Castlepollard Quarry, Deerpark, Castlepollard, Co. Westmeath

Castlepollard Quarry

Environmental Impact Assessment Report

Appendix 7.2

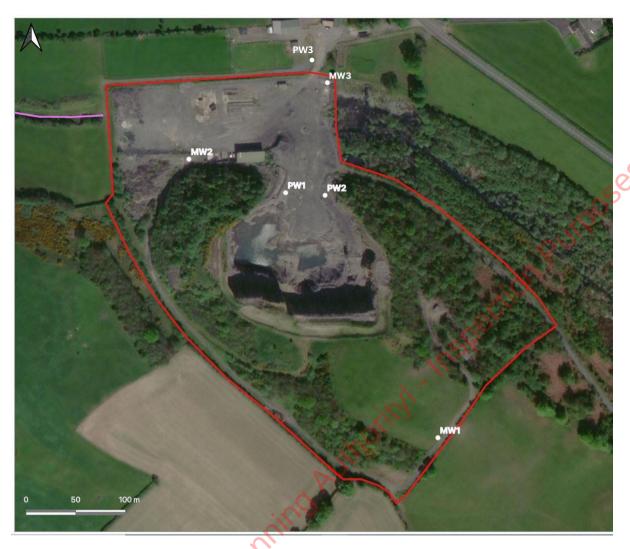
Borehole Lithology and Construction Logs

February 2022



Prepared by:

J Sheils Planning & Environmental Ltd 31 Athlumney Castle, Navan, Co. Meath



Drill Locations Castlepollard:

- PW1, PW2, PW3 = Water Wells for Yield Testing
- MW1, MW2, MW3 = Site Investigation Boreholes with 50mm diameter Piezometer installations for Long Term Monitoring Points



Date Drilled: 0 Drilled By: P Method: D Logged By: P BH Location on Site: L BH Depth (m) 2 BH GL Elevation (m OD) 6 BH BASE Elevation (m OD) 6	agan (Breedon Gr 6/04/2021 Briody & Sons Itd TH Hammer & Co amela Bartley booking into the ext	roup) I. (Aidan Di ompressed	rilling)	Hydro-G ational Grid C	Site: Site Location: A Project Ref:	Co. W Townl 21-P1	an (Breedon Group) Quarry @ Castlepollard, Westmeath nland = Deerpark (Fore By) 15 Castlepollard ing 647686, Northing 768396	es (S
Client: La Date Drilled: 0 Drilled By: P Method: D Logged By: P BH Location on Site: La BH Depth (m) 2 BH GL Elevation (m OD) 8 BH BASE Elevation (m OD) 6 Proposed Future Floor	agan (Breedon Gr 6/04/2021 Briody & Sons Itd TH Hammer & Co amela Bartley booking into the ext	roup) I. (Aidan Di ompressed	rilling)	Hydro-G ational Grid C	ite Location: Project Ref:	Townl 21-P1	nland = Deerpark (Fore By) 15 Castlepollard	(
Client: La Date Drilled: 0 Drilled By: P Method: D Logged By: P BH Location on Site: La BH Depth (m) 2 BH GL Elevation (m OD) 8 BH BASE Elevation (m OD) 6 Proposed Future Floor	agan (Breedon Gr 6/04/2021 Briody & Sons Itd TH Hammer & Co amela Bartley booking into the ext	roup) I. (Aidan Di ompressed	rilling)	Hydro-G ational Grid C	Project Ref:	21-P1	15 Castlepollard	(
Client: La Date Drilled: 0 Drilled By: P Method: D Logged By: P BH Location on Site: La BH Depth (m) 2 BH GL Elevation (m OD) 8 BH BASE Elevation (m OD) 6 Proposed Future Floor	agan (Breedon Gr 6/04/2021 Briody & Sons Itd TH Hammer & Co amela Bartley booking into the ext	roup) I. (Aidan Di ompressed	rilling)	ational Grid C	Co-ordinates:	Easti	ing 647686, Northing 768396	(
Date Drilled: 0 Drilled By: P Method: D Logged By: P BH Location on Site: L BH Depth (m) 2 BH GL Elevation (m OD) 8 BH BASE Elevation (m OD) 6 Proposed Future Floor	Briody & Sons Itd TH Hammer & Co amela Bartley poking into the ext	I. (Aidan Di	rilling)					9
Drilled By: P Method: D Logged By: P BH Location on Site: L BH Depth (m) 2 BH GL Elevation (m OD) 8' BH BASE Elevation (m OD) 6 Proposed Future Floor	Briody & Sons Itd TH Hammer & Co amela Bartley poking into the ext	ompressed						5
Method: D Logged By: P BH Location on Site: L BH Depth (m) 2 BH GL Elevation (m OD) 8 BH BASE Elevation (m OD) 6 Proposed Future Floor	TH Hammer & Co amela Bartley poking into the ext	ompressed						
Logged By: P BH Location on Site: L BH Depth (m) 2 BH GL Elevation (m OD) 6 BH BASE Elevation (m OD) 6 Proposed Future Floor	amela Bartley ooking into the ext 1 m		Air flush with Atla					
BH Location on Site: L BH Depth (m) 2 BH GL Elevation (m OD) 8 BH BASE Elevation (m OD) 6 Proposed Future Floor	ooking into the ext	rootion on		as Compco St	tand alone con	npress	sor.	103
BH Depth (m) 2 BH GL Elevation (m OD) 8 BH BASE Elevation (m OD) 6 Proposed Future Floor	1m	rootion and						Q_{a}
BH GL Elevation (m OD) 8' BH BASE Elevation (m OD) 6' Proposed Future Floor		raction are	a, on the RHS at	t entrance to ro	ock extraction a	area.		*
BH BASE Elevation (m OD) 6								
Proposed Future Floor	7.538m OD						: 01	
	6.5m OD							
	0m OD							
Important Note: This is a RH Log crea	ated from Observati	ions durina	drilling with a Rot	ary HAMMER E	 Rig rather than F	Rotany (CORE. This log is a description by a	1
hydrogeologist with hydrology, hydrog				ary i buviiviiLitti	ilg ratilor triair i	iolary	1103	
Depth Elevation	Wat	ter Strike					Drilling Notes	
(m bgl) (m OD) Description	Colour	(m bgl)	Drill Diameter	Installation D	etails			
0 87.5 broken floor to 0.3	Bm		12"		12" diameter	S		
1 86.5 2 85.5			(300mm)		Steel (1.2m AGL, 4.8m bgl)			
3 84.5 4 83.5		1			- Maria	!	Water Level 24/8/21 = 3.27 m bg	
5 82.5 6 81.5					OPEN HOLE			
7 80.5 8 79.5			8"		TO BASE @			
9 78.5 10 77.5 Solid Limeston	e NAVY Blue	none	(200mm)		21m bgl (68m OD)			
11 76.5 12 75.5								
13 74.5 14 73.5								
15 72.5								
16 71.5 17 70.5		<	2/0				Proposed Floor Elevation 70m OD	
18 69.5 Sandy clayey Lay	rer dirty orange 1.5m3	3/d		[[1		<u> </u>		
20 67.5 Solid Limeston		more water					Small Water strike @ 19.5m bgl @ drilling time estimte	
END BH @ 21m bgl = 66.5m OD							1.5m3/d = equivalent to 1.5 homes daily supply	
Drilled BH base is 4.5m below proposed	Notes:							
floor elevation.	YIELD TESTE	D using S	Submersible Pur	mp by Enviro	ologic confirm	ns Dril	illing Time yield estimate of ~1.5m3/hr	
1.5m3/d = Small Water Strike @ 3m belov proposed floor level.	Water	/21 = 3.27m b	ogl					

							-	Drilling ID:	PW2 Lagan 2021		
									Lagan (Breedon Group) Quarry @ Ca Westmeath	astlepollard, Co.	
		-		- 1			,	Site Location:	Townland = Deerpark (Fore By)		
	л y	/U	Irc) -•					21-P15 Castlepollard		
						N	lational Grid	Co-ordinates:	Easting 647726; Northing 768393	3	
		Client:	Lagan (Bree	adon Group	,)						
	Daf	te Drilled:	07/04/2021								oses Only
	D	rilled By:	P Briody & S	Sons ltd. (A	idan Drilling)						5
		Method:	DTH Hamm	er & Compr	ressed Air flush	with Atlas Compo	co Stand alon	e compressor.			CO -
	Lo	gged By:	Pamela Bart	tley							0
F	3H Location	n on Site:	Looking into	the extract	ion area, on the	LHS at entrance	to rock extrac	tion area.			R
	ВН	l Depth (m)	21m							80	
Bl	I GL Elevati	ion (m OD)	87.915m OD	<u>ر</u>							
BH B	BASE Elevation	ion (m OD)	67.9m OD						×	10.	
Р	Proposed Fut Elevation	uture Floor tion (m OD)							e ^C	, ,	
	t Note: This is plogical and civ				3 during drilling wi	ith a Rotary HAMN	/IER Rig rather	than Rotary CO	RE. This log is a description by a hydrog	geologist with hydrology,	
Donth	Flavotion	1			Metay Christo				Drilling Notes	s	
Depth (m bgl)		Desc	cription	Colour	Water Strike (m bgl)	Drill Diameter	Installation D	etails			
0	88.9	broken fl	floor to 0.3m	\Box		12"		12" diameter			
2	87.9 2 86.9	1	J	1		(300mm)		Steel (1.2m AGL, 4.8m bgl)			
3	85.9 4 84.9	1	J	1	I J	ļ	- +	- X		Water Level 24/8/21 = 3.57 m bgl	
5	83.9	1	J	1	1	'		100		Water Level 240/21 = 0.07 h. 2g.	
7	82.9 81.9	1	J	1	1	8"	\square	OPEN HOLE TO BASE @			
8	8 80.9 9 79.9	1	J		1	(200mm)	1101	21m bgl			
10	78.9	Solid Li	imestone	NAVY Blue	none			(68m OD)			
12	76.9	4	l	1	1			. '			
13 14	74.9	j	l	1				. '			
15 16		1	l	1	1			. '			
17	71 0	1	,	1 '		(1 1 1	.	Proposed Floor Flourtien 70	/Om OD	İ

Notes:

BH base is 3m below proposed floor elevation.

1.5m3/d = Small Water Strike @ 2m below proposed floor level.

Sandy clayey Layer Solid Limestone

70.9

69.9 68.9

END BH @ 21m bgl = 67.88m OD

Westmeath

YIELD TESTED using Submersible Pump by Envirologic confirms Drilling Time yield estimate of ~1.5m3/hr

Small Water strike @ 20m bgl @ drilling time estimte 1.5m3/d <u>= eq</u>uivalent to 1.5 homes daily supply requirment.

Water Level: 27/05/2021 = 0.8m bcl

								Drilling ID:	PW3 Cas	stlepollard 2021
								Site:	Lagan (Bree Westmeath	edon Group) Quarry @ Castlepollard, Co.
			Irc					Site Location:	Townland =	Deerpark (Fore By)
	3			_				G Project Ref:		
							National Grid	Co-ordinates:	Easting 64	7711; Northing 768549
			Lagan (Bree	eaon Group)					
		te Drilled:	, • •, _ • - •							
			_		idan Drilling)					
		Method:			ressed Air flush	with Atlas Comp	co Stand alon	e compressor.		
		gged By:	Pamela Bar			<i>"</i>				
- '	BH Locatio			entrance ga	ate, west of site	offices				
- BI		Depth (m)								
			88.786m OI 10.786m OI							
ВПВ	SASE Elevat	ion (m OD)			d bara. This wa	II in autoido the w		unting area. Dur	mana of this :	unall avalore or to do vide at double vistore
Propose	ed Bench De location	epth at this of the site		encountered	I in BHs to 21m					well = explore outside + what depth water ng point + provide site with dust
			reated from (vil engineering		s during drilling w	ith a Rotary HAMI	MER Rig rather	than Rotary COF	RE. This log is	a description by a hydrogeologist with
Depth	Elevation	_			Water Strike					Notes
(m bgl)	(m OD)	Desc	ription	Colour	(m bgl)	Drill Diameter	Installation D	etails		
0	88.8					8" (200mm)		8" diameter		
2	87.8 86.8					,				
3	85.8					to 50m bgl		Steel (0.6m AGI		
	84.8					to 50m bgl		(0.6m AGL, 23m bgl)		Cillo
5	83.8					to 50m bgl		(0.6m AGL,		o di
5 6 7	83.8 82.8 81.8				none	to 50m bgl		(0.6m AGL,		31/8/2021 = 6.2m bcl
5 6 7 8	83.8 82.8 81.8 80.8 79.8				none	to 50m bgl		(0.6m AGL,		31/8/2021 = 6.2m bel
5 6 7 8 9 10	83.8 82.8 81.8 80.8 79.8 78.8 77.8	Sands & Gra	ivels (Damp)	— -	none	to 50m bgl		(0.6m AGL,	, C	31/8/2021 = 6.2m bel
5 6 7 8 9 10 11 12	83.8 82.8 81.8 80.8 79.8 78.8	Sands & Gra	ıvels (Damp)	Brown	none	to 50m bgl		(0.6m AGL,	10.	31/8/2021 = 6.2m bel
12	83.8 82.8 81.8 80.8 79.8 78.8 77.8 76.8 75.8	Sands & Gra	ivels (Damp)	 Brown	none	to 50m bgl		(0.6m AGL,	10.	31/8/2021 = 6.2m bel
12 13 14 15 16	83.8 82.8 81.8 80.8 79.8 77.8 76.8 75.8 74.8 73.8 72.8	Sands & Gra	ovels (Damp)	Brown	none	to 50m bgl		(0.6m AGL,	10.	31/8/2021 = 6.2m bel
12 13 14 15 16 17	83.8 82.8 81.8 80.8 79.8 78.8 77.8 76.8 75.8 74.8 73.8 72.8 71.8	Sands & Gra	ovels (Damp)	Brown	none	to 50m bgl		(0.6m AGL,	10	31/8/2021 = 6.2m bot
12 13 14 15 16	83.8 82.8 81.8 80.8 79.8 77.8 76.8 75.8 74.8 73.8 72.8 71.8	Sands & Gra	ovels (Damp)	Brown		to 50m bgl		(0.6m AGL,	10	X
12 13 14 15 16 17 18 19 20	83.8 82.8 81.8 80.8 77.8 76.8 77.8 74.8 73.8 72.8 71.8 70.8 69.8	Sands & Gra	evels (Damp)	Brown	none Moist, no strike	to 50m bgl		(0.6m AGL,	10.	X
12 13 14 15 16 17 18 19 20 21 22 23	83.8 82.8 81.8 80.8 79.8 76.8 76.8 75.8 72.8 73.8 72.8 69.8 66.8 66.8	Sands & Gra	evels (Damp)	Brown		to 50m bgl		(0.6m AGL,		X
12 13 13 14 15 16 17 18 19 20 21 22 23 24 25	83.8 82.8 81.8 80.8 79.8 76.8 76.8 76.8 74.8 71.8 71.8 71.8 68.8 66.8 65.8 66.8	Sands & Gra	evels (Damp)	Brown		to 50m bgl		(0.6m AGL,		X
12 13 13 14 15 16 16 17 18 19 20 21 21 22 23 24 25 26 27	83.8 83.8 81.8 80.8 79.8 76.8 77.8 76.8 74.8 71.8 71.8 71.8 68.8 66.8 65.8 64.8 65.8	Sands & Gra	ivels (Damp)	Brown		to 50m bgl		(0.6m AGL,	110	X
12 13 13 14 15 16 16 17 19 20 21 22 23 24 24 25 26 27 28	83.8 82.8 81.8 80.8 79.8 78.8 76.8 77.8 76.8 74.8 70.8 69.8 66.8 65.8 64.8 65.8 66.8 65.8 66.8	Soft	Chalky		Moist, no strike	to 50m bgl		(0.6m AGL,	10.	X
12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28	83.8 82.8 81.8 80.8 79.8 76.8 75.8 75.8 73.8 73.8 71.8 69.8 69.8 66.8 65.8 64.8 63.8 63.8 63.8 66.8 64.8	Soft Limeston	·	Brown		to 50m bgl		(0.6m AGL, 23m bgl)	10.	X
12 13 14 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30	83.8 82.8 81.8 80.8 79.8 76.8 76.8 75.8 74.8 73.8 73.8 71.8 69.8 66.8 66.8 66.8 66.8 66.8 66.8 66	Soft Limeston	Chalky e/Mudstone		Moist, no strike	to 50m bgl		6" Steel 20m to 50m bgl (i.e. 30m of steel	10.	X
12 13 13 14 15 16 17 17 18 19 20 21 22 23 23 24 25 26 26 27 27 28 29 30 30 30 31 31 31 31 31 31 31 31 31 31 31 31 31	83.8 82.8 81.8 80.8 79.8 76.8 76.8 75.8 74.8 73.8 72.8 71.8 69.8 66.8 66.8 66.8 65.8 66.8 65.8 66.8 65.8 66.8	Soft Limeston	Chalky e/Mudstone		Moist, no strike	to 50m bgl		6" Steel 20m to 50m bgl	10.	X
12 13 14 15 16 17 17 18 19 20 22 23 23 24 25 25 26 27 27 27 27 28 30 31 31 31 32 33 33 33 33 33 33 33 33 33 33 33 33	83.8 83.8 81.8 80.8 79.8 76.8 76.8 77.8 76.8 71.8 71.8 71.8 66.8 66.8 66.8 66.8 65.8 66.8 65.8 66.8 65.8 66.8 65.8 66.8 65.8 66.8 65.8 66.8	Soft Limeston	Chalky e/Mudstone		Moist, no strike	to 50m bgl		6" Steel 20m to 50m bgl (i.e. 30m of steel wilded together at GL and dropped into the hole to sit	10.	X
121 131 141 156 177 181 191 201 222 233 245 267 276 289 300 303 333 333 333 333 333 333 333 33	83.8 83.8 80.8 80.8 79.8 76.8 77.8 76.8 77.8 77.8 71.8 71.8 71.8 68.8 66.8 66.8 66.8 65.8 66.8 65.8 65	Soft Limeston	Chalky e/Mudstone		Moist, no strike	to 50m bgl		6" Steel 20m to 50m bgl (i.e. 30m of steel welded together at CL and dropped into the hoel is because the hoel is	10.	Proposed Floor Elevation 70m OD 4m3/hr @ 40m bgl = ~50m OD = @ 24m
121 131 131 151 151 151 151 151 151 151 15	83.8 83.8 80.8 81.8 80.8 79.8 76.8 77.8 76.8 77.8 71.8 70.8 68.8 66.8 65.8 66.8 65.8 66.8 65.8 65	Soft Limeston (Brittle in pl	Chalky e/Mudstone		Moist, no strike	to 50m bgl		6" Steel 20m to 50m bgl (i.e. 30m of steel welded together at GL and dropped into the hole to sit from 20m to 50m, because the hoel is already case to 23m and we don't	10.	Proposed Floor Elevation 70m OD 4m3/hr @ 40m bgl = ~50m OD = @ 24m below proposed floor elevation in lands
121 131 141 156 177 181 199 201 222 233 244 244 255 255 255 255 255 255 333 333 333 333	83.8 82.8 81.8 80.8 79.8 76.8 76.8 75.8 74.8 73.8 73.8 71.8 69.8 66.8 65.8 66.8 65.8 66.8 65.8 66.8 65.8 66.8 65.8 66.8 66	Soft Limeston (Brittle in pl	Chalky e Mudstone aces, Broken)	White	Moist, no strike	to 50m bgl		6" Steel 20m to 50m bgl (i.e. 30m of steel welded together at CL and dropped into the hole to sit from 20m to 50m, because the hoel is already case to	10.	Proposed Floor Elevation 70m OD 4m3/hr @ 40m bgl = ~50m OD = @ 24m

6" Steel from 50m to 78m

END BH @ 78m bgl = 11.82m OD Notes:

BH Base is 62m below the proposed floor elevation. Water Strike is 22m below proposed floor elevation. No excavation planned here.

Chalky Limestone/Mudstone (Brittle in Places)

Weathered Limestone

Intermittent bands of Rock and SAND and Rock and SAND [COLLAPSING, UNSTABLE]

30.8 29.8

26.8 25.8 24.8 23.8

Drilling Estimated Yield = 3 to 4m3/hr = 75 to 100 m3/d encountered at a depth of 40m bgl. DID NOT SUSTAIN IN PUMP TEST. Actual Yield = \sim 5m3/d @ 40m bgl @ \sim 50m OD @ \sim 160m from proposed excavation.

5" push

together well bore from GL to

78m bgl (5m lengths, push together

joints, manually

slotted with angle grinder on site from 63m to 78m)

THE WATER IS CHALKY, WHITE, OPAQUE, CANNOT GET IT TO CLEAR.

Water Level: 31/8/2021 = 6.2m bcl

difficult to discers any further strikes, difficult progression, mucky slop returns, ? More water or not?

white liquid rock powder, fawny sand content

Po	eterse	en Dril	ling S	Service	s Lt	d.	on bel	half of					L	_aga	an						Rotary	y Drillir	ng Log						
Depth of			Drille	er's Strat	tum				Sample /	Hole / Te	st Details	1	1	0		Details	ı	0.16		1	Standar	d Penetra	tion Test	S	1	1		Ке	netix
Stratum Top (m)				escriptio				No	Туре	Insitu test	From (m)	To (m)	Liner Dia (mm)	Core run time (hhmm)	Total core Recovery (m)	Flush Return %	Flush Colour	Self Weight Pen (mm)	75 mm	150 mm	Seating Pen (mm)	75 mm	150 mm	225 mm	300 mm	Main Pen (mm)	N value	Casing Depth (m)	Water/ flush level (m)
0.00		F																				K.C							
0.00		Firm brov	vn sandy gr	avelly high co	bble cont	tent CLAY															0	7.							
																					X								
0.70		,	Weak grey v	weathered LIM	MESTON	E													•	.0									
																			Ž										
4.00		0.1																	6										
1.30		Strong grey	very tractur	ed LIMESTO	NE WITH J	oints of cher	I											6											
			Very strong grey LIMESTONE chert pockets																										
18.00		Very	Very strong grey LIMESTONE chert pockets																										
																W													
															~ C														
														D	,														
		details	1	01(0)				Dri			ent De	etails	0		1	ſ	1		Depth		round	Water	Reco	rd	ı	Depth	Ва	ckfill (m	
Start time (hhmm)	Hole (m)	Water (m)	Casing (m)	Casing (C) Open Hole (RO) Coring (RC)	Dia. (mm)	From (m)	To (m)	Barrel	Liner Type	Core Dia (mm)	Bit 1	Гуре	Casing	Туре	Bit serial No	Flush	Polymer	Time of strike	Struck (m)	Casing (m)	Inflow	5 min	10 min	15 min	20 min	Sealed (m)	Туре	From (m)	To (m)
1455											~																		
Finish time (hhmm)	Hole (m)	Water (m)	Casing (m)								V																		
1735	33.00		1.80																										
1733	33.00	Dry	1.00						4																				
Time from	Duration (hhmm)	Remarks	or detail	s of any ad	ditional	testing inf	formation,	Daywor	ks			SPT I.E). Numb	er	PE		Calibrat Date		01/02	2/2021	Proj	ject 1	Title						
1455		CAT Scann	ed: No					$^{\prime}$				SPT Ro	d Type		2 3/8 F	Regular	SPT End Ratio	ergy	0.	.00			Cas	stler	olla	rd C	uarry	,	
1455		Permit Con	pleted: Yes	i			X	9				Drilling	Crew D	etails					CSC	S No			Jui	-1101	, J 110				
		DREM (8.9	0m - 9.40m)): highly fractu	ired rock	with clay infi		•				Suppor	t Operat	ive		Jo	ohn Why	te			Weathe	er		Vari	able		Project No	21-0	Dec
												Lead D	riller			Step	han Pete	ersen			Date	•		19/04	/2021		Day	Mon	day
												Site cat	tegory					Green			Rig typ	е		Knebe	HY79			ole Num	ber
					X								Engine				П				Inclinat	tion		Orienta				ЛW 1	
					?	•						Lead D	riller's si	ignatur	e						Sheet			1	of	2	Comp	leted	Υ



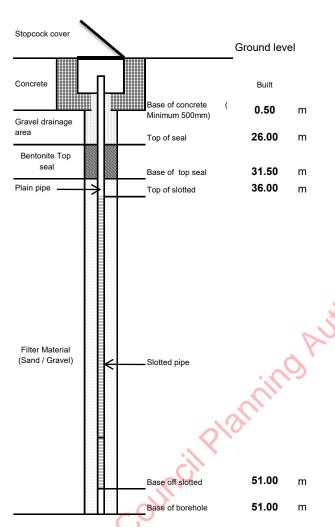
P	eterse	n Dril	ling S	Service	es Li	td.	on bel	half of					L	_aga	an						Rotary	y Drillir	ng Log						
Depth of				er's Stra					Sample /	Hole / Te	est Details	3				Details					Standar	d Penetra	tion Test	30				Kej	metix
Stratum Top (m)				escriptio				No	Туре	Insitu test	From (m)	To (m)	Liner Dia (mm)	Core run time (hhmm)	Total core Recovery (m)	Flush Return %	Flush Colour	Self Weight Pen (mm)	75 mm	150 mm	Seating Pen (mm)	75 mm	150 mm	225 mm	300 mm	Main Pen (mm)	N value	Casing Depth (m)	Water/ flush level (m)
									RO		0.00	51.00		0000		100	grey					² C						0.00	Dry
																					V								
																			ċ										
																			0										
																	. ((2)	•										
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-																W.													
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				1									70					1			<u> </u>		_						
		details	ı	Canina (C)			1	Dri	_		ent De	etails	0.		1				Depth	1	round	Water	r Reco	rd	1	Depth	Вас	ckfill (m	
Start time (hhmm)	Hole (m)	Water (m)	Casing (m)	Casing (C) Open Hole (RO) Coring (RC)	Dia. (mm)	From (m)	To (m)	Barrel	Liner Type	Core Dia (mm)		Туре	Casing	Туре	Bit serial No	Flush	Polymer	Time of strike	Struck (m)	Casing (m)	Inflow	5 min	10 min	15 min	20 min	Sealed (m)	Type	From (m)	To (m)
0745	33.00	Dry	1.80	RO C	154.00	_	1.80				DTH B	utton Bit	Sim. C	`aaina	115	Air	No												
Finish time	Hole	Water	Casing	RO	140.00		1.80 51.00			•	DTH B	utton Bit	SIII. C	asing		Air	No												
(hhmm)	(m)	(m)	(m)							•																			
1625										C																			
Time from	Duration (hhmm)	Remark	s or detail	s of any ad	ditiona	I testing in	formation,	Daywor	ks			SPT I.I	D. Numb	er	PI	01	Calibrat Date		01/02	2/2021	Proj	ject 1	Γitle						
												SPT Ro	d Type		2 3/8 F	Regular	SPT En	ergy	0.	.00			C_{α}	otlor	مالم	rd C)uarry	,	
							×^	7				Drilling	Crew D	etails					CSC	S No			Ca	sueh	JUlia	iiu C	luai i y		
							JUNT	.)				Suppor	rt Operat	tive		J	ohn Why	te			Weathe	er		Var	iable		Project No	21-[Dec
							10					Lead D	riller			Step	han Pete	ersen			Date			20/04	1/2021		Day	Tues	sday
						C						Site cat	tegory					Green			Rig typ	e		Knebe	HY79		Boreh	ole Num	ber
						\sim						Project	Engine	er							Inclinat	tion		Orient	ation		N	ЛW 1	
					N.							Lead D	riller's s	ignatuı	re						Sheet		1	2	of	2	Comp		Υ
		1																											

Petersen Drilling Services Ltd.



Summary of Standpipe Installation

Schematic Diagram (not to scale)



Installation	Detail	s	-0
			က်
Standpipe diameter (id)	5	0	mm
Borehole diameter	12	20	mm
Slot size		1	mm
Geosock	N	lo	
Gas tap	No	ne	
Filter type	Gra	avel	
Type of cover	Upr	ight	
Initial reading	D	ry	m
Time of Initial reading	12	45	hhmm
			,
	Base	Тор	
	(m)	(m)	
Concrete	0.50	GL	
Gravel drainage	26.00	0.50	
Borehole seal top	31.50	26.00	
Filter zone	51.00	31.50	
Plain pipe	36.00	GL	
Slotted zone	51.00	36.00	
Base of borehole	51.00		

Remarks

2nd bentonite seal 4 to 2.5m

Rig type	Knebel HY79	Proje	ct Title		
Drilli	ng Crew Details		Cactl	onollar	d Ouarry
Support Operative	John Whyte		Casu	epolial	d Quarry
Lead Driller	Stephan Petersen	Project	t No		21-Dec
Site category	Green	Day	Tuesday	Date	April 20, 2021
Engineer					Borehole Number
Lead Driller's signature					MW 1



Po	eterse	en Dril	ling S	Service	es Lt	d.	on bel	nalf of					L	_aga	an						Rotary	y Drillir	ng Log						
Depth of			Drille	er's Stra	tum				Sample /	Hole / Te	est Details	3		_		Details					Standar	d Penetra	tion Test	30				Key	metix
Stratum Top (m)				escriptio				No	Туре	Insitu test	From (m)	To (m)	Liner Dia (mm)	Core run time (hhmm)	Total core Recovery (m)	Flush Return %	Flush Colour	Self Weight Pen (mm)	75 mm	150 mm	Seating Pen (mm)	75 mm	150 mm	225 mm	300 mm	Main Pen (mm)	N value	Casing Depth (m)	Water/ flush level (m)
									RO		0.00	18.00		0000		100	brown											0.00	0.00
0.00	1	Firm dark bro	wn sandy g	ravelly CLAY	medium o	obble conte	nt																•						
																					V								
	Firm occas	sionally Soft h	rown orano	gish CLAY wit	th very fre	quent angula	ar limestone																						
4.60	1 11111 00000			fractured LIM															3	O									
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														5															
														1															
	Shift	details						Dril	ling E	quipm	nent De	etails	1		'	ı			I	G	round	Water	Reco	rd	I		Ва	ckfill (m	1)
Start time (hhmm)	Hole (m)	Water (m)	Casing (m)	Casing (C) Open Hole (RO) Coring (RC)	Dia. (mm)	From (m)	To (m)	Barrel	Liner Type	Core Dia (mm)	Bit '	Туре	Casing		Bit serial No	Flush	Polymer	Time of strike	Depth Struck (m)	Casing (m)	Inflow	5 min	10 min	15 min	20 min	Depth Sealed (m)	Туре	From (m)	To (m)
0925				C RO	140.00 154.00	0.00	18.00 18.00				DTH B	utton Bit	Sim. C	asing	115	Air	No	0930	4.50	4.50	Slow	0.00	0.00	0.00	0.00	N/S			
Finish time	Hole	Water	Casing	RO	134.00	0.00	16.00			•	DITTE	utton bit			113	All	INO												
(hhmm)	(m)	(m)	(m)							•																			
1425										C																			
									1			T			1		Calibuat		<u> </u>		1					l J			
Time from	Duration (hhmm)			s of any ad	lditional	testing inf	ormation,	Dayworl	ks). Numb	er	PE		Calibrat Date SPT End		01/02		Proj	ject 1	Title						
0925		CAT Scann	ed: No					$^{\prime}$				SPT Ro	d Type		2 3/8 F	Regular	Ratio	- 37	0.	00			Cas	stler	olla	rd C	(uarry	,	
0925		Permit Com	pleted: Yes	;			X	3				Drilling	Crew D	etails					csc	S No									
1355	0030	Dayworks: /	Airlift develo	pment of wel	II		JUNT					Suppor	t Operat	ive		Jo	ohn Whyt	te			Weathe	er		Vari	able		Project No	21-0	Оес
)					Lead D	riller			Step	han Pete	ersen			Date			19/04	/2021		Day	Mon	day
						U'						Site cat	egory					Green			Rig typ	e		Knebe	HY79			ole Num	ber
					×							Project	Engine	er							Inclinat	tion		Orienta	ation		N	/W 2	
					2	Ť						Lead D	riller's si	gnatur	e						Sheet			1	of	1	Comp	leted	Υ

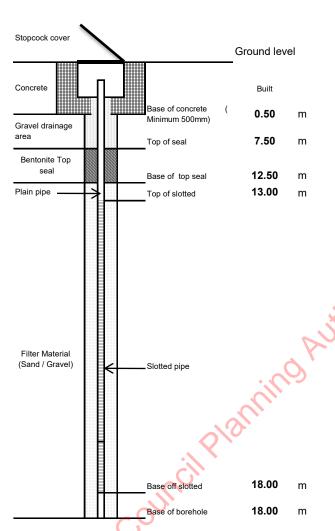


Petersen Drilling Services Ltd.



Summary of Standpipe Installation

Schematic Diagram (not to scale)



		S	Detail	Installation
22	C			
	mm	0	5	Standpipe diameter (id)
	mm	54	15	Borehole diameter
	mm	.5	0.	Slot size
		o	Z	Geosock
		ne	No	Gas tap
		ivel) Gra	Filter type
		ight	Upr	Type of cover
	m	00	0.0	Initial reading
ım	hhmr	35	13	Time of Initial reading
	i	Top (m)	Base (m)	Wij.
		~ -		' '
		13.00		
			18.00	Base of borehole
ım		avel ight 00 35	Gra Upr 0.4	Filter type Type of cover Initial reading

Remarks

2nd bentonite seal 5 to 3.5m

Rig type	Knebel HY79	Proje	ct Title		
Drilli	ing Crew Details		Coctl	onollar	d Ouarry
Support Operative	John Whyte		Casii	epoliai	rd Quarry
Lead Driller	Stephan Petersen	Project	t No		21-Dec
Site category	Green	Day	Monday	Date	April 19, 2021
Engineer					Borehole Number
Lead Driller's signature	,				MW 2



Pe	eterse	n Dril	ling S	Service	es Lt	d.	on bel	nalf of					L	_aga	an						Rotar	y Drillir	ng Log						
Depth of			Drille	er's Stra	tum				Sample /	Hole / Te	est Details	3				Details			1	,	Standar	d Penetra	tion Test	S				Ке	metix
Stratum Top (m)				escriptio				No	Туре	Insitu test	From (m)	To (m)	Liner Dia (mm)	Core run time (hhmm)	Total core Recovery (m)	Flush Return %	Flush Colour	Self Weight Pen (mm)	75 mm	150 mm	Seating Pen (mm)	75 mm	150 mm	225 mm	300 mm	Main Pen (mm)	N value	Casing Depth (m)	Water/ flush level (m)
									RO		0.00	18.50		0000		100	brown					_c C						0.00	Dry
0.00			Rock fi	II MADE GRO	DUND																0	7							
																					X								
0.70			Soft to fir	m dark browr	n DEAT															A C									
0.70			OOIL TO III	III dark brown	II LAI														X	10									
																			C										
1.90		Firm to	stiff grey v	ery silty CLA	Y slightly g	gravelly												5	8										
																		(5)											
	Firm to a	tiff orange br	owniah CL /	AY with occas	ional limo	atana fraam	onto likoly										11												
8.10	FIIII to s	uii orange bi	OWINSTI CLA	fault infill	sional lime	Storie fracifi	ents likely																						
-																X													
10.00	Fire	m to stiff light	arev silty C	LAY with lime	estone fra	rments fault	infill									100													
10.00		ii to otiii iigiit	groy only o	D (Will in inc	octorio ira	omento idali									VO	*													
14.50	St	iff orange GR	AVEL with	frequent lime	stone frac	ments fault	infill							0	,														
	Shift	details						Dril	ling E	quipm	ent De	etails								G	round	Water	Reco	rd			Ва	ckfill (m	1)
Start time (hhmm)	Hole (m)	Water (m)	Casing (m)	Casing (C) Open Hole (RO) Coring (RC)	Dia. (mm)	From (m)	To (m)	Barrel	Liner Type	Core Dia (mm)	Bit '	Туре	Casing		Bit serial No	Flush	Polymer	Time of strike	Depth Struck (m)	Casing (m)	Inflow	5 min	10 min	15 min	20 min	Depth Sealed (m)	Туре	From (m)	To (m)
0805				C RO	140.00 154.00	0.00	18.50 18.50				DTH B	utton Bit	Sim. C	asing	115	Air	No												
Finish time	Hole	Water	Casing		101.00	0.00	10.00			•	5.				1.0	7													
(hhmm)	(m)	(m)	(m)								•																		
0955									5	O.																			
Time from	Duration (hhmm)	Remarks	or detail	s of any ad	ditional	testing inf	ormation,	Dayworl	ks			SPT I.I). Numbe	er	PE		Calibrat Date		01/02	2/2021	Pro	ject 1	Title						
0805		CAT Scann	ed: Yes					U				SPT Ro	d Type		2 3/8 F	Regular	SPT End	ergy	0.	.00			0-	- 41	11 -			_	
0805		Permit Com	pleted: Yes				X	1				Drilling	Crew Do	etails	1		ivalio		CSC	S No			Cas	stiep	oolia	ıra C	(uarry	/	
0950	0030	Dayworks: A	Airlift develo	pment of wel	I		$^{\prime\prime}$,)				Suppor	t Operat	tive		Jo	ohn Why	te			Weathe	er		Vari	iable		Project No	21-0	Dec
		General; borehole apea	ered dry during drilling	but water rose overnight :	above ground. The	borehole was likely pre	ssurised during the dril	ing due to clay stuci	k in the casin pre-	vening water to e	nter	Lead D	riller			Step	han Pete	ersen			Date			21/04	1/2021		Day	Wedne	esday
						O'						Site cat	egory					Green			Rig typ	е		Knebe	HY79		Borel	ole Num	ber
					×							Project	Engine	er					-		Inclina	tion		Orienta	ation		N	ЛW 3	
					0	•						Lead D	riller's si	ignatur	е						Sheet			1	of	1	Comp	leted	Υ

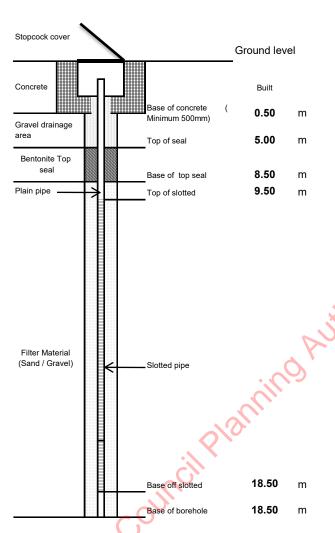


Petersen Drilling Services Ltd.



Summary of Standpipe Installation

Schematic Diagram (not to scale)



Installation	Detail	S	
			200
Standpipe diameter (id)	5	0	mm
Borehole diameter	15	54	mm
Slot size	0.	.5	mm
Geosock	N	0	
Gas tap	No	ne	
Filter type) Gra	ivel	
Type of cover	Upr	ight	
Initial reading	-0.	30	m
Time of Initial reading	09	50	hhmm
			-
	Base	Тор	
	(m)	(m)	
Concrete	0.50	GL	
Gravel drainage	5.00	0.50	
Borehole seal top	8.50	5.00	
Filter zone	18.50	8.50	
Plain pipe	9.50	GL	
Slotted zone	18.50	9.50	
Base of borehole	18.50		

Remarks

2nd bentonite seal 2 to 0.5m, waterlevel rose to 0.3m above ground over night

Rig type	Knebel HY79	Project Title			
Drilling Crew Details		Castlonallard Quarry			
Support Operative	John Whyte	— Castlepollard Quarry			
Lead Driller	Stephan Petersen	Project No		21-Dec	
Site category	Green	Day	Wednesday	Date	April 21, 2021
Engineer				Borehole Number	
Lead Driller's signature	,			MW 3	

