

SITE ASSESSMENT REPORT

DUNCAN D20-12, 20-13

COGCC SPILL TRACKING # 459804
COGCC REMEDIATION # 12461

Prepared for:



2115 117th Avenue
Greeley, CO 80631

Prepared by:



6855 West 119th Avenue
Broomfield, Colorado, 80020

October 1, 2019

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

Subject: **Site Assessment Report**
 Duncan D20-12, 20-13
 API #: 05-123-15466
 Spill/Release Point ID #: 459804
 Remediation Project #: 12461
 NWSW S20 T3N R64W
 Weld County, Colorado

Dear Mr. Evans:

Below please find a copy of the above referenced Site Assessment Report (Report) for the Duncan D20-12, 20-13 site (Site) in Weld County, Colorado. The text below describes assessment activities and environmental sampling conducted at the Site between August 21, 2019 and August 23, 2019 (Assessment) by Tasman Geosciences, Inc. (Tasman), on behalf of Noble Energy, Inc. (Noble).

Introduction

The purpose of this document is to describe the results of site assessment and subsequent soil and groundwater sampling activities conducted as part of the Assessment. The activities described below were performed in response to the discovery of suspected impacted media beneath the Duncan D20-12, 20-13 tank battery during plug and abandonment procedures on December 10, 2018.

Facility Background

The Site is located approximately 7.5 miles north of the Town of Hudson in Weld County, Colorado, as shown on Figure 1. The Site is surrounded by crop land, and the legal description is the northwest $\frac{1}{4}$ of the southwest $\frac{1}{4}$ of Section 20, Township 3 North, Range 64 West, of the 6th Principal Meridian. The Site is located on terrain that slopes to the north-northeast. The Site is approximately 0.5 miles south of Weld County Road 32 and has coordinates of 40.210677°, -104.584405°.

On December 11, 2018, historic impacts were confirmed beneath the Duncan D20-12, 20-13 tank battery during plug and abandonment activities. The approximate release location is shown on Figure 2. A Form 19 was submitted to the Colorado Oil and Gas Conservation Commission (COGCC) on December 12, 2018. The COGCC subsequently issued Spill/Release Point ID Number 459804 for this event and the site was plugged and abandoned. Activities and results of the initial investigation and excavation were reported in the documents *Duncan D20-12, 20-13 Excavation Summary Report* and *Duncan D20-12, 20-13 Remedial Excavation Report*. A Form 27 was submitted on February 11, 2019 and COGCC subsequently issued Remediation Number 12461 for the project.

Site Assessment Activities

On August 21, 2019, Tasman returned to the site to further assess groundwater impacts associated with the historical release at the former Duncan D20-12, 20-13 produced water vessel. Six boreholes (BH01-BH06) were advanced using direct push drilling techniques and converted into temporary groundwater monitoring wells. During soil boring activities, soil samples were collected and field screened for volatile organic compounds (VOCs) using a photo-ionization detector (PID) and standard head space sampling techniques. A total of 11 soil samples were submitted to Summit Scientific laboratory (Summit) in Golden, Colorado for benzene, toluene, ethylbenzene and total xylenes (BTEX), Total Petroleum Hydrocarbons – Gasoline Range Organics (TPH-GRO) using United States Environmental Protection Agency (USEPA) Method 8260B, as well as Total Petroleum Hydrocarbons – Diesel Range Organics (TPH-DRO) using USEPA Method 8015. Soil analytical results are summarized in Table 1 and sample locations are illustrated in Figure 3. Boring logs are included as Attachment A and laboratory analytical reports are included as Attachment B.

Following the installation and development of the six monitoring wells, Tasman collected groundwater samples on August 23, 2019. Groundwater was encountered at approximately six feet below ground surface (ft. bgs). Groundwater samples collected from the six monitoring wells were submitted to Summit for BTEX analysis. Groundwater analytical results are summarized in Table 3 and illustrated on Figure 5. The complete laboratory analytical report is included as Attachment B. Groundwater potentiometric surface contours are illustrated on Figure 4 and groundwater elevation data is summarized in Table 2.

Results

Laboratory analytical results for the soil samples collected below the observed groundwater table at BH01 and BH05 indicate benzene concentrations are in exceedance of COGCC Table 910-1 soil standards.

Groundwater analytical results for samples BH01 and BH05 indicate benzene and total xylenes concentrations are in exceedance of COGCC Table 910-1 standards. All other groundwater samples were below applicable COGCC Table 910-1 standards.

Conclusions

Based upon field and laboratory data collected during site assessment activities, petroleum hydrocarbon soil impacts remain at the site below the observed groundwater table in the area of BH01 and BH05. Dissolved phase groundwater impacts also remain at the site in the area of BH01 and BH05. Additional site assessment activities will be conducted until groundwater and soil impacts have been delineated. Tasman will continue quarterly groundwater monitoring until four consecutive quarters of groundwater results below applicable COGCC Table 910-1 standards are achieved.

Remarks

The discussion and conclusions contained in this report represent the professional opinions of Tasman Geosciences, Inc. These opinions are based on currently available information and are arrived at in accordance with currently accepted geologic and engineering practices.

Please contact me at (720) 431-1190 if you require additional information.

Sincerely,
Tasman Geosciences, Inc.



Brandon Bruns, PE
Project Manager

Attachments:

Table 1 – Soil Analytical Data

Table 2 – Groundwater Elevation Data

Table 3 – Groundwater Analytical Data

Figure 1 – Site Location Map

Figure 2 – Site Overview

Figure 3 – Soil Analytical Results Map (8/21/2019)

Figure 4 – Groundwater Potentiometric Contour Map (8/23/2019)

Figure 5 - Groundwater Analytical Results Map (8/23/2019)

Attachment A – Boring Logs

Attachment B – Laboratory Analytical Data Reports

TABLES

TABLE 1
SOIL ANALYTICAL DATA
NOBLE ENERGY, INC. - DUNCAN D20-12, 20-13

Soil Sample ID	Date	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Naphthalene (mg/kg)	TPH-GRO (mg/kg)	TPH-DRO (mg/kg)
COGCC Standard		0.17	85	100	175	23	500	
SS01@3'	12/10/18	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
SS02@3'	12/10/18	0.043	<0.0050	0.36	0.13	0.72	1,000	1,300
SS03@3'	12/10/18	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
SS04@3'	12/10/18	9.3	2.0	33	320	8.3	7,000	3,700
SS05@3'	06/06/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
SS06@3'	06/06/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
SS07@3'	06/06/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
SS08@3'	06/06/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
SS09@3'	06/06/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
SS10@3'	06/06/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
CS01	06/06/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
BH01@0-5'	08/21/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
BH01@15-17.5' ¹	08/21/19	0.20	<0.0050	0.55	3.8	0.38	72	170
BH01@17.5-20' ¹	08/21/19	0.18	<0.0050	0.42	2.7	0.22	<50	130
BH02@0-2'	08/21/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
BH03@0-2.5'	08/21/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
BH04@0-2.5'	08/21/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
BH04@18-20'	08/21/19	<0.0020	<0.0050	0.29	6.9	0.17	<50	100
BH05@0-2.5'	08/21/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50
BH05@15-17.5' ¹	08/21/19	0.27	<0.0050	0.74	5.5	0.45	180	280
BH05@17.5-20'	08/21/19	0.12	<0.0050	0.48	3.1	0.28	<50	100
BH06@0-2.5'	08/21/19	<0.0020	<0.0050	<0.0050	<0.010	<0.010	<50	<50

Soil Sample ID	Date	SAR	pH	EC (mmhos/cm)
COGCC Standard		<12	6-9	<4mmhos/cm
SS04@3'	12/10/18	4.01	8.43	2.95

COGCC = Colorado Oil and Gas Conservation Commission

TPH-GRO = Total petroleum hydrocarbons - gasoline range organics

TPH-DRO = Total petroleum hydrocarbons - diesel range organics

SAR = Sodium Absorption Ratio

EC = Specific Conductance

mg/kg = Milligrams per kilogram

mmhos/cm = Millimhos per centimeter

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

1. The laboratory applied an S-02 flag to the sample, meaning that the surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.

Soil standards referenced from COGCC Table 910-1

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

TABLE 2
GROUNDWATER ELEVATION DATA
NOBLE ENERGY, INC. - DUNCAN D20-12, 20-13

Monitoring Well ID	Date	Top of Casing Elevation (ft. AMSL)	Total Depth (ft. BTOC)	Depth to Water (ft.) ⁽¹⁾	Depth to LNAPL (ft.) ⁽¹⁾	LNAPL Thickness (ft.)	Groundwater Elevation* (ft. AMSL)
BH01	08/23/19	4772.46	21.77	5.32	ND	ND	4765.17
BH02	08/23/19	4773.47	17.30	5.47	ND	ND	4765.14
BH03	08/23/19	4770.68	14.10	5.83	ND	ND	4765.26
BH04	08/23/19	4773.76	20.74	5.62	ND	ND	4765.2
BH05	08/23/19	4772.36	20.15	5.56	ND	ND	4765.12
BH06	08/23/19	4772.64	16.63	5.53	ND	ND	4765.18

ft. = Feet

AMSL = Above mean sea level

BTOC = Below top of casing

LNAPL = Light non-aqueous phase liquid

ND = No LNAPL detected

* 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

TABLE 3
GROUNDWATER ANALYTICAL DATA
NOBLE ENERGY, INC. - DUNCAN D20-12, 20-13

Monitoring Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
COGCC Standard		5	560	700	1,400
GW01	12/10/18	970	3.2	560	3,800
BH01	08/23/19	440	<1.0	490	1,400
BH02	08/23/19	<1.0	<1.0	<1.0	<2.0
BH03	08/23/19	<1.0	<1.0	<1.0	<2.0
BH04	08/23/19	<1.0	<1.0	<1.0	<2.0
BH05	08/23/19	340	<1.0	500	1,700
BH06	08/23/19	<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

FIGURES

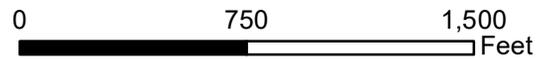
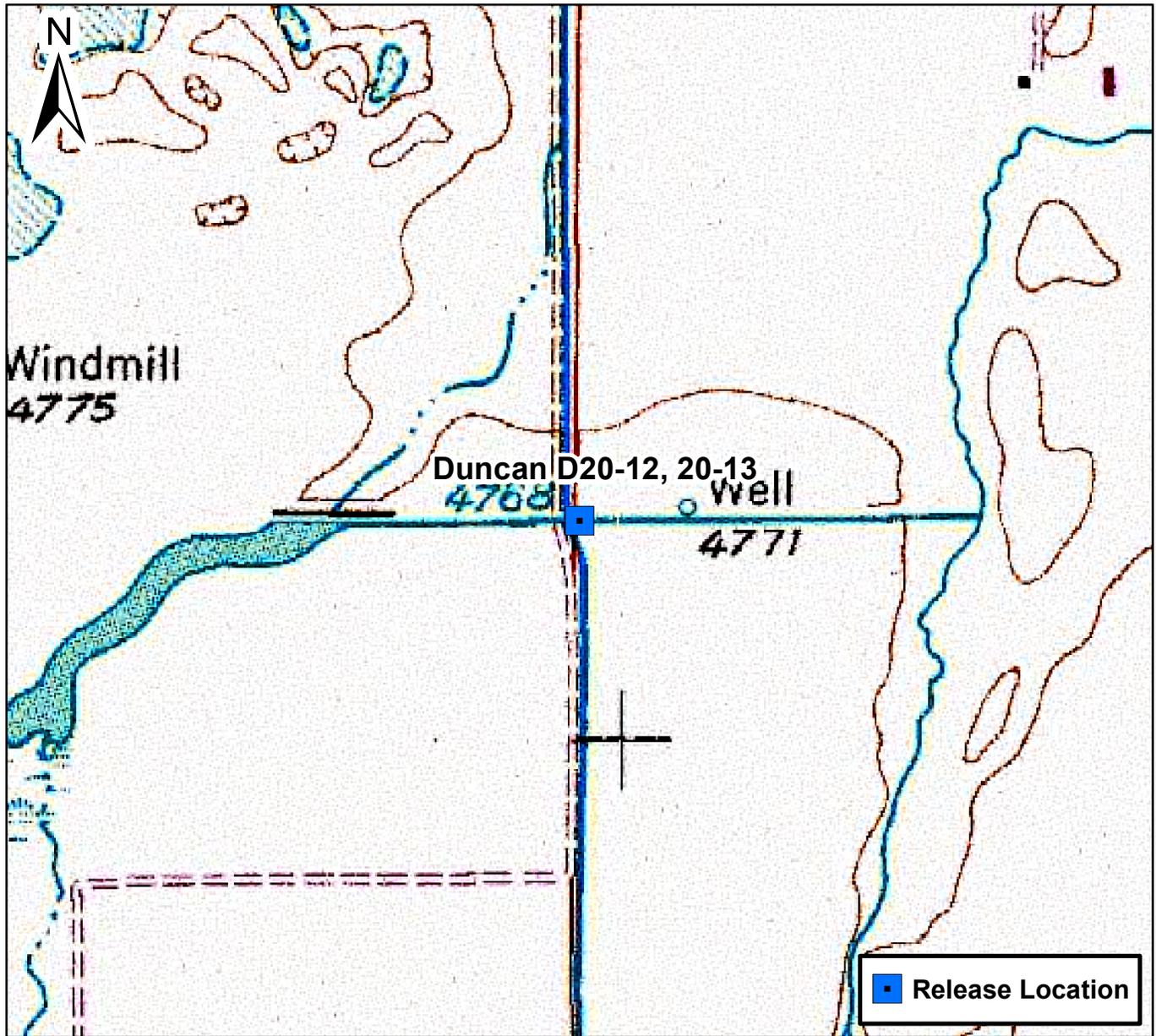
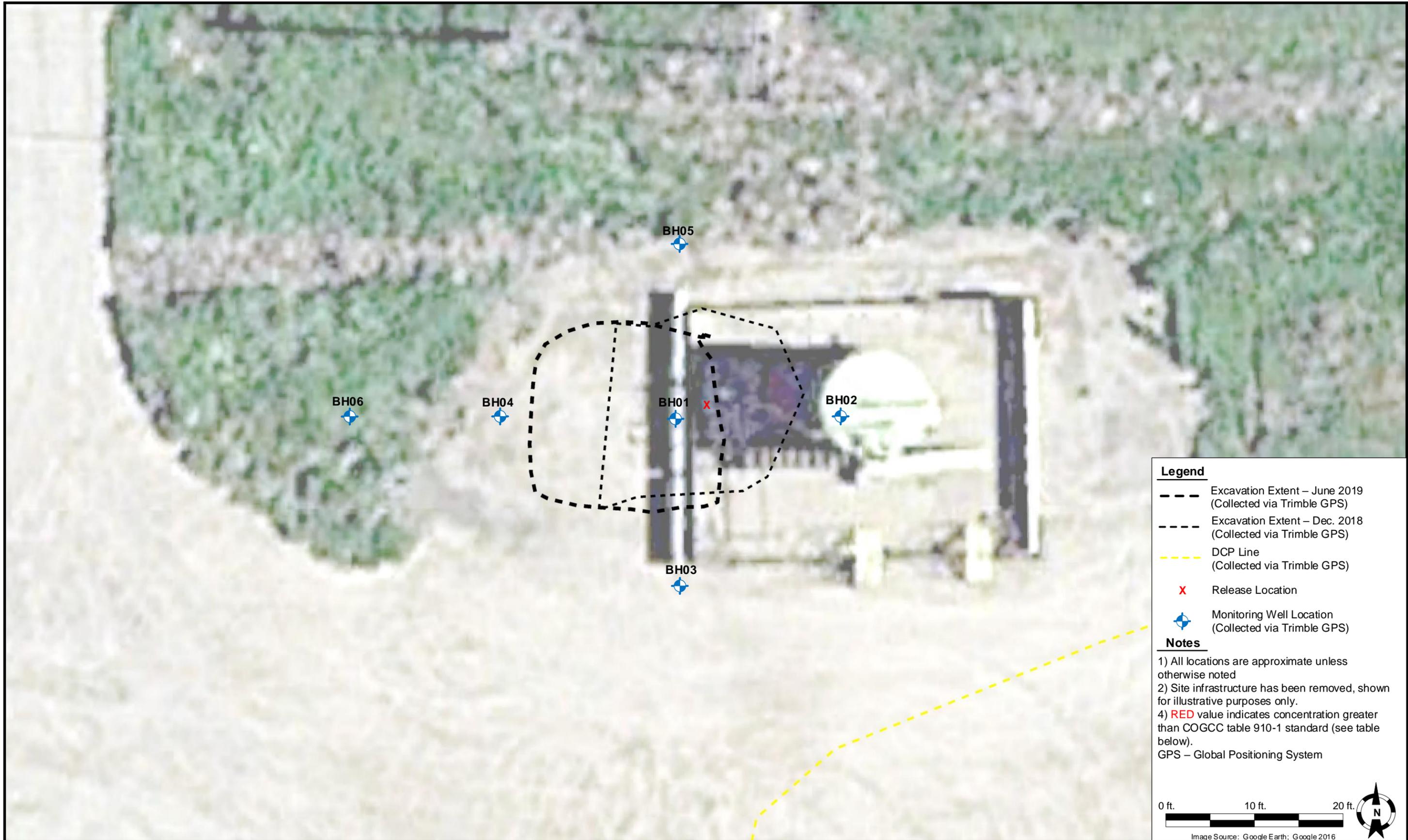


Figure 1

Site Location Map
 Duncan D20-12, 20-13
 NWSW S20 T3N R64W
 Weld County, Colorado



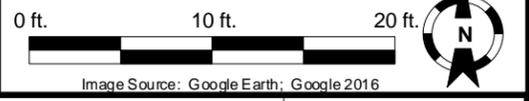


Legend

- Excavation Extent – June 2019
(Collected via Trimble GPS)
- Excavation Extent – Dec. 2018
(Collected via Trimble GPS)
- DCP Line
(Collected via Trimble GPS)
- X Release Location
- Monitoring Well Location
(Collected via Trimble GPS)

Notes

- 1) All locations are approximate unless otherwise noted
 - 2) Site infrastructure has been removed, shown for illustrative purposes only.
 - 4) RED value indicates concentration greater than COGCC table 910-1 standard (see table below).
- GPS – Global Positioning System



DATE:	9/10/2019
DESIGNED BY:	JW
DRAWN BY:	MG



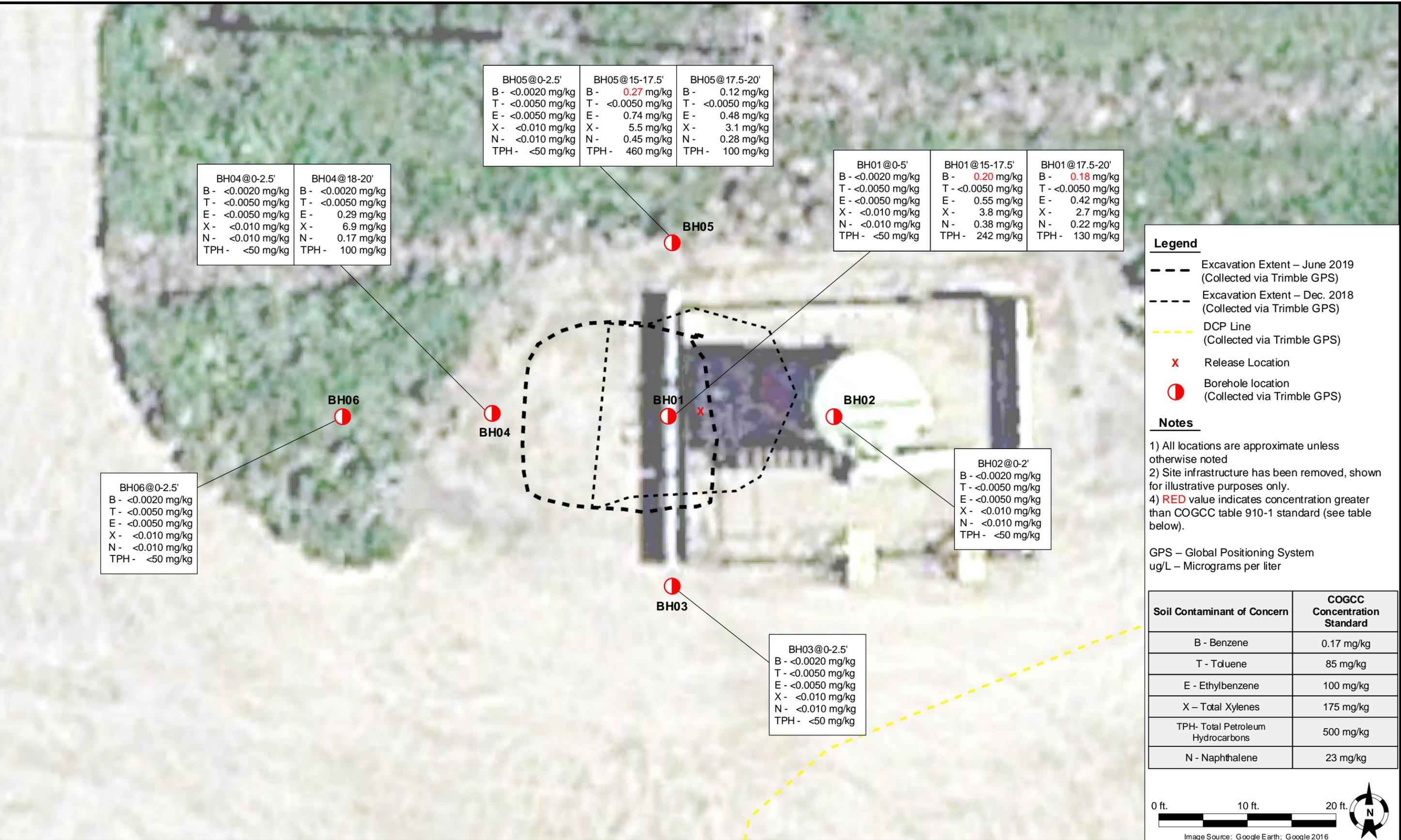
TASMAN
GEOSCIENCES

Tasman Geosciences, Inc.
6855 119th St.
Broomfield, CO 80020

Noble Energy, Inc. – DJ Basin
Duncan D20-12, 20-13
 NWSW, Section 20, Township 3 North, Range 64 West
 Weld County, Colorado

Site Overview

FIGURE
2



BH04@0-2.5'	BH04@18-20'
B - <0.0020 mg/kg	B - <0.0020 mg/kg
T - <0.0050 mg/kg	T - <0.0050 mg/kg
E - <0.0050 mg/kg	E - 0.29 mg/kg
X - <0.010 mg/kg	X - 6.9 mg/kg
N - <0.010 mg/kg	N - 0.17 mg/kg
TPH - <50 mg/kg	TPH - 100 mg/kg

BH05@0-2.5'	BH05@15-17.5'	BH05@17.5-20'
B - <0.0020 mg/kg	B - 0.27 mg/kg	B - 0.12 mg/kg
T - <0.0050 mg/kg	T - <0.0050 mg/kg	T - <0.0050 mg/kg
E - <0.0050 mg/kg	E - 0.74 mg/kg	E - 0.48 mg/kg
X - <0.010 mg/kg	X - 5.5 mg/kg	X - 3.1 mg/kg
N - <0.010 mg/kg	N - 0.45 mg/kg	N - 0.28 mg/kg
TPH - <50 mg/kg	TPH - 460 mg/kg	TPH - 100 mg/kg

BH01@0-5'	BH01@15-17.5'	BH01@17.5-20'
B - <0.0020 mg/kg	B - 0.20 mg/kg	B - 0.18 mg/kg
T - <0.0050 mg/kg	T - <0.0050 mg/kg	T - <0.0050 mg/kg
E - <0.0050 mg/kg	E - 0.55 mg/kg	E - 0.42 mg/kg
X - <0.010 mg/kg	X - 3.8 mg/kg	X - 2.7 mg/kg
N - <0.010 mg/kg	N - 0.38 mg/kg	N - 0.22 mg/kg
TPH - <50 mg/kg	TPH - 242 mg/kg	TPH - 130 mg/kg

BH06@0-2.5'
B - <0.0020 mg/kg
T - <0.0050 mg/kg
E - <0.0050 mg/kg
X - <0.010 mg/kg
N - <0.010 mg/kg
TPH - <50 mg/kg

BH02@0-2'
B - <0.0020 mg/kg
T - <0.0050 mg/kg
E - <0.0050 mg/kg
X - <0.010 mg/kg
N - <0.010 mg/kg
TPH - <50 mg/kg

BH03@0-2.5'
B - <0.0020 mg/kg
T - <0.0050 mg/kg
E - <0.0050 mg/kg
X - <0.010 mg/kg
N - <0.010 mg/kg
TPH - <50 mg/kg

Legend

- Excavation Extent – June 2019 (Collected via Trimble GPS)
- Excavation Extent – Dec. 2018 (Collected via Trimble GPS)
- DCP Line (Collected via Trimble GPS)
- X Release Location
- Borehole location (Collected via Trimble GPS)

Notes

- 1) All locations are approximate unless otherwise noted
- 2) Site infrastructure has been removed, shown for illustrative purposes only.
- 4) **RED** value indicates concentration greater than COGCC table 910-1 standard (see table below).

GPS – Global Positioning System
ug/L – Micrograms per liter

Soil Contaminant of Concern	COGCC Concentration Standard
B - Benzene	0.17 mg/kg
T - Toluene	85 mg/kg
E - Ethylbenzene	100 mg/kg
X – Total Xylenes	175 mg/kg
TPH- Total Petroleum Hydrocarbons	500 mg/kg
N - Naphthalene	23 mg/kg

0 ft. 10 ft. 20 ft.

Image Source: Google Earth; Google 2016

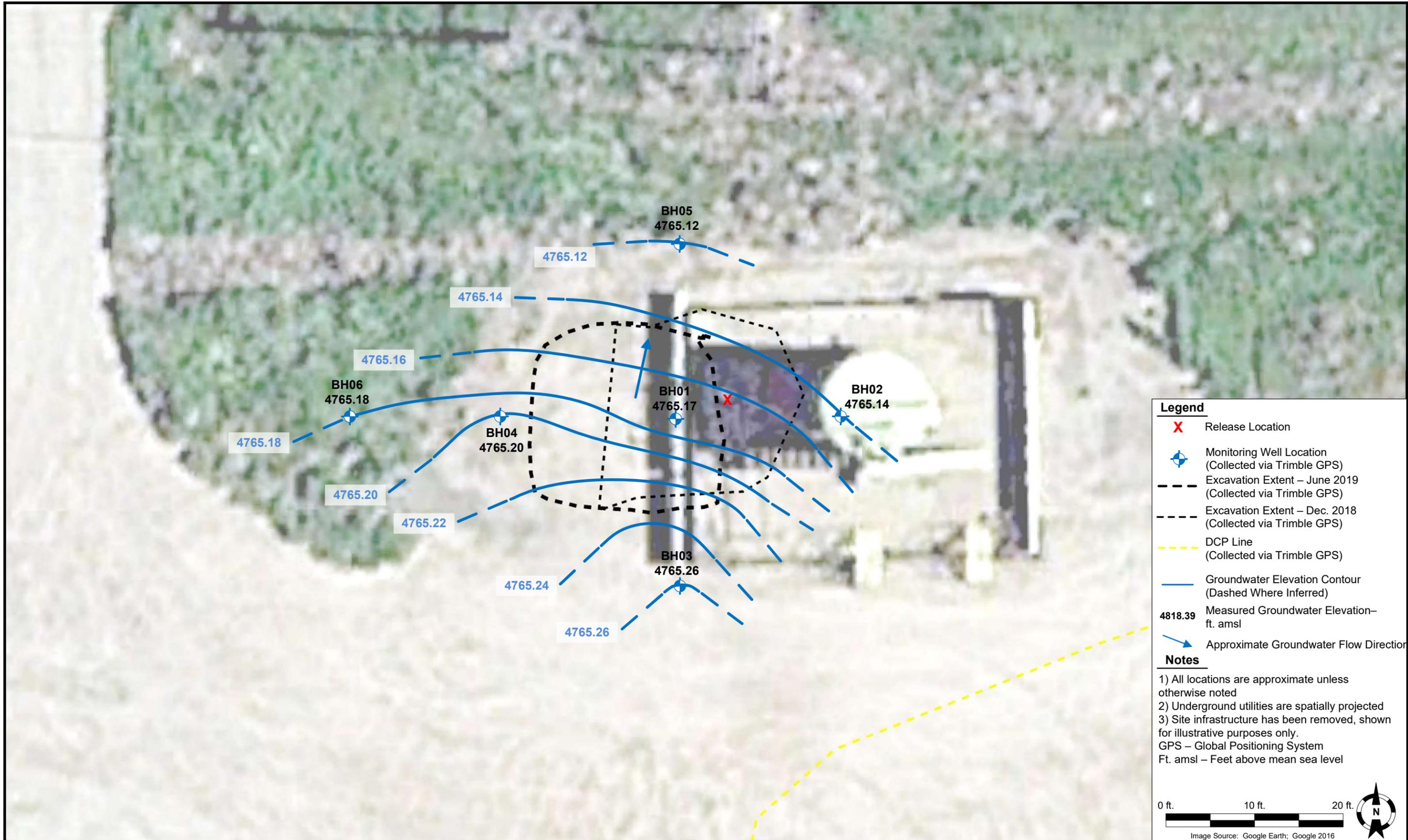
DATE: 09/09/19
 DESIGNED BY: JW
 DRAWN BY: TC

TASMAN GEOSCIENCES
 Tasman Geosciences, Inc.
 6855 119th St.
 Broomfield, CO 80020

Noble Energy, Inc. – DJ Basin
Duncan D20-12, 20-13
 NWSW, Section 20, Township 3 North, Range 64 West
 Weld County, Colorado

Soil Analytical Results Map
 (08/21/19)

FIGURE
 3



Legend

- X Release Location
- Monitoring Well Location (Collected via Trimble GPS)
- Excavation Extent – June 2019 (Collected via Trimble GPS)
- Excavation Extent – Dec. 2018 (Collected via Trimble GPS)
- DCP Line (Collected via Trimble GPS)
- Groundwater Elevation Contour (Dashed Where Inferred)
- 4818.39** Measured Groundwater Elevation–ft. amsl
- Approximate Groundwater Flow Direction

Notes

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

GPS – Global Positioning System
Ft. amsl – Feet above mean sea level

0 ft. 10 ft. 20 ft.

Image Source: Google Earth; Google 2016

DATE: 9/25/2019

DESIGNED BY: JW

DRAWN BY: MG

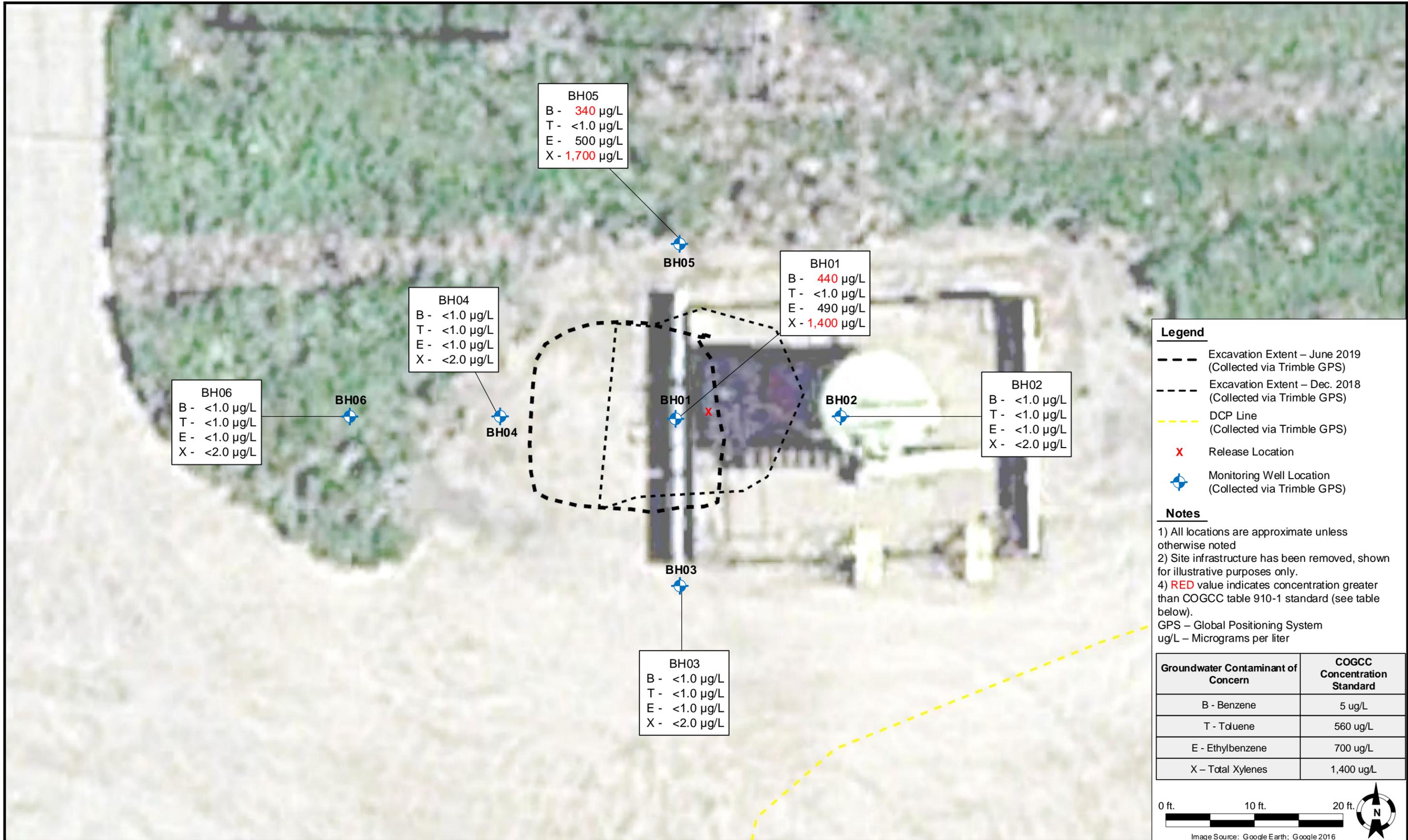
TASMAN
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Broomfield, CO, 80020

Noble Energy, Inc. – DJ Basin
Duncan D20-12, 20-13
NWSW, Section 20, Township 3 North, Range 64 West
Weld County, Colorado

Groundwater Potentiometric
Surface Contour Figure
(08/23/19)

FIGURE
4



DATE: 9/10/2019

DESIGNED BY: JW

DRAWN BY: MG

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Tasman Geosciences, Inc.
 6855 119th St.
 Broomfield, CO 80020

Noble Energy, Inc. – DJ Basin
Duncan D20-12, 20-13
 NWSW, Section 20, Township 3 North, Range 64 West
 Weld County, Colorado

Groundwater Analytical Results
 Map
 (08/23/19)

FIGURE
 5

ATTACHMENT A

BORING LOGS



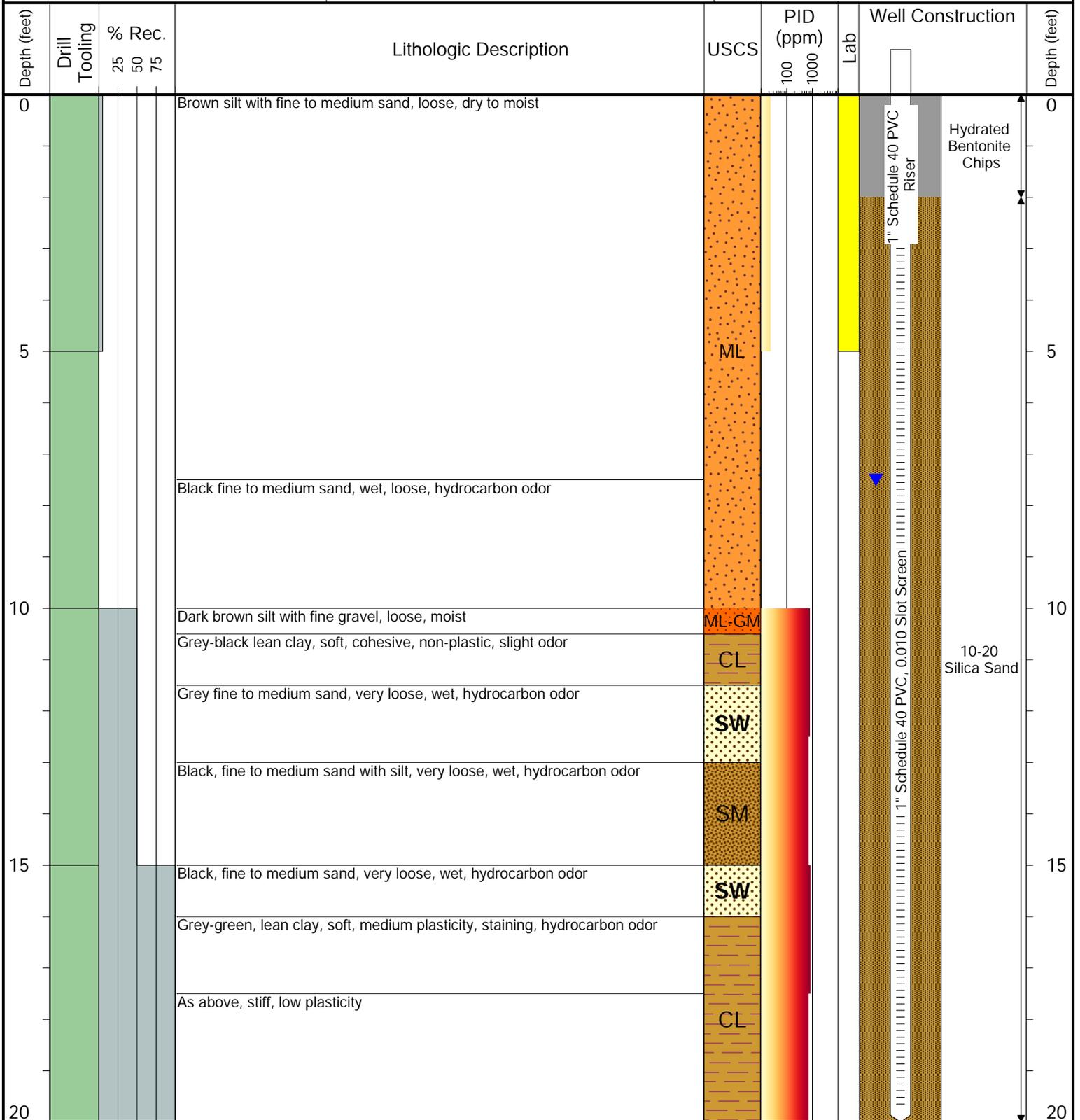
6855 119th St.
Broomfield, Colorado 80020

CLIENT: Noble Energy
 LOGGED BY: Tanner Cook
 PROJECT MANAGER: Jake Whritenour
 DRILLING CONTRACTOR: Site Services Drilling
 DRILLING EQUIPMENT: Geoprobe
 DRILL BIT SIZE (INCHES): 2
 DATE STARTED - COMPLETED: 8/21/2019 - 8/21/2019
 TOTAL WELL DEPTH (FT. BGS): 20
 DEPTH TO WATER (FT. BGS): 3.5

Duncan D20-12, 20-13

BORING / WELL ID: BH01

LOCATION: Weld County, Colorado
 LATITUDE (WGS 84): 40.21068058
 LONGITUDE (WGS 84): -104.584421
 CASING ELEVATION (FT. AMSL): 4772.46
 GROUND ELEVATION (FT. AMSL): 4770.49



Drilling / Sample Method:

- Macro-Core
- Solid Stem Auger
- Hollow Stem Auger
- Hand Auger

Laboratory Sample Types:

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



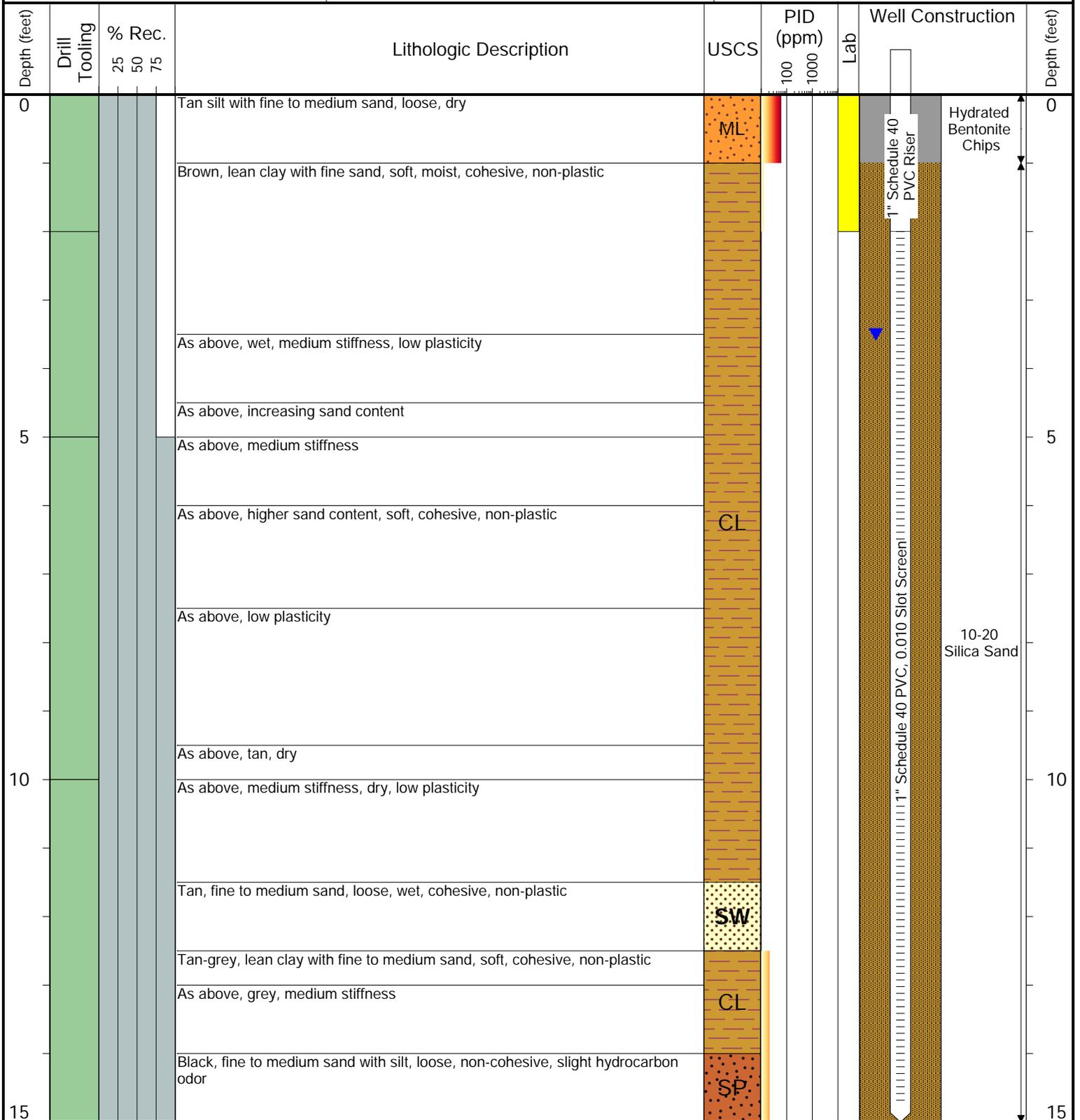
6855 119th St.
Broomfield, Colorado 80020

CLIENT: Noble Energy
 LOGGED BY: Tanner Cook
 PROJECT MANAGER: Jake Whritenour
 DRILLING CONTRACTOR: Site Services Drilling
 DRILLING EQUIPMENT: Geoprobe
 DRILL BIT SIZE (INCHES): 2
 DATE STARTED - COMPLETED: 8/21/2019 - 8/21/2019
 TOTAL WELL DEPTH (FT. BGS): 15
 DEPTH TO WATER (FT. BGS): 3.5

Duncan D20-12, 20-13

BORING / WELL ID: BH02

LOCATION: Weld County, Colorado
 LATITUDE (WGS 84): 40.2106772
 LONGITUDE (WGS 84): -104.5843575
 CASING ELEVATION (FT. AMSL): 4773.47
 GROUND ELEVATION (FT. AMSL): 4770.61



Drilling / Sample Method:

- Macro-Core
- Solid Stem Auger
- Hand Auger
- Hollow Stem Auger

Laboratory Sample Types:

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



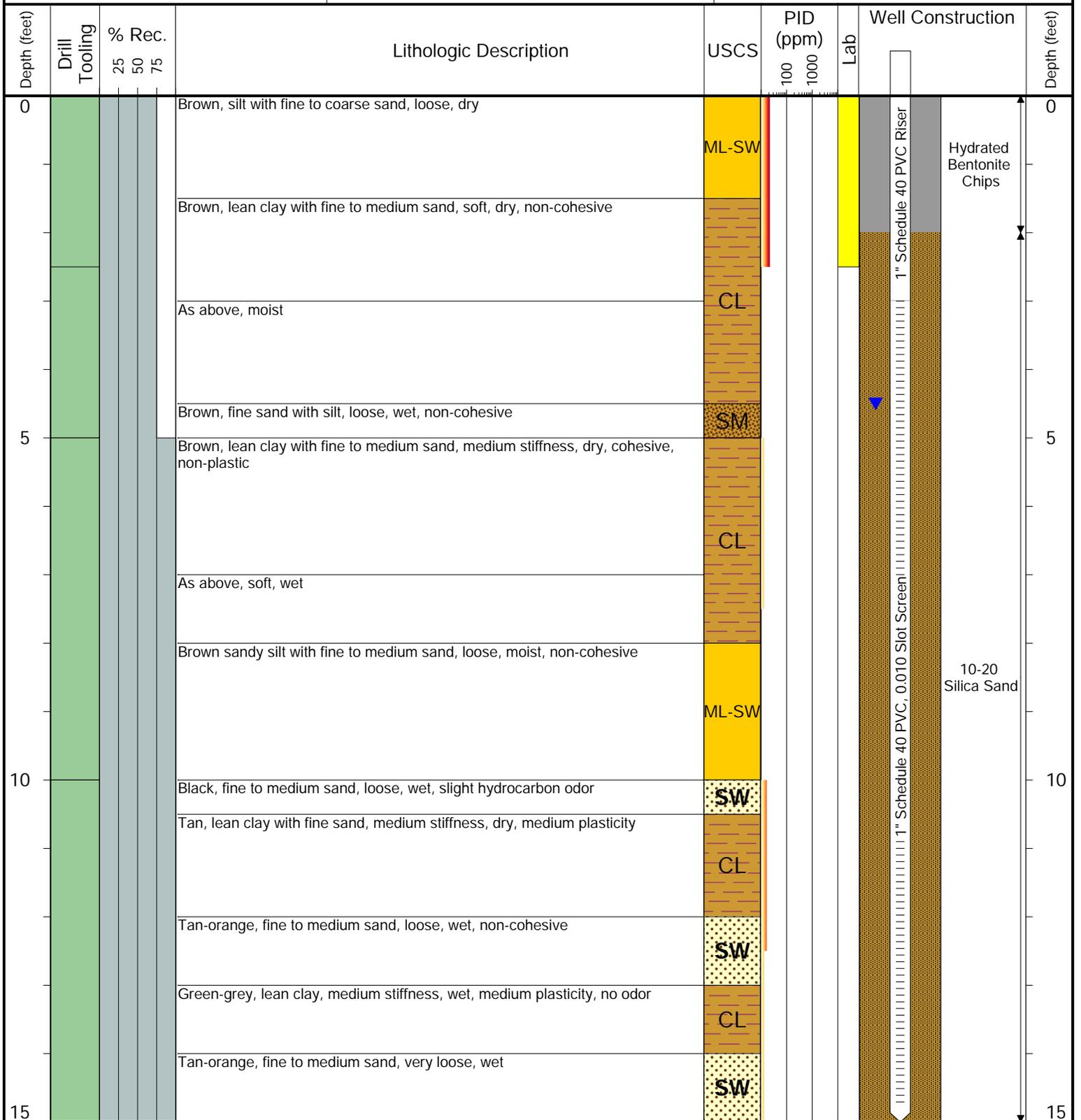
6855 119th St.
Broomfield, Colorado 80020

CLIENT: Noble Energy
 LOGGED BY: Tanner Cook
 PROJECT MANAGER: Jake Whritenour
 DRILLING CONTRACTOR: Site Services Drilling
 DRILLING EQUIPMENT: Geoprobe
 DRILL BIT SIZE (INCHES): 2
 DATE STARTED - COMPLETED: 8/21/2019 - 8/21/2019
 TOTAL WELL DEPTH (FT. BGS): 15
 DEPTH TO WATER (FT. BGS): 4.5

Duncan D20-12, 20-13

BORING / WELL ID: BH03

LOCATION: Weld County, Colorado
 LATITUDE (WGS 84): 40.21062278
 LONGITUDE (WGS 84): -104.584429
 CASING ELEVATION (FT. AMSL): 4770.68
 GROUND ELEVATION (FT. AMSL): 4771.09



Drilling / Sample Method:

- Macro-Core
- Solid Stem Auger
- Hand Auger
- Hollow Stem Auger

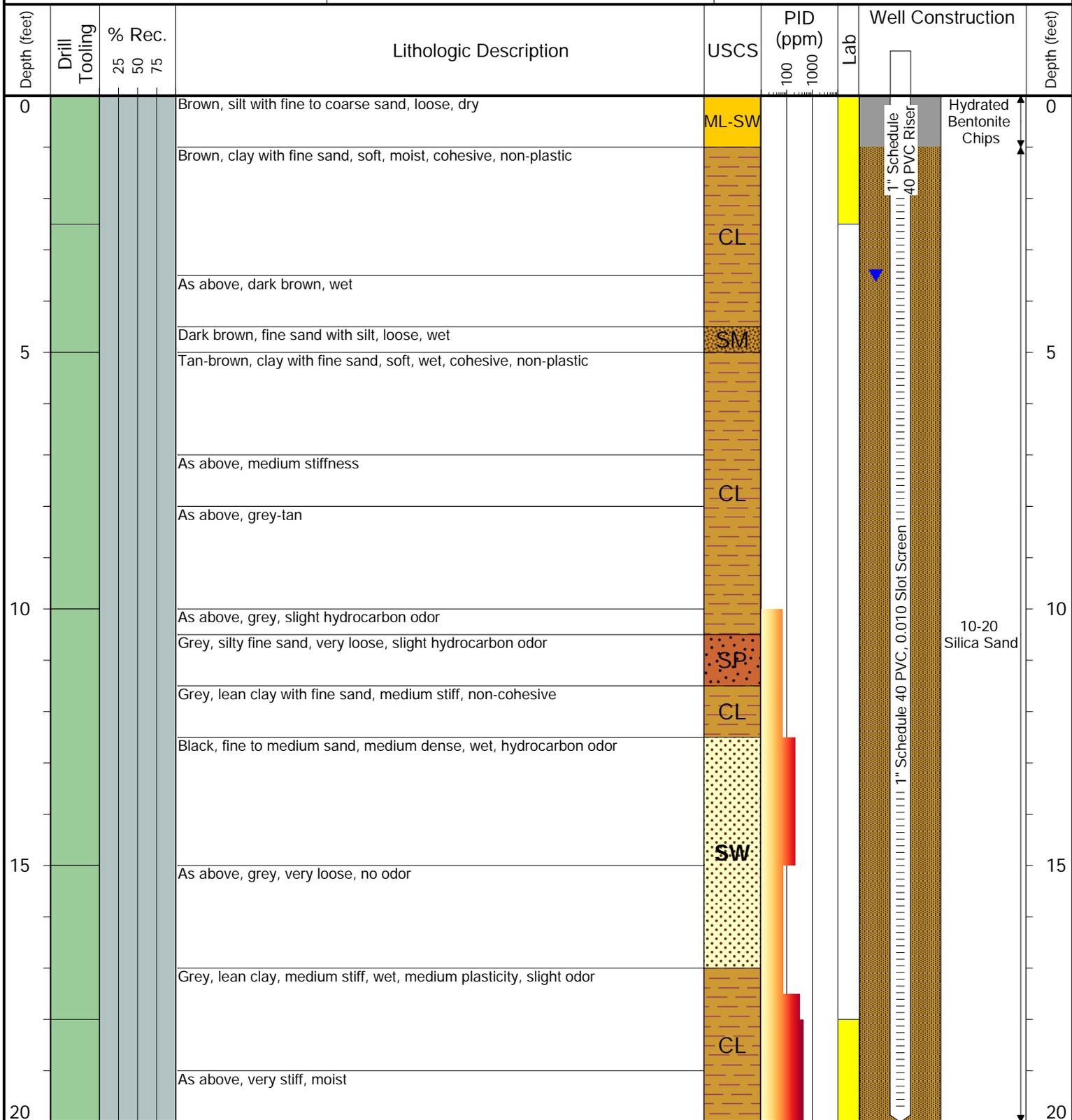
Laboratory Sample Types:

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



6855 119th St.
Broomfield, Colorado 80020

CLIENT: Noble Energy	Duncan D20-12, 20-13
LOGGED BY: Tanner Cook	
PROJECT MANAGER: Jake Whritenour	BORING / WELL ID: BH04
DRILLING CONTRACTOR: Site Services Drilling	
DRILLING EQUIPMENT: Geoprobe	LOCATION: Weld County, Colorado
DRILL BIT SIZE (INCHES): 2	LATITUDE (WGS 84): 40.21067549
DATE STARTED - COMPLETED: 8/21/2019 - 8/21/2019	LONGITUDE (WGS 84): -104.5844914
TOTAL WELL DEPTH (FT. BGS): 20	CASING ELEVATION (FT. AMSL): 4773.76
DEPTH TO WATER (FT. BGS): 3.5	GROUND ELEVATION (FT. AMSL): 4770.82



Drilling / Sample Method:

- Macro-Core
- Solid Stem Auger
- Hand Auger

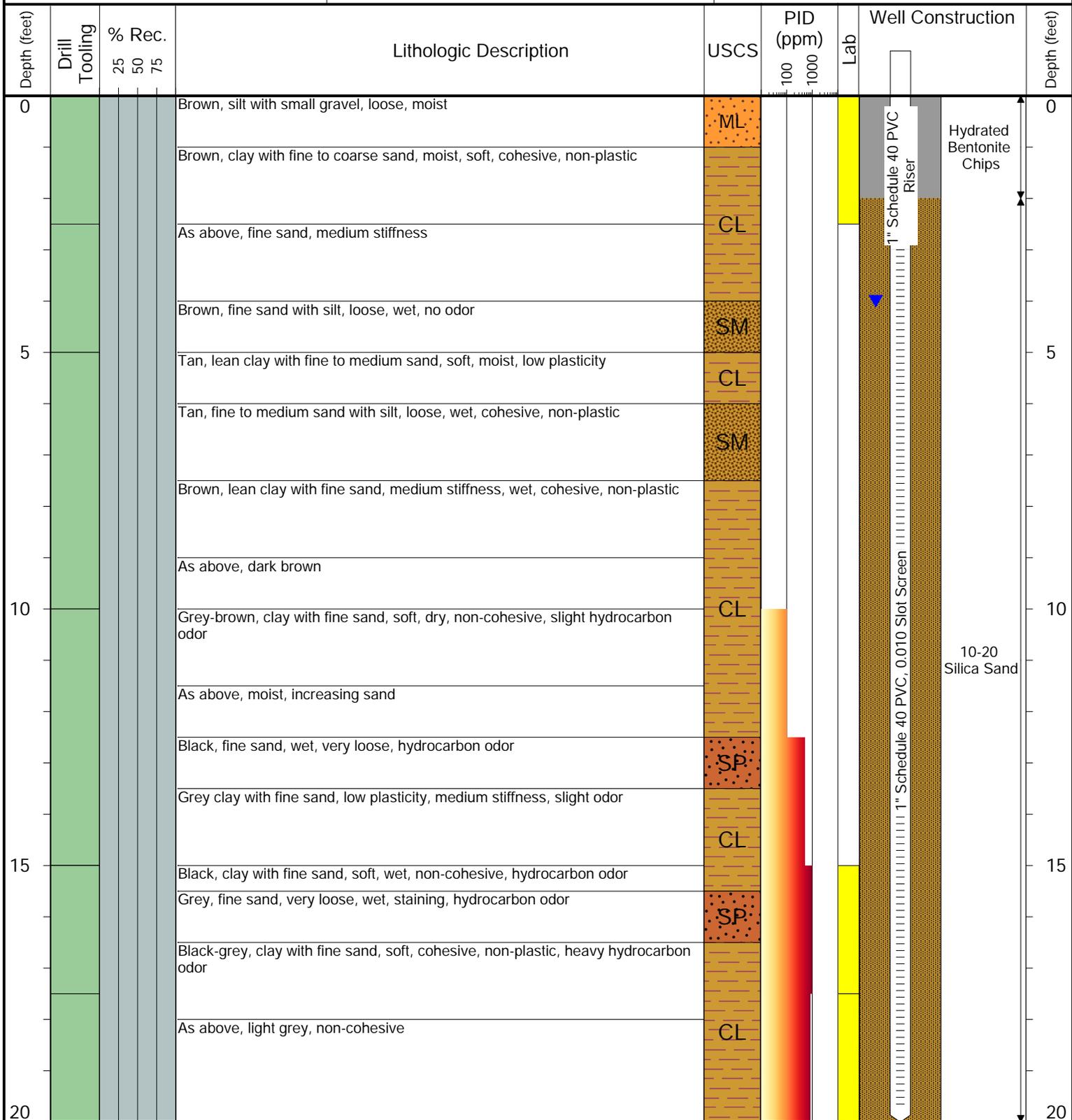
Laboratory Sample Types:

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



6855 119th St.
Broomfield, Colorado 80020

CLIENT: Noble Energy	Duncan D20-12, 20-13
LOGGED BY: Tanner Cook	
PROJECT MANAGER: Jake Whritenour	BORING / WELL ID: BH05
DRILLING CONTRACTOR: Site Services Drilling	
DRILLING EQUIPMENT: Geoprobe	LOCATION: Weld County, Colorado
DRILL BIT SIZE (INCHES): 2	LATITUDE (WGS 84): 40.21071589
DATE STARTED - COMPLETED: 8/21/2019 - 8/21/2019	LONGITUDE (WGS 84): -104.5844476
TOTAL WELL DEPTH (FT. BGS): 20	CASING ELEVATION (FT. AMSL): 4772.36
DEPTH TO WATER (FT. BGS): 4	GROUND ELEVATION (FT. AMSL): 4770.68



Drilling / Sample Method:

- Macro-Core
- Solid Stem Auger
- Hand Auger
- Hollow Stem Auger

Laboratory Sample Types:

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab



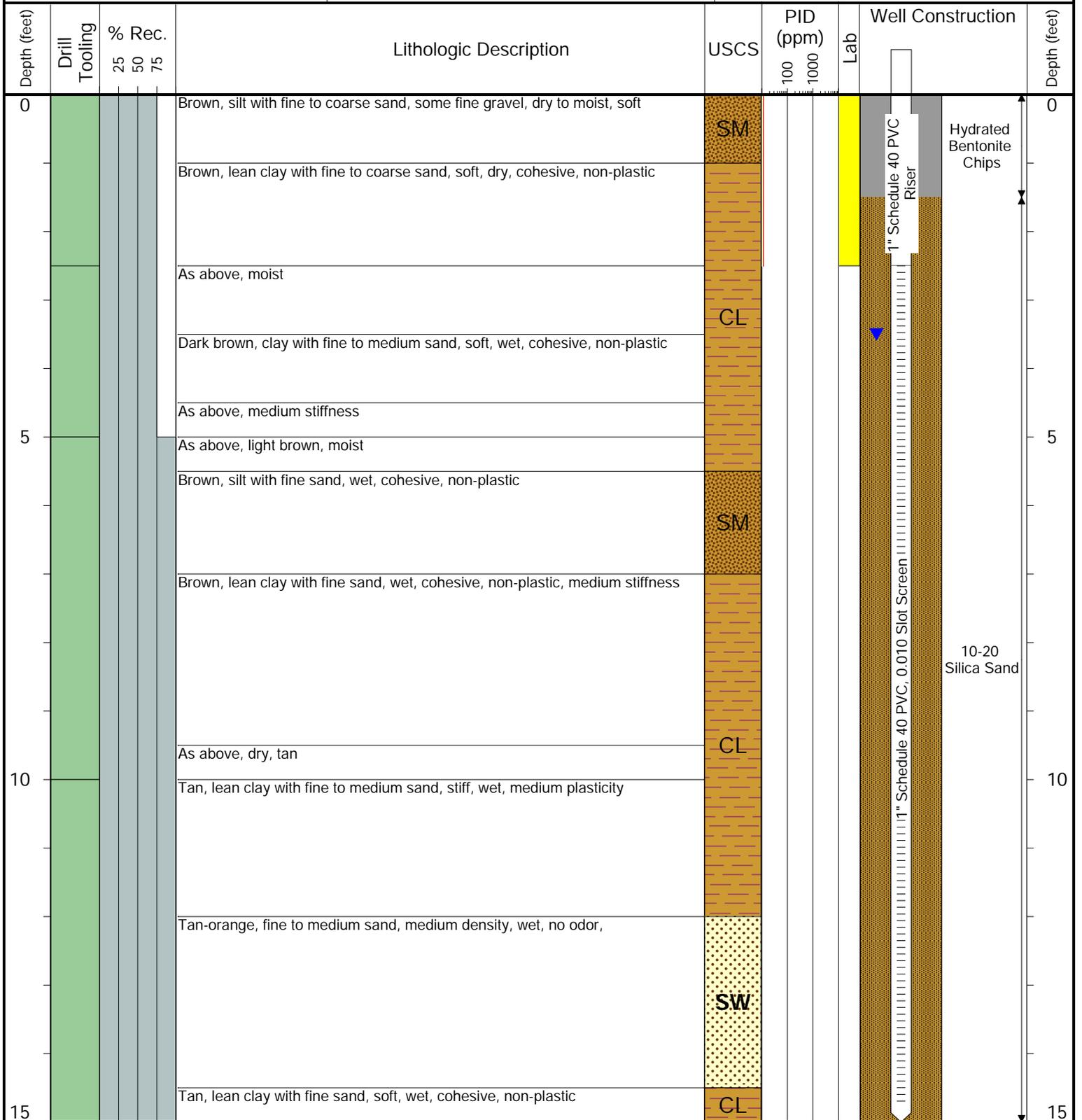
6855 119th St.
Broomfield, Colorado 80020

CLIENT: Noble Energy
 LOGGED BY: Tanner Cook
 PROJECT MANAGER: Jake Whritenour
 DRILLING CONTRACTOR: Site Services Drilling
 DRILLING EQUIPMENT: Geoprobe
 DRILL BIT SIZE (INCHES): 2
 DATE STARTED - COMPLETED: 8/21/2019 - 8/21/2019
 TOTAL WELL DEPTH (FT. BGS): 15
 DEPTH TO WATER (FT. BGS): 3.5

Duncan D20-12, 20-13

BORING / WELL ID: BH06

LOCATION: Weld County, Colorado
 LATITUDE (WGS 84): 40.21067318
 LONGITUDE (WGS 84): -104.5845637
 CASING ELEVATION (FT. AMSL): 4772.64
 GROUND ELEVATION (FT. AMSL): 4770.71



Drilling / Sample Method:

- Macro-Core
- Solid Stem Auger
- Hand Auger
- Hollow Stem Auger

Laboratory Sample Types:

- Geotechnical Lab
- Analytical Chemistry Lab
- Geotechnical & Analytical Chemistry Lab

ATTACHMENT B

LABORATORY ANALYTICAL DATA REPORT

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

August 29, 2019

Brandon Bruns

Tasman Geosciences

6855 W. 119th Ave.

Broomfield, CO 80020

RE: Noble - Duncan D20-12, 20-13

Work Order # 1908266

Enclosed are the results of analyses for samples received by Summit Scientific on 08/21/19 17:30. 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 Ben Shrewsbury

Laboratory Manager



Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Brunns

Reported:
08/29/19 17:10

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01@0-5'	1908266-01	Soil	08/21/19 12:45	08/21/19 17:30
BH01@15-17.5'	1908266-02	Soil	08/21/19 13:00	08/21/19 17:30
BH01@17.5-20'	1908266-03	Soil	08/21/19 13:05	08/21/19 17:30
BH02@0-2'	1908266-04	Soil	08/21/19 09:10	08/21/19 17:30
BH03@0-2.5'	1908266-05	Soil	08/21/19 12:00	08/21/19 17:30
BH04@0-2.5'	1908266-06	Soil	08/21/19 10:55	08/21/19 17:30
BH04@18-20'	1908266-07	Soil	08/21/19 11:10	08/21/19 17:30
BH05@17.5-20'	1908266-08	Soil	08/21/19 10:05	08/21/19 17:30
BH05@15-17.5'	1908266-09	Soil	08/21/19 10:15	08/21/19 17:30
BH06@0-2.5'	1908266-10	Soil	08/21/19 14:10	08/21/19 17:30
BH05@0-2.5'	1908266-11	Soil	08/21/19 10:10	08/21/19 17:30

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.

Summit Scientific

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

Page 1 of 2

Client: Noble/Tasman
Address: 6855 119th St
City/State/Zip: Broomfield CO
Phone: 303-487-1228 Fax: -
Sampler Name: Tanner Cook

Project Manager: Brandon Bruns, Invoice: Jacob Evans
E-Mail: Bbruns@tasman-geo.com
Project Name: Duncan D20-12, 20-13
Project Number:

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 @ 0-5'		1245	1			X			X				X	X						
BH01 @ 15-17.5'		1300																		
BH01 @ 17.5-20		1305																		
BH02 @ 0-2'		0910																		
BH03 @ 0-2.5'		1200																		
BH04 @ 0-2.5'		1055																		
BH04 @ 18-20		1110																		
BH05 @ 17.5-20		1005																		
BH05 @ 15-17.5		1015																		
BH06 @ 0-2.5		1410																		
Relinquished by: <u>Tanner Cook</u>		Date/Time: <u>8/21/19 1550</u>		Received by: <u>Tasman Loch Box</u>		Date/Time: <u>8/21/19 1550</u>		Turn Around Time (Check)			Notes:									
								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: <u>Tasman Loch Box</u>		Date/Time: <u>8/21/19 1730</u>		Received by: <u>[Signature]</u>		Date/Time: <u>8/21/19 1730</u>		Sample Integrity:												
Relinquished by:		Date/Time:		Received in Lab by:		Date/Time:		Temperature Upon Receipt: <u>4.7</u>												
								Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>												

Summit Scientific

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

Client: Noble/Tasman
Address: 6855 119th St.-
City/State/Zip: Broomfield, CO
Phone: 303-487-1228 Fax: -
Sampler Name: Tanner Cook

Project Manager: Brandon Bruns, Invoice: Jacob Evans
E-Mail: Bbruns@tasman-geo.com
Project Name: Duncan 020-12, 20-13
Project Number:

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				
BH05@0-2.5	8/21/19	1010	1			X		X					X	X					
Relinquished by: <u>Tanner Cook</u>		Date/Time: <u>8/21/19 1550</u>		Received by: <u>Tasman Loch Box</u>		Date/Time: <u>8/21/19 1550</u>		Turn Around Time (Check)					Notes:						
								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: <u>Tasman Loch Box</u>		Date/Time: <u>8/21/19 1730</u>		Received by: <u>[Signature]</u>		Date/Time: <u>8/21/19 1730</u>		Sample Integrity: <u>4.7</u>											
Relinquished by:		Date/Time:		Received in Lab by:		Date/Time:		Temperature Upon Receipt: <u>4.7</u>											
								Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>											

Sample Receipt Checklist

S2 Work Order _____

Client: Noble/TASUMAN Client Project ID: Duncan D20-12,20-13

Shipped Via: H.D./P.D./FedEx/UPS/USPS/Other Airbill #: _____

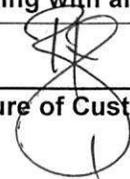
Matrix (check all that apply): Air Soil/Solid Water Other: _____
(Describe)

Temp (°C)	4.7
-----------	-----

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	
<u>Additional Comments (if any):</u> 				
⁽¹⁾ If NO, then contact the client before proceeding with analysis and note in case narrative.				

RE
Custodian Printed Name or Initials


Signature of Custodian

08/21/19
Date/Time 1802



Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Brun

Reported:
08/29/19 17:10

BH01@0-5'
1908266-01 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 12:45**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1908314	08/23/19	08/23/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 12:45**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		87.2 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		92.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 12:45**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	ND	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 12:45**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		105 %	30-150		"	"	"	"	

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
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Brun

Reported:
08/29/19 17:10

BH01@15-17.5'
1908266-02 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 13:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	0.20	0.0020	mg/kg	1	1908314	08/23/19	08/23/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.55	0.0050	"	"	"	"	"	"	
Xylenes (total)	3.8	1.0	"	100	"	"	"	"	
Naphthalene	0.38	0.010	"	1	"	"	"	"	
Gasoline Range Hydrocarbons	72	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 13:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		138 %	23-173	"	"	"	"	"	
Surrogate: Toluene-d8		83.2 %	20-170	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		241 %	21-167	"	"	"	"	"	S-02

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 13:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	170	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 13:00**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		98.6 %	30-150	"	"	"	"	"	

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
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/29/19 17:10

BH01@17.5-20'
1908266-03 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 13:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	0.18	0.0020	mg/kg	1	1908314	08/23/19	08/23/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.42	0.0050	"	"	"	"	"	"	
Xylenes (total)	2.7	1.0	"	100	"	"	"	"	
Naphthalene	0.22	0.010	"	1	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 13:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		124 %	23-173	"	"	"	"	"	
Surrogate: Toluene-d8		85.6 %	20-170	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		174 %	21-167	"	"	"	"	"	S-02

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 13:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	130	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 13:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		99.5 %	30-150	"	"	"	"	"	

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
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/29/19 17:10

BH02@0-2'
1908266-04 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 09:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1908314	08/23/19	08/23/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 09:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		87.7 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		90.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		115 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 09:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	ND	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 09:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		102 %	30-150		"	"	"	"	

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
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/29/19 17:10

BH03@0-2.5'
1908266-05 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 12:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1908314	08/23/19	08/23/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 12:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		84.2 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		92.8 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 12:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	ND	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 12:00**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		96.7 %	30-150		"	"	"	"	

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
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Brun

Reported:
08/29/19 17:10

BH04@0-2.5'
1908266-06 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1908314	08/23/19	08/23/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		86.9 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		93.1 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 10:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		96.9 %	30-150		"	"	"	"	

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
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/29/19 17:10

BH04@18-20'
1908266-07 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 11:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1908314	08/23/19	08/23/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.29	0.0050	"	"	"	"	"	"	
Xylenes (total)	6.9	1.0	"	100	"	"	"	"	
Naphthalene	0.17	0.010	"	1	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 11:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		99.8 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		89.3 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		150 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 11:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	100	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 11:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		95.9 %	30-150		"	"	"	"	

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
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Brun

Reported:
08/29/19 17:10

BH05@17.5-20'
1908266-08 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	0.12	0.0020	mg/kg	1	1908314	08/23/19	08/23/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.48	0.0050	"	"	"	"	"	"	
Xylenes (total)	3.1	1.0	"	100	"	"	"	"	
Naphthalene	0.28	0.010	"	1	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		107 %	23-173	"	"	"	"	"	
Surrogate: Toluene-d8		88.3 %	20-170	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		142 %	21-167	"	"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	100	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 10:05**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		95.7 %	30-150	"	"	"	"	"	

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
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Brun

Reported:
08/29/19 17:10

BH05@15-17.5'
1908266-09 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	0.27	0.0020	mg/kg	1	1908314	08/23/19	08/23/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	0.74	0.0050	"	"	"	"	"	"	
Xylenes (total)	5.5	1.0	"	100	"	"	"	"	
Naphthalene	0.45	0.010	"	1	"	"	"	"	
Gasoline Range Hydrocarbons	180	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		128 %	23-173	"	"	"	"	"	
Surrogate: Toluene-d8		84.4 %	20-170	"	"	"	"	"	
Surrogate: 4-Bromofluorobenzene		278 %	21-167	"	"	"	"	"	S-02

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	280	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 10:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		97.6 %	30-150	"	"	"	"	"	

Summit Scientific

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Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/29/19 17:10

BH06@0-2.5'
1908266-10 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	1908314	08/23/19	08/23/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		84.8 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		90.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 14:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		98.3 %	30-150		"	"	"	"	

Summit Scientific

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Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/29/19 17:10

BH05@0-2.5'
1908266-11 (Soil)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/21/19 10:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Benzene	ND	0.0020	mg/kg	1	1908314	08/23/19	08/24/19	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Naphthalene	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/21/19 10:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: 1,2-Dichloroethane-d4		85.6 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		94.5 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		104 %	21-167		"	"	"	"	

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/21/19 10:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
C10-C28 (DRO)	ND	50	mg/kg	1	1908315	"	08/24/19	EPA 8015M	

Date Sampled: **08/21/19 10:10**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
Surrogate: o-Terphenyl		100 %	30-150		"	"	"	"	

Summit Scientific

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Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/29/19 17:10

Volatile Organic Compounds by EPA Method 8260B - Quality Control

Summit Scientific

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

Batch 1908314 - EPA 5030 Soil MS

Blank (1908314-BLK1)

Prepared & Analyzed: 08/23/19

Benzene	ND	0.0020	mg/kg								
Toluene	ND	0.0050	"								
Ethylbenzene	ND	0.0050	"								
Xylenes (total)	ND	0.010	"								
Naphthalene	ND	0.010	"								
Gasoline Range Hydrocarbons	ND	50	"								
Surrogate: 1,2-Dichloroethane-d4	0.0354		"	0.0400		88.4		23-173			
Surrogate: Toluene-d8	0.0371		"	0.0400		92.8		20-170			
Surrogate: 4-Bromofluorobenzene	0.0396		"	0.0400		98.9		21-167			

LCS (1908314-BS1)

Prepared & Analyzed: 08/23/19

Benzene	0.0841	0.0020	mg/kg	0.100		84.1		70-130			
Toluene	0.0894	0.0050	"	0.100		89.4		70-130			
Ethylbenzene	0.0933	0.0050	"	0.100		93.3		70-130			
m,p-Xylene	0.193	0.010	"	0.200		96.7		70-130			
o-Xylene	0.0927	0.0050	"	0.100		92.7		70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0346		"	0.0400		86.6		23-173			
Surrogate: Toluene-d8	0.0371		"	0.0400		92.7		20-170			
Surrogate: 4-Bromofluorobenzene	0.0402		"	0.0400		100		21-167			

Matrix Spike (1908314-MS1)

Source: 1908266-01

Prepared & Analyzed: 08/23/19

Benzene	0.0845	0.0020	mg/kg	0.100	ND	84.5		70-130			
Toluene	0.0907	0.0050	"	0.100	ND	90.7		70-130			
Ethylbenzene	0.0928	0.0050	"	0.100	ND	92.8		70-130			
m,p-Xylene	0.193	0.010	"	0.200	ND	96.3		70-130			
o-Xylene	0.0939	0.0050	"	0.100	ND	93.9		70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0352		"	0.0400		87.9		23-173			
Surrogate: Toluene-d8	0.0379		"	0.0400		94.8		20-170			
Surrogate: 4-Bromofluorobenzene	0.0402		"	0.0400		100		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.



Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Brun

Reported:
08/29/19 17:10

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 1908314 - EPA 5030 Soil MS

Matrix Spike Dup (1908314-MSD1)	Source: 1908266-01			Prepared & Analyzed: 08/23/19						
Benzene	0.0853	0.0020	mg/kg	0.100	ND	85.3	70-130	0.848	30	
Toluene	0.0907	0.0050	"	0.100	ND	90.7	70-130	0.00	30	
Ethylbenzene	0.0937	0.0050	"	0.100	ND	93.7	70-130	0.998	30	
m,p-Xylene	0.192	0.010	"	0.200	ND	96.2	70-130	0.0156	30	
o-Xylene	0.0933	0.0050	"	0.100	ND	93.3	70-130	0.641	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0360</i>		<i>"</i>	<i>0.0400</i>		<i>90.0</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0373</i>		<i>"</i>	<i>0.0400</i>		<i>93.2</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0404</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>21-167</i>			

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
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/29/19 17:10

Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

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

Batch 1908315 - EPA 3550A

Blank (1908315-BLK1)

Prepared & Analyzed: 08/23/19

C10-C28 (DRO) ND 50 mg/kg

LCS (1908315-BS1)

Prepared: 08/23/19 Analyzed: 08/24/19

C10-C28 (DRO) 444 50 mg/kg 500 88.8 70-130

Matrix Spike (1908315-MS1)

Source: 1908266-01

Prepared: 08/23/19 Analyzed: 08/24/19

C10-C28 (DRO) 567 50 mg/kg 500 34.0 107 70-130

Matrix Spike Dup (1908315-MSD1)

Source: 1908266-01

Prepared: 08/23/19 Analyzed: 08/24/19

C10-C28 (DRO) 505 50 mg/kg 500 34.0 94.2 70-130 11.5 20

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
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/29/19 17:10

Notes and Definitions

S-02	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample extract.
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

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

September 03, 2019

Brandon Bruns

Tasman Geosciences

6855 W. 119th Ave.

Broomfield, CO 80020

RE: Noble - Duncan D20-12, 20-13

Work Order # 1908298

Enclosed are the results of analyses for samples received by Summit Scientific on 08/23/19 17:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Paul Shrewsbury For Ben Shrewsbury

Laboratory Manager



Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
09/03/19 07:16

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BH01	1908298-01	Water	08/23/19 11:30	08/23/19 17:30
BH02	1908298-02	Water	08/23/19 11:20	08/23/19 17:30
BH03	1908298-03	Water	08/23/19 11:00	08/23/19 17:30
BH04	1908298-04	Water	08/23/19 11:18	08/23/19 17:30
BH05	1908298-05	Water	08/23/19 11:05	08/23/19 17:30
BH06	1908298-06	Water	08/23/19 10:58	08/23/19 17:30

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.

1908298

Summit Scientific

S₂

4653 Table Mountain Drive ♦ Golden, Colorado 80403
303-277-9310 ♦ 303-374-5933 (f)

Client: Noble Enegry Project Manager: Brandon Bruns, Invoice: Jacob Evans
Address: E-Mail: bbruns@tasman-geo.com
City/State/Zip: Project Name: Duncan D 20-12, 20-13
Phone: Sampler Name: Kevin Chritz 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							
1	BH01	8/23/2019	11:30	3			X		X					X						
2	BH02	8/23/2019	11:20	3	X				X					X						
3	BH03	8/23/2019	11:00	3	X				X					X						
4	BH04	8/23/2019	11:18	3					X					X						
5	BH05	8/23/2019	11:05	3					X					X						
6	BH06	8/23/2019	10:58	3	X				X					X						
7																				
8																				
9																				
10																				

Relinquished by:  Date/Time: 8/23/2019 12:39	Received by: Tasman Box Date/Time: 8/23/2019 12:39	Turn Around Time (Check) Same Day <input type="checkbox"/> 72 hours 24 hours <input type="checkbox"/> Standard <input checked="" type="checkbox"/> 48 hours <input type="checkbox"/>	Notes:
Relinquished by: Tasman Box Date/Time: 8/23/2019 1730	Received by:  Date/Time: 8/23/19 1730	Sample Integrity: 	
Relinquished by:	Received by:	Temperature Upon Receipt:  Samples Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Sample Receipt Checklist

S2 Work Order 1908298

Client: NOBLE ENERGY Client Project ID: DUNCAN D 20-12, 20-13

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other _____ Airbill #: _____
 H.D. P.U. FedEx UPS USPS Other

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

Temp (°C)	5.8
-----------	-----

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.	✓			
Were all samples received intact ⁽¹⁾ ?	✓			
Was adequate sample volume provided ⁽¹⁾ ?	✓			
If custody seals are present, are they intact ⁽¹⁾ ?			✓	
Are samples with holding times due within 48 hours sample due within 48 hours present?		✓		
Is a chain-of-custody (COC) form present and filled out completely ⁽¹⁾ ?	✓			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	✓			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	✓			
Is the COC properly relinquished by the client w/ date and time recorded ⁽¹⁾ ?	✓			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.		✓		
Are samples preserved that require preservation (excluding cooling) ⁽¹⁾ ? Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect	✓			HCl
If samples are acid preserved for metals, is the pH ≤ 2 ⁽¹⁾ ? Record the pH in Comments.			✓	
If dissolved metals are requested, were samples field filtered?			✓	

Additional Comments (if any):

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

RZ

 Custodian Printed Name or Initials

RZ

 Signature of Custodian

8/23/19

 Date/Time



Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Brun

Reported:
09/03/19 07:16

BH01
1908298-01 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/23/19 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	440	100	ug/l	100	1908325	08/26/19	08/31/19	EPA 8260B	
Toluene	ND	1.0	"	1	"	"	"	"	
Ethylbenzene	490	100	"	100	"	"	"	"	
Xylenes (total)	1400	200	"	"	"	"	"	"	

Date Sampled: **08/23/19 11:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		116 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.7 %	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.



Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Brun

Reported:
09/03/19 07:16

BH02
1908298-02 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/23/19 11:20**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1908325	08/26/19	08/31/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **08/23/19 11:20**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		116 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		96.5 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.6 %		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.



Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Brun

Reported:
09/03/19 07:16

BH03
1908298-03 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/23/19 11:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1908325	08/26/19	08/31/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **08/23/19 11:00**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		118 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		98.2 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.8 %		21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
09/03/19 07:16

BH04
1908298-04 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/23/19 11:18**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1908325	08/26/19	08/31/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **08/23/19 11:18**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		120 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		98.0 %		21-167		"	"	"	"	

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Tasman Geosciences
6855 W. 119th Ave.
Broomfield CO, 80020

Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
09/03/19 07:16

BH05
1908298-05 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/23/19 11:05**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	340	100		ug/l	100	1908325	08/26/19	08/31/19	EPA 8260B	
Toluene	ND	1.0		"	1	"	"	"	"	
Ethylbenzene	500	100		"	100	"	"	"	"	
Xylenes (total)	1700	200		"	"	"	"	"	"	

Date Sampled: **08/23/19 11:05**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		117 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		99.7 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		96.6 %		21-167		"	"	"	"	

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Project Number: [none]
Project Manager: Brandon Brun

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09/03/19 07:16

BH06
1908298-06 (Water)

Summit Scientific

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/23/19 10:58**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Benzene	ND	1.0		ug/l	1	1908325	08/26/19	08/31/19	EPA 8260B	
Toluene	ND	1.0		"	"	"	"	"	"	
Ethylbenzene	ND	1.0		"	"	"	"	"	"	
Xylenes (total)	ND	2.0		"	"	"	"	"	"	

Date Sampled: **08/23/19 10:58**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Surrogate: 1,2-Dichloroethane-d4		122 %		23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %		20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.3 %		21-167		"	"	"	"	

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Project Number: [none]
Project Manager: Brandon Brunns

Reported:
09/03/19 07:16

Volatile Organic Compounds by EPA Method 8260B - Quality Control

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

Batch 1908325 - EPA 5030 Water MS

Blank (1908325-BLK1)

Prepared: 08/26/19 Analyzed: 08/31/19

Benzene	ND	1.0	ug/l							
Toluene	ND	1.0	"							
Ethylbenzene	ND	1.0	"							
Xylenes (total)	ND	2.0	"							
Surrogate: 1,2-Dichloroethane-d4	12.8		"	13.3		96.2		23-173		
Surrogate: Toluene-d8	12.2		"	13.3		91.5		20-170		
Surrogate: 4-Bromofluorobenzene	14.1		"	13.3		106		21-167		

LCS (1908325-BS1)

Prepared: 08/26/19 Analyzed: 08/31/19

Benzene	26.5	1.0	ug/l	33.3		79.6		51-132		
Toluene	29.0	1.0	"	33.3		87.0		51-138		
Ethylbenzene	29.5	1.0	"	33.3		88.4		58-146		
m,p-Xylene	61.7	2.0	"	66.7		92.6		57-144		
o-Xylene	29.7	1.0	"	33.3		89.0		53-146		
Surrogate: 1,2-Dichloroethane-d4	13.4		"	13.3		101		23-173		
Surrogate: Toluene-d8	12.5		"	13.3		93.7		20-170		
Surrogate: 4-Bromofluorobenzene	13.7		"	13.3		102		21-167		

Matrix Spike (1908325-MS1)

Source: 1908296-01

Prepared: 08/26/19 Analyzed: 08/31/19

Benzene	26.3	1.0	ug/l	33.3	ND	78.8		34-141		
Toluene	29.1	1.0	"	33.3	ND	87.4		27-151		
Ethylbenzene	29.5	1.0	"	33.3	ND	88.5		29-160		
m,p-Xylene	60.7	2.0	"	66.7	ND	91.1		20-166		
o-Xylene	29.2	1.0	"	33.3	ND	87.6		33-159		
Surrogate: 1,2-Dichloroethane-d4	13.2		"	13.3		99.3		23-173		
Surrogate: Toluene-d8	12.3		"	13.3		92.6		20-170		
Surrogate: 4-Bromofluorobenzene	13.7		"	13.3		103		21-167		

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Reported:
09/03/19 07:16

Volatile Organic Compounds by EPA Method 8260B - Quality Control

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

Batch 1908325 - EPA 5030 Water MS

Matrix Spike Dup (1908325-MSD1)	Source: 1908296-01			Prepared: 08/26/19 Analyzed: 08/31/19						
Benzene	26.6	1.0	ug/l	33.3	ND	80.0	34-141	1.40	30	
Toluene	28.9	1.0	"	33.3	ND	86.7	27-151	0.793	30	
Ethylbenzene	29.0	1.0	"	33.3	ND	87.1	29-160	1.57	30	
m,p-Xylene	60.5	2.0	"	66.7	ND	90.7	20-166	0.429	30	
o-Xylene	29.4	1.0	"	33.3	ND	88.2	33-159	0.717	30	
Surrogate: 1,2-Dichloroethane-d4	14.4		"	13.3		108	23-173			
Surrogate: Toluene-d8	12.6		"	13.3		94.5	20-170			
Surrogate: 4-Bromofluorobenzene	13.4		"	13.3		100	21-167			

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Project: Noble - Duncan D20-12, 20-13

Project Number: [none]
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Reported:
09/03/19 07:16

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