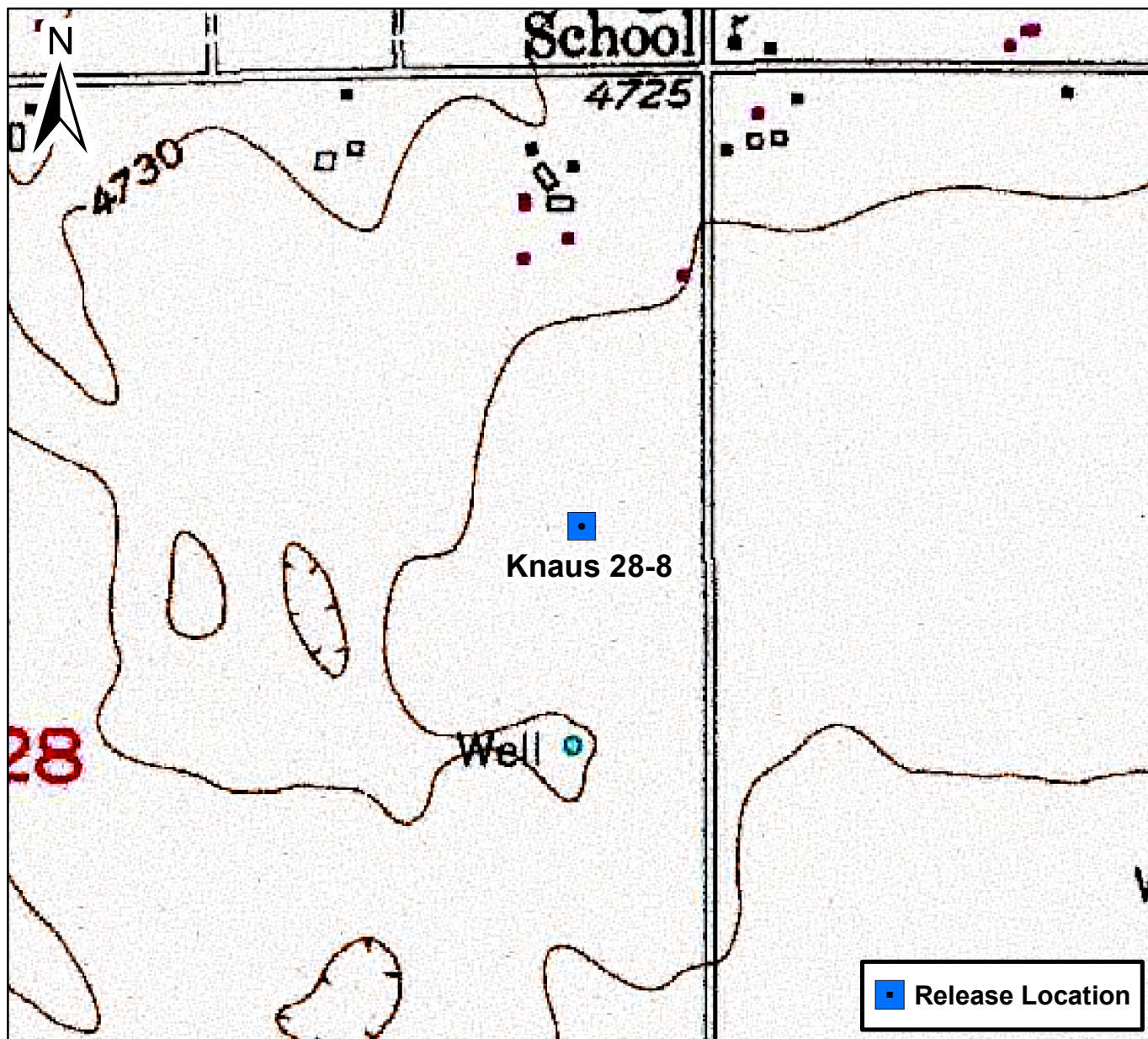
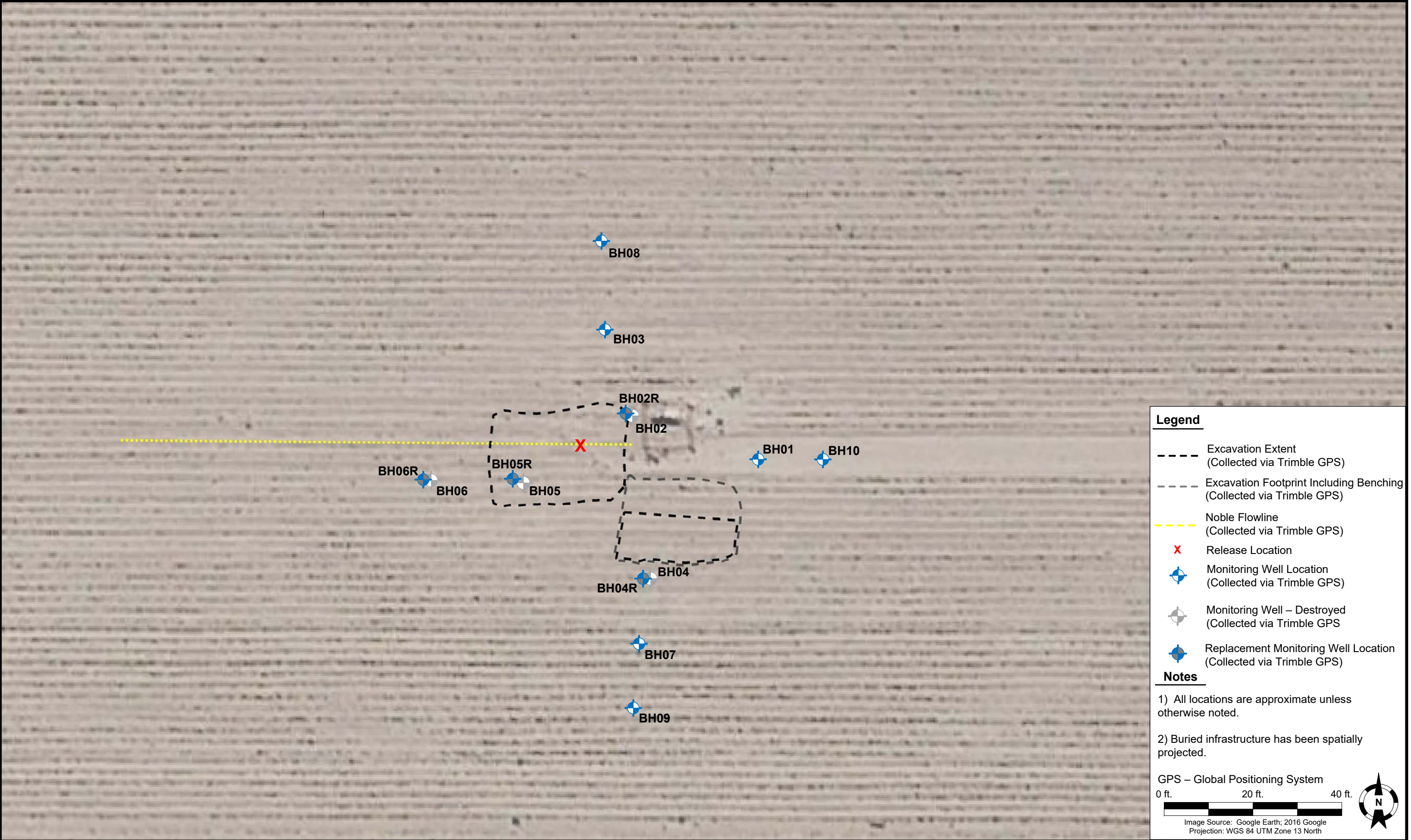
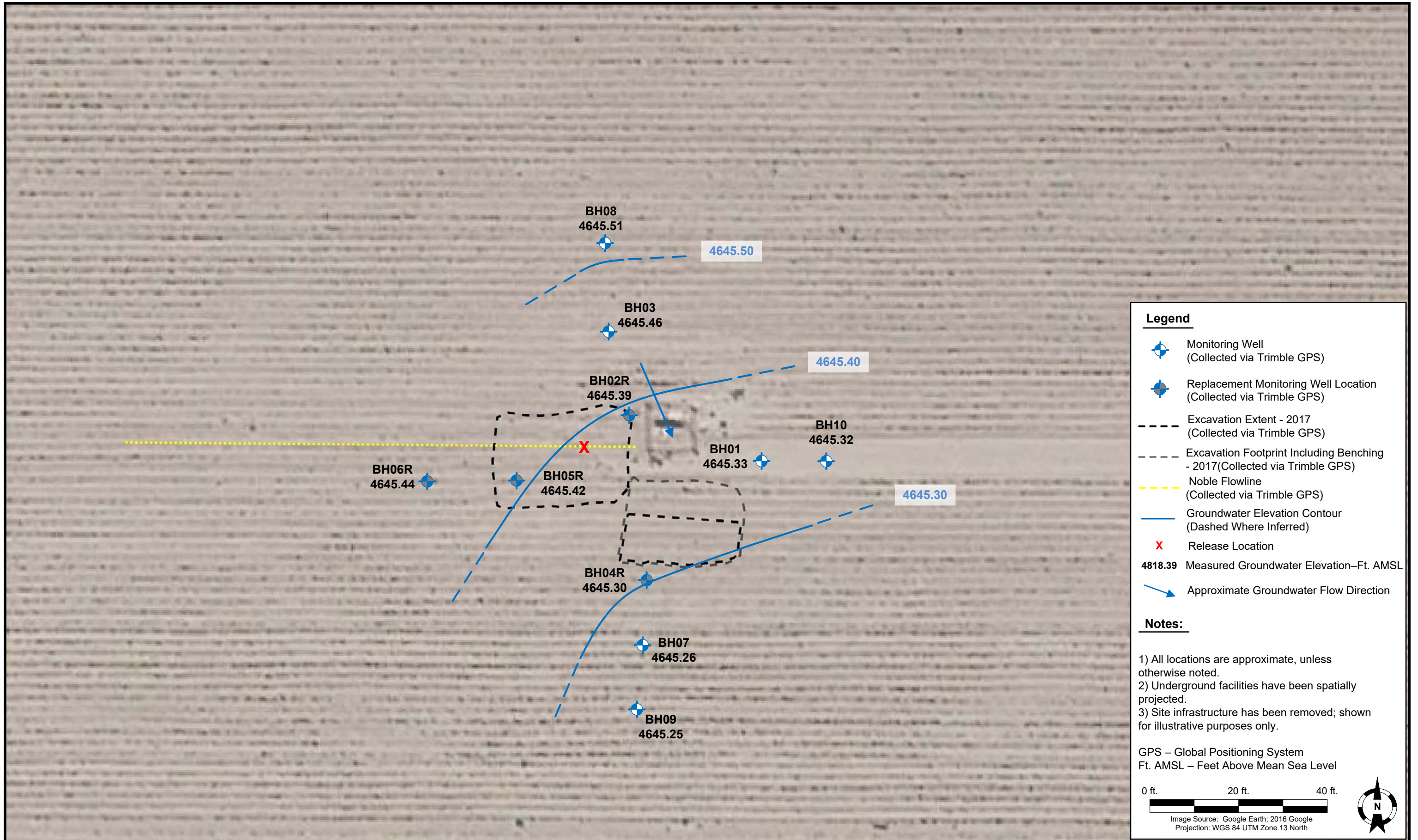


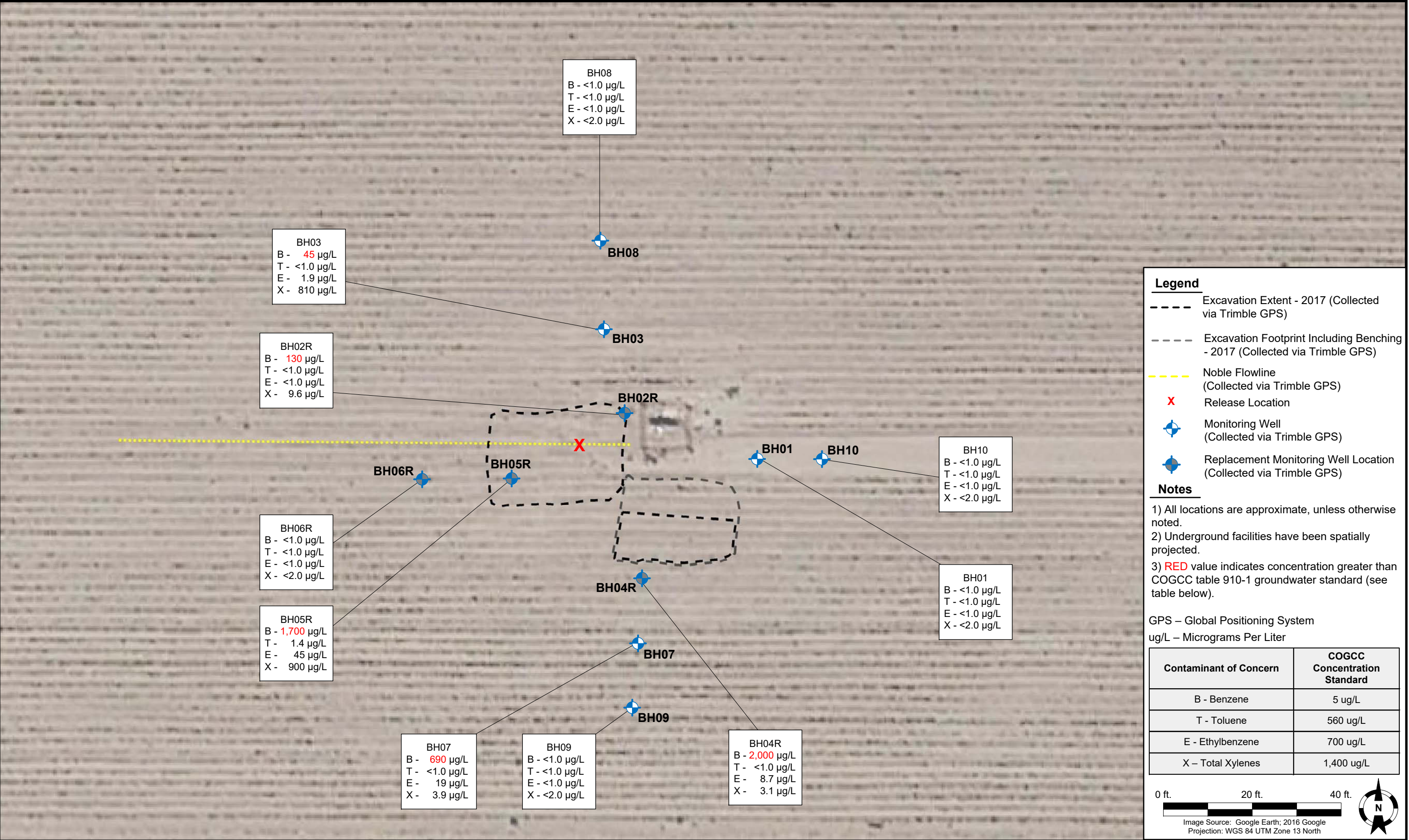
Figure 1

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









Summit Scientific

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,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury
President



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

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:

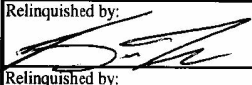

Sampler Name: Branson Fields

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 ₃	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																		
BH03		1230	2																		
BH04R		1220	3																		
BH05R		1240	3																		
BH06R		1200	3																		
BH07		1215	3																		
BH08		1155	3																		
BH09		1150	3																		
BH10		1130	3																		
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"/>	
																24 Hours <input type="checkbox"/>				Standard <input checked="" type="checkbox"/>	
																48 Hours <input type="checkbox"/>					
Relinquished by:				Date/Time:				Received in Lab by:				Date/Time:				Sample Integrity:					
																Temperature Upon Receipt: 5.1°C					
																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		"	"	"	"	

Summit Scientific

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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

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
Benzene	130	1.0	ug/l	1	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	ND	1.0	"	"	"	"	"	"	
Xylenes (total)	9.6	2.0	"	"	"	"	"	"	

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

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

Summit Scientific

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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

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
Benzene	45	1.0	ug/l	1	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	"	"	"	"	"	
Ethylbenzene	1.9	1.0	"	"	"	"	"	"	
Xylenes (total)	810	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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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
Benzene	2000	100	ug/l	100	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	1	"	"	"	"	
Ethylbenzene	8.7	1.0	"	"	"	"	"	"	
Xylenes (total)	3.1	2.0	"	"	"	"	"	"	

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

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

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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
Benzene	1700	10	ug/l	10	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	1.4	1.0	"	1	"	"	"	"	
Ethylbenzene	45	1.0	"	"	"	"	"	"	
Xylenes (total)	900	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		"	"	"	"	

Summit Scientific

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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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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
Benzene	690	10	ug/l	10	1803255	03/24/18	03/24/18	EPA 8260B	
Toluene	ND	1.0	"	1	"	"	"	"	
Ethylbenzene	19	1.0	"	"	"	"	"	"	
Xylenes (total)	3.9	2.0	"	"	"	"	"	"	

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

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

Summit Scientific

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Project: Noble - Knaus 28-8

Project Number: [none]
Project Manager: Brandon Bruns

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		"	"	"	"	

Summit Scientific

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Project: Noble - Knaus 28-8

Project Number: [none]
Project Manager: Brandon Bruns

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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Project: Noble - Knaus 28-8

Project Number: [none]
Project Manager: Brandon Bruns

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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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	
	Result	Limit	Units	Level	Result	%REC	Limits	RPD	Limit	Notes

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			

Summit Scientific

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Tasman Geosciences
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

Volatile Organic Compounds by EPA Method 8260B - Quality Control
Summit Scientific

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

Batch 1803255 - EPA 5030 Water MS

Matrix Spike Dup (1803255-MSD1)	Source: 1803269-01			Prepared & Analyzed: 03/24/18						
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	
Surrogate: 1,2-Dichloroethane-d4	13.6		"	13.3		102	37-154			
Surrogate: Toluene-d8	12.6		"	13.3		94.7	45-149			
Surrogate: 4-Bromofluorobenzene	12.8		"	13.3		96.2	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

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