



**Sunoco  
Pipeline L.P.**

**Report Cover Sheet / D21.08**

(Use as 8.5x11 Cover Sheet for Reports without a Template)

Highlighted areas have a drop down list to select from.

All documents must be loaded to PCS Drop Box in PDF format and Named with underscores between each of these items:  
Document #; Spread; Inspectors First Initial & Last Name; then Date of Report. **EXAMPLE: D12.05\_OPP1\_JGreen\_020116**

<b>Inspector Name:</b>	Brian Lipinski, PG	
<b>Contractor Name:</b>	Michels Directional Crossings	
<b>Report Date:</b>	8/12/2020	
<b>Rev:</b>		
<b>Report Type:</b>	Misc Reports	
<b>Document Type:</b>	HDD Directional Survey	
<b>Spread:</b>	Spread 6	
<b>Pipeline #</b>	12127	
<b>Pipeline / Facility Name:</b>	20" Houston Injection-Twin Oaks	
<b>Pipeline / Facility SCADA Code:</b>	12127 - HST7-TWI5-20	
<b>Area:</b>	Eastern Area Pipelines	
<b>District:</b>	Montello	
<b>Mile Post:</b>		
<b>Station Start:</b>	14801+68	
<b>Station End:</b>	14828+04	
<b>Lat:</b>		
<b>Long:</b>		
<b>County:</b>	Chester	
<b>State:</b>	Pennsylvania	
<b>Agency:</b>	PADEP	
<b>Heat Number:</b>		
<b>Serial Number:</b>		
<b>NOTES:</b>	<p>End of Day Summary: Michels Pipeline spent the day cleaning up the IR. The reamer was pulled from the hole. Three truckloads (26 yards) of grout were pumped into the IR at the end of the day.  Ream from SE to NW. Total Length (MD): 2,686 ft  Total footage for the day (MD): 0 ft claimed + 0 ft unclaimed = 0 ft  Total footage completed to date (MD): 1579 ft (claimed) + n/aft (BTS) + 15 ft (unclaimed) = 1594ft  Estimated HD bit location: np ft (claimed) + n/a ft (BTS) + 0ft (unclaimed) = np ft  Estimated Pipeline Station Number: ---  No IRs. No LOC. No LCMs.  % Complete US+DS (MD): (n/a ft + 1594 ft)/2,686 ft = 59%</p>	
<b>Inspector Name:</b>	<b>Inspector Signature:</b>	<b>Date:</b>
Brian Lipinski, PG	<i>Brian Lipinski, PG</i>	8/12/2020
<b>Chief Inspector Name:</b>	<b>Chief Inspector Signature:</b>	<b>Date:</b>

# Sunoco Pipeline L.P. - Pennsylvania Pipeline Project

## HDD Inspection Daily Report

<b>Date:</b> 08/12/20	<b>Utility Inspector:</b> DS/Brad Golay: 580.304.9871 US/Leslie Gray: 870.217.2714	<b>PG Inspector:</b> Brian Lipinski, PG <b>PG Support:</b>			
<b>Spread #:</b> 6		<b>Company:</b> GES, Inc			
<b>HDD#/Name:</b> S3-0290-20 (US-DS)/Little Conestoga Rd Permit Name: Milford Rd/Little Conestoga Rd DS address: Green Valley Road, Downingtown, 19335 (40.079037, -75.711695). Look for RCE. US address: Little Conestoga Rd & Milford Rd, 19355 (40.082544, -75.716790)		<b>Weather</b> AM: 78-88 °F, partly cloudy PM: 88-90 °F, partly cloudy with thunderstorms Wind: SW, 2-12 mph Prior 24-hrs Precip: 0 inches			
<b>HDD Plan #:</b> PA-CH-0100.0000-RD <b>County/Township:</b> Chester/Upper Uwchlan Twp.					
<b>Drilling Supervisor:</b> <b>Company:</b> Michels		<b>HDD Path Length (ft):</b> 2,641 (HD) / 2,686 (MD) <b>Drilling Direction:</b> NW to SE [ ] SE to NW [X]			
		<b>Station start (SE):</b> 14828+04 <b>Starting Elev:</b> 377.76	<b>Station end (NW):</b> 14801+68 <b>Ending Elev:</b> 494.056		
<b>Steerhand/Surveyor:</b> n/a during ream		<b>Daily Claimed Footage per UI Report</b>	<b>Start</b>	<b>End</b>	<b>Total</b>
<b>Foreman:</b> James Day (DS) / Richard Wulff (US)			1579	1579	0
			na	na	na
<b>Driller:</b> James Day (DS) / Richard Wulff (US)			na	na	
<b>Rig Type:</b> Michels 880 (US and DS)			na	na	
<b>Drilling Stage:</b> Pilot [ ] Ream [X] Swab [ ] Pipe Pullback [ ] Post-pipe pull inspection [ ] <b>Pilot exit point/dist. from stake:</b> <b>Drill/Ream bit size:</b> 30"-inch		<b>Rate of Advancement:</b> Slow [ ] Moderate [ ] Rapid [ ] NA: [X]			
		<b>Materials Generated for Disposal:</b> Yes [X] No [ ]			
<b>IR Risk:</b> Low [ ] Medium [ ] High [X] If med/high, why? LOCs and IRs occurred during drilling for 16-in line (see Section 3)		<b>Waste Description:</b> IR cleanup materials; no amounts provided.			

<b>Previous IR in Area?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, when? During drilling for the 16-in line (see Section 3).	<b>Known Water Sources in ROI?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Residential well within 450 ft buffer of HDD alignment.
<b>Known Product Release Location(s)?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, describe:	<b>Wetlands:</b> W-H17
<b>Contamination Encountered?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If yes, describe:	<b>Streams:</b> S-H10 (SE stream segment), S-H11 (NW stream segment)
<b>Estimated GW Depth (from borings):</b> 16 ft-bgs at SE end.	<b>Other:</b> (Pond: P-H2 – east/northeast of ROW)
<b>Significant Increase of Groundwater in Returns?</b> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> If yes, describe:  <b>Distance/Depth/Est. Rate:</b> 16 ft-bgs at SE end/10 gpm.  After 16-in pipe was pulled groundwater did eventually emerge from SE e/e requiring a containment system. Flow on 5/21/20 was moderate – estimated to be 10 gpm from outer conductor casing.	<b>Unanticipated Water Sources Encountered?</b> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> If Yes, describe:
<p><b>Estimated Known Median Groundwater Well Yield:</b> 10 gpm +/-</p> <p><b>Area Geology (formations/fractures):</b></p> <p>The northwest entry/exit is located over the southeastern extent of a metadiabase, and SE of Milford Rd is a graphitic gneiss, referred to as the Pickering Gneiss.</p> <ul style="list-style-type: none"> <li>• <b>Metadiabase:</b> Regional maps show the metadiabase to the SE edge of Milford Rd. Consists of a dark-greenish-gray to almost black diabase. Grain size is generally 0.5 to 1 mm. The rock consists of augite, feldspar, and magnetite. Much of it has been extensively altered. Feldspar is altered to sericite, and augite has been replaced by epidote and chlorite. It occurs as mostly thin dikes, but a few may be greater than 100 feet thick. It exhibits no banding.</li> <li>• <b>Graphitic gneiss:</b> The graphitic felsic gneiss includes quartz, orthoclase, hornblende, biotite, graphite, and small areas of marble. It is light to medium gray. The graphite occurs as flakes 1 to 2 mm in diameter, somewhat larger than the usual grain size of the rock, and is disseminated throughout the gneiss. The unit is also referred to as the Pickering Gneiss. It has distinct and very common flaggy banding and is of sedimentary origin.</li> <li>• <b>Franklin Marble:</b> Observed on regional maps and occurs to the southeast of the graphitic gneiss. White- to light-gray-weathering, white, grayish-white, or, less commonly pinkish-orange, coarse- to locally fine-crystalline calcite marble with accessory amounts of graphite, phlogopite, chondrodite, clinopyroxene.</li> </ul> <p><b>Approximate fracture locations based on Refraction:</b> 5+68, 7+58, 10+33, 11+33, 12+08, 12+98, 13+48, 14+98, 15+53, 18+23, 20+43, 22+08, 23+48 (0+00 is NW entry/26+41 is SE entry)</p> <p><b>Approximate fracture locations based on MASW:</b> 5+78, 7+68, 10+08, 11+78, 13+48, 16+08, 18+48, 20+33, 22+28 (0+00 is NW entry/26+41 is SE entry)</p>	

1. Drilling Observations				
TIME ONSITE	DRILLING OBSERVATIONS	ROTARY TORQUE/PUSH-PULL/ANNULAR PRESSURE	DRILLING FLUID COMPOSITION/PUMPING RATE	MUD RETURN OBSERVATIONS
0700 to 1000	Michels pipeline cleaning up IR in Wetlands W-H17 and Stream S-H10. No UI Report.	RT = NA Push = NA AP = NA	Bentonite, NA	NA
1000 to 1300	Michels pipeline cleaning up IR in Wetlands W-H17 and Stream S-H10. Drill crew pulling joints from hole. No UI Report.	RT = NA Push = NA AP = NA	Bentonite, NA	NA
1300 to 1600	Michels pipeline cleaning up IR in Wetlands W-H17 and Stream S-H10. Drill crew pulling joints from hole. At about 1400, there were 17 joints pulled on the rack. Crew cabbed up for lightning until 1600. No UI Report.	RT = NA Push = NA AP = NA	Bentonite, NA	NA
1600 to 2030	Michels pipeline cleaning up IR in Wetlands W-H17 and Stream S-H10. Drill crew pulling joints from hole. Reamer at rig at 1810. Keystone Concrete arrived at 1810 and pumped 3 loads of grout into the IR depression. No UI Report.	RT = NA Push = NA AP = NA	Bentonite, NA	NA
<p><b>End of Day Summary:</b> Michels Pipeline spent the day cleaning up the IR. The reamer was pulled from the hole. Three truckloads (26 yards) of grout were pumped into the IR at the end of the day.</p> <p>Ream from SE to NW. Total Length (MD): 2,686 ft</p> <p><b>Total footage for the day (MD):</b> 0 ft claimed + 0 ft unclaimed = 0 ft</p> <p><b>Total footage completed to date (MD):</b> 1579 ft (claimed) + n/aft (BTS) + 15 ft (unclaimed) = 1594ft</p> <p><b>Estimated HD bit location:</b> np ft (claimed) + n/a ft (BTS) + 0ft (unclaimed) = np ft</p> <p><b>Estimated Pipeline Station Number:</b> ---</p> <p>No IRs. No LOC. No LCMs.</p> <p><b>% Complete US+DS (MD):</b> (n/a ft + 1594 ft)/2,686 ft = 59%</p>				

## 2. Other Observations

TIME ONSITE	OBSERVATIONS WALKING DRILL PATH	IR NOTED/ DESCRIPTION
0745-0845	Inspected and observed IR cleanup at Wetland W-H17 and downgradient in Stream S-H10.	NA
0945-1150	Inspected and observed IR cleanup at Wetland W-H17 and downgradient in Stream S-H10. Noted that the drill crew was pulling drill pipe on the DS rig.	NA
1315-1410	Inspected and observed IR cleanup at Wetland W-H17 and downgradient in Stream S-H10. Noted that the drill crew was pulling drill pipe on the DS rig. There are 17 joints out at 1410 when crew cabbed up for lightning.	NA
1600-2030	Inspected and observed IR cleanup at Wetland W-H17 and downgradient in Stream S-H10. The reamer was on the rig by 1810. Nothing was observed in the IR as the reamer was being removed from the hole. A concrete pump truck arrived at 1820 and began pumping grout into the IR depression. Each load only took approximately 10-15 minutes to pump but the last truck didn't arrive until 2002. Groundwater was observed coming from DS entry hole.	NA

## 3. Comments

### NOTES:

Upper Uwchlan Twp. Ordinance precludes personnel being on site prior to 0700 weekdays &, 0900 Saturday. Permitted work hours 7am-7pm (Mon through Fri) and 9am to 5pm (Sat). No work on Sundays or legal holidays.

**P&P Reference date:** Last revised 06/11/2019.

DS: 36-in outer casing: Installed to 90.1 ft (pipe in the ground); angle = 16 degrees.

DS: Centralizer casing: Installed to 95.05 ft; angle = 16 degrees

US: 36-in outer casing: Installed to 138.25 ft (pipe in the ground); angle = 18.5 degrees.

US: Centralizer casing: Installed to ~138.25 ft; angle = 18.5 degrees

**2/20/20:** BHA = 0.95 ft (bit) + 7.38 ft (jetting assembly) + 8.93 ft (gyro) + 1.23 ft (crossover sub) = 18.59 ft

**2/20/20:** BTS = 8.33 ft (gyro sensor/survey point 3 ft past jetting assembly)

**2/21/20:** BTS = 29.25 ft (mud motor/monel)

### 3. Comments

**3/2/20:** Confirmed that 26+41 (DS entry) is the 36-in casing and the reference point for a "completed" joint is the SE (i.e., DS) side of the vice. Drilling SE to NW. Offset from 36-in casing to vice is 18.85 ft SE. Steerhand makes all corrections such that distances reference edge of 36-in casing (26+41).

All Form A distances (HD and MD) include the BTS since the steerhand provide HD and MD to the gyro sensor.

**3/3/20:** PGs must minimize foot traffic across the wetlands (W-H17). Based on communications with Josh Prosceno, PGs will walk to edges from the SE and NW (from NW will park within in ROW on Highview). Onsite EI will fly the wetlands 2-3x in AM and PM, weather permitting and provide PGs with photo of wetlands if anything changes or an end of day photo. Person inspecting the ROW will park near NW edge of LOD to minimize vehicle traffic in work space.

**3/4/20:** Installed 20 yd<sup>3</sup> grout (used open joint at 645 ft MD from SE entry). Did not see grout emerge at SE entry.

**3/5/2020:** Jetting Assembly BHA = 11.5 ft

**3/6/20:** Installed 40 yd<sup>3</sup> (used open joint at ~508 ft MD from SE entry). While pumping third load, grout started to emerge at SE entry.

**3/9/20:** Augered out 36-in casing to 90.1 ft.

**3/13/20:** New BHA: 58.44 ft; New BTS: 32.96 ft. Changes due to different survey tool, and added monel to drill string with mud-motor.

**3/14/20:** Installed approximately 50 yd<sup>3</sup> grout (from open grout joint at 653.6 ft MD from SE entry). Grout observed within outer 36" casing at SE entry during pumping from the 5<sup>th</sup> grout truck. Grout volume to be confirmed in Monday (3/16/2020) meeting.

**3/16/20:** Drilled out grout from 26-in casing. Hard materials encountered at ~78 ft.

**3/20/20:** Tripped in joint #16, then Covid-19 related statewide work stoppage. Steady return flow before shutting down. After shut-down continuous flow from 36-in casing at 10 to 15 gpm.

**5/18/20:** Project restarted following Covid-19 work stoppage.

**5/22/20:** New BHA: 60.5 ft; New BTS: 33.5 ft. Utilizing new survey tool and added Monel to drill string with mud motor. Began augering out 36-in casing at NW entry.

**5/29/20:** Michels began drilling out grout placed before the Covid-19 work stoppage.

**5/30/30:** Michels reached face and resumed drilling new rock.

**6/01/20:** Drilled joint #21 then tripped out. Loss of flow was determined and while tripping back in at joint #14. Tripped back out swabbed the hole and tripped back in.

**06/18/20:** Change in BHA (60.6') from 33.5' bit to sensor to 33.6'

**6/19/20:** Begin pilot hole intersect phase at joint #29 (US side)

**06/25/20:** US mud fluid began discharging on the DS side today.

**06/26/20:** US intersected the DS bore today and began tripping in to DS side to begin reaming from DS.

**06/27/20:** US pushed through to the DS side today.

**3. Comments**

<b>IRs/LOC/Spills</b>				
<b>Date</b>	<b>IR/ LOC/ Spill?</b>	<b>Location: feet from entry / and (pipeline station)</b>	<b>Quantity (gal)</b>	<b>Comments</b>
6/19/17	LOC	~19+52 (add 20 ft to plot on 20-in P&P). 16-in station ~14821+62	1,500	LOC occurred while drilling 16-in pilot at ~1,952 ft from NW e/e. Drilling pilot from NW to SE.
6/20/19	LOC	~19+00 / (add 20 ft to plot on 20-in P&P). 16-in station ~14821+10	20,000	LOC occurred while drilling 16-in pilot at ~1,900 ft from NW e/e. Tripping out to NW e/e during pilot.
6/21/19	LOC	0+00 to ~19+87 (add 20 ft to plot on 20-in P&P). (16-in stations ~14802+10 to ~14821+97)	22,113	LOC occurred while drilling 16-in pilot, tripping in from NW e/e to the SE.
6//22/17	IR	~22+57 (add 20 ft to plot on 20-in P&P). 16-in station ~14824+67	50 to 100	IR occurred while drilling 16-in pilot along the embankment between the wetlands and the pond (P-H2).
8/29/17	IR	~22+90 (add 20 ft to plot on 20-in P&P). 16-in station ~14825+00	No volume provided.	IR occurred while drilling 16-in pilot, west of the alignment after resumed drilling following shut-down. Drilling fluid was being circulated for restart after shutdown.
3/3/2020	Partial LOC	~20+08 / (20-in station ~14821+17)	500	When bit 645 to 650 ft (MD) or 632 ft HD, NW of SE entry, driller observed ~50% decrease in returns to mud-pit. Drilling then immediately shut-down. Est fluid loss 500 gallons.
3/5/20	Full LOC	~21+68 (20-in station ~14823+50)	100	While tripping in with jetting assembly, pump rate of 300 gpm, driller observed full loss of returns at 485.5 ft (MD) (or ~472 ft HD) from SE entry. Est fluid loss 100 gallons.
3/13/20	LOC	~19+55 (20-in station ~14821+17)	~500	After tripping in to bottom, and advancing bore ~10 ft with BHA including mud-motor configuration, observed a LOC with an approximate 500 gallon fluid loss.
6/2/20	Fluid Loss	Joint 22 from SE e/e (695.5 to 728/14821+08 to 14820+75)	4,600	Loss of drilling fluid, but no change in both return flow to mud-pit or cuttings from shaker.

**3. Comments**

6/3/20	Fluid Loss	Joint 23 from SE e/e (728 to ~780 ft HD/14820+75 to 14820+23)	4,784	Loss of drilling fluid, but no change in both return flow to mud-pit or cuttings from shaker.
6/4/20	Fluid Loss	Joints 24 through 27 from SE e/e (~740 to ~867 ft HD/14821+40 to 14820+26)	6,400	Loss of drilling fluid, but no change in both return flow to mud-pit or cuttings from shaker.
6/5/20	Fluid Loss	Joint 28 SE e/e (~887 to ~937 ft HD/14819+16 to 14818+66)	2,250	Loss of drilling fluid, but no change in both return flow to mud-pit or cuttings from shaker.
6/6/20	Fluid Loss	Tripped out then tripping in up to Joint #11 (~	2,000	Michels reported fluid losses of 2,000 gallons for the day. No LOC or loss of cuttings returns observed
7/2/20	Spill	Drilling joint 19, fitting burst on rig	~10	Drilling fluid spilled onto joint rack, rig and below rig in secondary recovery pit. Minimal spill.
7/10/20	Spill	~100 feet from DS entry 14827+00	<5	Oily substance on timber mat. Absorbent applied and later removed; covered 12X6 area.
8/10/20	IR	In Wetlands W-H17 at station 14824+00	10,000	Mud in wetlands W-H17; inspected off LOD and it extends several hundred feet downstream in S-H10. Subsequent inspections by third parties revealed it made it downstream to the Marsh Creek Lake

**4. 3<sup>rd</sup> Party Inspections**

NAME	AGENCY	TIME ONSITE	COMMENTS/OBSERVATIONS/DEFICIENCIES



# Photographs

Comments: (Morning) View of IR site.



Comments: (Morning) View of stream S-H10 approximately 100ft downgradient of main IR. .



Date: 08/12/20

HDD Location: S3-0290-20 (US-DS)

Comments: (Morning) View of containment around IR point.



Comments: (Evening) View of IR prior to being filled with grout.



Date: 08/12/20

HDD Location: S3-0290-20 (US-DS)

Comments: (Evening) View of IR after being filled with grout.



**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
03/17/20		JValvik	32	20'auger	NW to SE	P ~34" auger	N/A	est 20'	est 20'	N/A	N/A	N/A	N/A	N/A	N/A	metadiabase	Hand Grab samples-Yellow brown silty sand, some weathered rock fragments (metadiabase)	none
03/17/20		JValvik	32	30'auger	NW to SE	P ~34" auger	N/A	est 30'	est 30'	N/A	N/A	N/A	N/A	N/A	N/A	metadiabase	A/A	none
5/28/2020																		Reported that petroleum odors observed while augering out 36-in casing. Casing at ~123 ft.
6/5/2020	19:00	TJohnson	N/A	N/A	NW to SE	Pilot - P	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Preparing to drill
6/6/2020		Ty Jackson	37	BHA	NW to SE	P - 12.25											No cuttings - bit in casing.	
6/8/2020		Steven Tanen	94.8	1a-1 to 3a-6	"	"	104	122	35	19	13,500	22,500	239	14	Steady		No cuttings - bit in casing.	Using BHA for distances (37 ft) since UI not permitted to request bit to survey point distance (aka bit to sensor)
"		"	31.9	4a-1 to 4a-5	"	"											No cuttings - bit in casing.	
"	12:59	"		4aA-6	"	"											No cuttings.	12:52 -on bottom/rock face
"	14:18	"	31.5	5a-1	"	"	175.2									Pickering Gneiss	Light gray, m to f, quartz and feldspar, tr calcite, tr biotite, trace hornblende, trace magnetite	Started joint #5 at 13:53
"	14:29	"		5a-2	"	"	180.2									"	"	
"	14:33	"		5a-3	"	"	185.2									"	"	
"	14:38	"		5a-4	"	"	190.2									"	"	
"	14:42	"		5a-5	"	"	195.2									"	"	- same, becoming coarser (c to m)
"	14:47	"		5a-6	"	"	201.7	221.99	54	n/p	16,785	50,000	239	27	"	"	- same, becoming finer (m to f)	Using BHA for distances (37 ft) since UI not permitted to request bit to survey point distance (aka bit to sensor)
6/9/2020	9:48	"	31.9	6a-1	"	"				n/p	23,000	55,000	107	25	"	"	Light gray coarse to fine, quartz and feldspar, calcite, biotite, trace hornblende, trace magnetite	0941: Started joint #6
"	9:55	"		6a-2	"	"										"	"	
"	10:05	"		6a-2	"	"										"	"	
"	10:28	"		6a-2	"	"										"	"	
"	10:42	"		6a-5	"	"										"	"	
"	11:55	"		6a-6	"	"	232.2	253.89	63.3							"	"	Using BHA for distances (37 ft) since UI not permitted to request bit to survey point distance (aka bit to sensor)
"	14:15	"	31.5	7a-1	"	"										"	"	1348: started joint #7.
"	16:15	"		7a-2	"	"				n/p	24000	55000	107	27	"	"	"	1415 started 7-2 (stopped from 1451 to 1600 due to hydraulic leak at mudpit pump (<1 pint). Cleaned up, replaced hose due to pin-hole leak.
"	16:55	"		7a-3	"	"	~247	~269								"	"	1655: Advanced #7 ~15 ft before tripping out to add mud-pump. HD & MD estimated based on where stopped before tripping out to change down-hole tooling (i.e., add mud motor) >>>Using BHA for distances (37 ft) since UI not permitted to request bit to survey point distance (aka bit to sensor)
<b>New joint count since extended BHA ~22 ft (previous sampling IDs renamed (e.g. 7-3 updated to 7a-3)</b>																		
6/10/2020	11:31	Steve Tanen		6-5	"	"									Steady	"	Light gray to gray coarse to fine, quartz and feldspar, trace calcite, biotite, trace hornblende, trace magnetite, some oxidation observed. Trace to little sericite, epidote and chlorite observed suggesting residuals from drilling through diabase mapped by others in area.	New joint count due to exention of BHA when adding mud-motor. BTS = 33.5 ft (per Michels management). Started 6-5 at 1123
"	12:08	"		6-6	"	"	228.7	274.34	63	18					"	"	"	
"	12:34	"	31.5	7-1	"	"										"	"	1224: started #7
"	12:42	"		7-2	"	"					20,000	51,000	685	29	"	"	"	
"	12:52	"		7-3	"	"										"	"	
"	13:01	"		7-4	"	"										"	"	
"	13:13	"		7-5	"	"										"	"	
"	14:31	"		7-6	"	"	260.7	305.84	33	30						"	"	
"	14:59	"	31.83	8-1	"	"										"	"	1450: started #8

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
"	15:11	"		8-2	"	"										"	- same with decreasing sericite, epidote and chlorite, increasing coarse materials (f Gravel size fragments observed).	
"	15:29	"		8-3	"	"										"		
"	15:43	"		8-4	"	"					20,000	60,000	700	33		"		
"	15:56	"		8-5	"	"										"		
"	16:12	"		8-6	"	"										"		
"	16:57	"	31.65	9-1	"	"										"		1652: started #9
"	17:14	"		9-2	"	"										"		
"	17:23	"		9-3	"	"										"		
"	17:33	"		9-4	"	"										"		
"	17:54	"		9-5	"	"										"		
"	18:12	"		9-6	"	"	321.4	369.32		24	12,000	51,000	700	40		"		1837 to 1847: started #10, drilled ~3 ft
06/11/20	10:49	Ty Johnson	31.1	10-1	"	"										Pickering Gneiss	quartz, feldspare, biotite, dark mineral	1040: started joint#10
"	11:09	"		10-2	"	"										Pickering Gneiss	quartz, feldspare, biotite, dark mineral	
"	11:13	"		10-3	"	"										Pickering Gneiss	quartz, feldspare, biotite, dark mineral	
"	11:21	"		10-4	"	"										Pickering Gneiss	quartz, feldspare, biotite, dark mineral, green mineral	
"	11:27	"		10-5	"	"										Pickering Gneiss	quartz, feldspare, biotite, dark mineral, green mineral	
"	11:35	"		10-6	"	"	351.5	401.5	101	30	20,000	61,000	700	46	100	Pickering Gneiss	quartz, feldspare, biotite, dark mineral, green mineral	
"	12:08	"	32	11-1	"	"										Pickering Gneiss	quartz, feldspare, biotite, dark mineral, green mineral	1157: started joint #11
"	12:16	"		11-2	"	"										Pickering Gneiss	quartz, feldspare, biotite, dark mineral, green mineral, yellow mineral	
"	1:29	"		11-3	"	"										Pickering Gneiss	quartz, feldspare, biotite, dark mineral, green mineral, yellow mineral	
"	13:55	"		11-4	"	"										"	quartz, feldspare, biotite, dark mineral, green mineral, yellow mineral	
"	13:59	"		11-5	"	"										"	quartz, feldspare, biotite, dark mineral, green mineral	
"	14:12	"		11-6	"	"	382.5	433.5	110	24	13,000	59,000	700	55		"	quartz, feldspare, biotite, dark mineral, green mineral	
"	15:13	"	31.5	12-1	"	"										"	quartz, feldspare, biotite, dark mineral, green mineral, yellow mineral	1446: started joint #12
"	15:43	"		12-2	"	"										"	quartz, feldspare, biotite, dark mineral, green mineral	
"	16:00	"		12-3	"	"										"	quartz, feldspare, biotite, dark mineral	
"	16:23	"		12-4	"	"										"	quartz, feldspare, biotite, dark mineral	
"	16:40	"		12-5	"	"										"	quartz, feldspare, biotite, dark mineral, green mineral	
"	16:51	"		12-6	"	"										"	quartz, feldspare, biotite, dark mineral, green mineral	
"	17:30	"	31.4	13-1	"	"										"	quartz, feldspare, biotite, dark mineral, green mineral	1717: started joint #13
"	17:35	"		13-2	"	"										"	quartz, feldspare, biotite, dark mineral	
"	17:43	"		13-3	"	"										"	quartz, feldspare, biotite, dark mineral, green mineral	
"	17:58	"		13-4	"	"										"	quartz, feldspare, biotite, dark mineral	
"	18:06	"		13-5	"	"										"	quartz, feldspare, biotite, dark mineral	
"	18:24	"		13-6	"	"	443.5	497.5	129	18	13,200	58,000	700	62	100	"	quartz, feldspare, biotite, dark mineral	
06/12/20	8:10	"	31.5	14-1	"	"										"	qzt, feldsp, dk mineral,	0800: start joint 14
"	8:35	"		14-2	"	"										"	qzt, feldsp, dk mineral, minor green mineral	
"	8:50	"		14-3	"	"										"	qzt, feldsp, dk mineral,	
"	9:05	"		14-4	"	"										"	qzt, feldsp, dk mineral, green mineral, minor biotite	
"	9:32	"		14-5	"	"										"	qzt, feldsp, dk mineral, minor yellow mineral	
"	9:55	"		14-6	"	"	443.5	497.5	130	18	13,000	60,000	700	73	100	"	qzt, feldsp, dk mineral, minor biotite, black garnet	1004: finish joint 14
"	10:30	"	31.6	15-1	"	"										"	qzt, feldsp, dk mineral, bright white mineral, minor green mineral	1023: start joint 15
"	10:45	"		15-2	"	"										"	qzt, feldsp, dk mineral, bright white mineral, minor green mineral	
"	11:10	"		15-3	"	"										"	qzt, feldsp, dk mineral, bright white mineral, minor light green mineral	
"	11:35	"		15-4	"	"										"	qzt, feldsp, dk mineral, bright white mineral major	
"	12:00	"		15-5	"	"										"	qzt, feldsp, dk mineral, bright white mineral, dk green mineral very minor	
"	12:10	"		15-6	"	"	503.5	560.5	149	15	13,000	60,000	700	78	100	"	qzt, feldsp, dk mineral, bright white mineral	1247: finish joint 15

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
"	13:05	"	31.5	16-1	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor, dark and light green mineral minor,	1256: start joint 16
"	14:10	"		16-2	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor, dark green mineral minor, black garnet, biotite	
"	14:30	"		16-3	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor, dark green mineral minor, biotite	
"	14:55	"		16-4	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor, dark green mineral minor, light yellow/green mineral, biotite	
"	15:15	"		16-5	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor, dark green mineral minor, biotite	
"	15:25	"		16-6	"	"	531.5	591.5	158	16.8	13,000	66,000	700	79	100	"	qzt, feldsp, dk mineral, bright white mineral minor, biotite	1539: finish joint 16
"	16:00	"	31.6	17-1	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor	1555: start joint 17
"	16:15	"		17-2	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor, dark green mineral, biotite	
"	16:30	"		17-3	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor, biotite	
"	16:58	"		17-4	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor	
"	17:05	"		17-5	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor	1717: completed 25 ft of joint17 then tripped out to joint 9; added unclaimed footage to HD and MD; 1830: finish trip out to joint 9
06/13/20	13:20	"		17-6	"	"										"	qzt, feldsp, dk mineral, bright white mineral minor, green mineral,	1326: completed joint 17, tripped out to joint 16 then began shaving
06/15/20	n/a	Steven Tanen		see comments	"	"									Steady	"	n/s	n/s: no samples. Continued to shave and swab bore along joint #17. Multiple passes made were made throughout the day. Joint #17 will be claimed once bore back desired path. Plan is to take a survey shot at start of 6/16/20 to assess Joint #17 bit location.
06/16/20	n/a	Brian Lapinski		17-6	"	"	564.5	623.54	165						Steady	Pickering Gneiss		Once shaving completed, took a survey shot at the end of Joint #17 on 6/16/20
"	9:00	"	32.1	18-1	"	"										"	gray to light gray, medium to fine, quartz, feldspar (plagioclase), trace hornblends, little to trace sericite (white, fine grained and soft flakes), and trace epidote	0845: Started #18
"	9:10	"		18-2	"	"										"		
"	9:25	"		18-3	"	"				21	13,000	60,000	700	83	"	"	- decreasing grain size	
"	9:45	"		18-4	"	"										"		
"	9:58	"		18-5	"	"										"		
"	10:17	"		18-6	"	"	595.7	655.64	173							"		Swabbed and shaved at end of joint 18
"	12:44	"	31.59	19-1	"	"										"		1236: Started #19
"	12:56	Steve Tanen		19-2	"	"					12,000	55,000	700	87	"	"		
"	14:09	"		19-3	"	"										"		
"	14:19	"		19-4	"	"										"		
"	14:30	"		19-5	"	"										"		-same, but very fine
"	14:45	"		19-6	"	"	626.5	687.23	179.6							"		
"	15:20	"	31.67	20-1	"	"										"		1507: Started #20
"	15:33	"		20-2	"	"				22.8	13,000	58,000	700	91	"	"		
"	15:55	"		20-3	"	"										"		
"	16:04	"		20-4	"	"										"		
"	16:14	"		20-5	"	"										"		
"	16:35	"		20-6	"	"	657.5	718.9	186.1							"		
"	17:32	"	31.57	21-1	"	"										"		1721: Started #21
"	17:45	"		21-2	"	"										"		
"	17:56	"		21-3	"	"										"		
"	18:08	"		21-4	"	"										"		
"	18:24	"		21-5	"	"				19.2	15,000	57,000	700	93	"	"		1846: stopped with ~ 1.5 ft to go on joint.
06/17/20	9:18	Steve Tanen		21-6	"	"	688.5	750.5	192	15	12,000	40,000	457	93	"	"	Intermediate Gneiss - Gray, m to f, quartz, feldspar (plagioclase), hornblende, trace sericite	0900: continued on #21 (1.5 ft remained). Rig idle for repairs after #21 completed.

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
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Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
"	14:50	"	33.66	22-1	"	"										"	"	Added ~2 ft spider between #21 and #22. 1433: Started Joint #22
"	15:03	"		22-2	"	"										"	"	
"	15:17	"		22-3	"	"										"	"	
"	15:32	"		22-4	"	"				n/r	14,000	56,000	700	93	"	"	"	
"	15:54	"		22-5	"	"										"	"	
"	16:29	"		22-6	"	"	721.5	784.1	198.4							"	"	
"	17:42	"		23-1	"	"										"	"	- same as above, but becoming fine to very fine
"	18:08	"		23-2	"	"										"	"	1729: Started Joint #23
"	18:24	"		23-3	"	"										"	"	
"	18:36	"		23-4	"	"				16.8	13,000	50,000	700	107	"	"	"	Stopped for the day ~3 ft past 23-4
06/18/20	8:06	Ty Johnson		23-4	"	"										"	"	quartz, feldspar, dark mineral,, lots of biotite
"	8:15	"		23-5	"	"										"	"	quartz, feldspar, dark mineral,, lots of biotite, minor light green minereal,
"	8:30	"		23-6	"	"										"	"	quartz, feldspar, dark mineral,, lots of biotite, minor bright white minereal,
"	9:25	"		24-1	"	"										"	"	quartz, feldspar, dark mineral, biotite, minor bright white minereal,
"	9:45	"		24-2	"	"										"	"	quartz, feldspar, dark mineral, biotite, minor bright white minereal,
"	10:05	"	31.54	24-3	"	"	752.5	815.5	204	0.28	12,000	54,000	700	106	100	"	"	quartz, feldspar, dark mineral, biotite, minor bright white minereal,
"	10:30	"		24-4	"	"										"	"	quartz, feldspar, dark mineral, biotite, minor bright white minereal,
"	10:55	"		24-5	"	"										"	"	quartz, feldspar, dark mineral, biotite, minor bright white minereal,
"	11:10	"		24-6	"	"										"	"	quartz, feldspar, dark mineral, biotite, minor bright white minereal,
"	12:15	"		25-1	"	"										"	"	quartz, feldspar, dark mineral, biotite, minor bright white minereal, very minor yellow mineral
"	12:30	"		25-2	"	"										"	"	quartz, feldspar, dark mineral, biotite, minor bright white minereal, very minor green mineral
"	12:50	"	31.59	25-3	"	"	783.5	847.5	210	0.24	15,000	62,000	700	117	100	"	"	quartz, feldspar, dark mineral, biotite, minor bright white minereal, very minor green mineral
"	14:30	"		25-4	"	"										"	"	quartz, feldspar, dark mineral, minor biotite, minor bright white mineral
"	14:45	"		25-5	"	"										"	"	quartz, feldspar, dark mineral, minor bright white mineral,very minor green mineral
"	15:00	"		25-6	"	"										"	"	quartz, feldspar, dark mineral, biotite, bright white mineral
"	15:55	"	31.91	26-1	"	"	815.5	879.5	215	0.26	20,000	61,000	700	120	"	"	"	quartz, feldspar, dark mineral, biotite, bright white mineral
"	16:10	"		26-2	"	"										"	"	quartz, feldspar, dark mineral, bright white mineral, light green mineral
"	16:20	"		26-3	"	"										"	"	quartz, feldspar, dark mineral, bright white mineral
"	16:45	"		26-4	"	"										"	"	quartz, feldspar, dark mineral, biotite, bright white mineral, minor green mineral
"	17:00	"		26-5	"	"										"	"	quartz, feldspar, dark mineral, minor biotite, bright white mineral, minor light green mineral
"	17:20	"	31.77	26-6	"	"	846.7	910.94	218.9	0.24	19,000	60,000	700	116	"	"	"	quartz, feldspar, dark mineral, bright white mineral
06/19/20	8:36	"		27-1	"	"										"	"	quartz, feldspar, dark mineral, bright white mineral, minor biotite
"	9:00	"		27-2	"	"										"	"	quartz, feldspar, dark mineral, bright white mineral, minor biotite, minor green mineral
"	9:14	"		27-3	"	"										"	"	quartz, feldspar, dark mineral, bright white mineral, minor biotite, minor green mineral

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
"	9:41	"		27-4	"	"										"	quartz, feldspar, dark mineral, bright white mineral, minor biotite	
"	10:00	"	31.54	27-5	"	"	np	910.94	np	np	16,000	60,000	700	115	100	"	quartz, feldspar, dark mineral, minor bright white mineral, minor biotite, minor green mineral	
"	10:16	"		27-6	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral, minor biotite	1021: Complete drilling joint 27
"	11:40	"		28-1	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral, minor biotite	1102: Begin drilling joint 28
"	12:35	"		28-2	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral, minor biotite	
"	12:58	"	31.47	28-3	"	"	844.5	908.98	222.7	0.26	14,000	60,000	700	134	100	"	quartz, feldspar, dark mineral, minor bright white mineral, minor biotite	
"	missed	"		28-4	"	"										"		missed due to lightning threat
"	missed	"		28-5	"	"										"		missed due to lightning threat; 1345: Complete drilling joint 28
"	14:08	"		28-6	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral	1400: begin drilling joint 29. Crew moved from drilling pilot hole to pilot hole intersect; 1408: sample 28-6 collected due to miss during lightning threat.
"	14:31	"		29-1	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral	
"	14:50	"		29-2	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral, minor biotite	
"	15:03	"		29-3	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral	
"	15:32	"		29-4	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral, minor biotite	
"	15:52	"		29-5	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral	
"	16:00	"	31.7	29-6	"	"	909.3	973.95	229.3	0.25	15,000	60,000	700	123	100	"	quartz, feldspar, dark mineral, minor bright white mineral, biotite	1604: Complete drilling joint 29
"	17:52	"		30-1	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral, minor biotite	1625: Begin drilling joint 30
"	18:00	"		30-2	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral, minor biotite	
"	18:14	"		30-3	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral	
"	18:23	"		30-4	"	"										"	quartz, feldspar, dark mineral, minor bright white mineral	
"	18:28	"		30-5	"	"	940.8	1005.65	229.3	0.27	16,000	58,000	700	125	100	"	quartz, feldspar, dark mineral, minor bright white mineral	1830: Stop for the day with 25 feet of joint 30 drilled
06/20/20	10:25	"	32	30-6	"	"	972.5	1037.5	232	0.48	14,000	55,000	700	112	100	"	quartz, feldspar, dark mineral, minor bright white mineral, biotite, minor green mineral	10:26: Complete drilling joint 30; Then begin surveying for intersection process
"	16:21	"		31-1	"	"	972.5	1037.5	232	np	14,000	55,000	700	112	100	"	quartz, feldspar, dark mineral, minor bright white mineral, biotite	Still trying to intersect downstream bore: Completed 8 feet of joint 31
06/22/20	n/a	Brian Lipinski, PG		31-2	"	"										"	no sample collected; overlap of DS drilled section	
"	n/a	"		31-3	"	"										"	"	
"	n/a	"		31-4	"	"										"	"	
"	n/a	"		31-5	"	"										"	"	
"	n/a	"	31.71	31-6	"	"	1004.9	1069.37	231.3	12	13,000	60,000	700	114	steady	"	"	
"	n/a	"		32-1	"	"										"	"	
"	n/a	"		32-2	"	"										"	"	
"	n/a	"		32-3	"	"										"	"	
"	n/a	"		32-4	"	"										"	"	
"	n/a	"		32-5	"	"										"	"	
"	n/a	"	31.53	32-6	"	"	1036.4	1100.9	232.4	10.2	13,000	61,000	700	128	Steady	"	"	

Horizontal Distance = straight line distance from entry point to drill bit.  
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Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)



**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
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Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
"	15:26	"		33-1	"	"										"	gray to light gray, medium to fine, quartz, feldspar (plagioclase), trace hornblends, little to trace sericite (white, fine grained and soft flakes), and trace epidote	
"	15:50	"		33-2	"	"										"	no change	
"	16:30	"		33-3	"	"										"		
"	17:01	"		33-4	"	"										"		
"	17:40	"		33-5	"	"										"		
"	18:22	"	31.77	33-6	"	"	1068.2	1132.67	233.3	9	14,000	60,000	700	133	Steady	"		
06/23/20	10:29	Brian Lipinski, PG		34-1	"	"										"	gray to light gray, medium to fine, quartz, feldspar (plagioclase), trace hornblends, little to trace sericite (white, fine grained and soft flakes), and trace epidote	
"	11:04	"		34-2	"	"										"	no change	
"	11:40	"		34-3	"	"										"		
"	11:50	"		34-4	"	"										"		
"	12:05	"		34-5	"	"										"		
"	12:35	"	31.73	34-6	"	"	1099.6	1164.4	235.5	15	14,000	60,000	700	135	steady	"		
"	13:45	"		35-1	"	"										"		
"	14:03	"		35-2	"	"										"		
"	14:39	"		35-3	"	"										"		
"	15:00	"		35-4	"	"										"		
"	15:20	"		35-5	"	"										"		
"	15:49	"	31.85	35-6	"	"	1131.4	1196.25	236.3	13.8	13,000	65,000	700	138	steady	"		
"	17:05	"		36-1	"	"										"		
"	17:20	"		36-2	"	"										"		
"	17:39	"		36-3	"	"										"		
"	17:58	"		36-4	"	"										"		
06/24/20	8:00	Brian Lipinski, PG		36-5	"	"										Pickering Gneiss	gray to light gray, medium to fine, quartz, feldspar (plagioclase), trace hornblends, little to trace sericite (white, fine grained and soft flakes), and trace epidote	
"	8:24	"	31.73	36-6	"	"	1163.1	1227.98	236.7	15	14,000	65,000	700	137	steady	"	no change	
"	9:15	"		37-1	"	"										"		
"	9:44	"		37-2	"	"										"		
"	10:24	"		37-3	"	"										"		
"	10:45	"		37-4	"	"										"		
"	11:03	"		37-5	"	"										"		
"	11:24	"	31.77	37-6	"	"	1194.9	1259.75	236.9	13.8	13,000	60,000	700	138	steady	"		
"	12:50	"		38-1	"	"										"		
"	13:00	"		38-2	"	"										"		
"	13:12	"		38-3	"	"										"		
"	14:30	"		38-4	"	"										"		
"	15:05	"		38-5	"	"										"		
"	15:15	"	31.38	38-6	"	"	1226.3	1291.13	237.1	13.2	15,000	60,000	700	140	steady	"		
"	17:30	"		39-1	"	"										"		
"	18:00	"		39-2	"	"										"		
"	18:18	"		39-3	"	"										"		
"	18:30	"		39-4	"	"										"		
06/25/20	9:10	Ty Johnson		39-5	"	"										"	quartz, feldspar, dark mineral, bright white mineral	
"	9:31	"	31.54	39-6	"	"		1322.67								"	quartz, feldspar, dark mineral, bright white mineral, minor biotite	
"	10:34	"		40-1	"	"										"	quartz, feldspar, dark mineral, bright white mineral	
"	11:29	"		40-2	"	"										"	quartz, feldspar, dark mineral, bright white mineral, minor biotite	
"	12:00	"		40-3	"	"										"	quartz, feldspar, dark mineral, bright white mineral	
"	12:26	"		40-4	"	"										"	quartz, feldspar, dark mineral, bright white mineral	
"	missed	"		40-5	"	"	1257.8	1322.67	237.7	0.15	13,000	65,000	700	143	100	"	missed	
"	13:07	"	31.98	40-6	"	"										"	quartz, feldspar, dark mineral, bright white mineral, minor biotite	
"	missed	"		41-1	"	"										"	missed	Drilling fluid returns intercepted downstream. Cuttings can not be sampled

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)	
"	missed	"		41-2	"	"										"	missed	Drilling fluid returns intercepted downstream. Cuttings can not be sampled	
"	missed	"		41-3	"	"	1256.3	1321.15	237.8	0.18	13,500	63,000	700	142	returns on DS side	"	missed	Drilling fluid returns intercepted downstream. Cuttings can not be sampled	
"	missed	"	20	41-4	"	"		1341.15					516	142	returns on DS side	"	missed	Drilling fluid returns intercepted downstream. Cuttings can not be sampled	
HDD No.: S3-0290-20 (DS)																			
Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)	
02/20/20	17:25	Steve Tanen	n/a	n/a	SE to NW	P - 12	na	na	na	na	na	na	na	na	na	na	na	Set-up BHA, calibrated gyro, then electrical issues. BTS = 8.33 ft. BHA = 18.59 ft	
02/21/20	1600	Lawrence Galiano	31.92	1-1	SE to NW	P - 12	na	na	0	80	1,400	65,030	258	4	100	Pickering Gneiss	Overburden - dk grayish brown sandy silt	Advanced BHA with mud motor/monel	
"	1605	"	"	1-2	"	"	na	na	"	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1610	"	"	1-3	"	"	na	na	"	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1615	"	"	1-4	"	"	na	na	"	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1620	"	"	1-5	"	"	na	na	"	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1625	"	"	1-6	"	"	na	na	"	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1630	"	31.82	2-1	"	"	50.63	63.8	14	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1635	"	"	2-2	"	"	"	-	"	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1640	"	"	2-3	"	"	"	-	"	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1645	"	"	2-4	"	"	"	-	"	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1650	"	"	2-5	"	"	"	-	"	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1655	"	"	2-6	"	"	"	-	"	"	"	"	"	"	"	"	Overburden - dk grayish brown sandy silt	"	
"	1700	"	32.12	3-1	"	"	"	80.8	"	"	"	"	"	"	"	"	weathered bedrock: Dark gray medium-grained gneiss	"	
"	1705	"	"	3-2	"	"	"	-	"	"	"	"	"	"	"	"	weathered bedrock: Dark gray medium-grained gneiss	"	
"	1705	"	"	3-3	"	"	"	-	"	"	"	"	"	"	"	"	Light to dark gray medium-coarse grained gneiss	"	
"	1715	"	"	3-4	"	"	"	101.8	"	"	"	"	"	"	"	"	Light to dark gray medium-coarse grained gneiss	"	
2/22/2020	11:30	Steve Tanen	"	na	na	na	na	na	"	na	na	na	na	na	na	na	na	No samples/no drilling activities	Rig down for repairs (mud cleaning system and power unit). Waiting on parts, expected 2/25/20.
2/27/2020	16:05	"	"	4-5	SE to NW	P - 12.25		36.6325							steady	Pickering Gneiss	dark gray mafic graphitic gneiss - hornblendes (<75%), qtz, orthoclase, graphite	Rig idle from 2/22-2/26/2020 - radiator system. 1556: Started drilling (continuing joint partially completed prior to breakdown). Change in the Joint count noted - corrected. Likely occurred when switching over from jetting bit assembly to mud motor.	
"	16:11	"	"	4-6	"	"	141.92	146.53	32		1,400	65,000	672	0	"	"	"	After joint completed, rig idle - mechanical (shaker system motor)	
2/28/2020	9:31	Alan R. Hirschfeld/ Steve Tanen	31.92	5-1	"	"									steady	"	dark gray mafic graphitic gneiss - hornblendes (<70%), qtz, orthoclase, graphite, tr.iron oxidation. Fine to medium sand sized	Started joint at 0915 after maintenance on mud-system pump.	
"	9:36	"	"	5-2	"	"									"	"	med gray felsic gneiss with hornblendes (<30%), qtz, and orthoclase		
"	9:45	"	"	5-3	"	"									"	"	a/a, increasng in size, medium to coarse grained, tr. iron oxidation		
"	9:51	"	"	5-4	"	"									"	"	a/a , med to coarse, with gravel sized fragments, moderaately oxidized		
"	9:57	"	"	5-5	"	"									"	"	light to med gray felsic gneiss with hornblendes (<30%), qtz, and orthoclase		
"	10:01	"	"	5-6	"	"	177.21	177.93	40.8		1,000	1,500	672	3	steady	"	a/a, fine to medium grain sized cuttings	Stopped for maintenance.	
"	13:10	"	31.85	6-1	"	"					1,400	1,500	672	29	"	"	a/a	Started joint at 1304	
"	13:17	"	"	6-2	"	"									"	"	a/a, increasing in size, med to coarse grain sized cuttings		
"	13:22	"	"	6-3	"	"									"	"	a/a		
"	13:25	"	"	6-4	"	"									"	"	a/a, slight iron oxidation (<30%)		
"	13:29	"	"	6-5	"	"									"	"	a/a, trace iron oxidation (<10%)	Stopped drilling (maintence) at 13:39	

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
"	14:34	"		6-6	"	"										"	a/a	Restarted drilling at 14:28
"	15:00	"	32.92	7-1	"	"										"	Highly weathered, oxidized, decomposed (>70%) brown felsic gneiss, with qtz and orthoclase, w soft silty oxidized nodules	Started joint at 1455. Easily pushing through.
"	15:03	"		7-2	"	"										"	Weathered, oxidized, decomposed (about 50%) light gray to brown felsic gneiss, with qtz and orthoclase, w soft silty oxidized nodules	Easily pushing through 5-ft intervals (1 minute or less)
"	15:04	"		7-3	"	"										"	a/a	"
"	15:05	"		7-4	"	"										"	a/a	"
"	15:06	"		7-5	"	"										"	a/a	"
"	15:07	"		7-6	"	"	235.06	242.7	56.47							"	a/a	"
"	16:03	"	31.67	8-1	"	"				14,000	14,000	1,500	672	42		"	a/a	Started joint at 1601. Easily pushing through.
"	16:04	"		8-2	"	"										"	a/a	Easily pushing through 5-ft intervals (1 minute or less)
"	16:05	"		8-3	"	"										"	a/a	"
"	16:05	"		8-4	"	"										"	a/a	"
"	16:06	"		8-5	"	"										"	a/a	"
"	16:06	"		8-6	"	"										"	a/a	"
"	16:18	"	31.44	9-1	"	"										"	a/a	Started joint at 1617. Easily pushing through.
"	16:21	"		9-2	"	"										"	a/a	Easily pushing through 5-ft intervals (1 minute or less)
"	16:22	"		9-3	"	"										"	a/a	"
"	16:23	"		9-4	"	"										"	a/a	"
"	16:23	"		9-5	"	"										"	a/a	"
"	16:24	"		9-6	"	"	296.51	305.81	70.79							"	a/a	"
"	16:35	"	32.94	10-1	"	"										"	a/a	Started joint at 1633
"	16:36	"		10-2	"	"										"	a/a	Easily pushing through 5-ft intervals (1 minute or less)
"	16:38	"		10-3	"	"										"	a/a	Harder interval, still relatively soft materials
"	16:40	"		10-4	"	"				14,000	1,200	699	55			"	a/a	Shutdown for mechanical issues (mud pump)
02/29/20	11:07	Marty Mengel/ Steve Tanen		10-5	"	"									Steady	"	Weathered , oxidized (approx 40%) light gray to tan felsic gneiss with qtz and orthoclase. Trace graphite. Med - course grain. 15% dark minerals.	Started drilling at 1106 on joint partially completed day prior.
"	11:09	"	323.6	10-6	"	"	328.76	338.75	77.41							"	a/a	
"	12:28	"	33.74	11-1	"	"										"	a/a	After joint #10 added spider (~2 ft). Joint 31.74 ft (total addition ~33.74 ft). Started joint at 1226
"	12:30	"		11-2	"	"										"	a/a	
"	12:31	"		11-3	"	"										"	a/a	
"	12:33	"		11-4	"	"										"	a/a	
"	12:34	"		11-5	"	"										"	a/a	
"	12:35	"		11-6	"	"										"	a/a	
"	12:48	"	32.99	12-1	"	"					15,000	1,000	699	59		"	Weathered , oxidized (approx 40%), light gray to tan felsic gneiss with qtz and orthoclase. Med - course grain. 20% dark minerals.	Started joint at 1245
"	12:50	"		12-2	"	"										"	a/a	
"	12:51	"		12-3	"	"										"	Weathered , oxidized (approx 40%), light gray to tan felsic gneiss with qtz and orthoclase. 20% dark minerals. 85% med-course grain. Approx 15% med gray gneiss cobble content.	Increased grain sizes
"	12:52	"		12-4	"	"										"	a/a	
"	12:53	"		12-5	"	"										"	a/a	
"	12:54	"		12-6	"	"										"	a/a	
"	13:53	"	32.97	13-1	"	"										"	a/a	Started joint at 1351
"	13:55	"		13-2	"	"										"	Weathered , oxidized (approx 40%), light gray to tan felsic gneiss with qtz and orthoclase. 20% dark minerals. Med-course grain.	

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1-2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
"	13:57	"		13-3	"	"											a/a	
"	13:59	"		13-4	"	"											a/a	
"	14:00	"		13-5	"	"											Less weathered , less oxidized (approx 20%), light to med gray/brown felsic gneiss with qtz and orthoclase. 20% dark minerals. Med-coarse grain.	
"	14:01	"		13-6	"	"											a/a	
"	14:38	"	32.92	14-1	"	"											a/a	Started joint at 1437
"	13:39	"		14-2	"	"											a/a	
"	14:41	"		14-3	"	"											a/a	
"	14:42	"		14-4	"	"											a/a	
"	14:43	"		14-5	"	"											a/a	
"	14:44	"		14-6	"	"											a/a	
"	14:55	"	31.85	15-1	"	"											a/a	Started joint at 1454
"	14:56	"		15-2	"	"											a/a	
"	15:00	"		15-3	"	"											a/a	Drilling rate notably slower - harder materials
"	15:03	"		15-4	"	"											a/a	
"	15:06	"		15-5	"	"											a/a	
"	15:09	"		15-6	"	"	490.9	503.31	105.35								a/a	
"	15:47	"	31.85	16-1	"	"											a/a	Started joint at 1542
"	15:51	"		16-2	"	"											a/a	
"	15:54	"		16-3	"	"											a/a	
"	15:58	"		16-4	"	"											a/a	
"	16:03	"		16-5	"	"											Less weathered , less oxidized (approx 15%), light to med gray/brown felsic gneiss with qtz and orthoclase. 30% dark minerals. Med-course grain.	Drilling rates notably slower starting at 15:00 (~475 ft).
"	16:06	"		16-6	"	"	522.52	535.16	109.15								a/a	
"	16:20	"	31.78	17-1	"	"					14,000	2,300	699	84			a/a	Started joint at 1615
"	16:26	"		17-2	"	"											a/a	
"	16:32	"		17-3	"	"											Less weathered, less oxidized (<10%), light to dark gray/brown felsic gneiss with qtz and orthoclase. 30% dark minerals. Med-course grain.	
"	16:38	"		17-4	"	"					17,000	2,300	699	99			a/a	
03/02/20	8:48	Brian Duggan/ Steve Tanen		17-5	"	"											Less weathered, less oxidized (<10%), light to dark gray/brown felsic gneiss with qtz and orthoclase. 30% dark minerals.Trace graphite	Started 17-5 at 0848
"	9:25	"		17-6	"	"	554.13	566.94	112								"	
"	10:03	"	32.9	18-1	"	"					19,000	2,300	700	113			"	Started joint at 0936
"	10:15	"		18-2	"	"											"	
"	10:29	"		18-3	"	"											"	
"	10:37	"		18-4	"	"											"	
"	11:19	"		18-5	"	"											"	Drilled 1037 to 1045, 1114 to 1119
"	11:32	"		18-6	"	"	586.93	599.89									"	Drilled 1119 to 1127, 1128 to 1132. Then started tripping out due to signal issue.
"	18:40	"	31.71	19-1	"	"					19,000	1,500	700	86			"	Started at 1825, stopped at 1840. Did not complete 19-1. Completed 3/2/20 at 0805 (started at 0800)
03/03/20	8:15	"		19-2	"	"											"	Started 19-2 at 0805
"	8:25	"		19-3	"	"											"	
"	8:36	"		19-4	"	"											"	
"	8:48	"		19-5	"	"											"	
"	8:58	"		19-6	"	"	618.54	631.6									"	
"	10:53	"	31.7	20-1	"	"					19,000	2,200	700	86			"	Started Joint @0932/ Stopped at 0934 (mech issue)/restarted at 1011 to 1017/1025 to 1055
"	11:04	"		20-2	"	"											"	

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
"	11:17	"		20-3	"	"								No notable change in AP	~50% reduction	"	"	1104 to 1117 then stopped due to partial LOC when driller observed ~50% reduction in mud returns. Did not complete 20-3 at time of partial LOC, ~2 ft of interval drilled.
03/04/20	19:00	Brian Duggan	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	No drilling activity, no samples. Grouting operations were performed as drilling was suspended due to yesterday's loss of fluid. Approximately 20 cubic yards of grout were pumped into borehole. Although bentonite bags and water were reportedly consumed (see Form B) no pumping was reported.
03/05/20	19:00	Steve Tanen	na	na	SE to NW	~12-in Jetting Bit	na	na	na	na	na	na	300 to start then dropped to 100	na	steady then 0% at ~485.5 ft MD	na	No grout observed in cuttings.	Tripping in w/ jetting assembly to clear grout from bore. Tripped into 485.5 ft at 300 gpm then experienced full mud loss (no returns to mud pit). Stopped tripping in.
03/06/20		Steve Tanen	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	Grouted bore. Installed 40 yd3 of grout. Grout started to emerge from casing at SE entry while pumping third load.
03/07/20		Marty Mengel	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	Augured approximately 20-feet of grouted casing today. No flow in mud pit.
03/09/20	19:00	Brian Duggan	na	na	SE to NW	na	na	na	na	na	na	na	na	na	na	na	na	Auguring completed with approximately 70-feet of grout removed from the casing. No flow in mud pit.
03/10/20	9:54	Steve Tanen	na	na	SE to NW	~12-in Jetting Bit	na	na	14	na	0	1,000	258	4	Steady	na	na	Tripping in w/ jetting bit assembly to clear grout from bore and confirm return flow.
"	12:38	"	"	"	"	"	na	na	56	na	0	1,000	205	1	"	"	na	"
"	15:37	"	"	"	"	"	na	na	70	na	0	1,000	205	60	"	"	na	"
"	18:59	"	"	"	"	"	na	na	89	na	1,500	1,500	280	105	"	"	na	Continued to trip in - stopped (at 1859) while advancing #13
03/11/20	10:00	Chris Mulry	na	na	SE to NW	~12-in Jetting Bit	na	na	90	na						na	na	advancing jetting bit through grout plug
"	16:00	"	na	na	"	"	629.24	642.4	119.7	31.7	13,000	1,500	285	103	100	felsic gneiss	na	tripped out, hole is clear at maximum length
03/12/20	19:00	Chris Mulry	na	na	SE to NW	none	na	na	na	na	na	na	na	na	na	na	na	no drilling, no tools in hole, no mud circulation.
03/13/20	16:09	Steve Tanen/Micah Forbes	31.76	19-5 (change to BHA)	"	P-12.25									Steady	felsic gneiss	Felsic gneiss. Grayish qtz and orthoclase. 30% dark minerals. Trace oxidation observed (<10%)	BHA changed to include mud-motor & monel. New joint count due to change in BHA. Reached bottom at ~19-5
"	16:43	"		19-6	"	"	685.58	698.74			1,200	3,700	699	85 to 72	LOC	intermediate gneiss	Intermediate gneiss. Increasing % of darker minerals.	Drilling notably harder at ~680 ft HD. LOC after completed joint and swabbing/sizing bore.
03/14/20	18:00	Marty Mengel	na	na	na	na	na	na	na	na	na	na	na	na	na	na	na	Grouted bore. Installed approx 50 yd3 of grout. Grout started to emerge from casing at SE entry while pumping 5th load.
03/16/20	17:00	Steven Tanen	na	na	SE to NW	~34-in auger	na	na	na	na	na	na	na	na	na	na	na	Reamed 34-in casing. Encountered hard materials (set grout) at ~78 ft.
03/17/20	19:00	"	na	na	"	P-12.25	na	na	na	na	na	na	na	na	na	na	na	na - tripping in
3/18/2020	10:00	Jeffrey Valvik	na	na	"	"	na	na	na	na	na	na	na	na	na	na	na	na - tripping in
"	13:00	"	"	"	"	"	na	na	na	na	1,400	50,000	306	64			na	na - tripping in
"	16:00	"	"	"	"	"	na	na	na	na	1,200	36,000	306	32			na	na - tripping in
"	18:00	Jeffrey Valvik	na	na	"	P-12.25	na	na	na	na	1,200	36,000	306	72	na	na	na	na - tripping in
3/19/2020	10:00	"	"	"	"	"	na	na	na	na	1,900	6,000	306	65	na	na	na	na - tripping in
"	13:00	"	"	"	"	"	na	na	na	na	na	na	na	na	na	na	na	na - tripping in
"	16:00	"	"	"	"	"	na	na	na	na	na	na	na	na	na	na	na	na - tripping in
"	19:00	"	"	"	"	"	na	na	na	na	1,400	2,900	600	64	na	na	na	na - tripping in
3/20/2020	16:41	Steve Tanen	na	na	"	"	na	na	na	na	na	na	na	na	na	na	na	na
5/22/2020	19:00	Lawrence Galiano	na	na	SE to NW	P-12.25	na	na	na	na	0	250	204	40	Steady	na	na	na-tripping in
5/23/2020	12:00	Lawrence Galiano	na	na	SE to NW	P-12.25	na	na	na	na	na	na	na	na	na	na	na	na

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
5/26/2020	19:00	Lawrence Galiano	na	na	SE to NW	P-12.25	na	na	na	na	na	na	na	na	na	na	na	Tripping in. Total of 17 joints advanced.
5/27/2020	19:00	Chris Mulry	na	na	SE to NW	P-12.25	na	na	na	na	na	na	na	na	na	na	na	Trip in, then trip out for sensor communication issue.
5/28/2020	19:00	Bob Heim	na	na	SE to NW	P-12.25	na	na	na	na	na	na	na	na	na	na	na	Trip out for connection / communication issues.
5/29/2020	17:15	Bob Heim	(redrill of 18-4 through 19-5 with current BTS configuration). Grout interval, not logged.	na	SE to NW	P-12.25	na	na	na	na	13,000	40,000	700	56	Steady	na	na (actually felsic gneiss, but this was from sides of borehole as drilled grout interval). No new formation cut today.	Trip in #4 - #18 (partial), drilled grout out of rest of #18 and out of approx. 25' of #19. Driller stated 8' more grout to drill before reach face. Based on this, projected face very closely matches HD & MD reported for sample 20-3 on 3/3 of this form and not the numbers on 3/13.
5/30/2020	14:27	Bob Heim		20-1	SE to NW	P-12.25	666	679								Pickerling Gneiss	felsic gneiss	
"	14:59	"		20-2	"	"	666	679								"	"	
"	15:14	"		20-3	"	"	666	679								"	"	
"	15:29	"		20-4	"	"	666	679								"	"	
"	15:40	"		20-5	"	"	666	679								"	"	
"	15:52	"	31.89	20-6	"	"	665.96	679.14	142.5	19	20,000	50,000	700	68	Steady	"	"	Drilled joint #20 (new rock, beyond grout).
"	16:34	"	31.51	21-1	"	"										"	"	Started joint #21
06/01/20	8:08	Ty Johnson	"	21-2	"	"										"	"	continued joint #21
"	8:21	"	"	21-3	"	"										"	"	"
"	8:29	"	"	21-4	"	"										"	"	"
"	8:33	"	"	21-5	"	"										"	"	"
"	8:49	"	"	21-6	"	"	695.41	708.50	145	0.9	18,000	42,000	700	54	"	"	"	Completed joint #21 (new rock)
06/02/20	16:24	Max Howard/Steve Tanen	33.04	22-1	"	"					18,000	68,000	700	75	"	"	Felsic gneiss: gray, some purple, glassy, white to brown, mix of quartz, calcite, with trace clinopyroxene and mica.	Started joint at 15:24. Stopped at ~15:26 due to driller reported diminished fluid returns and possible fluid loss (reported at ~350 gallons). PG did not observe reduction of return flow to the mud-pit or a loss of cuttings returns to the mud-cleaning/shaker system. Resumed at 16:14 after driller communicated with Michels senior management and subsequent conversations with Michels senior management, CM and ETP. CM, Ray Banach updated PGs (Steve Tanen and Lieschen Fish).
"	16:37	"		22-2	"	"										"	"	"
"	16:58	"		22-3	"	"										"	"	"
"	17:12	"		22-4	"	"										"	"	"
"	17:29	"		22-5	"	"										"	"	"
"	17:54	"		22-6	"	"	728.5	741.69	149	0.4						"	"	Drilling halted at end of joint due to continued fluid losses (no visible loss of return flow to the mud-pit and constant flow of cuttings observed at mud-cleaning/shaker system). CM called and updated PG (Steve Tanen) and noted that driller will continue to proceed while monitoring return flow to the mud-pit and mud-cleaning/shaker system.
06/03/20	1543	Max Howard	32.03	23-1	"	"				0.33	18,000	65,000	700	78	"	"	"	
06/03/20	1620	Max Howard		23-2	"	"												
06/03/20	1640	Max Howard		23-3	"	"												
06/03/20	1648	Max Howard		23-4	"	"												
06/03/20	1700	Max Howard		23-5	"	"												
06/03/20	1713	Max Howard		23-6	"	"	759.5	772.5	153.3									
06/03/20	1800	Max Howard	31.95	24-1	"	"												
06/03/20	1815	Max Howard		24-2	"	"												
06/03/20	1833	Max Howard		24-3	"	"												
06/03/20	1840	Max Howard		24-4	"	"												

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**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
06/04/20	7:40	Chris Mulry		24-5	SE to NW	P-12.25					18,000	65,000	700	82	steady	Pickering Gneiss	Intermediate Gneiss-dark gray and white, quartz-rich gneiss with pyroxene, hornblende, mica, calcite and trace garnet.	
"		"		24-6	"	"											no change	
"		"	31.5	25-1	"	"				20							" "	
"	8:50	"		25-1	"	"											" "	
"		"		25-3	"	"											" "	
"		"		25-4	"	"											" "	
"		"		25-5	"	"											" "	
"		"		25-6	"	"											" "	
"	11:00	"	31.5	26-1	"	"				17.7	18,000	65,000	700	78	steady	Pickering Gneiss	" "	
"		"		26-2	"	"											" "	
"		"		26-3	"	"											" "	
"		"		26-4	"	"											" "	
"		"		26-5	"	"											" "	
"		"		26-6	"	"				19.4							" "	
"	14:00	"	31.5	27-1	"	"											" "	
"		"		27-2	"	"											" "	
"		"		27-3	"	"											" "	
"		"		27-4	"	"											" "	
"		"		27-5	"	"											" "	
"	15:48	"		27-6	"	"	886.95	899.5	162.9	17.2	19,000	65,000	700	78	steady	Pickering Gneiss	" "	
06/05/20	11:15	Chris Mulry	32.92	28-1	SE to NW	P-12.25				0.4	18,000	65,000	700	82	steady	Pickering Gneiss	Intermediate Gneiss-medium gray and white, quartz-rich gneiss with pyroxene, hornblende, mica, calcite and trace garnet.	A 2.5 ft spider sub was added during trip in after Joint # 25
"	12:12	"		28-2	"	"											" "	
"	12:36	"		28-3	"	"											" "	
"	13:55	"		28-4	"	"				0.4	18,000	65,000	700	78	"	"	" "	
"	14:12	"		28-5	"	"											" "	
"	14:33	"		28-6	"	"	921.75	935.09	164.7								" "	Drilling halted from 14:40 - 17:56 for severe weather interruption and mud pump maintenance.
"	17:56	"	33.0	29-1	"	"											" "	
"	18:29	"		29-2	"	"											" "	
"	18:46	"		29-3	"	"				0.4	17,000	47,000	700	78	"	"	no change in cuttings	
06/06/20	17:00	Will Avery	na	na	SE to NW	P-12.25											" "	No advancement. Trip out/in
06/08/20	11:45	Andrew Thomas,PG		29-4	SE to NW	P-12.25											" "	trip in
06/08/20	11:57	Andrew Thomas,PG		29-5	SE to NW	P-12.25											" "	
06/08/20	12:40	Andrew Thomas,PG		29-6	SE to NW	P-12.25	954.5	968.5	124	0.4	17,000	47,000	700	78	steady	"	" "	
06/08/20	14:12	Andrew Thomas,PG		30-1	SE to NW	P-12.25											" "	
06/08/20	14:29	Andrew Thomas,PG		30-2	SE to NW	P-12.25											" "	
06/08/20	14:50	Andrew Thomas,PG		30-3	SE to NW	P-12.25											" "	
06/08/20	15:15	Andrew Thomas,PG		30-4	SE to NW	P-12.25											" "	
06/08/20	15:31	Andrew Thomas,PG		30-5	SE to NW	P-12.25				0.3	17,000	53,000	700	81	steady	"	" "	
06/08/20	16:19	Andrew Thomas,PG		30-6	SE to NW	P-12.25	987.5	987.5	123								" "	
06/08/20	17:00	Andrew Thomas,PG	32.95	31-1	SE to NW	P-12.25											" "	
06/08/20	17:23	Andrew Thomas,PG		31-2	SE to NW	P-12.25											" "	
06/08/20	17:39	Andrew Thomas,PG		31-3	SE to NW	P-12.25											" "	
06/08/20	17:54	Andrew Thomas,PG		31-4	SE to NW	P-12.25											" "	
06/08/20	18:23	Andrew Thomas,PG		31-5	SE to NW	P-12.25				0.4	17,000	53,000	700	83	steady	"	" "	
06/09/20	8:31	Chris Mulry		31-6	SE to NW	P-12.25	1020.57	1033.99	123								Pickering Gneiss	
"	9:15	"	32.02	32-1	"	"											" "	
"	9:46	"		32-2	"	"											" "	
"	10:15	"		32-3	SE to NW	P-12.25				0.4	20,000	53,000	700	75	steady	Pickering Gneiss	Intermediate Gneiss-medium gray and white, quartz-rich gneiss with pyroxene, k-feldspar, hornblende, mica, calcite and trace garnet.	

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
"	10:35	"	"	32-4	"	"										"		
"	10:48	"	"	32-5	"	"										"		
"	11:23	"	"	32-6	"	"	1053.48	1066.91	123							"		
06/09/20	12:05	Chris Mulry	32.94	33-1	SE to NW	P-12.25									steady	Pickering Gneiss		
"	12:24	"	"	33-2	"	"										"		
"	12:49	"	"	33-3	SE to NW	P-12.25				0.3	20,000	51,000	700	78	steady	Pickering Gneiss		
"	14:05	"	"	33-4	"	"										"		
"	14:25	"	"	33-5	"	"										"		
"	14:58	"	"	33-6	"	"	1086.4	1099.85	124							"		
06/09/20	15:43	Chris Mulry	32.85	34-1	SE to NW	P-12.25									steady	Pickering Gneiss		
"	16:11	"	"	34-2	SE to NW	P-12.25				0.4	19,000	48,000	700	76	steady	Pickering Gneiss		
"	16:35	"	"	34-3	"	"										"		
"	17:02	"	"	34-4	"	"										"		
"	17:26	"	"	34-5	"	"				0.4	19,000	48,000	700	76	steady	Pickering Gneiss	no change in cuttings	drilling halted at 1728 due to problems with mud plant.
06/10/20	10:17	Brian Lipinski, PG	32.85	34-6	SE to NW	P-12.25				0.3		63,000	700	80	steady	Pickering Gneiss	Light gray quartz and feldspar, tr calcite, tr biotite, trace hornblende	drilling halted for 25 minutes for refueling
"	11:10	"	32.8	35-1	"	"						63,000	700	80	steady	Pickering Gneiss	no change in cuttings	
"	11:34	"	"	35-2	"	"									steady	Pickering Gneiss	"	
"	12:01	"	"	35-3	"	"				0.3					steady	Pickering Gneiss	"	
"	13:50	"	"	35-4	"	"									steady	Pickering Gneiss	no change in cuttings	looks like LCM in cuttings
"	14:40	"	"	35-5	"	"									steady	Pickering Gneiss	"	"
"	15:01	"	"	35-6	"	"					19,000	64,000	700	81	steady	Pickering Gneiss	"	"
"	15:36	"	32.99	36-1	"	"				0.5					steady	Pickering Gneiss	"	"
"	16:04	"	"	36-2	"	"									steady	Pickering Gneiss	"	"
"	16:25	"	"	36-3	"	"									steady	Pickering Gneiss	"	"
"	16:38	"	"	36-4	"	"									steady	Pickering Gneiss	"	"
"	17:01	"	"	36-5	"	"									steady	Pickering Gneiss	"	"
"	17:26	"	"	36-6	"	"	1185.03	1213.49	124.7	0.3	18,000	42,000	700	80	steady	Pickering Gneiss	"	"
"	17:52	"	32.97	37-1	"	"									steady	Pickering Gneiss	"	"
"	18:15	"	"	37-2	"	"									steady	Pickering Gneiss	"	"
"	18:35	"	"	37-3	"	"									steady	Pickering Gneiss	"	"
06/11/20	8:25	Brian Lipinski, PG	"	37-4	SE to NW	P-12.25									steady	Pickering Gneiss	Light gray quartz and feldspar, tr calcite, tr biotite, trace hornblende	less LCM material in returns than yesterday
"	8:57	"	"	37-5	"	"									steady	Pickering Gneiss	no change in cuttings	
"	9:31	"	"	37-6	"	"	1217.98	1231.46	124.8	0.3	18,000	42,000	700	86	steady	Pickering Gneiss	"	
"	10:31	"	32.99	38-1	"	"									steady	Pickering Gneiss	"	
"	11:05	"	"	38-2	"	"									steady	Pickering Gneiss	"	
"	11:30	"	"	38-3	"	"									steady	Pickering Gneiss	"	
"	16:18	"	"	38-4	"	"									steady	Pickering Gneiss	"	
"	16:50	"	"	38-5	"	"									steady	Pickering Gneiss	"	
"	17:25	"	"	38-6	"	"	1250.96	1264.44	124.7	0.5	21,000	70,000	700	79	steady	Pickering Gneiss	"	
"	17:55	"	"	39-1	"	"									steady	Pickering Gneiss	"	
"	18:15	"	"	39-2	"	"									steady	Pickering Gneiss	"	
"	18:33	"	"	39-3	"	"									steady	Pickering Gneiss	"	
06/12/20	8:06	Brian Lipinski, PG	"	39-4	SE to NW	P-12.25									steady	Pickering Gneiss	Light gray quartz and feldspar, tr calcite, tr biotite, trace hornblende	
"	8:27	"	"	39-5	"	"									steady	Pickering Gneiss	no change in cuttings	
"	8:57	"	32.99	39-6	"	"	1283.95	1297.43	124.5	0.5	22,000	73,000	700	78	steady	Pickering Gneiss	same with less biotite and less hornblende	
"	10:21	"	"	40-1	"	"									steady	Pickering Gneiss	no change in cuttings	
"	10:48	"	"	40-2	"	"									steady	Pickering Gneiss	"	
"	11:19	"	"	40-3	"	"									steady	Pickering Gneiss	"	
"	11:35	"	"	40-4	"	"									steady	Pickering Gneiss	"	
"	11:51	"	"	40-5	"	"									steady	Pickering Gneiss	"	
"	12:20	"	32.99	40-6	"	"	1316.94	1330.42	124.3	0.5	22,000	75,000	700	82	steady	Pickering Gneiss	"	
"	14:01	"	"	41-1	"	"									steady	Pickering Gneiss	"	

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)



**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1 -2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)	
"	14:32	"		41-2	"	"										steady	Pickering Gneiss	"	
"	15:02	"		41-3	"	"										steady	Pickering Gneiss	"	
"	15:21	"		41-4	"	"										steady	Pickering Gneiss	"	
"	15:46	"		41-5	"	"										steady	Pickering Gneiss	"	
"	16:44	"		41-6	"	"	1352.03	1365.48	124.1	np	23,000	62,000	700	83		steady	Pickering Gneiss	"	
"	17:19	"		42-1	"	"										steady	Pickering Gneiss	"	
"	17:43	"		42-2	"	"										steady	Pickering Gneiss	"	
"	18:00	"		42-3	"	"										steady	Pickering Gneiss	"	
"	18:33	"		42-4	"	"										steady	Pickering Gneiss	"	
06/13/20	11:32	Steve Tanen/ Rob Croydon		42-5	"	"										"	"	gray to light gray, medium to fine, quartz, feldspar (plagioclase), trace hornblends, trace garnet, little to trace sericite (white, fine grained and soft flakes)	Started 42-5 at 1126
"	12:01	"		42-6	"	"	1383.7	1397.34	123.9	36(*)	22,000	81,000	700	83		"	"	"	(*) Appears that number being provided is ft/min; PG converted to ft/hr
"	13:44	"	33.08	43-1	"	"										"	"	"	Started Joint 43 at 1250, stopped for lunch at 1310, resumed #43 at 1342
"	14:14	"		43-2	"	"										"	"	"	
"	14:29	"		43-3	"	"										"	"	"	
"	14:49	"		43-4	"	"				36(*)	23,000	81,000	700	87		"	"	"	(*) Appears that number being provided is ft/min; PG converted to ft/hr
"	15:02	"		43-5	"	"										"	"	"	
"	15:38	"		43-6	"	"	1416.83	1430.35	123.6							"	"	"	
"	16:28	"	31.9	44-1	"	"				42(*)	23,000	78,000	700	86		"	"	"	Started Joint 44 at 1615. (*) Appears that number being provided is ft/min; PG converted to ft/hr
6/15/2020	7:53	Brian Lipinski, PG	"	44-2	SE to NW	P-12.25										Steady	Pickering Gneiss	gray to light gray, medium to fine, quartz, feldspar (plagioclase), trace hornblends, little to trace sericite (white, fine grained and soft flakes), and trace epidote	
"	8:15	"	"	44-3	"	"										"	"	no change	
"	8:37	"	"	44-4	"	"										"	"	"	
"	8:53	"	"	44-5	"	"										"	"	"	
"	9:20	"	"	44-6	"	"	1448.73	1462.25	123.4	42	22,000	74,000	700	88		"	"	"	
"	10:21	"	31.78	45-1	"	"										"	"	"	
"	10:47	"	"	45-2	"	"										"	"	"	
"	11:00	"	"	45-3	"	"										"	"	"	
"	11:16	"	"	45-4	"	"	1480.6	1493.52	123.3	42	22,000	70,000	700	92		"	"	"	
"	11:35	"	"	45-5	"	"										"	"	"	
"	11:56	"	"	45-6	"	"										"	"	"	
"	13:40	"	31.72	46-1	"	"										"	"	"	
"	13:59	"	"	46-2	"	"										"	"	"	
"	14:15	"	"	46-3	"	"										"	"	"	
"	14:36	"	"	46-4	"	"										"	"	"	
"	14:45	"	"	46-5	"	"										"	"	"	
"	14:59	"	"	46-6	"	"	1512.31	1525.84	123.3	42	23,000	77,000	700	91		"	"	"	
"	15:32	"	31.55	47-1	"	"										"	"	"	
"	15:50	"	"	47-2	"	"										"	"	"	
"	16:14	"	"	47-3	"	"										"	"	"	
"	16:30	"	"	47-4	"	"										"	"	"	
"	17:07	"	"	47-5	"	"										"	"	"	
"	17:23	"	"	47-6	"	"	1543.86	1557.39	123.2	36	23,000	75,000	700	93		"	"	"	
"	17:57	"	31.6	48-1	"	"										"	"	"	
"	18:10	"	"	48-2	"	"										"	"	"	
"	18:30	"	"	48-3	"	"										"	"	"	
06/16/20	7:45	Brian Lipinski, PG	"	48-4	SE to NW	P-12.25										steady	Pickering Gneiss	gray to light gray, medium to fine, quartz, feldspar (plagioclase), trace hornblends, little to trace sericite (white, fine grained and soft flakes), and trace epidote	
"	8:20	"	"	48-5	"	"										"	"	no change in cuttings	

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM A  
PG HDD DRILLING LOG**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd/Little Conestoga Rd

Date	Time (military)	PG Name	Joint Length or Sub length	Sample ID as Joint #-? E.g. 101-1-2 -3	Drilling Direction	Pilot - P Ream - R Bit Size	Horizontal Distance (HD) to Bit (feet)	Drill Length (MD) to Bit (feet)	Depth (feet)	Drilling Rate (ft / hour)	Rotary Torque (ft-lbs)	Drill Pressure (psi)	Fluid Pumping Rate (gpm)	Annular Pressure (psi)	Est. Fluid Returns (percent)	Formation	Cuttings Description	Comments (Drilling parameters from UI 3hr Update Reports)
"	8:40	"	"	48-6	"	"	1575.47	1588.99	122.7	48	23,000	71,000	700	89	"	"	"	
"	9:35	"	31.53	49-1	"	"									"	"	"	
"	9:55	"	"	49-2	"	"									"	"	"	
"	10:25	"	"	49-3	"	"									"	"	"	
"	10:50	"	"	49-4	"	"									"	"	"	
"	11:30	"	"	49-5	"	"									"	"	"	
"	11:55	"	"	49-6	"	"	1606.98	1620.52	121.8	30	23,000	79,000	700	91	"	"	"	
"	12:45	"	31.68	50-1	"	"									"	"	"	
"	13:00	"	"	50-2	"	"									"	"	"	
"	14:15	"	"	50-3	"	"									"	"	"	
"	14:35	"	"	50-4	"	"									"	"	"	
"	15:00	"	"	50-5	"	"									"	"	"	
"	15:30	"	"	50-6	"	"	1638.43	1652.2	120.5	24	24,000	80,000	700	94	"	"	"	
"	16:45	"	31.66	51-1	"	"									"	"	"	
"	17:05	"	"	51-2	"	"									"	"	"	
"	17:30	"	"	51-3	"	"									"	"	"	
"	18:00	"	"	51-4	"	"									"	"	"	
"	18:33	"	"	51-5	"	"									"	"	"	
06/17/20	09:10	Brian Lipinski, PG		51-6	SE to NW	P-12.25	1670.24	1683.86	118.8	24	25,000	85,000	700	92	steady	Pickering Gneiss	gray to light gray, medium to fine, quartz, feldspar (plagioclase), trace hornblends, little to trace sericite (white, fine grained and soft flakes), and trace epidote	
"	10:25	"	32.91	52-1	"	"									"	"	no change in cuttings	
"	10:40	"	"	52-2	"	"									"	"	"	
"	10:55	"	"	52-3	"	"									"	"	"	
"	11:20	"	"	52-4	"	"									"	"	"	
"	11:45	"	"	52-5	"	"									"	"	"	
"	12:05	"	"	52-6	"	"	1703.09	1716.77	116.6	24	25,000	87,000	700	92	"	"	"	
06/19/20	1010	Max Howard	32.95	53-1	"	"	1702.3	1716.22	113.7	12	26,000	86,000	700	90	"	"	gray to light gray, medium to fine, quartz, feldspar (plagioclase), trace hornblends, little to trace sericite (white, fine grained and soft flakes), and trace epidote	
"	1035	Max Howard	"	53-2	"	"									"	"	"	
"	1100	Max Howard	"	53-3	"	"									"	"	"	
"	1130	Max Howard	"	53-4	"	"									"	"	"	
"	1140	Max Howard	"	53-5	"	"									"	"	gray to light gray, medium to fine, quartz (increase), feldspar (plagioclase), trace hornblends, little to trace sericite (white, fine grained and soft flakes), and trace epidote	
"	1210	Max Howard	"	53-6	"	"									"	"	"	
06/20/20	0:00	Glennon Graham, Jr.																No drilling today, Working on pilot intersect.

Horizontal Distance = straight line distance from entry point to drill bit.  
Drill Length = length of tools in ground (bit to entrance).  
Depth = ft below ground surface perpendicular to predefined location on drill path (e.g. entry)

**FORM B  
Materials Consumed**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd./Little Conestoga Rd  
(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
03/17/20	17:00	Jeffrey Valvik	P - 36" auger	NW to SE	0	0	0	0	0	0	0	0	0	0	0	---	0	0	np	none taken off site. Still more 36" casing needed to drive in.
03/18/20	--	--	"	"	0	0	0	0	0	0	0	0	0	0	0	---	0	0	np	advancing casing
03/19/20	--	--	"	"	0	0	0	0	0	0	0	0	0	0	0	---	0	0	np	"
03/20/20	--	--	"	"	0	0	0	0	0	0	0	0	0	0	0	---	0	0	np	"
06/05/20	19:00	Ty Johnson	NA	NW to SE	0	0	0	0	0	0	0	0	0	0	0	Sodium	0	0	np	Prepping to drill
06/06/20	19:00	Ty Johnson	NA	NW to SE	0	0	0	0	0	0	0	0	0	0	0	Sodium	0	0	np	Prepping to drill
06/08/20	1001	Steven Tanen	P - 12.25	"	2,000	56	56	0	0	0	2,000	2,000	800	0	0	sodium	0	40	np	Cleaned up 40 gal release of drilling mud on timber mats in LOD. Started pilot on US side. Filled casing with mud.
"	1246	"	"	"	7,092	43	99	0	0	0	7,092	9,092	239	3,585	3,585	"	0	0	np	1107 started trip in hole, end of Joint #4 (~30/31.9 ft) on bottom
"	1546	"	"	"	535	6	105	0	0	0	535	9,627	239	13,623	17,208	"	0	0	np	
"	1645	"	"	"	0	0	105	0	0	0	0	9,627	0	0	17,208	"	0	0	np	1645 to 1835: Rig idle due to foot injury to rig-hand
6/9/2020	0939	"	"	"	225	35	140	0	0	0	225	9,852	107	803	18,011	"	0	0	np	Tripped and started Joint #6
"	1245	"	"	"	755	21	161	0	0	0	755	10,607	107	14,552	32,563	"	0	0	np	
"	1601	"	"	"	56	40	201	0	0	0	56	10,663	107	7,062	39,625	"	0	0	np	1601 resume drilling after hydraulic leak
"	1730	"	"	"	1,044	10	211	0	0	0	1,044	11,707	107	5,778	45,403	"	0	0	np	Continued on Joint 7 for ~15 ft (until 1655), then started to trip out (pump rate for advancing Joint 7 - UI reported 0 since numbers collected after rig finished tripping out)
06/10/20	0939	"	"	"	0	0	211	0	0	0	0	11,707	0	0	45,403	"	0	0	np	Orienting steering system (new BHA with mud-motor)
"	1241	"	"	"	507	6	217	0	0	0	507	12,214	685	30,140	75,543	"	0	0	np	
"	1542	"	"	"	869	4	221	0	0	0	869	13,083	700	33,600	109,143	"	0	0	np	
"	1847	"	"	"	950	21	242	0	0	0	950	14,033	700	121,100	230,243	"	0	0	np	Finished Joint #9, adv #10 ~3 of 5 ft
06/11/20	1033	Ty Johnson	"	"	0	0	242	0	0	0	0	14,033	0	0	230,243	"	0	0	np	
"	1331	"	"	"	1,582	16	258	0	0	0	1,582	15,615	700	70,000	300,243	"	0	0	np	Finished Joint #10; start Joint #11
"	1633	"	"	"	126	8	266	0	0	0	126	15,741	700	28,700	328,943	"	0	0	np	Finish Joint #11; start Joint 12
"	2002	"	"	"	893	2	268	0	0	0	893	16,634	700	105,700	434,643	"	0	0	np	Finished Joint #12; finish Joint # 13
06/12/20	1034	"	"	"	1,446	23	291	0	0	0	1,446	18,080	700	86,800	521,443	"	0	0	np	Finished Joint #14
"	1331	"	"	"	1,124	0	291	0	0	0	0	18,080	700	61,600	583,043	"	14	0	np	Finished Joint 15; start joint 16; 5 supersacks were used
"	1632	"	"	"	446	0	291	0	0	0	0	18,080	700	107,100	690,143	"	0	0	np	Finished Joint 16; start joint 17
"	1014	"	"	"	571	0	291	0	0	0	0	18,080	700	51,800	741,943	"	0	0	np	Completed 25 ft. of joint 17 then tripped out; 5 supersacks were used
06/13/20	1033	"	"	"	0	0	291	0	0	0	0	18,080	0	0	741,943	"	0	0	np	Tripping in
"	1332	"	"	"			291			0	0	18,080	0	0	741,943				np	Tripped in to rock face
"	1632	"	"	"	1,070	10	301	0	0	0	1,070	19,150	700	191,100	933,043	"	0	0	np	completed joint 17; tripped out to 16 and began shaving
06/15/20	0946	Steven Tanen	"	"	0	0	301	0	0	0	0	19,150	700	28,700	961,743	"	0	0	np	Shaving bore along Joint #17
"	1239	"	"	"	196	0	301	0	0	0	0	19,150	709	141,091	1,102,834	"	0	0	np	Continue to shave along #17, made multiple passes
"	1602	"	"	"	803	2	303	0	0	0	803	19,953	700	99,400	1,202,234	"	0	0	np	"
"	1845	"	"	"	385	0	303	0	0	0	0	19,953	700	84,700	1,286,934	"	0	0	np	Continued to shave along #17 w multiple passes. Will take a survey shot 6/16/20 to assess Joint 17 bit location.
06/16/20	0934	Brian Lapinski	"	"	912	10	313	0	0	0	912	20,865	700	54,600	1,341,534	"	0	0	np	Completed shaving, advancing #18.
"	1253	"	"	"	161	0	313	0	0	0	0	20,865	700	125,300	1,466,834	"	13	0	np	Shaved after #18 completed
"	1529	Steven Tanen	"	"	756	3	316	0	0	0	756	21,621	700	51,800	1,518,634	"	0	0	np	

**FORM B  
Materials Consumed**

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HDD Permit Name: Milford Rd./Little Conestoga Rd  
(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
"	1847	"	"	"	73	0	316	0	0	0	0	21,621	700	105,700	1,624,334	"	0	0	np	
06/17/20	1004	"	"	"	876	12	328	0	0	0	876	22,497	457	23,307	1,647,641	"	0	0	np	0951: Completed last 1.5 ft of #21; then rig idle for repairs to mud pump
"	1244	"	"	"	0	0	328	0	0	0	0	22,497	0	0	1,647,641	"	13	0	np	Rig idle for repairs to generator and mud system during this period
"	1548	"	"	"	220	0	328	0	0	0	0	22,497	700	52,500	1,700,141	"	0	0	np	1431: Resumed drilling, starting on #22
"	1846	"	"	"	277	0	328	0	0	0	0	22,497	700	85,400	1,785,541	"	0	0	np	
06/18/20	1000	Ty Johnson	"	"	797	6	334	0	0	0	797	23,294	700	62,300	1,847,841	"	0	0	np	0757: resumed drilling joint 23; 0906: begin drilling joint 24
"	1300	"	"	"	922	12	346	0	0	0	922	24,216	700	100,100	1,947,941	"	0	0	np	1119: completed joint 24; 1151: began drilling joint 25
"	1600	"	"	"	90	0	346	0	0	0	0	24,216	700	63,700	2,011,641	"	0	0	np	1508: complete drilling joint 25; 1526: begin drilling joint 26
"	1900	"	"	"	685	0	346	0	0	0	0	24,216	700	69,300	2,080,941	"	0	0	np	1758: Joint 27 on rig. Drilling ceased due to mechanical problem
06/19/20	1000	"	"	"	945	10	356	0	0	0	945	25,161	700	25,900	2,106,841	"	0	0	np	818: begin drilling joint 27
"	1300	"	"	"	329	0	356	0	0	0	0	25,161	700	73,500	2,180,341	"	0	0	np	1021: Complete joint 27; 1102: Begin drilling joint 28
"	1600	"	"	"	218	4	360	0	0	0	218	25,379	700	79,800	2,260,141	"	0	0	np	1345: Complete drilling joint 28; 1406: Begin drilling joint 29
"	1900	"	"	"	2	0	360	0	0	0	0	25,379	700	15,400	2,275,541	"	0	0	np	1604: Complete drilling joint 29; 1625: Begin drilling joint 30
06/20/20	1000	"	"	"	0	0	360	0	0	0	0	25,379		0	2,275,541	"	0	0	np	have not started drilling yet
"	1300	"	"	"	0	0	360	0	0	0	0	25,379	700	17,500	2,293,041	"	0	0	np	1012 - 1026: completed drilling joint 30
"	1600	"	"	"	0	0	360	0	0	0	0	25,379	700	32,200	2,325,241	"	0	0	np	1238: joint 30 on rack; 1345: survey shots on joint 29; 2:15 PM, Vac-Truck pumped out liquid waste from the cutting's tanks and took it to the downstream side drill; 1529: begin drilling joint 31; 1630: stop drilling for the day.
06/22/20	1000	Brian Lipinski, PG	"	"	704	15	375	0	0	0	704	26,083	700	0	2,325,241	Sodium	13	0	np	Drilling joint 31
"	1300	"	"	"	0	5	380	0	0	0	0	26,083	700	0	2,325,241	"	0	0	np	Drilled Joint # 31 for a total of 32'
"	1600	"	"	"	986	5	385	0	0	0	986	27,069	700	0	2,325,241	"	0	0	np	Finished joint # 32 for a total of 32'
"	1900	"	"	"	184	0	385	0	0	0	0	27,069	700	0	2,325,241	"	0	0	np	Finished joint 33
06/23/20	1000	Brian Lipinski, PG	"	"	0	0	385	0	0	0	0	27,069	700	0	2,325,241	sodium	0	0	np	drilling joint 34
"	1300	"	"	"	432	7	392	0	0	0	432	27,501	700	0	2,325,241	"	0	0	np	finished joint 34
"	1600	"	"	"	446	0	392	0	0	0	0	27,501	700	0	2,325,241	"	0	0	np	finished joint 35
"	1900	"	"	"	667	3	395	0	0	0	667	28,168	700	0	2,325,241	"	0	0	np	drilled 22ft of joint 36
06/24/20	1000	Brian Lipinski, PG	"	"	326	10	405	0	0	0	326	28,494	700	0	2,325,241	Sodium	0	0	np	finished joint 36
"	1300	"	"	"	90	0	405	0	0	0	0	28,494	700	0	2,325,241	"	0	0	np	finished joint 37
"	1600	"	"	"	770	9	414	0	0	0	770	29,264	700	0	2,325,241	"	0	0	np	finished joint 38
"	1900	"	"	"	27	1	415	0	0	0	27	29,291	700	0	2,325,241	"	0	0	np	dilling joint 39
06/25/20	1000	Ty Johnson, PG	"	"	636	7	422	0	0	0	636	29,927	700	26,600	2,351,841	Sodium	0	0	np	complete drilling joint 39
06/25/20	1300	"	"	"	90	0	422	0	0	0	0	29,927	700	118,300	2,470,141	"	0	0	np	drilling joint 40
06/25/20	1600	"	"	"	1,470	6	428	0	0	0	1,470	31,397	700	32,900	2,503,041	"	0	0	np	complete drilling joint 40; begin drilling joint 41; 1418 drilling fluid intercepted DS
06/25/20	1900	"	"	"	624	4	432	0	0	0	624	32,021	516	13,416	2,516,457	"	0	0	np	complete drilling 20 feet of joint 41
06/26/20	1000	"	"	"	155	3	435	0	0	0	155	32,176		0	2,516,457	"	0	0	np	5 supersacks used
06/26/20	1300	"	"	"	1,581	19	454	0	0	0	1,581	33,757	516	0	2,516,457	"	12.5	0	np	1 Dump truck
06/26/20	1600	"	"	"	36	0	454	0	0	0	0	33,757	516	0	2,516,457	"	0	0	np	

**FORM B  
Materials Consumed**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd./Little Conestoga Rd  
(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)	
06/26/20	1900	"	"	"	270	9	463	0	0	0	270	34,027		0	2,516,457		0	0	np		
<b>Merged US-DS Form B on 6/27/20 (US above/DS below)</b>																					
02/20/20	17:25	Steve Tanen	P - 12	SE to NW	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	np	Set-up BHA, calibrated gyro, then electrical issues. No drilling conducted.
02/21/20	1000	Lawrence Galiano	P - 12	SE to NW	0	6	6	0	0	0	0	0	400	44,000	44,000	sodium	0	0	np	Advanced BHA 4 joints	
02/21/20	1300	Lawrence Galiano	P - 12	SE to NW	0	16	22	0	0	0	0	0	0	0	44,000	sodium	0	0	np	Tripped out 4 joints	
02/21/20	1500	Lawrence Galiano	P - 12	SE to NW	0	0	22	0	0	0	0	0	0	0	44,000	sodium	0	0	np	Drill idle, repairing mud system	
02/21/20	1700	Lawrence Galiano	P - 12	SE to NW	7,500	14	36	0	0	0	7,500	7,500	258	11,610	55,610	sodium	0	0	np	Advanced BHA 2 joints	
02/22/20	1130	Steve Tanen	P - 12.25	"	0	0	36	0	0	0	0	7,500	0	0	55,610	na	0	0	np	Rig idle - repairs to mud cleaning system/power unit. Waiting on parts. Expected 2/25/20.	
02/27/20	1830	Steve Tanen	"	"	400	13	49	0	0	0	400	7,900	672	14,784	70,394	sodium	0	0	np	Rig idle for repairs 2/22/20 through 2/26/20. Restarted ~1600 on 2/27/20	
02/28/20	1006	"	"	"		8	57	0	0	0	0	7,900	672	30,912	101,306	"	0	0	np	1001: Idle - mech issue mud sys	
"	1257	"	"	"		3	60	0	0	0	0	7,900	0	0	101,306	"	0	0	np		
"	1601	"	"	"		3	63	0	0	0	0	7,900	672	28,896	130,202	"	0	0	np	1304: restarted drilling	
"	1640	"	"	"	500	3	66	0	0	0	500	8,400	699	13,281	143,483	"	0	0	np	Water used only provided at EOD. Shut-down at 1640 (mechanical issue)	
02/29/20	1000	"	"	"		0	66	0	0	0	0	8,400	0	0	143,483	"	0	***	np	***Reportedly, 9 loads of water were removed from the mud-pit overnight. No drilling - mechanic onsite for repair to mud system.	
"	1246	"	"	"		40	106	0	0	0	0	8,400	699	9,087	152,570	"	0	0	np	1106: Started drilling. Reportedly increasing mud viscosity.	
"	1612	"	"	"		11	117	0	0	0	0	8,400	699	37,746	190,316	"	0	0	np		
"	1638	"	"	"	0	4	121	0	0	0	0	8,400	699	9,087	199,403	"	13	7,100	np	Liquid disposal is water from frac tanks. Water used, soil & liquid disposal reported at EOD.	
03/02/20	1004	"	"	"		10	131	0	0	0	0	8,400	700	44,800	244,203	"	0	0	np	0848: Started drilling	
"	1300	"	"	"		0	131	0	0	0	0	8,400	700	45,850	290,053	"	0	0	np	Tripped out 9 joints (30s/ea)	
"	1607	"	"	"		5	136	0	0	0	0	8,400	700	9,450	299,503	"	0	0	np	Tripped out 3 joints (30s/ea)	
"	1840	"	"	"	0	48	184	0	0	0	0	8,400	700	21,583	321,086	"	0	0	np	No water added, working on increasing mud viscosity to manage groundwater infiltration into bore	
03/03/20	1012	"	"	"		0	184	0	0	0	0	8,400	700	64,400	385,486	"	13		np		
"	1256	"	"	"		0	184	0	0	0	0	8,400	0	0	385,486	"			np	Tripping out = no mud used	
"	1558	"	"	"		5	189	0	0	0	0	8,400	0	0	385,486	"			np	Tripping in = no mud used; mud generation used to flush "grout" joints prior to connecting to drill string. Water volume provided as end of day total	
"	1740	"	"	"	200	10	199	0	0	0	200	8,600	0	0	385,486	"		12000	np	Tripping in = no mud used; water volume provided as end of day total	
03/04/20	1600	Brian Duggan	na	na	0	0	199	0	0	0	0	8,600	0	0	385,486	na	0	0	np	No drilling activity. Grouting operations performed from 1230 to 1455. Tripping out begins. Drilling to resume tomorrow. Installed 20yd3 of grout.	
"	1900	"	na	na	1,200	26	225	0	0	0	1,200	9,800	0	0	385,486	sodium	0	12,000	np	No drilling activity and no pumping reported. Tripping out completed. Drilling to resume tomorrow.	
03/05/20	1000	Steve Tanen					225			0	0	9,800		0	385,486	"			np	Reinstalling centralizer casing - no 10am report	

**FORM B  
Materials Consumed**

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HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd./Little Conestoga Rd  
(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
"	1316	"	R - 12 in**	SE to NW		27	252	0	0	0	0	9,800	300	7,200	392,686	"	0	0	np	Tripping w Jetting Bit Assembly
"	1423	"		"	0	0	252	0	0	0	0	9,800	100	10,300	402,986	"	0	0	np	Following mud loss decreased pump rate, while swabbed to work on reestablishing flow
"	1900	"		"	0	13	265	0	0	0	0	9,800	0	0	402,986	"	0	9,000	np	Total water usage provided at end of day.
03/06/20	1720	"	na	na	0	0	265	0	0	0	0	9,800	0	0	402,986	na	0	3,000	np	Grouted bore. Intalled 40 yd3 of grout. Grout started to emerge from casing at SE entry while pumping thrid load.
03/07/20	1700	Marty Mengel	na	na	0	0	265	0	0	0	0	9,800	0	0	402,986	na	39	0	np	Soil disposal volume includes some grout cuttings
03/09/20	1900	Brian Duggan	na	na	0	0	265	0	0	0	0	9,800	0	0	402,986	na	26	0	np	Grout cuttings removed from site for disposal. No other materials consumed.
03/10/20	0954	Steve Tanen	P - 12.25	SE to NW		0	265	0	0	0	0	9,800	258	516	403,502	sodium	0	0	np	Tripping in w jetting bit assembly.
"	1238	"	"	"		40	305	0	0	0	0	9,800	205	20,500	424,002	"	0	0	np	
"	1537	"	"	"		0	305	0	0	0	0	9,800	205	5,945	429,947	"	0	0	np	
"	1859	"	"	"	3,100	15	320	0	0	0	3,100	12,900	280	56,280	486,227	"	0	0	np	Water used only provided at EOD.
03/11/20	1000	Chris Mulry	P - 12.25	SE to NW	0	15	335	0	0	0	0	12,900	285	0	486,227	"	0	0	np	
"	1600	"	"	"	3,000	5	340	0	0	0	3,000	15,900	0	0	486,227	"	20	1000	np	
03/12/20	1500	Chris Mulry	na	SE to NW	0	0	340	0	0	0	0	15,900	0	0	486,227	"	0	3000	np	no drilling, no mud circulation today
03/13/20	0946	Steve Tanen	P - 12.25	"		0	340	0	0	0	0	15,900	0	0	486,227	"	0	0	np	0930 Started tripped in.
"	1307	"	"	"		0	340	0	0	0	0	15,900	150	3,000	489,227	"	0	0	np	10 joints in at ~2 min/joint (ave)
"	1550	"	"	"		20	360	0	0	0	0	15,900	150	2,400	491,627	"	0	0	np	8 joints in at ~2 min/joint (ave)
"	1945	"	"	"	1,000	10	370	0	0	0	1,000	16,900	699	27,960	519,587	"	0	0	np	Water used only provided at EOD
03/14/20	1600	Marty Mengel	na	na	0	0	370	0	0	0	0	16,900	0	0	519,587	--	0	3000	np	Intalled 50 yd3 of grout into bore. Grout started to emerge from casing at SE entry while pumping 5th load
"	1800	"	na	Na	3,200	25	395	0	0	0	3,200	20,100	150	1,500	521,087	--	0	6000	np	Pump rate and time estimated (not provided). Pumped 50yd3 grout.
03/16/20	0954	Steve Tanen	--	--		0	395	0	0	0	0	20,100	0	0	521,087	--			np	
"	1241	"	--	--		0	395	0	0	0	0	20,100	0	0	521,087	--			np	
"	1545	"	~36-in auger	SE to NW	0	0	395	0	0	0	0	20,100	0	0	521,087	--	13	3,000	np	Augered out 36-in casing
03/17/20	0938	"	P - 12.25	"			395	0	0	0	0	20,100	0	0	521,087	sodium	0	0	np	Re-installing 14-in casing; info for use of LCMs not provided (not on UI data form)
"	1250	"	"	"			395	0	0	0	0	20,100	0	0	521,087	"	0	0	np	Tripped in BHA (jetting assembly)
"	1543	"	"	"			395	0	0	0	0	20,100	306	18,207	539,294	"	0	0	np	Tripping w Jetting Bit Assembly (7 joints)
"	1821	"	"	"	6,800	30	425	0	0	0	6,800	26,900	309	24,720	564,014	"	0	0	np	Tripping w jetting bit assembly (3 joints); bentonite and water provided at end of day.
03/18/20	1000	Jeffrey Valvik	P - 12.25	SE to NW	0	0	425	0	0	0	0	26,900	0	0	564,014	"	0	0	np	
03/18/20	1300	Jeffrey Valvik	P - 12.25	SE to NW	0	0	425	0	0	0	0	26,900	306	0	564,014	"	0	0	np	
03/18/20	1600	Jeffrey Valvik	P - 12.25	SE to NW	0	0	425	0	0	0	0	26,900	306	0	564,014	"	0	0	np	
03/18/20	1900	Jeffrey Valvik	P - 12.25	SE to NW	4,400	27	452	0	0	0	4,400	31,300	306	0	564,014	"	0	0	np	
03/19/20	1000	Jeffrey Valvik	P - 12.25	SE to NW	0	0	452	0	0	0	0	31,300	306	0	564,014	"	0	0	np	
03/19/20	1300	Jeffrey Valvik	P - 12.25	SE to NW	0	0	452	0	0	0	0	31,300	0	0	564,014	"	0	0	np	
03/19/20	1600	Jeffrey Valvik	P - 12.25	SE to NW	0	0	452	0	0	0	0	31,300	0	0	564,014	"	0	0	np	
03/19/20	1900	Jeffrey Valvik	P - 12.25	SE to NW	3,000	41	493	0	0	0	3,000	34,300	600	0	564,014	"	0	0	np	
03/20/20	0939	Steve Tanen	"	"			493	0	0	0	0	34,300	605	54,450	618,464	"	0	0	np	Tripped in #16 (w mud-motor)
"	1249	"	"	"	1,200	20	513	0	0	0	1,200	35,500	605	8,470	626,934	"	0	0	np	Started #17 (with mud-motor) then tripped out due to statewide Covid-19 work stoppage.

**FORM B  
Materials Consumed**

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HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd./Little Conestoga Rd  
(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
05/21/20	1900	Chris Mulry	P - 12.25	SE to NW	3,000	48	561	0	0	0	3,000	38,500	0	0	626,934	"	0	0	np	no drilling, no tools in hole
05/22/20	1900	Lawrence Galiano	P - 12.25	SE to NW	5,200	42	603	0	0	0	5,200	43,700	100	24,500	651,434	"	0	0	np	Tripped in mud motor and 5 joints
05/23/20	1100	Lawrence Galiano	P - 12.25	SE to NW		0	603	0	0	0	0	43,700	0	0	651,434	NA	0	0	np	No drilling conducted due to weather
05/26/20	1900	Lawrence Galiano	P - 12.25	SE to NW	300	20	623	0	0	0	300	44,000	600	198,000	849,434	"	0	0	np	Tripped in 4 joints
05/27/20	1900	Chris Mulry	P - 12.25	SE to NW	2,000	31	654	0	0	0	2,000	46,000	700	35,000	884,434	"	0	0	np	mostly maintenance conducted, tripped in 1/2 joint, then tripped out 8 joints
05/28/20	1900	Bob Heim	P - 12.25	SE to NW	0	0	654	0	0	0	0	46,000	0	0	884,434	"	0	240	np	Trip out for connection / communication issues.
05/29/20	0930	Bob Heim	P - 12.25	SE to NW	0	1	655	0	0	0	0	46,000	100	400	884,834	Sodium	0	11760	np	Liquid disposal addition is correction made by UI for 5/28. Tripped in #3, #4
"	1230	Bob Heim	P - 12.25	SE to NW	0	0	655	0	0	0	0	46,000	100	2,800	887,634	"	0	0	np	Tripped in #5 - #12
"	1530	Bob Heim	P - 12.25	SE to NW	0	0	655	0	0	0	0	46,000	700	18,200	905,834	"	0	0	np	Tripped in #13 to partially into #18 where encountered and drilled out grout.
"	1830	Bob Heim	P - 12.25	SE to NW	2,200	53	708	0	0	0	2,200	48,200	700	63,700	969,534	"	0	12000	np	Drilled grout completing approx 25' of #19. Suspect water and bags reported this row are actually totals for the day. Liquid disposal as well.
05/30/20	0930	Bob Heim	P - 12.25	SE to NW	0	0	708	0	0	0	0	48,200		0	969,534	sodium	0		np	Not drilling.
"	1230	Bob Heim	P - 12.25	SE to NW	0	0	708	0	0	0	0	48,200	700	9,100	978,634	"	0		np	Resumed drilling grout on joint #19.
"	1630	Bob Heim	P - 12.25	SE to NW	5,000	46	754	0	0	0	5,000	53,200	700	98,700	1,077,334	"	13	9000	np	Drilled #20 into face (new rock). Started drilling #21.
"	1700	Bob Heim	P - 12.25	SE to NW	0	0	754	0	0	0	0	53,200	700	7,700	1,085,034	"	0	0	np	Continued drilling #21.
06/01/20	1000	Ty Johnson	P - 12.25	SE to NW		0	754	0	0	0	0	53,200		0	1,085,034	"	0	0	np	No Report; Drilled #21; Tripped all the way out; Tripped In: start 1230
"	1300	Ty Johnson	P - 12.25	SE to NW		0	754	0	0	0	0	53,200	700	10,500	1,095,534	"	0	0	np	Tripping In to #14
"	1600	Ty Johnson	P - 12.25	SE to NW		0	754	0	0	0	0	53,200	0	0	1,095,534	"	0	0	np	Tripped Out to #3
"	1900	Ty Johnson	P - 12.25	SE to NW	5,100	79	833	0	0	0	5,100	58,300	0	0	1,095,534	"	0	0	np	Tripped In to #7
06/02/20	0938	Steve Tanen	"	"	0	0	833	0	0	0	0	58,300	600	3,600	1,099,134	"	0	0	np	Tripping in. (used pump rate from next interval as not drilling when data collected)
"	1235	"	"	"	0	0	833	0	0	0	0	58,300	600	16,200	1,115,334	"	0	0	np	Tripping in.
"	1544	"	"	"	0	0	833	0	0	0	0	58,300	700	11,200	1,126,534	"	0	0	np	Resumed pilot at Joint #22
"	1758	"	"	"	6,100	88	921	0	0	0	6,100	64,400	700	78,400	1,204,934	"	13	0	np	Stopped due to fluid losses
06/03/20	0930	Max Howard	"	"	0	0	921	0	0	0	0	64,400	0	0	1,204,934	"	0	0	np	
"	1230	"	"	"	0	0	921	0	see comments	0	0	64,400	0	0	1,204,934	"	0	0	np	Estimated 1,700 gallons Plugz-it used. Bag count not provided.
"	1530	"	"	"	0	0	921	0	0	0	0	64,400	700	66,500	1,271,434	"	0	0	np	
"	1830	"	"	"	8,700	112	1,033	0	4	4	8,700	73,100	700	42,000	1,313,434	"	13	0	np	LCM was used, UI reportd "4 additional bags of "Plugz-it"
06/04/20	0930	Chris Mulry	P - 12.25	SE to NW	0	0	1,033	0	2	6	0	73,100	700	89,600	1,403,034	sodium	0	3000	np	pilot drilling, completed joint #24
"	1230	"	"	"	0	0	1,033	0	2	8	0	73,100	700	70,700	1,473,734	"	0	3000	np	pilot drilling - completed joint #26
"	1530	"	"	"	0	0	1,033	0	0	8	0	73,100	700	77,000	1,550,734	"	0	3000	np	pilot drilling - completed joint #27
"	1830	"	"	"	7,100	66	1,099	0	0	8	7,100	80,200	0	0	1,550,734	"	13	3000	np	began tripping out at 1610 due to loss of connection with sensor
06/05/20	0930	Chris Mulry	P - 12.25	SE to NW	0	0	1,099	0	0	8	0	80,200	700	7,000	1,557,734	sodium	0	3000	np	Tripping in, 11 joints advanced thus far. Minimal intermittent mud circulation.
"	1300	"	"	"	0	0	1,099	0	0	8	0	80,200	700	45,500	1,603,234	"	0	3000	np	completed tripping in and advanced joint #28 approx 17 ft
"	1600	"	"	"	0	0	1,099	0	0	8	0	80,200	700	30,800	1,634,034	"	0	3000	np	Drilling suspended 1440 - 1756 For severe weather
"	1900	"	"	"	2,600	109	1,208	0	0	8	2,600	82,800	700	37,100	1,671,134	"	0	0	np	Completed half of joint #29

FORM B  
Materials Consumed

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Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
06/06/20	1700	Will Avery	P - 12.25	SE to NW	10,100	64	1,272	0	0	8	10,100	92,900	0	0	1,671,134	"	13	0	np	Trip out/in
06/08/20	1000	Steve Tannen	P - 12.25	SE to NW	0	0	1,272	0	0	8	0	92,900	0	0	1,671,134	"	0	0	np	Trip In
06/08/20	1300	Andrew Thomas	P - 12.25	SE to NW	0	0	1,272	0	0	8	0	92,900	700	49,000	1,720,134	"	0	0	np	pilot drilling - complete joint 29
06/08/20	1600	Andrew Thomas	P - 12.25	SE to NW	0	0	1,272	0	0	8	0	92,900	700	84,000	1,804,134	"	0	0	np	pilot drilling - complete joint 29
06/08/20	1900	Andrew Thomas	P - 12.25	SE to NW	600	78	1,350	0	0	8	600	93,500	700	105,000	1,909,134	"	0	0	np	pilot drilling - complete joint 30
06/09/20	1000	Chris Mulry	P - 12.25	SE to NW	0	0	1,350	0	0	8	0	93,500	700	81,900	1,991,034	"	13	3000	np	pilot drilling - complete joint 31
"	1300	"	"	"	0	0	1,350	0	0	8	0	93,500	700	121,800	2,112,834	"	0	3000	np	pilot drilling - complete joint 32
"	1600	"	"	"	0	0	1,350	0	0	8	0	93,500	700	87,500	2,200,334	"	0	3000	np	pilot drilling - complete joint 33
"	1900	"	"	"	2,300	47	1,397	0	0	8	2,300	95,800	700	72,100	2,272,434	"	0	3000	np	pilot drilling - advance 29 feet of joint 34
06/10/20	1000	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,397	0	0	8	0	95,800	700	0	2,272,434	sodium	0		np	pilot drilling joint 34
06/10/20	1300	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,397	0	0	8	0	95,800	700	0	2,272,434	Sodium	0		np	pilot drilling joint 35
06/10/20	1600	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,397	0	0	8	0	95,800	700	0	2,272,434	Sodium	0		np	pilot drilling joint 35
06/10/20	1900	Brian Lipinski, PG	P - 12.25	SE to NW	3,000	50	1,447	0	2	10	3,000	98,800	700	0	2,272,434	Sodium	3		np	pilot drilling joint 36
06/11/20	1000	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,447	0	0	10	0	98,800	700	0	2,272,434	Sodium	0		np	pilot drilling joint 37
06/11/20	1300	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,447	0	0	10	0	98,800	700	0	2,272,434	Sodium	0		np	tripping in/out
06/11/20	1600	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,447	0	0	10	0	98,800	700	0	2,272,434	Sodium	0		np	tripping in/out
06/11/20	1900	Brian Lipinski, PG	P - 12.25	SE to NW	2,500	32	1,479	0	0	10	2,500	101,300	700	0	2,272,434	Sodium	0		np	pilot drilling joint 38 and 15ft of 39
06/12/20	1000	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,479	0	0	10	0	101,300	700	0	2,272,434	Sodium	0		np	pilot drilling joint 39 and put on joint 40
06/12/20	1300	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,479	0	0	10	0	101,300	700	0	2,272,434	Sodium	0		np	pilot drilling joint 40 and put on joint 41
06/12/20	1600	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,479	0	0	10	0	101,300	700	0	2,272,434	Sodium	0		np	pilot drilling joint 41 and put on 42
06/12/20	1900	Brian Lipinski, PG	P - 12.25	SE to NW	2,000	27	1,506	0	0	10	2,000	103,300	700	0	2,272,434	Sodium	0		np	pilot drilling joint 42
06/13/20	1204	Steve Tanen	"	"			1,506	0	0	10	0	103,300	700	25,900	2,298,334	"	0	0	np	resumed at 42-5 at 1126, materials consumed, not reported until EOD
"	1451	"	"	"			1,506	0	0	10	0	103,300	700	65,800	2,364,134	"	0	0	np	materials consumed, not reported until EOD
"	1641	"	"	"	800	14	1,520	0	0	10	800	104,100	700	44,100	2,408,234	"	0	0	np	Bentonite bag and water consumed provided as total at the end of the shift
06/15/20	1000	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,520	0	0	10	0	104,100	700	0	2,408,234	sodium	0	0	np	pilot drilling joint 44
"	1300	"	"	"	0	0	1,520	0	0	10	0	104,100	700	0	2,408,234	"	0	0	np	pilot drilling joint 45
"	1600	"	"	"	0	0	1,520	0	0	10	0	104,100	700	0	2,408,234	"	0	0	np	pilot drilling joint 46
"	1900	"	"	"	2,100	32	1,552	0	0	10	2,100	106,200	700	0	2,408,234	"	13	0	np	pilot drilling joint 47; Bentonite bag and water consumed provided as total at the end of the shift
06/16/20	1000	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,552	0	0	10	0	106,200	700	0	2,408,234	sodium	0	0	np	pilot drilling joint 48
"	1300	"	"	"	0	0	1,552	0	0	10	0	106,200	700	0	2,408,234	"	0	0	np	pilot drilling joint 49
"	1600	"	"	"	0	0	1,552	0	0	10	0	106,200	700	0	2,408,234	"	0	0	np	pilot drilling joint 50
"	1900	"	"	"	2,700	31	1,583	0	0	10	2,700	108,900	700	0	2,408,234	"	13	0	np	pilot drilling joint 51; Bentonite bag and water consumed provided as total at the end of the shift
06/17/20	1000	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,583	0	0	10	0	108,900	700	0	2,408,234	sodium	0	0	np	drilled joint 51
"	1300	"	"	"	0	0	1,583	0	0	10	0	108,900	700	0	2,408,234	"	0	0	np	drilled joint 52
"	1600	"	"	"	0	0	1,583	0	0	10	0	108,900	700	0	2,408,234	"	0	0	np	tripping out
"	1900	"	"	"	2,900	17	1,600	0	0	10	2,900	111,800	700	0	2,408,234	"	0	0	np	tripping out - note that 1500 gallons/2900 gallons of water reported was used to clean the mud motor and not pumped downhole.
06/18/20	1000	Max Howard	"	"	0	0	1,600	0	0	10	0	111,800	0	0	2,408,234	"	0	0	np	Tripped In Hole (TIH)
06/18/20	1300	Max Howard	"	"	0	0	1,600	0	0	10	0	111,800	0	0	2,408,234	"	0	0	np	TIH
06/18/20	1600	Max Howard	"	"	0	0	1,600	0	0	10	0	111,800	0	0	2,408,234	"	0	0	np	TIH
06/18/20	1900	Max Howard	"	"	1,300	42	1,642	0	0	10	1,300	113,100	0	0	2,408,234	"	0	0	np	TIH
06/19/20	1000	Max Howard	"	"	0	0	1,642	0	0	10	0	113,100	0	0	2,408,234	"	13	0	np	Rig Maintnence
06/19/20	1300	Max Howard	"	"	0	0	1,642	0	0	10	0	113,100	700	84,000	2,492,234	"	0	0	np	Drilled joint 53



**FORM B  
Materials Consumed**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd./Little Conestoga Rd  
(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
06/19/20	1600	Max Howard	"	"	0	0	1,642	0	0	10	0	113,100	0	0	2,492,234	"	0	0	np	Back off for US to drill, Idle
06/19/20	1900	Max Howard	"	"	700	52	1,694	0	0	10	700	113,800	0	0	2,492,234	"	0	6000	np	Back off for US to drill, Idle
06/20/20	1000	Glennon C. Grham, Jr	P - 12.25	SE to NW	0	0	1,694	0	0	10	0	113,800	0	0	2,492,234	sodium	0	0	np	Drill idle, working with US drill on intrsect.
06/20/20	1300	Glennon C. Grham, Jr	"	"	0	0	1,694	0	0	10	0	113,800	0	0	2,492,234	"	0	0	np	Trip in joints 52 and 53, working with US drill on intrsect.
06/20/20	1600	Glennon C. Grham, Jr	"	"	1,300	17	1,711	0	0	10	1,300	115,100	0	0	2,492,234	"	0	1300	np	Trip out joints 53 tp 47. 46 joints remain in hole, working with US drill on intrsect.
06/22/20	1000	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,711	0	0	10	0	115,100	0	0	2,492,234	sodium	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/22/20	1300	"	"	"	0	0	1,711	0	0	10	0	115,100	0	0	2,492,234	"	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/22/20	1600	"	"	"	0	0	1,711	0	0	10	0	115,100	0	0	2,492,234	"	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/22/20	1900	"	"	"	1,100	5	1,716	0	0	10	1,100	116,200	0	0	2,492,234	"	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/23/20	1000	Brian Lipinski, PG	P - 12.25	SE to NW	0	0	1,716	0	0	10	0	116,200	0	0	2,492,234	sodium	0	0	np	Michels employees checked hoses and fueled equipment. They slowly tripped back out to joint 45 while taking shots
06/23/20	1300	"	"	"	0	0	1,716	0	0	10	0	116,200	0	0	2,492,234	"	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/23/20	1600	"	"	"	0	0	1,716	0	0	10	0	116,200	0	0	2,492,234	"	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/23/20	1900	"	"	"	0	0	1,716	0	0	10	0	116,200	0	0	2,492,234	"	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/24/20	1000	Brian Lipinski, PG	"	"	0	0	1,716	0	0	10	0	116,200	0	0	2,492,234	sodium	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/24/20	1300	"	"	"	0	0	1,716	0	0	10	0	116,200	0	0	2,492,234	"	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/24/20	1600	"	"	"	0	0	1,716	0	0	10	0	116,200	0	0	2,492,234	"	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/24/20	1900	"	"	"	800	4	1,720	0	0	10	800	117,000	0	0	2,492,234	"	0	0	np	no drilling; maintenance while US works towards pilot intersect
06/25/20	1000	Ty Johnson, PG	"	"	0	0	1,720	0	0	10	0	117,000	0	0	2,492,234		13	0	np	no drilling; maintenance while US works towards pilot intersect; 1 Vac trucks shipped mud back to US pit.
06/25/20	1300	Ty Johnson, PG	"	"	0	0	1,720	0	0	10	0	117,000	0	0	2,492,234		0	0	np	no drilling; maintenance while US works towards pilot intersect; 1 Vac trucks shipped mud back to US pit.
06/25/20	1600	Ty Johnson, PG	"	"	0	0	1,720	0	0	10	0	117,000	0	0	2,492,234		0	0	np	no drilling; 1418: US mud received DS. 2 Vac trucks shipped mud back to US pit.
06/25/20	1900	Ty Johnson, PG	"	"	0	0	1,720	0	0	10	0	117,000	0	0	2,492,234		0	9000	np	no drilling; 1418: US mud received DS. 2 Vac trucks shipped mud back to US pit.
06/26/20	1000	"	"	"	0	0	1,720	0	0	10	0	117,000	0	0	2,492,234			0	np	US mud received DS. 2 Vac trucks shipped mud back to US pit.
06/26/20	1300	"	"	"	0	0	1,720	0	0	10	0	117,000	0	0	2,492,234			0	np	US mud received DS. 2 Vac trucks shipped mud back to US pit.
06/26/20	1600	"	"	"	0	0	1,720	0	0	10	0	117,000	0	0	2,492,234			0	np	US mud received DS. 2 Vac trucks shipped mud back to US pit.
06/26/20	1900	"	"	"	0	22	1,742	0	0	10	0	117,000	0	0	2,492,234	Sodium		3000	np	US mud received DS. Vac trucks shipped mud back to US pit.

**FORM B  
Materials Consumed**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd./Little Conestoga Rd  
(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
06/27/20	1000	"	"	"	0	0	1,742	0	0	10	0	117,000		0	2,492,234				np	1 Vac truck brought mud from DS side to US side
06/27/20	1300	"	"	"	471	6	1,748	0	0	10	471	117,471		0	2,492,234	Sodium		3000	np	1 vac truck removing waste; 30 joints tripped in to complete the push through to DS side
06/27/20	1600	"	"	"	0	0	1,748	0	0	10	0	117,471		0	2,492,234			3000	np	1 vac truck removing waste
06/29/20	1000	Brian Lipinski, PG	R - 30"	SE to NW	0	0	1,748	0	0	10	0	117,471		0	2,492,234			0	np	installing reamer
06/29/20	1300	Brian Lipinski, PG	"	SE to NW	0	0	1,748	0	0	10	0	117,471		0	2,492,234			0	np	reamed 3 joints
06/29/20	1600	Brian Lipinski, PG	"	SE to NW	0	0	1,748	0	0	10	0	117,471	700	0	2,492,234	sodium		0	np	reamed joint 4
06/29/20	1900	Brian Lipinski, PG	"	SE to NW	5,400	66	1,814	0	0	10	5,400	122,871	700	0	2,492,234	sodium		3000	np	reamed joints 5 and 6
06/30/20	1000	Brian Lipinski, PG	R - 30"	SE to NW	0	14	1,828	0	0	10	0	122,871	700	0	2,492,234	sodium	13	0	np	reaming joint 7
06/30/20	1300	Brian Lipinski, PG	"	SE to NW	2,847	53	1,881	0	0	10	2,847	125,718	700	0	2,492,234	sodium	26	0	np	finished reaming joint 7, 8, 9 and started 10
06/30/20	1600	Brian Lipinski, PG	"	SE to NW	1351	16	1,897	0	0	10	1,351	127,069	700	0	2,492,234	sodium	0	0	np	finished reaming joints 10 and 11
06/30/20	1900	Brian Lipinski, PG	"	SE to NW	2,586	36	1,933	0	0	10	2,586	129,655	700	0	2,492,234	sodium	0	0	np	reamed joints 12, 13, 14, and 15
07/01/20	1000	Brian Lipinski, PG	R - 30"	SE to NW	1,700	19	1,952	0	0	10	1,700	131,355	700	0	2,492,234	sodium	0	0	np	reamend joint 16
07/01/20	1300	Brian Lipinski, PG	"	SE to NW	1,100	21	1,973	0	0	10	1,100	132,455	700	0	2,492,234	sodium	26	0	np	reamed joint 17 and started 18
07/01/20	1600	Brian Lipinski, PG	"	SE to NW	1,000	22	1,995	0	0	10	1,000	133,455	700	0	2,492,234	sodium	13	0	np	Reaming joint 18
07/01/20	1900	Brian Lipinski, PG	"	SE to NW	1,733	19	2,014	0	0	10	1,733	135,188	700	0	2,492,234	sodium	0	0	np	finished reaming joint 18
07/02/20	1000	Ty Johnson, PG	"	SE to NW	1,700	30	2,044	0	0	10	1,700	136,888	700	64,400	2,556,634	sodium	0	0	np	one supersack added to cuttings tank; one Vac Truck onsite removing waste but not disposing it putting back into pit
07/02/20	1300	Ty Johnson, PG	"	SE to NW	900	23	2,067	0	0	10	900	137,788	700	86,800	2,643,434	sodium	0	0	np	one supersack added to cuttings tank; one Vac Truck onsite removing waste but not disposing it putting back into pit
07/02/20	1600	Ty Johnson, PG	"	SE to NW	2,093	38	2,105	0	0	10	2,093	139,881	700	102,200	2,745,634	sodium	0	0	np	one Vac Truck onsite removing waste but not disposing it putting back into pit
07/02/20	1900	Ty Johnson, PG	"	SE to NW	400	4	2,109	0	0	10	400	140,281	700	51,100	2,796,734	sodium	0	0	np	one Vac Truck onsite removing waste but not disposing it putting back into pit
07/03/20	1000	Ty Johnson, PG	"	SE to NW	0	0	2,109	0	0	10	0	140,281		0	2,796,734			13	np	One dump truck removing solid waste. one Vac Truck onsite removing waste but not disposing it putting back into pit
07/03/20	1300	Ty Johnson, PG	"	SE to NW	0	0	2,109	0	0	10	0	140,281		0	2,796,734			0	np	one Vac Truck onsite removing waste but not disposing it putting back into pit. Cleaning hole with "doughnut" assembly
07/06/20	1000	Brian Lipinski, PG	"	SE to NW	3,900	0	2,109	0	0	10	0	140,281	0	0	2,796,734	sodium	26	0	np	Ran doughnut 1.5 joints into hole to clean hole
07/06/20	1300	Brian Lipinski, PG	"	SE to NW	2,700	40	2,149	0	0	10	2,700	142,981	550	0	2,796,734	sodium	26	0	np	Ran doughnut 6 joints into hole to clean hole
07/06/20	1600	Brian Lipinski, PG	"	SE to NW	500	32	2,181	0	0	10	500	143,481	550	0	2,796,734	sodium	13	0	np	Ran doughnut all the way to the reamer. Cabbed up for lightning
07/06/20	1900	Brian Lipinski, PG	"	SE to NW	0	0	2,181	0	0	10	0	143,481	0	0	2,796,734	sodium	0	0	np	No activity; cabbed up for lightning. Part of crew left at 5; rest remained until 6.
07/07/20	1000	Brian Lipinski, PG	"	SE to NW	0	0	2,181	0	0	10	0	143,481	0	0	2,796,734	sodium	0	0	np	pulling doughnut out of hole
07/07/20	1300	Brian Lipinski, PG	"	SE to NW	3,500	71	2,252	0	0	10	3,500	146,981	700	0	2,796,734	sodium	13	0	np	tripping out
07/07/20	1600	Brian Lipinski, PG	"	SE to NW	100	14	2,266	0	0	10	100	147,081	700	0	2,796,734	sodium	13	0	np	tripping out
07/07/20	1900	Brian Lipinski, PG	"	SE to NW	300	15	2,281	0	0	10	300	147,381	700	0	2,796,734	sodium	0	0	np	tripping back in
07/08/20	1000	Brian Lipinski, PG	"	SE to NW	100	16	2,297	0	0	10	100	147,481	700	0	2,796,734	sodium	13	0	np	tripping back into the hole
07/08/20	1300	Brian Lipinski, PG	"	SE to NW	1,000	17	2,314	0	0	10	1,000	148,481	700	0	2,796,734	sodium	26	0	np	tripping back into the hole
07/08/20	1600	Brian Lipinski, PG	"	SE to NW	0	0	2,314	0	0	10	0	148,481	0	0	2,796,734	sodium	13	0	np	repairing mud pump
07/08/20	1900	Brian Lipinski, PG	"	SE to NW	200	15	2,329	0	0	10	200	148,681	700	0	2,796,734	sodium	0	0	np	tripped all the way back in; cabbed up for lightning from 1730-1830

**FORM B  
Materials Consumed**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd./Little Conestoga Rd  
(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
07/09/20	1000	Ty Johnson, PG	"	SE to NW	1,400	39	2,368	0	0	10	1,400	150,081	700	84,000	2,880,734	sodium	0	0	np	At rock face and begin reaming with joint 21; complet joint 21; begin joint 22
07/09/20	1300	Ty Johnson, PG	"	SE to NW	100	20	2,388	0	0	10	100	150,181	700	119,000	2,999,734	sodium	0	0	np	drilling joint 22; grout in mud downhole needs replaced. It is not moving cuttings out, so disposing of it as solid waste.
07/09/20	1600	Ty Johnson, PG	"	SE to NW	100	17	2,405	0	0	10	100	150,281	700	73,500	3,073,234	sodium	13	0	np	completed joint 22; begin reaming joint 23; Drilling fluid needs replaced due to grout added to it durning reaming. Replacing all drilling fluid and removing it as solid waste. 3 supersacks used
07/09/20	1900	Ty Johnson, PG	"	SE to NW	2,900	27	2,432	0	0	10	2,900	153,181	700	108,500	3,181,734	sodium	13	0	np	continue to ream joint 23. Drilling fluid needs replaced due to grout added to it durning reaming. Replacing all drilling fluid and removing it as solid waste. 9 supersacks used
07/10/20	1000	Ty Johnson, PG	"	SE to NW	2,100	47	2,479	0	0	10	2,100	155,281	700	95,200	3,276,934	sodium	13	0	np	complete joint 23 and begin joint 24; Replacing all drilling fluid and removing it as solid waste. 2 supersacks used
07/10/20	1300	Ty Johnson, PG	"	SE to NW	0	9	2,488	0	0	10	0	155,281	700	87,500	3,364,434	sodium	0	0	np	continued reaming joint 24; Replacing all drilling fluid and removing it as solid waste. 4 supersacks used
07/10/20	1600	Ty Johnson, PG	"	SE to NW			2,488			10	0	155,281		0	3,364,434				np	no report - rainout
07/10/20	1900	Ty Johnson, PG	"	SE to NW			2,488			10	0	155,281		0	3,364,434				np	no report - rainout
07/11/20	1000	Ty Johnson, PG	"	SE to NW	0	0	2,488	0	0	10	0	155,281	0	0	3,364,434	Sodium			np	not drilling yet
07/11/20	1300	Ty Johnson, PG	"	SE to NW	1,700	57	2,545	0	0	10	1,700	156,981	700	91,700	3,456,134	Sodium	13	0	np	resumed reaming joint 24
07/11/20	1600	Ty Johnson, PG	"	SE to NW	400	2	2,547	0	0	10	400	157,381	700	109,200	3,565,334	Sodium	26	0	np	completed joint 24 and began reaming joint 25
07/11/20	1900	Ty Johnson, PG	"	SE to NW	0	0	2,547	0	0	10	0	157,381	700	32,900	3,598,234	Sodium	0	0	np	reaming joint 25
07/13/20	1000	Brian Lipinski, PG	"	SE to NW	400	25	2,572	0	0	10	400	157,781	700	63,000	3,661,234	Sodium	13	0	np	reaming joint 25
07/13/20	1300	Brian Lipinski, PG	"	SE to NW	400	31	2,603	0	0	10	400	158,181	700	126,000	3,787,234	Sodium	13	0	np	completed reaming joint 25, started joint 26
07/13/20	1600	Brian Lipinski, PG	"	SE to NW	1,000	31	2,634	0	0	10	1,000	159,181	700	91,000	3,878,234	Sodium	13	0	np	reaming joint 26
07/13/20	1900	Brian Lipinski, PG	"	SE to NW	1,000	8	2,642	0	0	10	1,000	160,181	700	108,500	3,986,734	Sodium	0	0	np	completed reaming joint 26, started joint 27
07/14/20	1000	Brian Lipinski, PG	"	SE to NW	1,500	36	2,678	0	0	10	1,500	161,681	700	42,000	4,028,734	Sodium	13	0	np	reaming joint 27
07/14/20	1300	Brian Lipinski, PG	"	SE to NW	3,754	56	2,734	0	0	10	3,754	165,435	700	119,000	4,147,734	Sodium	13	0	np	finished reaming joint 27, sarded reaming joint 28
07/14/20	1600	Brian Lipinski, PG	"	SE to NW	100	29	2,763	0	0	10	100	165,535	700	105,000	4,252,734	Sodium	0	0	np	reaming joint 28
07/14/20	1900	Brian Lipinski, PG	"	SE to NW	700	26	2,789	0	0	10	700	166,235	700	105,000	4,357,734	sodium	0	0	np	finished reaming joint 28. determined that while adding joint 29, they twisted off the drill stem on the US side of the reamer.
07/15/20	1000	Brian Lipinski, PG	"	SE to NW	400	39	2,828	0	0	10	400	166,635	700	42,000	4,399,734	sodium	0	0	np	tripped out to joint 25. running a doughnut to aid hole cleanout
07/15/20	1300	Brian Lipinski, PG	"	SE to NW	1,200	18	2,846	0	0	10	1,200	167,835	700	84,000	4,483,734	sodium	0	0	np	ran doughnut 19 joints into the hole
07/15/20	1600	Brian Lipinski, PG	"	SE to NW	1,500	5	2,851	0	0	10	1,500	169,335	700	84,000	4,567,734	sodium	0	0	np	Ran doughnut to the reamer
07/15/20	1900	Brian Lipinski, PG	"	SE to NW	7,658	46	2,897	0	0	10	7,658	176,993	700	84,000	4,651,734	sodium	0	0	np	tripped out to joint 18
07/16/20	1000	Ty Johnson, PG	"	SE to NW	0	2	2,899	0	0	10	0	176,993	700	17,500	4,669,234	sodium	0	0	np	tripped out 18 jointsto the reamer, pulled the centralizer and detached reamer; 2 supersacks were used
07/16/20	1300	Ty Johnson, PG	"	SE to NW	0	0	2,899	0	0	10	0	176,993	0	0	4,669,234		26	0	np	tripping out 25 joints to broken joint; 3 supersacks used

**FORM B  
Materials Consumed**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd./Little Conestoga Rd  
(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
07/16/20	1600	Ty Johnson, PG	"	SE to NW	4,757	30	2,929	0	0	10	4,757	181,750	0	0	4,669,234	sodium	13	0	np	US trips into DS pit; 2 supersacks used
07/16/20	1900	Ty Johnson, PG	"	SE to NW	700	0	2,929	0	0	10	0	181,750	0	0	4,669,234		0	0	np	Assembling reamer tools.
07/17/20	1000	Ty Johnson, PG	"	SE to NW	300	4	2,933	0	0	10	300	182,050	700	18,900	4,688,134	sodium	0	0	np	Tripped 5 joints in and installed the centralizer
07/17/20	1300	Ty Johnson, PG	"	SE to NW	1,500	18	2,951	0	0	10	1,500	183,550	700	30,100	4,718,234	sodium	13	0	np	Tripping reamer in and returned to rock face at joint 28. 4 supersacks used.
07/17/20	1600	Ty Johnson, PG	"	SE to NW	2,500	23	2,974	0	0	10	2,500	186,050	700	26,600	4,744,834	sodium	0	0	np	Reaming joint 29
07/17/20	1900	Ty Johnson, PG	"	SE to NW	700	2	2,976	0	0	10	700	186,750	700	109,200	4,854,034	sodium	0	0	np	Completed joint 29; begin reaming joint 30; 3 supersacks used
07/18/20	1000	Ty Johnson, PG	"	SE to NW	0	0	2,976	0	0	10	0	186,750	0	0	4,854,034		13	0	np	working on mud rig
07/18/20	1300	Ty Johnson, PG	"	SE to NW	600	8	2,984	0	0	10	600	187,350	700	96,600	4,950,634	sodium	13	0	np	Continued drilling joint 30; 1 supersack used
07/18/20	1600	Ty Johnson, PG	"	SE to NW	0	0	2,984	0	0	10	0	187,350	700	17,500	4,968,134	sodium	0	0	np	Completed joint 30
07/18/20	1900	Ty Johnson, PG	"	SE to NW	0	0	2,984	0	0	10	0	187,350	700	21,000	4,989,134	sodium	0	0	np	Reaming joint 30
07/20/20	1000	Brian Lipinski, PG	"	SE to NW	0	0	2,984	0	0	10	0	187,350	0	0	4,989,134	sodium	0	0	np	working on US rig
07/20/20	1300	Brian Lipinski, PG	"	SE to NW	400	6	2,990	0	0	10	400	187,750	700	77,000	5,066,134	sodium	13	0	np	reaming joint 31
07/20/20	1600	Brian Lipinski, PG	"	SE to NW	0	3	2,993	0	0	10	0	187,750	700	105,000	5,171,134	sodium	0	0	np	finished joint 31 and started 32
07/20/20	1900	Brian Lipinski, PG	"	SE to NW	200	10	3,003	0	0	10	200	187,950	700	84,000	5,255,134	sodium	0	0	np	finished reaming joint 32 and 33
07/21/20	1000	Brian Lipinski, PG	"	SE to NW	0	0	3,003	0	0	10	0	187,950	0	0	5,255,134	sodium	26	0	np	working on mud rig
07/21/20	1300	Brian Lipinski, PG	"	SE to NW	500	25	3,028	0	0	10	500	188,450	700	42,000	5,297,134	sodium	13	0	np	reaming joint 34
07/21/20	1600	Brian Lipinski, PG	"	SE to NW	100	52	3,080	0	0	10	100	188,550	750	90,000	5,387,134	sodium	0	0	np	reaming joint 34
07/21/20	1900	Brian Lipinski, PG	"	SE to NW	400	51	3,131	0	0	10	400	188,950	750	112,500	5,499,634	sodium	0	3000	np	finished joint 34 and started joint 35
07/22/20	1000	Brian Lipinski, PG	"	SE to NW	0	0	3,131	0	0	10	0	188,950	0	0	5,499,634	sodium	13	3000	np	working on mud rig
07/22/20	1300	Brian Lipinski, PG	"	SE to NW	200	44	3,175	0	0	10	200	189,150	750	112,500	5,612,134	sodium	0	0	np	finished joint 35 and started joint 36
07/22/20	1600	Brian Lipinski, PG	"	SE to NW	0	30	3,205	0	0	10	0	189,150	750	112,500	5,724,634	sodium	0	0	np	finished joint 36 and started 37
07/22/20	1900	Brian Lipinski, PG	"	SE to NW	0	12	3,217	0	0	10	0	189,150	750	45,000	5,769,634	sodium	0	0	np	continued reaming joint 37 but stopped due to rain at 1700
07/23/20	1000	Ty Johnson, PG	"	SE to NW	0	0	3,217	0	0	10	0	189,150		0	5,769,634		0	0	np	tripped joint 37 out, pulled casing and ran doughnut for 3 joints.
07/23/20	1300	Ty Johnson, PG	"	SE to NW	0	70	3,287	0	0	10	0	189,150	500	58,000	5,827,634	sodium	13	0	np	ran doughnut for 14 joints; 3 supersacks used
07/23/20	1600	Ty Johnson, PG	"	SE to NW	0	0	3,287	0	0	10	0	189,150	500	30,000	5,857,634		0	0	np	finished running doughnut for a total of 18 joints and began tripping them out
07/23/20	1900	Ty Johnson, PG	"	SE to NW	1,900	89	3,376	0	0	10	1,900	191,050	500	1,500	5,859,134	sodium	13	0	np	18 joints are tripped out and circulated the reamer for an unknown amount of time; 8 supersacks used
07/24/20	1000	Ty Johnson, PG	"	SE to NW	0	0	3,376	0	0	10	0	191,050	0	0	5,859,134		13	0	np	tripped joints 37-35 out and put spider-sub on.
07/24/20	1300	Ty Johnson, PG	"	SE to NW	700	62	3,438	0	0	10	700	191,750	750	51,000	5,910,134	sodium	13	0	np	tripped joints 37-35 in and circulated drilling fluid; 7 supersacks used.
07/24/20	1600	Ty Johnson, PG	"	SE to NW	300	25	3,463	0	0	10	300	192,050	750	84,750	5,994,884	sodium	0	0	np	Michels employees completed reaming joint 37 and began 38.
07/24/20	1900	Ty Johnson, PG	"	SE to NW	200	41	3,504	0	0	10	200	192,250	750	82,500	6,077,384	sodium	0	0	np	Reaming joint 38; 2 supersacks used
07/25/20	1000	Ty Johnson, PG	"	SE to NW	0	0	3,504	0	0	10	0	192,250		0	6,077,384		0	0	np	swabbing hole and trucking mud from frac tank to US pit to assist in flushing the borehole
07/25/20	1300	Ty Johnson, PG	"	SE to NW	1,400	70	3,574	0	0	10	1,400	193,650	750	101,250	6,178,634	Sodium	0	0	np	complete joint 38 and begin joint 39; 2 supersacks used
07/25/20	1600	Ty Johnson, PG	"	SE to NW	100	68	3,642	0	0	10	100	193,750	750	72,750	6,251,384	Sodium	0	0	np	reaming joint 39, 1 supersack used.
07/25/20	1900	Ty Johnson, PG	"	SE to NW			3,642	0	0	10	0	193,750		0	6,251,384				np	No report. Reaming joint 39

**FORM B  
Materials Consumed**

HDD No.: S3-0290-20 (US-DS)

HDD Name: Little Conestoga Rd

HDD Permit Name: Milford Rd./Little Conestoga Rd

(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags) Plugz-it (bags)		Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
07/27/20	1000	Brian Lipinski, PG	"	SE to NW	0	0	3,642	0	0	10	0	193,750	0	0	6,251,384		0	0	np	swabbing hole and trucking mud from frac tank to US pit to assist in flushing the borehole
07/27/20	1300	Brian Lipinski, PG	"	SE to NW	1,800	95	3,737	0	0	10	1,800	195,550	0	0	6,251,384		0	0	np	swabbing hole
07/27/20	1600	Brian Lipinski, PG	"	SE to NW	4,463	95	3,832	0	0	10	4,463	200,013	750	90,000	6,341,384	Sodium	13	0	np	finished reaming joint 39
07/27/20	1900	Brian Lipinski, PG	"	SE to NW	2,000	49	3,881	0	0	10	2,000	202,013	750	97,500	6,438,884	Sodium	0	0	np	reaming joint 40
07/28/20	1000	Brian Lipinski, PG	"	SE to NW	300	46	3,927	0	0	10	300	202,313	750	37,500	6,476,384	Sodium	13	0	np	reaming joint 40
07/28/20	1300	Brian Lipinski, PG	"	SE to NW	1,670	50	3,977	0	0	10	1,670	203,983	750	82,500	6,558,884	Sodium	13	0	np	finished reaming joint 40 and started joint 41
07/28/20	1600	Brian Lipinski, PG	"	SE to NW	0	35	4,012	0	0	10	0	203,983	750	90,000	6,648,884	Sodium	26	0	np	continued reaming joint 41
07/28/20	1900	Brian Lipinski, PG	"	SE to NW	100	41	4,053	0	0	10	100	204,083	750	97,500	6,746,384	Sodium	0	0	np	finished reaming joint 41 and started joint 42
07/29/20	1000	Brian Lipinski, PG	"	SE to NW	1,573	64	4,117	0	0	10	1,573	205,656	750	97,500	6,843,884	Sodium	0	0	np	continued reaming joint 42
07/29/20	1300	Brian Lipinski, PG	"	SE to NW	0	26	4,143	0	0	10	0	205,656	750	120,000	6,963,884	sodium	0	0	np	finished reaming joint 42 and started joint 43
07/29/20	1600	Brian Lipinski, PG	"	SE to NW	515	21	4,164	0	0	10	515	206,171	750	82,500	7,046,384	sodium	0	0	np	finished reaming joint 43
07/29/20	1900	Brian Lipinski, PG	"	SE to NW	400	21	4,185	0	0	10	400	206,571	750	120,000	7,166,384	sodium	0	0	np	finished reaming joint 44
07/30/20	1000	Ty Johnson, PG	"	SE to NW	0	0	4,185	0	0	10	0	206,571		0	7,166,384		13	0	np	Ran bull-nose bit parrallel to drill stem to clean hole.
07/30/20	1300	Ty Johnson, PG	"	SE to NW	6,294	94	4,279	0	0	10	6,294	212,865	750	64,500	7,230,884	sodium	13	0	np	Tripped bull-nose out and began reaming joint 45; 6 supersacks used
07/30/20	1600	Ty Johnson, PG	"	SE to NW	2,063	40	4,319	0	0	10	2,063	214,928	750	73,500	7,304,384	sodium	0	0	np	Continued reaming joint 45; 6 supersacks used
07/30/20	1900	Ty Johnson, PG	"	SE to NW	1,100	28	4,347	0	0	10	1,100	216,028	750	105,000	7,409,384	sodium	0	0	np	Completed joint 45
07/31/20	1000	Ty Johnson, PG	"	SE to NW	8,473	149	4,496	0	0	10	8,473	224,501	750	73,500	7,482,884	sodium	26	0	np	Began reaming joint 46; 4 supersacks used
07/31/20	1300	Ty Johnson, PG	"	SE to NW	6,111	77	4,573	0	0	10	6,111	230,612	750	93,750	7,576,634	sodium	13	0	np	Completed reaming joint 46 and began
07/31/20	1600	Ty Johnson, PG	"	SE to NW	0	16	4,589	0	0	10	0	230,612	750	87,000	7,663,634	sodium	13	0	np	Michels completed joint 47 and began 48; 3 supersacks used
07/31/20	1900	Ty Johnson, PG	"	SE to NW	200	19	4,608	0	0	10	200	230,812	750	92,250	7,755,884	sodium	0	0	np	completed joint 48
08/01/20	1000	Ty Johnson, PG	"	SE to NW	0	0	4,608	0	0	10	0	230,812		0	7,755,884		0	0	np	no drilling
08/01/20	1300	Ty Johnson, PG	"	SE to NW	3,700	70	4,678	0	0	10	3,700	234,512	400	8,800	7,764,684	sodium	0	0	np	circulated fluid, sat idle, then began tripping out reamer; 6 supersacks used
08/01/20	1600	Ty Johnson, PG	"	SE to NW	5,400	70	4,748	0	0	10	5,400	239,912		0	7,764,684	sodium	26	0	np	Tripping out reamer, having difficulty; 7 supersacks used
08/01/20	1900	Ty Johnson, PG	"	SE to NW	3,000	53	4,801	0	0	10	3,000	242,912		0	7,764,684		0	0	np	Tripping out reamer, having difficulty
08/03/20	1000	Brian Lipinski, PG	"	SE to NW	0	105	4,906	0	0	10	0	242,912	0	0	7,764,684	sodium	0	0	np	tripping in doughnut to reamer
08/03/20	1300	Brian Lipinski, PG	"	SE to NW	0	20	4,926	0	0	10	0	242,912	0	0	7,764,684	sodium	0	3000	np	tripped doughnut in, checked returns, tripped doughnut back out.
08/03/20	1600	Brian Lipinski, PG	"	SE to NW	2,300	28	4,954	0	0	10	2,300	245,212	0	0	7,764,684	sodium	13	3000	np	tripped reamer out
08/03/20	1900	Brian Lipinski, PG	"	SE to NW	0	0	4,954	0	0	10	0	245,212	0	0	7,764,684	sodium	0	0	np	installed new reamer
08/04/20	1000	Brian Lipinski, PG	"	SE to NW	0	0	4,954	0	0	10	0	245,212	0	0	7,764,684	sodium	0	0	np	rained out; drillers onsite monitoring pit
08/04/20	1300	Brian Lipinski, PG	"	SE to NW	0	0	4,954	0	0	10	0	245,212	0	0	7,764,684	sodium	0	0	np	rained out; drillers onsite monitoring pit
08/04/20	1600	Brian Lipinski, PG	"	SE to NW	0	0	4,954	0	0	10	0	245,212	0	0	7,764,684	sodium	0	0	np	rained out; drillers onsite monitoring pit
08/04/20	1900	Brian Lipinski, PG	"	SE to NW	0	0	4,954	0	0	10	0	245,212	0	0	7,764,684	sodium	0	0	np	rained out; drillers onsite monitoring pit
08/05/20	1000	Brian Lipinski, PG	"	SE to NW	0	0	4,954	0	0	10	0	245,212	0	0	7,764,684	sodium	0	0	np	no work - insufficient equipment to run all drills on spread 6 so 290 is shut down
08/05/20	1300	Brian Lipinski, PG	"	SE to NW	0	0	4,954	0	0	10	0	245,212	0	0	7,764,684	sodium	0	0	np	no work - insufficient equipment to run all drills on spread 6 so 290 is shut down
08/06/20	1000	Ty Johnson, PG	"	SE to NW	0	0	4,954	0	0	10	0	245,212		0	7,764,684		0	0	np	no drilling. The crew mixed drilling fluid and solid waste

**FORM B  
Materials Consumed**

HDD No.: S3-0290-20 (US-DS)  
HDD Name: Little Conestoga Rd  
HDD Permit Name: Milford Rd./Little Conestoga Rd  
(merged US-DS Form B on 6/27/20)

Date (xx/xx/xx)	Time (military)	Professional Geologist	Pilot - P Ream - R Bit Size	Drilling Direction	Clean Water (gal)	Bentonite (bags)	Total Bentonite (bags)	Loss Control Materials DrillPlex (bags)	Plugz-it (bags)	Total LCM (bags)	Estimated Mud Mixed (gallons)	Running total Mud Mixed (gallons)	Pump Rate (gpm)	Approximate Mud Pumped Downhole (gallons)	Running Total Mud Pumped (gallons)	Type of Bentonite (sodium or calcium)	Soil Disposal (yd3)	Liquid Disposal (gal)	Mud Wt./ Vis.	Comments (Materials consumed based on 3 hr UI Update Reports)
08/06/20	1300	Ty Johnson, PG	"	SE to NW	1,837	42	4,996	0	0	10	1,837	247,049	750	13,500	7,778,184	sodium	0	0	np	began tripping in, 18 joints in hole; 9 supersacks used
08/06/20	1600	Ty Johnson, PG	"	SE to NW	279	9	5,005	0	0	10	279	247,328	750	56,250	7,834,434	sodium	13	0	np	continued tripping in, 31 joints in hole
08/06/20	1900	Ty Johnson, PG	"	SE to NW	400	5	5,010	0	0	10	400	247,728	750	75,000	7,909,434	sodium	13	0	np	Tripped all the way in through joint 48 back to rock face.
08/07/20	1000	Ty Johnson, PG	"	SE to NW	100	60	5,070	0	0	10	100	247,828	750	70,500	7,979,934	sodium	0	0	np	began reaming joint 49, 3 supersacks used
08/07/20	1300	Ty Johnson, PG	"	SE to NW	185	54	5,124	0	0	10	185	248,013	750	45,000	8,024,934	sodium	13	0	np	completed joint 49 and began reaming joint 50
08/07/20	1600	Ty Johnson, PG	"	SE to NW	50	17	5,141	0	0	10	50	248,063	750	93,000	8,117,934	sodium	26	0	np	completed reaming joint 50 and began joint 51; 9 supersacks used
08/07/20	1900	Ty Johnson, PG	"	SE to NW	0	0	5,141	0	0	10	0	248,063		0	8,117,934		0	0	np	no report - rainout
08/08/20	1000	Ty Johnson, PG	"	SE to NW			5,141			10	0	248,063		0	8,117,934				np	placing wash over tool on joint 51 to clean borehole
08/08/20	1300	Ty Johnson, PG	"	SE to NW	2,100	150	5,291	0	0	10	2,100	250,163	600	66,000	8,183,934	sodium	0	0	np	running wash over tool to clean hole and periodically checking circulation; 10 supersacks used
08/08/20	1600	Ty Johnson, PG	"	SE to NW	15,044	119	5,410	0	0	10	15,044	265,207	600	25,200	8,209,134	sodium	26	0	np	running wash over tool to clean hole and periodically checking circulation; 1 supersack used
08/08/20	1900	Ty Johnson, PG	"	SE to NW	0	0	5,410	0	0	10	0	265,207		0	8,209,134		0	0	np	no report; tripping wash over tool out
08/10/20	1000	Brian Lipinski, PG	"	SE to NW	0	0	5,410	0	0	10	0	265,207	600	36,000	8,245,134	Sodium	13	0	np	ran the wash tool in 11 joints; reamer still 50 joints in
08/10/20	1300	Brian Lipinski, PG	"	SE to NW	7,115	20	5,430	0	0	10	7,115	272,322	600	36,000	8,281,134	Sodium	13	0	np	ran the wash tool in 21 joints; reamer still 50 joints in
08/10/20	1600	Brian Lipinski, PG	"	SE to NW			5,430			10	0	272,322	600	36,000	8,317,134				np	no report; UI said wash tool was out of the hole at 1520; IR was confirmed at 1536 in Wetlands W-H17
08/10/20	1900	Brian Lipinski, PG	"	SE to NW			5,430			10	0	272,322		0	8,317,134				np	no report; cleaning up IR
08/11/20	1000	Brian Lipinski, PG	"	SE to NW			5,430			10	0	272,322		0	8,317,134				np	no UI report; cleaning up IR
08/11/20	1300	Brian Lipinski, PG	"	SE to NW			5,430			10	0	272,322		0	8,317,134				np	no UI report; cleaning up IR
08/11/20	1600	Brian Lipinski, PG	"	SE to NW			5,430			10	0	272,322		0	8,317,134				np	no UI report; cleaning up IR
08/11/20	1900	Brian Lipinski, PG	"	SE to NW			5,430			10	0	272,322		0	8,317,134				np	no UI report; cleaning up IR
08/12/20	1000	Brian Lipinski, PG	"	SE to NW			5,430			10	0	272,322		0	8,317,134				np	no UI report; cleaning up IR
08/12/20	1300	Brian Lipinski, PG	"	SE to NW			5,430			10	0	272,322		0	8,317,134				np	no UI report; cleaning up IR; pulling reamer
08/12/20	1600	Brian Lipinski, PG	"	SE to NW			5,430			10	0	272,322		0	8,317,134				np	no UI report; cleaning up IR; pulling reamer
08/12/20	1900	Brian Lipinski, PG	"	SE to NW			5,430			10	0	272,322		0	8,317,134				np	no UI report; cleaning up IR; finished pulling reamer and pumped 3 loads of grout into IR

Drilling Contractor:  
Bore ID:

**Michels**  
**S3-0290-20 (US-DS)**  
(combined 6/27/20)

**PPP 6 Drill Path Monitoring Log**

Date	Time	Print Name	Comments
3/17/2020	900	Jeffrey Valvik, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
3/17/2020	1220	Jeffrey Valvik, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
3/17/2020	1345	Jeffrey Valvik, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/4/2020	1400	Ty Johnson, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/4/2020	1745	Ty Johnson, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/5/2020	845	Ty Johnson, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/5/2020	1150	Ty Johnson, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/5/2020	1730	Ty Johnson, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/6/2020	920	Ty Johnson, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/6/2020	1300	Ty Johnson, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/6/2021	1600	Ty Johnson, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/8/2020	1045	Steven Tanen, PG	Inspected ROW from the NW (US) e/e to pipeline station 14807+40 (~578 ft from NW e/e). No IRs.
"	1305	"	Inspected ROW from the NW (US) e/e to pipeline station 14807+40 (~578 ft from NW e/e). No IRs.
"	1450	"	Inspected ROW from the NW (US) e/e to pipeline station 14807+40 (~578 ft from NW e/e). No IRs.
"	1745	"	Inspected ROW from the NW (US) e/e to pipeline station 14807+40 (~578 ft from NW e/e). Bit at ~14803+64 (~202 ft (HD) from NW e/e). No IRs.
6/9/2020	953	Lindsay Phillips	Inspected ROW from the NW (US) e/e to pipeline station 14807+40 (~578 ft from NW e/e). No IRs.
"	1200	"	Inspected ROW from the NW (US) e/e to pipeline station 14807+40 (~578 ft from NW e/e). No IRs.
"	1430	"	Inspected ROW from the NW (US) e/e to pipeline station 14813+91 (~1,229 ft from NW e/e). No IRs.
"	1600	"	Inspected ROW from the NW (US) e/e to pipeline station 14813+91 (~1,229 ft from NW e/e). No IRs.
"	1710	Steven Tanen, PG	Inspected ROW from the NW (US) e/e to pipeline station 14813+91 (~1,229 ft from NW e/e). Bit at ~14804+09 (~247 ft (HD) from NW e/e). No IRs.
6/10/2020	940	Steven Tanen, PG	Inspected ROW from the NW (US) e/e to pipeline station 14805+87 (~425 ft from NW e/e). No IRs.
"	1215	"	Inspected ROW from the NW (US) e/e to pipeline station 14805+87 (~425 ft from NW e/e). No IRs.
"	1320	"	Inspected ROW from the NW (US) e/e to pipeline station 14805+87 (~425 ft from NW e/e). No IRs.
"	1520	"	Inspected ROW from the NW (US) e/e to pipeline station 14805+87 (~425 ft from NW e/e). No IRs.
"	1645	"	Inspected ROW from the NW (US) e/e to pipeline station 14805+87 (~425 ft from NW e/e). No IRs.
"	1817	"	Inspected ROW from the NW (US) e/e to pipeline station 14807+40 (~578 ft from NW e/e). No IRs.
6/11/2020	800	Ty Johnson, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1200	Will Avery, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1400	Will Avery, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1600	Will Avery, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1800	Will Avery, PG	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/12/2020	800	Ty Johnson, PG and Matt Feits	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1015	Matt Feits	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.

Drilling Contractor:  
Bore ID:

**Michels**  
**S3-0290-20 (US-DS)**  
(combined 6/27/20)

**PPP 6 Drill Path Monitoring Log**

Date	Time	Print Name	Comments
"	1222	Ty Johnson	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1445	Ty Johnson	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1645	Matt Feits	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1830	Matt Feits	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/13/2020	935	Matt Feits	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1330	Matt Feits	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1530	Matt Feits	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
"	1630	Ty Johnson	Inspected LOD from the Entry Pit (US Side) to Highview Road including areas along Little Conestoga Road from Milford Road to the LOD at Highview Road. Overlapping with inspections from the Exit pad (DS side) area. No areas of IR or subsidence were noted.
6/15/2020	855	Steven Tanen, PG	Inspected LOD from the US entry to 14809+38. Maximum distance drilled ~14807+26. No IRs. Also inspected ECDs along northwest edge of LOD. No issues.
"	1115	"	Inspected LOD from the US entry to 14809+38. Maximum distance drilled ~14807+26. No IRs.
"	1430	"	Inspected LOD from the US entry to 14809+38. Maximum distance drilled ~14807+26. No IRs. Also inspected ECDs along northwest edge of LOD. No issues.
"	1630	"	Inspected LOD from the US entry to 14809+38. Maximum distance drilled ~14807+26. No IRs.
"	1820	"	Inspected LOD from the US entry to 14809+38. Maximum distance drilled ~14807+26. No IRs. Also inspected ECDs along northwest edge of LOD. No issues.
6/16/2020	900	Brian Lapinski, PG	Inspected LOD from the US entry to 14808+00 (bit at ~14807+36). No IRs.
"	1135	"	Inspected LOD from the US entry to 14808+00 (bit at ~14807+58). No IRs.
"	1430	Lindsay Phillips	Inspected LOD from the US entry to 14809+38 (bit at ~14808+00). No IRs. Also inspected ECDs along northwest edge of LOD. No issues.
"	1635	Steven Tanen, PG	Inspected LOD from the US entry to 14809+38 (bit at ~14808+19). No IRs. Also inspected ECDs along northwest edge of LOD. No issues.
"	1830	"	Inspected LOD from the US entry to 14809+38 (bit at ~14808+35). No IRs. Also inspected ECDs along northwest edge of LOD. No issues.
6/17/2020	918	Steven Tanen, PG	Inspected LOD from the US entry to 14809+38 (bit at ~14808+35). No IRs. Also inspected ECDs along northwest edge of LOD. No issues.
"	1514	Lindsay Phillips	Inspected LOD from the US entry to 14809+38 (bit at ~14808+65). No IRs.
"	1630	Steven Tanen, PG	Inspected LOD from the US entry to 14809+38 (bit at ~14808+84). No IRs. Also inspected ECDs along northwest edge of LOD. No issues.
"	1830	"	Inspected LOD from the US entry to 14809+38 (bit at ~14809+06). No IRs. Also inspected ECDs along northwest edge of LOD. No issues.
6/18/2020	810	Matt Feits	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
"	1130	Matt Feits	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
"	1430	Ty Johnson	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
"	1630	Matt Feits	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
"	17:50	Matt Feits	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
"	18:40	Ty Johnson & Matt Feits	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
6/19/2020	9:30	Ty Johnson	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
"	14:00	Ty Johnson	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
"	16:10	Ty Johnson	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
"	18:30	Ty Johnson	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
6/20/2020	9:30	Ty Johnson	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
"	11:45	Ty Johnson	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.
"	15:00	Ty Johnson	Inspected LOD from the US entry to STA 14813+92. Inspected residential water well from LOD at STA 14806+00. No IRs.





Drilling Contractor:  
Bore ID:

**Michels**  
S3-0290-20 (US-DS)  
(combined 6/27/20)

**PPP 6 Drill Path Monitoring Log**

Date	Time	Print Name	Comments
2/20/2020	0815	Steve Tanen	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – drilling hadn't started). Observed grayish streaks in mud in wetlands W-H17 at eastern most end of stream segment S-H11 (not drilling related – drilling hadn't started). Stream segment S-H10 flowing clear.
"	1500	"	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – drilling hadn't started). Observed grayish streaks in mud in wetlands W-H17 at eastern most end of stream segment S-H11 (not drilling related – drilling hadn't started). Stream segment S-H10 flowing clear.
2/21/2020	0830	Lawrence Galiano	Walked LOD from SE entry (14828+03) to split-rail fence line (14821+77) roundtrip Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – water was present prior to drilling activities. Stream segment S-H10 flowing clear. Walked LOD from SE entry (14828+03) to split-rail fence line (14821+77) and back. Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – water was present prior to drilling activities. Stream segment S-H10 flowing clear.
"	1020	"	Walked LOD from SE entry (14828+03) to split-rail fence line (14821+77) roundtrip Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – water was present prior to drilling activities. Stream segment S-H10 flowing clear. Walked LOD from SE entry (14828+03) to split-rail fence line (14821+77) and back. Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – water was present prior to drilling activities. Stream segment S-H10 flowing clear.
"	1400	"	Walked LOD from SE entry (14828+03) to split-rail fence line (14821+77) roundtrip Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – water was present prior to drilling activities. Stream segment S-H10 flowing clear. Walked LOD from SE entry (14828+03) to split-rail fence line (14821+77) and back. Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – water was present prior to drilling activities. Stream segment S-H10 flowing clear.
"	1550	"	Walked LOD from SE entry (14828+03) to split-rail fence line (14821+77) roundtrip Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – water was present prior to drilling activities. Stream segment S-H10 flowing clear. Walked LOD from SE entry (14828+03) to split-rail fence line (14821+77) and back. Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – water was present prior to drilling activities. Stream segment S-H10 flowing clear.
2/22/2020	0950	Steve Tanen	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Standing water observed in swale crossing ROW at ~14822+80 (not drilling related – rig idle for repairs). Observed grayish streaks in sediment in wetlands W-H17 at eastern most end of stream segment S-H11 (not drilling related – rig idle for repairs and observed prior to drilling start-up), otherwise stream segment S-H11 flowing clear. Stream segment S-H10 flowing clear.
2/24/2020			Rig idle for repairs, no PGs onsite
2/25/2020			Rig idle for repairs, no PGs onsite
2/26/2020			Rig idle for repairs, no PGs onsite
2/27/2020	1355	Alan Hirshfeld, PG	Walked from SE entry to NW entry/exit. Standing water observed in swale crossing ROW at ~14822+80 (observed prior to drilling start-up). Observed grayish streaks in sediment in wetlands W-H17 at eastern most end of stream segment S-H11 (observed prior to drilling start-up), otherwise stream segment S-H11 flowing clear. Stream segment S-H10 flowing clear.
"	1415	"	Walked from SE entry to NW entry/exit. Standing water observed in swale crossing ROW at ~14822+80 (observed prior to drilling start-up). Observed grayish streaks in sediment in wetlands W-H17 at eastern most end of stream segment S-H11 (observed prior to drilling start-up), otherwise stream segment S-H11 flowing clear. Stream segment S-H10 flowing clear.
"	1628	Steve Tanen, PG	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Standing water observed in swale crossing ROW at ~14822+80 (observed prior to drilling starting up). Observed grayish streaks in sediment in wetlands W-H17 at eastern most end of stream segment S-H11 (observed prior to drilling start-up), otherwise stream segment S-H11 flowing clear. Stream segment S-H10 flowing clear.
2/28/2020	0725	Alan Hirshfeld, PG	Prior to drilling start up for the day, walked from SE entry to NW e/e. Standing water observed in swale crossing ROW at ~14822+80 (observed prior to 1 <sup>st</sup> day of drilling). Observed grayish streaks in sediment in wetlands W-H17 at eastern most end of stream segment S-H11 (observed prior to 1 <sup>st</sup> day of drilling), otherwise stream segment S-H11 flowing clear. Stream segment S-H10 flowing clear; however, iron precipitate and bio-sheen observed (both observed prior to 1 <sup>st</sup> day of drilling).
"	0745	"	Walked from SE entry to NW entry/exit. Conditions the same as observed during the previous inspection, as noted above.
"	0830	Steve Tanen, PG	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above.
"	1240	"	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above.
"	1440	Alan Hirshfeld, PG	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection as noted above. Michels stationed a full-time spotter in the wetlands area.
"	1612	Steve Tanen, PG	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspections, as noted above. Michels stationed a full-time spotter in the wetlands area.
"	1722	"	After completion of drilling, walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspections, as noted above.
3/2/2020	0852	"	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Observed grayish-brown streaks in sediment in wetlands W-H17 at eastern most end of stream segment S-H11 (observed prior to 1 <sup>st</sup> day of drilling), otherwise stream segment S-H11 flowing clear. Stream segment S-H10 flowing clear; however, iron precipitate and bio-sheen observed (both observed prior to 1 <sup>st</sup> day of drilling). No IRs.

Drilling Contractor:  
Bore ID:

**Michels**  
**S3-0290-20 (US-DS)**  
(combined 6/27/20)

**PPP 6 Drill Path Monitoring Log**

Date	Time	Print Name	Comments
"	1029	"	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above. No IRs.
"	1132	"	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above. No IRs.
"	1447	Steve Tanen & Brian Duggan	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above. No IRs.
"	1757	Steve Tanen	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above. No IRs.
3/3/2020	0836	Steve Tanen, PG	Walked from SE entry (14828+03) to Highview Rd (~14818+44) and back. Observed grayish-brown streaks in sediment in wetlands W-H17 at eastern most end of stream segment S-H11 (observed prior to 1 <sup>st</sup> day of drilling), otherwise stream segment S-H11 flowing clear. Stream segment S-H10 flowing clear; however, iron precipitate and bio-sheen observed (both observed prior to 1 <sup>st</sup> day of drilling). No IRs.
"	1045	"	Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above. No IRs.
"	1118	Steve Tanen & Brian Duggan	Following reported partial LOC, walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Drill bit at ~14821+71. Conditions the same as observed during the previous inspection, as noted above. Michels crew walked to Highview Rd (~14818+44) and along RCE to Green Valley Rd. No IRs.
"	1200	Steve Tanen	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above. No IRs.
"	1415	Brian Duggan, PG	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above. No IRs.
"	1515	Steve Tanen & Brian Duggan	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above. No IRs.
"	1630	Steve Tanen	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above. No IRs.
"	1741	"	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection, as noted above. No IRs.
3/4/2020	715	Brian Duggan, PG	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, around adjacent pond berm (as allowed due to Condition 2) to split-rail fence line (14821+77) and returned. Running waters and standing water clear; no IRs or significant earth features.
	830	"	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, around adjacent pond berm (as allowed due to Condition 2) to split-rail fence line (14821+77) and returned. Running waters and standing water clear; no IRs or significant earth features.
	1010	"	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Drove to LOD crossing Highview Rd and walked LOD south to split-rail fence line (14821+77) and returned. Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Running waters and standing water clear; no IRs or significant earth features.
	1200	"	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Drove to LOD crossing Highview Rd and walked LOD south to split-rail fence line (14821+77) and returned. Running waters and standing water clear; no IRs or significant earth features.
	1320	"	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). After grout was pumped from the first truck, walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Running waters and standing water clear; no IRs or significant earth features.
	1445	"	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). After grout was pumped from the second truck, and pigs were pushed through the stems, walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Running waters and standing water clear; no IRs or significant earth features.
	1520	"	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Drove to LOD crossing Highview Rd and walked LOD south to split-rail fence line (14821+77) and returned. Running waters and standing water clear; no IRs or significant earth features.
	1720	"	Implemented Condition 2 monitoring (i.e., expanded inspection area to include 100 ft beyond HDD alignment in area of sensitive receptors). Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Running waters and standing water clear; no IRs or significant earth features.
3/5/2020	0745	Steve Tanen and Jeff Valvik	Continuing with Condition 2 monitoring. Walked from SE entry (14828+03) to Highview Rd (~14818+44) and back. Streams clear. Standing water in ROW – no emerging or otherwise flowing groundwater observed (conditions as previously observed prior to drilling start-up). All streams clear. No IRs.
"	1000	Steve Tanen, PG	Continuing with Condition 2 monitoring. Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection as noted above. All streams clear. No IRs.
"	1145	"	Continuing with Condition 2 monitoring. Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection as noted above. All streams clear. No IRs.

Drilling Contractor:  
Bore ID:

**Michels**  
S3-0290-20 (US-DS)  
(combined 6/27/20)

**PPP 6 Drill Path Monitoring Log**

Date	Time	Print Name	Comments
"	1344	"	Continuing with Condition 2 monitoring. Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection as noted above. All streams clear. No IRs.
"	1447	"	Continuing with Condition 2 monitoring. Following reported LOC, walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Drill bit at ~14823+05. Conditions the same as observed during the previous inspection, as noted above. All streams clear. No IRs.
"	1350	Jeff Valvik, PG	Continuing with Condition 2 monitoring. Following reported LOC, walked from SE entry (14828+03) to SE edge of wetlands W-H17 and back. Conditions the same as observed during the previous inspection, as noted above. All streams clear. No IRs.
"	1615	"	Continuing with Condition 2 monitoring. Following reported LOC, walked from SE entry (14828+03) to SE edge of wetlands W-H17 and back. Conditions the same as observed during the previous inspection, as noted above. All streams clear. No IRs.
"	1736	Steve Tanen	Continuing with Condition 2 monitoring. Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection as noted above. All streams clear. No IRs.
"	1825	"	Continuing with Condition 2 monitoring. Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection as noted above. All streams clear. No IRs.
3/6/2020	0740	Jeff Valvik, PG	Continuing with Condition 2 monitoring. Walked from SE entry (14828+03) to Highview Rd (~14818+44) and back. Streams clear. Standing water in ROW – no emerging or otherwise flowing groundwater observed (conditions as previously observed prior to drilling start-up). All streams clear. No IRs.
"	720	Jeff Valvik, PG	Inspected southeast edge of wetlands. All streams and standing water clear. No IRs.
"	1213 to 1427	Steve Tanen & Jeff Valvik	Continued with Condition 2 monitoring. While grout being pumped one PG continuously monitored area from NW edge of wetlands W-H17, while other PG monitored from mud-pit to SE edge of wetlands. All streams and standing water remained clear – no IRs observed – while pumping grout.
"	1524	Steve Tanen, PG	Continuing with Condition 2 monitoring. Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection as noted above. All streams clear. No IRs.
"	1620	"	Continuing with Condition 2 monitoring. Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection as noted above. All streams clear. No IRs.
"	1705	"	Continuing with Condition 2 monitoring. Walked from SE entry (14828+03) to split-rail fence line (14821+77) and back. Conditions the same as observed during the previous inspection as noted above. All streams clear. No IRs.
3/7/2020	0913	Marty Mengel, PG	Walked LOD from DS drill rig to SE side of Wetland W-H17 and streams (S-H10 & S-H11). Water clear. No IRs.
"	1016	"	Inspected LOD from drill pad to southeast edge of Wetland W-H17. Streams (S-H10 & S-H11) and standing water clear. No IRs.
"	1056	"	Drive inspection to US side/Milford Road. No IRs or other atypical conditions observed.
"	1100	"	Drove to Highview Road and parked. Walked LOD over area of borehole bottom and to NW side of wetlands W-H17. Observed wetlands from west side of pond P-H2 berm ("condition 2 monitoring"). Streams and ponded water clear. No IRs.
"	1401	"	Drove to Highview Road and parked. Walked LOD over area of borehole bottom and to NW side of wetlands W-H17. Observed wetlands and streams from west side of pond P-H2 berm ("condition 2 monitoring"). Streams and ponded water clear. Drove to US side. No IRs.
"	1510	"	Walked LOD from DS drill rig to SE side of Wetland W-H17 and streams. Water clear. No IRs.
"	1606	"	Drove to Highview Road and parked. Walked LOD over area of borehole bottom and to NW side of wetlands W-H17. Observed wetlands and streams from west side of pond P-H2 berm ("condition 2 monitoring"). Streams and ponded water clear. No IRs.
"	1632	"	Walked LOD from DS drill rig to SE side of Wetland W-H17 and streams. Water clear. No IRs.
3/9/2020	740	Steve Tanen, PG	Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. No IRs or other significant features observed.
"	820	Brian Duggan, PG	Drove to LOD crossing at Highview Rd and walked LOD south to edge of wetland W-H17; walked adjacent pond berm (per HDD IRR Contingency Plan Condition 2); and returned. Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Running waters and standing water observed to be clear; no IRs or significant earth features observed.
"	847	Steve Tanen, PG	Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. No IRs or other significant features observed.
"	1100	Brian Duggan, PG	Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Running waters and standing water observed to be clear; no IRs or significant earth features observed.
"	1230	"	Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Running waters and standing water observed to be clear; no IRs or significant earth features observed.
"	1345	"	Drove to LOD crossing Highview Rd and walked LOD south to edge of wetland W-H17 and returned. Running waters and standing water observed to be clear; no IRs or significant earth features observed.
"	1420	"	Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Running waters and standing water observed to be clear; no IRs or significant earth features observed.
"	1620	"	Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Running waters and standing water observed to be clear; no IRs or significant earth features observed.
"	1720	"	Walked from SE entry (14828+03) to edge of wetland W-H17, and streams S-H10 & S-H11, and returned. Running waters and standing water observed to be clear; no IRs or significant earth features observed.

Drilling Contractor:  
Bore ID:

**Michels**  
**S3-0290-20 (US-DS)**  
(combined 6/27/20)

**PPP 6 Drill Path Monitoring Log**

Date	Time	Print Name	Comments
3/10/2020	745	Steve Tanen, PG	Continuing with Condition 2 monitoring. Initial inspection conducted prior to the start-up of drilling. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected pond P-H2 and wetlands from berm between pond P-H2 and wetlands W-H17 (i.e., area of monitoring expanded near receptors 100 ft beyond the HDD alignment per Condition 2). Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). All standing and flowing water in wetlands clear. Sediments with gray streaks and gray sediment in the wetlands was observed from edges of wetland, but no flowing, churning or bubbling sediment in the wetlands area was observed. Grey sediment and sediment with gray streaks in the wetlands was a pre-existing condition prior to the initial start-up of drilling at this location. Clear standing water observed on ROW between wetlands and fence – no flow observed – this is an ongoing pre-existing condition. No IRs observed.
"	910	"	Continuing with Condition 2 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected pond P-H2 and wetlands from berm between pond P-H2 and wetlands W-H17. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
"	1055	"	Continuing with Condition 2 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected pond P-H2 and wetlands from berm between pond P-H2 and wetlands W-H17. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
"	1220	"	Continuing with Condition 2 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected pond P-H2 and wetlands from berm between pond P-H2 and wetlands W-H17. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
"	1347	"	Continuing with Condition 2 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected pond P-H2 and wetlands from berm between pond P-H2 and wetlands W-H17. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
"	1528	"	Continuing with Condition 2 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected pond P-H2 and wetlands from berm between pond P-H2 and wetlands W-H17. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
"	1720	"	Continuing with Condition 2 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected pond P-H2 and wetlands from berm between pond P-H2 and wetlands W-H17. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
"	1820	"	Continuing with Condition 2 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected pond P-H2 and wetlands from berm between pond P-H2 and wetlands W-H17. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
"	1844	"	Continuing with Condition 2 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected pond P-H2 and wetlands from berm between pond P-H2 and wetlands W-H17. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
3/11/2020	735	Brian Duggan, PG	Condition 1 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected wetlands W-H17 and adjacent stream segments within LOD. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
"	1000	"	Condition 1 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected wetlands W-H17 and adjacent stream segments within LOD. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
"	1115	"	Condition 1 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected wetlands W-H17 and adjacent stream segments within LOD. No changes to the conditions discussed above. No IRs.
"	1400	"	Condition 1 monitoring. Inspection conducted while drilling/pumping mud. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected wetlands W-H17 and adjacent stream segments within LOD. Inspected area from NW edge of wetlands W-H17 to split-rail fence (14821+77). No changes to the conditions discussed above. No IRs.
"	1755	Chris Mulry, PG	Inspection conducted while tripping out with minimal mud flow. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected area from NW edge of wetlands W-H17 to Highview Road. No changes to the conditions discussed above. No IRs.
3/12/2020	730	Chris Mulry, PG	Condition 1 monitoring with no drilling taking place. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected pond P-H2, stream S-H11 and adjacent wetlands from edge of LOD. All standing and flowing water in wetlands and stream is clear. Clear standing water observed on ROW between wetlands and fence – no flow observed – this is an ongoing pre-existing condition. No IRs observed.
"	1000	"	Inspection conducted with no drilling or mud circulation. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected stream S-H11. Inspected area from NW edge of wetlands W-H17 northwest to Highview Road (14818+40). No changes to the conditions discussed above. No IRs.
"	1300	"	Inspection conducted with no drilling or mud circulation. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected stream S-H11. Inspected area from NW edge of wetlands W-H17 northwest to Highview Road (14818+40). No changes to the conditions discussed above. No IRs.
"	1630	"	Inspection conducted with no drilling or mud circulation. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Inspected stream S-H11. Inspected area from NW edge of wetlands W-H17 northwest to Highview Road (14818+40). No changes to the conditions discussed above. No IRs.

Drilling Contractor:  
Bore ID:

**Michels**  
S3-0290-20 (US-DS)  
(combined 6/27/20)

PPP 6 Drill Path Monitoring Log			
Date	Time	Print Name	Comments
3/13/2020	725	Steve Tanen, PG	Prior to the start-up of drilling for the day (preparing to start tripping in new drill string), inspected area from SE entry (14828+03) to SE edge of wetlands W-H17 (14824+74). Observed standing and flowing water in wetlands and stream is clear. No IRs.
"	1100	Steve Tanen, PG and Micah Forbes, PG	Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17 & ROW inspected from Highview Rd to NW edge of wetlands W-H17. Observed standing and flowing water in wetlands and stream is clear. No IRs.
"	1350	Steve Tanen and Micah Forbes	Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17 & ROW inspected from Highview Rd to NW edge of wetlands W-H17. Observed standing and flowing water in wetlands and stream is clear. No IRs.
"	1620	Steve Tanen	Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17. Observed standing and flowing water in wetlands and stream is clear. No IRs.
"	1653	Steve Tanen and Micah Forbes	Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17 & ROW inspected from Highview Rd to NW edge of wetlands W-H17. Observed standing and flowing water in wetlands and stream is clear. No IRs.
"	1800	Steve Tanen	Following notification by Lead EI of a confirmed LOC, with an approximate 500 gallon loss of drilling fluid, ROW monitoring upgraded to Condition 2 and the area of the wetlands was inspected up to 100 ft from the HDD alignment. Inspected area from SE entry (14828+03) to SE edge of wetlands W-H17 & ROW inspected from Highview Rd to NW edge of wetlands W-H17. Observed standing and flowing water in wetlands and stream is clear. No IRs.
3/14/2020	910	Marty Mengel, PG	Inspected LOD between SE entry (14828+03) and Highview Road, including wetland W-H17, stream S-H10, stream S-H11, Pond P-H2 and the borehole bottom area. Due to the 2/13/2020 loss-of-circulation (LOC) of approx. 500 gallons, Condition 2 monitoring is in effect (walk up to 100-feet from the LOD). Observed flowing and standing water was clear. No IRs observed.
"	1105	"	Inspected LOD between SE entry (14828+03) and Highview Road, including wetland W-H17, stream S-H10, stream S-H11, Pond P-H2 and the borehole bottom area. Due to the 2/13/2020 loss-of-circulation (LOC) of approx. 500 gallons, Condition 2 monitoring is in effect (walk up to 100-feet from the LOD). Observed flowing and standing water was clear. No IRs observed.
"	1250	"	After grouting began, inspected LOD between SE entry (14828+03) and Highview Road, including wetland W-H17, stream S-H10, stream S-H11, Pond P-H2 and the borehole bottom area. Due to the 2/13/2020 loss-of-circulation (LOC) of approx. 500 gallons, Condition 2 monitoring is in effect (walk up to 100-feet from the LOD). Observed flowing and standing water was clear. No IRs observed.
"	1350	"	Inspected LOD between SE entry (14828+03) and Highview Road, including wetland W-H17, stream S-H10, stream S-H11, Pond P-H2 and the borehole bottom area. Due to the 2/13/2020 loss-of-circulation (LOC) of approx. 500 gallons, Condition 2 monitoring is in effect (walk up to 100-feet from the LOD). Observed flowing and standing water was clear. No IRs observed.
6/8/2020	1455	"	Inspected LOD between SE entry (14828+03) and Highview Road, including wetland W-H17, stream S-H10, stream S-H11, Pond P-H2 and the borehole bottom area. Due to the 2/13/2020 loss-of-circulation (LOC) of approx. 500 gallons, Condition 2 monitoring is in effect (walk up to 100-feet from the LOD). Observed flowing and standing water was clear. No IRs observed.
"	1606	"	After grouting completed, inspected LOD between SE entry (14828+03) and Highview Road, including wetland W-H17, stream S-H10, stream S-H11, Pond P-H2 and the borehole bottom area. Due to the 2/13/2020 loss-of-circulation (LOC) of approx. 500 gallons, Condition 2 monitoring is in effect (walk up to 100-feet from the LOD). Observed flowing and standing water was clear. No IRs observed.
3/16/2020	959	Steve Tanen, PG	Prior to advancing 14-in casing inspected ROW from SE entry to SE edge of wetlands W-H17; inspected ROW from Highview Rd to NW edge of wetland W-H17. No IRs.
"	1520	"	While augering inspected ROW from SE entry to SE edge of wetlands W-H17. No IRs.
"	1655	"	After tripping out auger, inspected ROW from SE entry to SE edge of wetlands W-H17. No IRs.
3/17/2020	0731	"	Condition 2 monitoring: Prior to advancing 14-in casing inspected ROW from SE entry to SE edge of wetlands W-H17; inspected ROW from Highview Rd to NW edge of wetland W-H17. Standing water observed in ROW NW of wetlands W-H17. No emerging groundwater observed. No IRs.
"	1436	"	Condition 2 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Gray streaks observed in wetland sediments; however, no flowing or otherwise emerging mud observed. No IRs.
"	1647	"	Condition 2 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Gray streaks observed in wetland sediments; however, no flowing or otherwise emerging mud observed. No IRs.
"	1758	"	Condition 2 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Gray streaks observed in wetland sediments; however, no flowing or otherwise emerging mud observed. No IRs.
"	1854	"	Condition 2 monitoring: Following the conclusion of drilling for the day, inspected from SE entry (14828+03) to and around wetlands W-H17. Gray streaks observed in wetland sediments; however, no flowing or otherwise emerging mud observed. No IRs.
3/18/2020	720	Jeffrey Valvik	Condition 1 monitoring: Prior to resumption tripping in, inspected ROW from SE entry to SE edge of wetlands W-H17; inspected ROW from Highview Rd to NW edge of wetland W-H17. Standing water observed in ROW NW of wetlands W-H17. No emerging groundwater observed. No IRs.
3/18/2020	830	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.
3/18/2020	1000	Jeffrey Valvik	Condition 1 monitoring: Prior to resumption tripping in, inspected ROW from SE entry to SE edge of wetlands W-H17; inspected ROW from Highview Rd to NW edge of wetland W-H17. Standing water observed in ROW NW of wetlands W-H17. No emerging groundwater observed. No IRs.
3/18/2020	1030	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.
3/18/2020	1100	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.

Drilling Contractor:  
Bore ID:

**Michels**  
S3-0290-20 (US-DS)  
(combined 6/27/20)

PPP 6 Drill Path Monitoring Log			
Date	Time	Print Name	Comments
3/18/2020	1150	Jeffrey Valvik	Condition 1 monitoring: Prior to resumption tripping in, inspected ROW from SE entry to SE edge of wetlands W-H17; inspected ROW from Highview Rd to NW edge of wetland W-H17. Standing water observed in ROW NW of wetlands W-H17. No emerging groundwater observed. No IRs.
3/18/2020	1330	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.
3/18/2020	1420	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.
3/18/2020	1900	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.
3/19/2020	735	Jeffrey Valvik	Condition 1 monitoring: Prior to resumption tripping in, inspected ROW from SE entry to SE edge of wetlands W-H17; inspected ROW from Highview Rd to NW edge of wetland W-H17. Standing water observed in ROW NW of wetlands W-H17. No emerging groundwater observed. No IRs.
3/19/2020	740	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.
3/19/2020	1000	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.
3/19/2020	1210	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.
3/19/2020	1550	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.
3/19/2020	1900	Jeffrey Valvik	Condition 1 monitoring: Inspected from SE entry (14828+03) to and around wetlands W-H17. Inspected from Highland Ave to the NW entry. No IRs.
3/20/2020	0749	Chris Mulry, PG	Prior to the start-up of drilling, inspected from SE entry to SE edge of wetlands W-H17. No IRs.
"	0945	"	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. Standing water observed in ROW (~14822+80) between split-rail fence and NW edge of wetlands, no emerging water while drilling. Standing water observed prior to initial start-up of drilling at this location. No IRs.
"	1154	Steven Tanen, PG	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. Standing water observed in ROW (~14822+80) between split-rail fence and NW edge of wetlands, no emerging water while drilling. Standing water observed prior to initial start-up of drilling at this location. No IRs.
"	1230	"	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. Standing water observed in ROW (~14822+80) between split-rail fence and NW edge of wetlands. Standing water observed prior to initial start-up of drilling at this location. No IRs.
"	1503	"	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. Standing water observed in ROW (~14822+80) between split-rail fence and NW edge of wetlands. Standing water observed prior to initial start-up of drilling at this location. No IRs.
5/20/2020	730	Chris Mulry, PG	Inspected from SE entry to SE edge of wetlands W-H17. All clear. No IRs.
"	1000	"	Inspected from Highview Rd to NW edge of wetlands W-H17. No standing water in field as prior. No IRs.
"	1215	"	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs.
"	1320	"	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs.
5/21/2020	730	Chris Mulry, PG	Inspected from SE entry to SE edge of wetlands W-H17. All clear. No IRs.
"	815	"	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs.
"	1100 - 1130	"	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs.
"	1400-1430-	"	Inspected from Highview Rd to NW edge of wetlands W-H17. Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs.
5/22/2020	0745	Lawrence Galiano	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	0850	"	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed
"	1050	"	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed
"	1310	"	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues.
"	1515	"	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed
"	1700	"	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues.
5/23/2020	0940	Lawrence Galiano	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
5/26/2020	0915	Lawrence Galiano	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1200	"	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1510	"	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1640	"	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1830	"	Inspected from SE entry to SE edge of wetlands W-H17; inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
5/27/2020	0730	Chris Mulry	Inspected from SE entry to SE edge of wetlands W-H17. Water running clear. No IRs or subsidence issues observed.
"	0850	"	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1100-1145	"	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1430-1510	"	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed

Drilling Contractor:  
Bore ID:

**Michels**  
S3-0290-20 (US-DS)  
(combined 6/27/20)

**PPP 6 Drill Path Monitoring Log**

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5/28/2020	0750	Bob Heim, Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1000	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1015	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1230	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1445	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1635	Bob Heim	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1645	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1805	Bob Heim	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
5/29/2020	0755	Bob Heim	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	0945	Bob Heim	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1015	Bob Heim	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1150	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1215	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1345	Bob Heim	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1430	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1545	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
5/30/2020	0945	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	0958	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1210	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1219	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1415	Bob Heim	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1425	Bob Heim	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1640	Bob Heim	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1650	Bob Heim	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
6/1/2020	740	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	750	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	952	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1002	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1333	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1400	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1600	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1636	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1745	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1755	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
"	1844	Ty Johnson	Inspected from SE entry to SE edge of wetlands W-H17. Running clear. No IRs or subsidence issues observed.
"	1849	Ty Johnson	Inspected from Highview Rd to NW edge of wetlands W-H17. No IRs or subsidence issues observed.
6/2/2020	740	Max Howard, PG	Inspected from SE entry to SE edge of wetlands W-H17. Water running clear. No IRs. Then drove to Highview Rd and inspected from Highview Rd to NW edge of wetlands W-H17. No IRs.  PG also inspected US drill pad to assess auger cuttings soil pile. Michels safety onsite monitoring activities. Both Michels and GES screened drill cuttings which had petroleum-like odor and distinct discolorations. Area screened with PID by both Michels and GES and no recordable readings with PID.
"	1030	Max Howard, PG	Inspected from SE entry to SE edge of wetlands W-H17. Water running clear. No IRs. Then drove to Highview Rd and inspected from Highview Rd to NW edge of wetlands W-H17. No IRs.
"	1325	Max Howard, PG	Inspected from SE entry to SE edge of wetlands W-H17. Water running clear. No IRs. Then drove to Highview Rd and inspected from Highview Rd to NW edge of wetlands W-H17. No IRs.
"	1540	Max Howard, PG	Inspected from SE entry to SE edge of wetlands W-H17. Water running clear. No IRs. Then drove to Highview Rd and inspected from Highview Rd to NW edge of wetlands W-H17. No IRs.
"	1700	Max Howard, PG	Inspected from SE entry to SE edge of wetlands W-H17. Water running clear. No IRs. Then drove to Highview Rd and inspected from Highview Rd to NW edge of wetlands W-H17. No IRs.
"	1805	Steven Tanen, PG	Inspected from SE entry to SE edge of wetlands W-H17. Water running clear. No IRs. Then drove to Highview Rd and inspected from Highview Rd to NW edge of wetlands W-H17. No IRs.























Drilling Contractor:  
Bore ID:

**Michels**  
S3-0290-20 (US-DS)  
(combined 6/27/20)

**PPP 6 Drill Path Monitoring Log**

Date	Time	Print Name	Comments
8/1/2020	1620-1645	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/3/2020	0730-0800	Brian Lipinski, PG	Inspected from DS entry to entry to SE edge of wetlands W-H17. Water is running clear. Drove to Highview Rd and inspected to NW edge of wetlands W-H17. Water is running clear. Then inspected ROW from Highview Rd to US entry pit. Inspected water well at station 14806+00. No IRs.
8/3/2020	0945-1020	Brian Lipinski, PG	Inspected from DS entry to entry to SE edge of wetlands W-H17. Water is running clear. Drove to Highview Rd and inspected to NW edge of wetlands W-H17. Water is running clear. Then inspected ROW from Highview Rd to US entry pit. Inspected water well at station 14806+00. No IRs.
8/3/2020	1245-1315	Brian Lipinski, PG	Inspected from DS entry to entry to SE edge of wetlands W-H17. Water is running clear. Drove to Highview Rd and inspected to NW edge of wetlands W-H17. Water is running clear. Then inspected ROW from Highview Rd to US entry pit. Inspected water well at station 14806+00. No IRs.
8/3/2020	1445-1520	Brian Lipinski, PG	Inspected from DS entry to entry to SE edge of wetlands W-H17. Water is running clear. Drove to Highview Rd and inspected to NW edge of wetlands W-H17. Water is running clear. Then inspected ROW from Highview Rd to US entry pit. Inspected water well at station 14806+00. No IRs.
8/3/2020	1645-1710	Brian Lipinski, PG	Inspected from DS entry to entry to SE edge of wetlands W-H17. Water is running clear. Drove to Highview Rd and inspected to NW edge of wetlands W-H17. Water is running clear. Then inspected ROW from Highview Rd to US entry pit. Inspected water well at station 14806+00. No IRs.
8/3/2020	1800	Brian Lipinski, PG	Starting at DS side, inspected the ROW to the SE edge of the wetlands W-H17. Water is running clear. No IRs.
8/4/2020	0730-0745	Brian Lipinski, PG	Inspected from DS entry to SW edge of wetlands W-H17. Inspected ECDs on US and DS pads
8/4/2020	1000-1030	Brian Lipinski, PG	Inspected from DS entry to entry to SE edge of wetlands W-H17. Water is running clear. Drove to Highview Rd and inspected to NW edge of wetlands W-H17. Water is running clear. Then inspected ROW from Highview Rd to US entry pit. Inspected water well at station 14806+00. No IRs.
8/4/2020	1200-1215	Brian Lipinski, PG	Inspected from DS entry to SW edge of wetlands W-H17. Inspected ECDs on DS drill pad.
8/4/2020	1415-1445	Brian Lipinski, PG	Inspected from DS entry to entry to SE edge of wetlands W-H17. Water is running clear. Drove to Highview Rd and inspected to NW edge of wetlands W-H17. Water is running clear. Then inspected ROW from Highview Rd to US entry pit. Inspected water well at station 14806+00. No IRs.
8/4/2020	1745-1800	Brian Lipinski, PG	Inspected DS entry pit and US entry Pit. No IRs.
8/5/2020	0730-0800	Brian Lipinski, PG	Inspected from US entry to entry to NW edge of wetlands W-H17. Inspected water well at station 14806+00. The water is running clear in wetlands W-H17. Drove to DS site and inspected the ROW to the SE edge of the wetlands W-H17. Water is running clear. Inspected the DS entry pit and all accumulated precipitation had been pumped from the pit. No IRs.
8/5/2020	1000-1030	Brian Lipinski, PG	Inspected from US entry to entry to NW edge of wetlands W-H17. Inspected water well at station 14806+00. The water is running clear in wetlands W-H17. Drove to DS site and inspected the ROW to the SE edge of the wetlands W-H17. Water is running clear. Inspected the DS entry pit and all accumulated precipitation had been pumped from the pit. No IRs.
8/5/2020	1330-1400	Brian Lipinski, PG	Inspected from US entry to entry to NW edge of wetlands W-H17. Inspected water well at station 14806+00. The water is running clear in wetlands W-H17. Drove to DS site and inspected the ROW to the SE edge of the wetlands W-H17. Water is running clear. Inspected the DS entry pit and all accumulated precipitation had been pumped from the pit. No IRs.
8/6/2020	900	Ty Johnson, PG	Inspected wetland W-C48 SE of DS drill rig. Water clear. No precipitation occurred over the last 24 hours.
8/6/2020	940-1010	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/6/2020	1155-1225	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/6/2020	1410-1445	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/6/2020	1625-1650	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/6/2020	1820-1845	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/6/2020	1853	Ty Johnson, PG	Inspected wetland W-C48 SE of DS drill rig. Water clear.
8/7/2020	730	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/7/2020	835-900	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/7/2020	1045-1105	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/7/2020	1210-1235	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/7/2020	1430-1500	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/8/2020	912	Ty Johnson, PG	Inspected wetland W-C48 SE of DS drill rig. Water slightly turbid. 0.8 inches of precipitation occurred over the last 24 hours.
8/8/2020	1025-1050	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/8/2020	1200-1225	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/8/2020	1415-1450	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/8/2020	1615-1640	Ty Johnson, PG	Inspected wetland W-H17 from SE side. No IRs. Water running clear. Inspected from NW entry to NW edge of wetlands W-H17. No IRs. Inspected residential water well from LOD at STA 14806+00. No IRs.
8/8/2020	1649	Ty Johnson, PG	Inspected wetland W-C48 SE of DS drill rig. Water clear.

Drilling Contractor:  
Bore ID:

**Michels**  
S3-0290-20 (US-DS)  
(combined 6/27/20)

PPP 6 Drill Path Monitoring Log			
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8/10/2020	0730-0800	Brian Lipinski, PG	Inspected from US entry to entry to NW edge of wetlands W-H17. Inspected water well at station 14806+00. The water is running clear in wetlands W-H17. Drove to DS site and inspected the ROW to the SE edge of the wetlands W-H17. Water is running clear. No IRs.
8/10/2020	1000-1025	Brian Lipinski, PG	Inspected from US entry to entry to NW edge of wetlands W-H17. Inspected water well at station 14806+00. The water is running clear in wetlands W-H17. Drove to DS site and inspected the ROW to the SE edge of the wetlands W-H17. Water is running clear. No IRs.
8/10/2020	1115-1130	Brian Lipinski, PG	Inspected DS entry pit to SE edge of wetland W-H17. Water is running clear. No IRs.
8/10/2020	1500-1635	Brian Lipinski, PG	Inspected from US entry to entry to NW edge of wetlands W-H17. Inspected water well at station 14806+00. Wetland looks to have mud in it but can't get into check – too wet. Went to DS side and it is clear. Drove back to US side and walked around edge and it appears to be drilling mud. Called Brad Golay the DS UI and notified him at 1526. He came with Leslie Gray the US UI and confirmed it at 1536. I notified Lieschen Fiesch at 1546. Received permission from Josh Prosceno at 1552 to walk of ROW to find the end of the mud. Mud is in stream S-H10 and extends several hundred feet downgradient. Walked about 300-400 ft and brush was too dense to walk further. Lead Inspector told PG to move vehicle out of the Highview Rd Neighborhood at around 1635.
8/11/2020	0730-0930	Brian Lipinski, PG	Inspected IR cleanup at Wetland W-H17 and downgradient in Stream S-H10
8/11/2020	1030-1230	Brian Lipinski, PG	Inspected IR cleanup at Wetland W-H17 and downgradient in Stream S-H10
8/11/2020	1400-1530	Brian Lipinski, PG	Inspected IR cleanup at Wetland W-H17 and downgradient in Stream S-H10
8/11/2020	1700-1930	Brian Lipinski, PG	Inspected IR cleanup at Wetland W-H17 and downgradient in Stream S-H10
8/12/2020	0745-0845	Brian Lipinski, PG	Inspected and observed IR cleanup at Wetland W-H17 and downgradient in Stream S-H10.
8/12/2020	0945-1150	Brian Lipinski, PG	Inspected and observed IR cleanup at Wetland W-H17 and downgradient in Stream S-H10. Noted that the drill crew was pulling drill pipe on the DS rig
8/12/2020	1315-1410	Brian Lipinski, PG	Inspected and observed IR cleanup at Wetland W-H17 and downgradient in Stream S-H10. Noted that the drill crew was pulling drill pipe on the DS rig. There are 17 joints out at 1410 when crew cabbed up for lightning.
8/12/2020	1600-2030	Brian Lipinski, PG	Inspected and observed IR cleanup at Wetland W-H17 and downgradient in Stream S-H10. The reamer was on the rig by 1810. Nothing was observed in the IR as the reamer was being removed from the hole. A concrete pump truck arrived at 1820 and began pumping grout into the IR depression. Each load only took approximately 10-15 minutes to pump but the last truck didn't arrive until 2002. Groundwater was observed coming from DS entry hole.