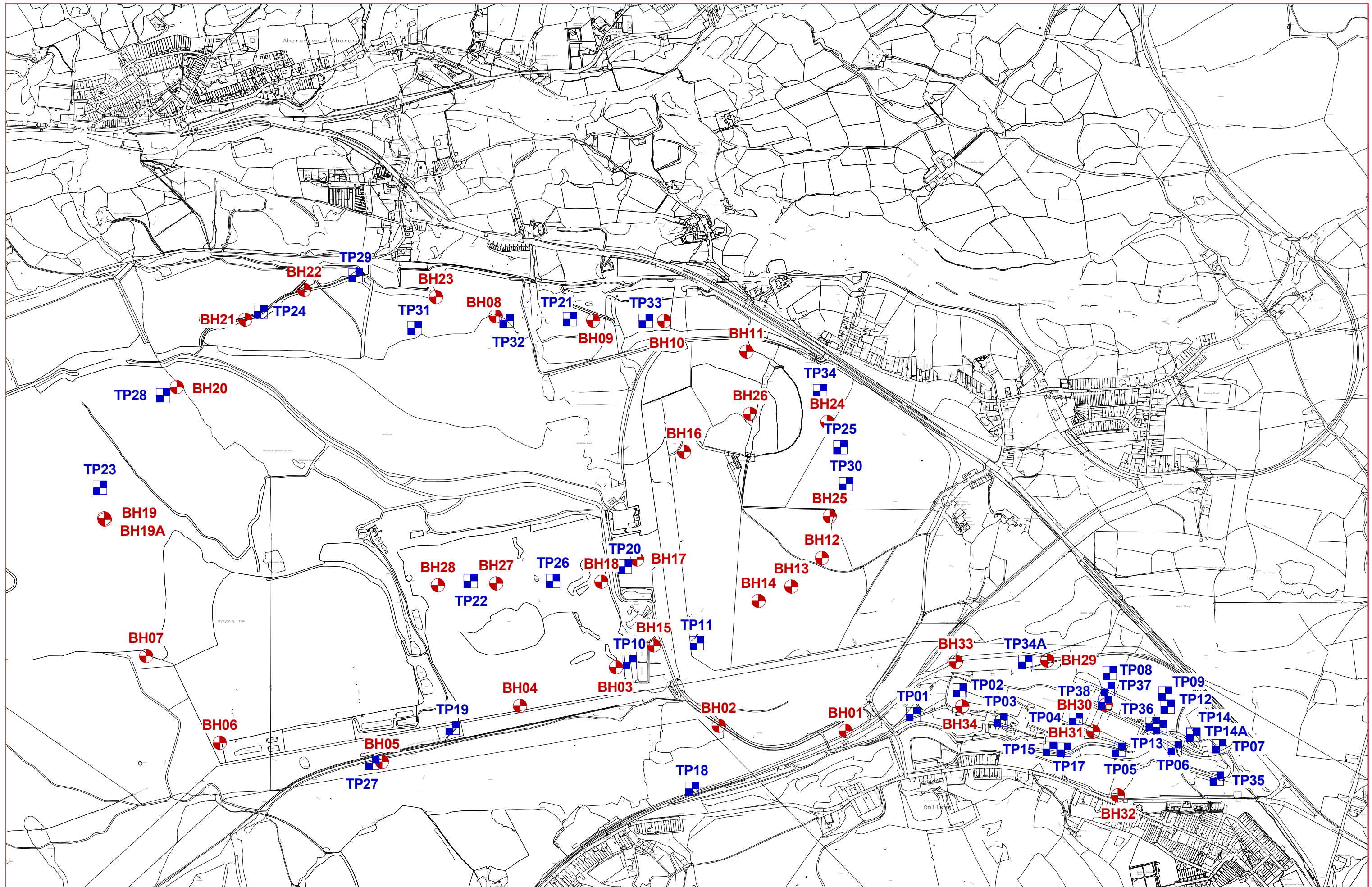




KEY		Borehole		Trial Pit		Dynamic Probe		In-situ Test
		Window Sample		Sampling Point		Historical Borehole		

PROJECT
GLOBAL CENTRE OF RAIL
EXCELLENCE

DRAWING TITLE:
EXPLORATORY HOLE
LOCATION PLAN

JOB NO. Q0652	FIGURE NO. 2
DATE 07/02/22	SCALE 1:12000

APPENDIX II – ENGINEER’S BOREHOLE LOGS

Contract : Global Centre of Rail Excellence											Borehole No. BH01	
Client : Global Centre of Rail Excellence												
Dates : 30/11/21 - 20/11/21					Job Number : Q0652					Ground Level : 228.29 m A.O.D. Level to Ordnance Datum		
Location :					Engineer : ARUP					Coordinates: 284008.75 E 210457.29 N Co-ordinates to National Grid		

m B.G.L.	Run Details				Fractures		Samples		Strata				Water
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Type No. Blows	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	
0										Clay and Colliery Spoil (Drillers Description)			
1													
2													
3													
4													
5									5.00	Weathered Mudstone (Drillers Description)		223.29	
6									(2.20)				
7													
8									7.20	Mudstone with Sandstone Bands (Drillers Description)		221.09	
9													
10													
11													
12													
13									13.20	Weak Coal (Drillers Description)		215.09	
14									(1.70)				
15									14.90	Mudstone (Drillers Description)		213.39	
16													
17													
18													
19													
20													
21													
22													
23									22.50	Sandstone (Drillers Description)		205.79	
24													
25													
26													
27													
28													
29													
30													
31									30.00	Terminated at 30.0mbgl (Scheduled Depth)		198.29	
32													
33													
34													

Hole Progress / Water Obs				Casing		Groundwater				Flush		
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns
				7.20	115.00	5.00 13.70	0.00 0.00	Rapid Groundwater Inflow. Rose to 0.5magl Rapid Groundwater Inflow. Rose to 0.5magl		0.00 - 30.00	Mist	100

Plant: Commachio 600
Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-7.2mbgl, Rotary 'open hole' 7.2-30.0mbgl

	Plas Newydd Swansea Tel: 01554744880 email: enquiries@quantumgeotechnic.co.uk	Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	
		QGL	P Darby	1 Of 1	35		

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Contract : Global Centre of Rail Excellence											Borehole No.	
Client : Global Centre of Rail Excellence											BH02	
Dates : 29/11/21 - 29/11/21					Job Number : Q0652					Ground Level : 238.03 m A.O.D. Level to Ordnance Datum		
Location :					Engineer : ARUP					Coordinates: 283562.15 E 210475.29 N Co-ordinates to National Grid		

m B.G.L.	Run Details				Fractures		Samples		Strata					Water
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Type No. Blows	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.		
0														
1									(1.20)	Colliery Spoil (Drillers Description)				
2									1.20	Brown Clay (Drillers Description)		236.83		
3									(0.80)	Clay and Boulders (Drillers Description)		236.03		
4									2.00					
5									(1.90)					
6									3.90	Weathered Mudstone (Drillers Description)		234.13		
7									(1.80)					
8									5.70	Mudstone (Drillers Description)		232.33		
9									(3.10)					
10									8.80	Sandstone (Drillers Description)		229.23		
11									(4.30)					
12														
13									13.10	Mudstone (Drillers Description)		224.93		
14														
15														
16														
17									(6.60)					
18														
19														
20									19.70	Cavity (Drillers Description)		218.33		
21									(0.70)	Hard Drill - Loss of Returns (Drillers Description)		217.63		
22									20.40					
23														
24														
25														
26									(9.60)					
27														
28														
29														
30									30.00	Terminated at 30.0mbgl (Scheduled Depth)		208.03		
31														
32														
33														
34														

Hole Progress / Water Obs				Casing		Groundwater				Flush		
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns
				4.20	115.00					0.00 - 19.70	Mist	100
										19.70 - 30.00	Mist	0

Plant: Commachio 600

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Encountered. ODEX GL-4.2mbgl, Rotary 'open hole' 4.2-30.0mbgl

	Plas Newydd Swansea Tel: 01554744880 email: enquiries@quantumgeotechnic.co.uk	Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	
		QGL	P Darby	1 Of 1	35		

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Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 18/11/21 - 22/11/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 258.30 m A.O.D.
Level to Ordnance Datum

Coordinates: 283200.00 E
210681.00 N
Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No. BH03

0 m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities						Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description			
0	1.20 - 2.70								1.20 - 2.70	D1	1.2	SPT (C) 50/60mm (25/10mm-75/50mm----)	(1.20)	MADE GROUND - Grey clayey slightly sandy GRAVEL. Gravel is fine to coarse angular mudstone.										
1		20	10	0									1.20	Colliery Spoil (Drillers Description) Arisings are grey clayey Gravel. Gravel is fine to medium angular mudstone		257.10								
2																								
3									2.70 - 3.70	D2	2.7	SPT (C) 50/90mm (12-13/5mm-41-9/15mm--)												
4	4.20 - 5.70								4.20 - 5.70	D3	4.2	SPT (C) 50/30mm (25/5mm-75/25mm----)		 between 3.7 and 4.2mbgl mudstone boulder										
5		37	27	15																				
6									5.70 - 7.20	D4	5.7	SPT (C) 50/65mm (25/10mm-75/55mm----)												
7																								
8									7.20 - 8.70	D5	7.2	SPT (C) 75/120mm (12-13/8mm-39-36/45mm--)												
9									8.70 - 10.20	D6	8.7	SPT (C) 50/110mm (25/45mm-75/65mm----)												
10									10.20 - 11.70	D7	10.2	SPT (C) 75/190mm (10-15/60mm-25-30-20/40mm-)												

Hole Progress / Water Obs				Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Encountered. ODEX GL-22.2mbgl, Rotary coring 22.2-32.7mbgl
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour	
										0.00 - 13.20	Mist	100		

Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

Sheet No.
1 Of 3

m Per Page
11

All measurements in metres unless otherwise stated

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 18/11/21 - 22/11/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 258.30 m A.O.D.
Level to Ordnance Datum

Coordinates: 283200.00 E
210681.00 N
Co-ordinates to National Grid

Orientation & Inclination:
Orientation: N/A
Inclination: N/A

Borehole No. BH03

11m B.G.L.

11

12

13

14

15

16

17

18

19

20

21

Run Details				Fracture Details				Samples		Insitu Tests		Strata				Discontinuities						Water
Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description		
								11.70 - 13.20	D8	11.7	SPT (C) 66 (10-10-15-15-15-21)	(20.60)										
								13.20 - 14.70	D9	13.2	SPT (C) 92/285mm (5-3-7-14-31-40/60mm)											
								14.70 - 16.20	D10	14.7	SPT (C) 92/260mm (6-2-8-13-30-41/35mm)											
								16.20 - 17.70	D11	16.2	SPT (C) 50/80mm (25/50mm-75/30mm----											
								17.70 - 19.20	D12	17.7	SPT (C) 75/155mm (18-7/0mm-27-31-17/5mm--)											
								19.20 - 20.70	D13	19.2	SPT (C) 50/115mm (25/50mm-75/65mm----											
								20.70 - 21.80	D14	20.7	SPT (C) 75/80mm (21-4/0mm-61-14/5mm--)											
												21.80	Mudstone (Drillers Description)		236.50							

Hole Progress / Water Obs

Casing

Groundwater

Flush

Date / Time

H. Depth

C. Depth

Water

Depth

Diam.

Struck

Rose To

Behaviour

Sealed

Depth

Type

Returns

Colour

19/11/2021 07:00

11.70

11.70

13.20 - 21.80
21.80 - 32.70

Mist
Mist

50
100

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Encountered. ODEX GL-22.2mbgl, Rotary coring 22.2-32.7mbgl

Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

Sheet No.
2 Of 3

m Per Page
11

All measurements in metres unless otherwise stated

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Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 18/11/21 - 22/11/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 258.30 m A.O.D.
Level to Ordnance Datum

Coordinates: 283200.00 E
210681.00 N
Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No. BH03

23m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities						Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description			
	22.20 - 23.70								22.20	C1	22.2	SPT (C) 50/20mm (25/10mm-75/10mm----)	(0.40) 22.20	Weak to medium strong grey MUDSTONE with two discontinuity sets. (SOUTH WALES COAL MEASURES)		236.10	22.20				Sub-horizontal to 15 degree discontinuity set (bedding) extremely close to closely spaced, rough planar, partly open, locally with orange surface staining. sub-vertical to 70 degree discontinuity set (joints) smooth planar locally undulating, partly open, locally with orange surface staining.. Between 22.7 and 23.2mbgl sub-horizontal discontinuity surfaces highly weathered up to 50mm penetration with reduction in strength to very weak and weathered to fine angular gravel.			
		97	43	10	20	100	200	13																
	23.70 - 25.20								23.70	C2											Between 24.04 and 24.34mbgl sub-vertical discontinuity.			
		87	60	30	20	80	180	15																
	25.20 - 26.70																				Below 25.2mbgl sub-horizontal discontinuities close to medium spaced. between 25.2 and 25.7mbgl sub-vertical discontinuity. Between 25.4 and 25.6mbgl sub-horizontal discontinuities extrmeley closely spaced and highly weathered to coarse angular gravel up to 50mm penetration. At 25.8mbgl 45 degree discontinuity smooth undulating, partly open, clean / fresh.			
		100	90	69	50	166	400	8																
	26.70 - 28.20								27.20 - 27.40	C3			(10.50)											
		99	80	23	20	87	270	16																
28.20 - 29.70								28.50 - 28.70	C4															
	93	73	56	100	175	400	7																	
29.70 - 31.20								29.60 - 29.70	C5															
	100	93	24	10	83	200	17																	
31.20 - 32.70								31.25 - 31.55	C7												At 31.1mbgl 45 degree discontinuity smooth planar, open, clean / fresh.			
	99	75	27	15	114	290	12																	
32.7								32.60 - 32.70	C6				32.70	Terminated at 32.7mbgl (Investigation Supervisors Instruction)		225.60								

Hole Progress / Water Obs

Date / Time

H. Depth

C. Depth

Water

Casing

Depth

Diam.

Groundwater

Struck

Rose To

Behaviour

Sealed

Flush

Depth

Type

Returns

Colour

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Encountered. ODEX GL-22.2mbgl, Rotary coring 22.2-32.7mbgl

				22.20	115.00									
--	--	--	--	-------	--------	--	--	--	--	--	--	--	--	--

Quantum Geotech

Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

Sheet No.
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All measurements in metres unless otherwise stated



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Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH03

Dates : 18/11/21 - 22/11/21

Job Number : Q0652

Ground Level : 258.30 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283200.00 E
210681.00 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
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Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH03

Dates : 18/11/21 - 22/11/21

Job Number : Q0652

Ground Level : 258.30 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283200.00E
210681.00 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
2 Of 2

m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 22/11/21 - 23/11/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 257.69 m A.O.D.
Level to Ordnance Datum

Coordinates: 282861.72 E
210545.42 N
Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No. BH04

0m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities					Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description		
									0.00 - 0.50	B1				MADE GROUND - Brown slightly gravelly organic SILT.	x o x x o								
									0.00 - 1.60	D1			(0.50)		x x x x x	257.19							
									0.50 - 1.00	B2			0.50	MADE GROUND - Soft to firm grey gravelly CLAY. Gravel is fine to coarse angular mudstone.									
											1.2	SPT (C) 75/110mm (18-7/0mm-25-50/35mm--)	(1.10)										
									1.60 - 2.00	D2			1.60	Dark brown PEAT	/ / / / /	256.09							
									2.00 - 2.70	D3			2.00	Firm light brown slightly gravelly CLAY. Gravel is fine to coarse angular mudstone.	o o o o o	255.69							
									2.70	SPTLS1			2.7	SPT (S) 95/260mm (2-3-3-4-5-83/35mm)	(1.10)								
									2.70 - 3.10	D4					o o o o o								
									3.10 - 3.90	D5			3.10	Clay & Boulders (Drillers Description)		254.59							
													(0.80)										
								3.90 - 4.20	D6			3.90	Light grey slightly clayey slightly silty slightly sandy GRAVEL. Gravel is fine to coarse angular to sub-angular mudstone. (COMPLETELY WEATHERED SOUTH WALES COAL MEASURES)		253.79								
								4.20 - 5.20	B3			4.2	SPT (C) 75/80mm (20-5/0mm-55-20/5mm--)	(1.30)									
								5.20	C9			5.20	Weak grey SILTSTONE with two discontinuity sets. (SOUTH WALES COAL MEASURES)	x x x x x	252.49								
5.70 - 7.20							NI	5.70	C1					x x x x x		5.70				Sub-horizontal to 10 degree discontinuity set extremely close to closely spaced, smooth planar, tight to partly open, clean / fresh locally with orange surface staining and highly weathered to silty sandy angular gravel upto 50mm penetration. sub-vertical to 70 degree discontinuity set smooth undulating tight to partly open clean / fresh locally with orange surface staining and silt surface coating..			
	60	25	10	10	90	150	9							x x x x x									
7.20 - 8.70							NI	7.20	C2				(3.50)	 Between 7.2 and 7.4mbgl non-intact, recovered as fine to coarse angular Gravel	x x x x x								
	80	50	0	10	40	50	20							x x x x x									
8.70 - 10.20								8.70	C3			8.70	Weak grey MUDSTONE with two discontinuity sets. (SOUTH WALES COAL MEASURES)		248.99				Between 8.7 and 11.7mbgl sub-horizontal to 70 degree discontinuity set extremely closely spaced.				
	87	0	0	15	50	100	25																
10.20 - 11.70							NI	10.20	C4														
	73	0	0																				

Hole Progress / Water Obs				Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Encountered. ODEX GL-4.2mbgl, Rotary coring 4.2-17.8mbgl, Rotary 'open hole' 17.8-30.0mbgl
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour	
25/11/2021	7.20	5.70		5.70	115.00					0.00 - 30.00	Mist			

Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

Sheet No.
1 Of 3

m Per Page
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All measurements in metres unless otherwise stated

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 22/11/21 - 23/11/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 257.69 m A.O.D.

Level to Ordnance Datum

Coordinates: 282861.72 E

210545.42 N

Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No. BH04

11m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities						Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	Depth (Thickness)	Dip	Direction	Fracture Set	Discontinuity Description			
		73	0	0				NI									11.70							
	11.70 - 13.20													 Between 11.7 and 14.7mbgl non-intact, recovered as fine to coarse angular Gravel and angular Cobbles										
		57	3	0				NI																
	13.20 - 14.70								13.20	C5			(8.30)											
		53	6	0				NI																
	14.70 - 16.20								14.70	C6				 Between 14.7 and 15.0mbgl completely weathered to a clayey sandy fine to coarse angular Gravel										
		100	42	25				NI																
	16.20 - 17.70								16.20	C7				 Between 16.2 and 17.1mbgl non-intact, recovered as coarse angular Gravel										
	99	40	24																					
				30	120	230	4	17.45 - 17.70	C8				17.00 (0.15) Weak black COAL. Highly weathered to fine to medium angular Gravel. (SOUTH WALES COAL MEASURES)		240.69									
													17.15 (0.55) Between 17.1 and 17.3mbgl completely weathered to soft to firm gravelly Clay		240.54									
													17.70 Medium strong MUDSTONE with one discontinuity set. (SOUTH WALES COAL MEASURES)		239.99									
													Mudstone (Drillers Description)											
Hole Progress / Water Obs				Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Encountered. ODEX GL-4.2mbgl, Rotary coring 4.2-17.8mbgl, Rotary 'open hole' 17.8-30.0mbgl										
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour											

Quantum Geotech

Plas Newydd Swansea Tel: 01554744880 email: enquiries@quantumgeotechnic.co.uk

Operator: QGL

Logged By: P Darby

Logged Date:

Equipment Used: Rig: Commachio 600.

Sheet No. 2 Of 3

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All measurements in metres unless otherwise stated

AGS

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence																				Borehole No. BH04								
Client : Global Centre of Rail Excellence																												
Dates : 22/11/21 - 23/11/21										Job Number : Q0652					Ground Level : 257.69 m A.O.D. Level to Ordnance Datum				Coordinates: 282861.72 E 210545.42 N Co-ordinates to National Grid				Orientation & Inclination: Orientation: N/A Inclination: N/A					
Location :										Engineer : ARUP																		
22m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata							Discontinuities							Water	
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description							
22																												
23																												
24													(12.30)															
25																												
26																												
27																												
28																												
29																												
30													30.00	Terminated at 30.0mbgl (Scheduled Depth)		227.69												
31																												
32																												
Hole Progress / Water Obs					Casing		Groundwater					Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Encountered. ODEX GL-4.2mbgl, Rotary coring 4.2-17.8mbgl, Rotary 'open hole' 17.8-30.0mbgl												
Date / Time		H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour														
Operator: QGL										Logged By: P Darby		Logged Date:		Equipment Used: Rig: Commachio 600.							Sheet No. 3 Of 3		m Per Page 11		All measurements in metres unless otherwise stated		AGS	

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH04

Dates : 22/11/21 - 23/11/21

Job Number : Q0652

Ground Level : 257.69 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 282861.72E
210545.42 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
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m Per Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH04

Dates : 22/11/21 - 23/11/21

Job Number : Q0652

Ground Level : 257.69 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 282861.72E
210545.42 N
Co-ordinates to Nation Grid



Plas Newydd
Swansea
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Operator:
QGL

Logged By:
P Darby

Sheet No.
2 Of 2

m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 1/12/21 - 3/12/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 239.39 m A.O.D.
Level to Ordnance Datum

Coordinates: 282375.78 E
210348.29 N
Co-ordinates to National Grid

Orientation & Inclination:
Orientation: N/A
Inclination: N/A

Borehole No.
BH05

0 m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities						Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description			
0														Firm to stiff grey very gravelly CLAY with low cobble content. Gravel is fine to coarse sub-rounded to angular mudstone, occasional coal and sandstone. Cobbles are sub-rounded sandstone and mudstone.										
1									1.20 - 1.40	D1	1.2	SPT (S) 8 (2-1-2-3-2-1)												
									1.50	SPTLS1	1.6	Vane - P=90 - R=40kN/m2												
2									1.70 - 2.70	B1														
											2.7	SPT (S) 50/87mm (25/47mm-50/40mm---		 gravelly below 3.0mbgl										
3									3.00	SPTLS2														
									4.00	UT1	4.2	SPT (S) 23 (6-5-6-6-5-6)												
4									4.20 - 4.40	D2	4.5	Vane - P=60 - R=16kN/m2												
									4.50	SPTLS3	5	Vane - P=70 - R=14kN/m2												
5									4.70 - 5.70	B2														
									5.20 - 5.40	D3	5.7	SPT (S) 25 (6-5-4-7-7-7)												
6									6.00	SPTLS4	6.1	Vane - P=135 - R=30kN/m2												
									6.20 - 7.20	B3	7.2	SPT (C) 70/62mm (25/61mm-30-70/62mm---		 stiff below 7.2mbgl										
7											8.7	SPT (S) 40 (4-7-12-10-9-9)												
									9.00 - 9.20	D4	9	Vane - P=40 - R=14kN/m2		 below 8.7mbgl occasional bands (<100mm thick) fine silty Sand										
8									9.00	SPTLS6	9.7	Vane - P=70 - R=15kN/m2												
									9.20 - 10.20	B4	10.1	Vane - P=75 - R=24kN/m2												
9											10.2	SPT (S) 36 (7-12-12-7-7-10)												
									10.20 - 10.40	B5	10.5	Vane - P=140 - R=44kN/m2												
10										D5														

Hole Progress / Water Obs

Casing

Groundwater

Flush

Date / Time

H. Depth

C. Depth

Water

Depth

Diam.

Struck

Rose To

Behaviour

Sealed

Depth

Type

Returns

Colour

10.20

115.00

0.00 - 30.70

Mist

100

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-7.2mbgl, Rotary coring 7.2-30.7mbgl



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

Sheet No.
1 Of 3

m Per Page
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All measurements in metres unless otherwise stated



Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 1/12/21 - 3/12/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level :
239.39 m A.O.D.
Level to Ordnance Datum

Coordinates: 282375.78 E
210348.29 N
Co-ordinates to National Grid

Orientation & Inclination:
Orientation: N/A
Inclination: N/A

Borehole No.
BH05

1 m B.G.L.

11.00 - 12.00

100

97

88

40

200

300

4

11.60 - 11.85

C1

11.00

Medium strong to strong grey thinly to thickly interlaminated MUDSTONE and SANDSTONE with one discontinuity set. (SOUTH WALES COAL MEASURES)

228.39

11.00

Sub-horizontal to 15 degree discontinuity set closely spaced, smooth to rough planar, partly open to open, clean / fresh.
At 11.3mbgl sub-angular coarse gravel infill.

12.00 - 13.50

100

100

83

10

167

380

8

12.20 - 12.60

C2

(2.20)

2.20

13.50 - 15.00

100

95

64

60

115

200

12

13.85 - 14.00

C3

13.20

Medium strong grey MUDSTONE with one discontinuity set. (SOUTH WALES COAL MEASURES)

226.19

13.20

Sub-horizontal to 15 degree discontinuity set closely spaced, smooth to rough planar, partly open to open, clean / fresh.

15.00 - 16.00

100

87

56

20

111

260

8

..... between 15.2 and 15.3mbgl highly weathered to sandy fine to coarse angular Gravel

16.00 - 17.50

100

98

52

60

150

280

10

15.90 - 16.00

C4

(6.90)

6.90

Below 16.0mbgl sub-horizontal discontinuities extremely close to closely spaced and loclly with silt surface coating.

17.50 - 19.00

98

90

45

40

113

160

12

17.20 - 17.35

C5

At 17.67mbgl sub-horizontal discontinuity highly weathered to fine to coarse angular gravel up to 60mm penetration.
Between 17.8 and 17.9mbgl sub-vertical discontinuity smooth undulating, partly open with silt surface coating.

19.00 - 20.50

97

78

7

20

51

100

27

18.65 - 18.75

C6

20.50 - 22.00

NI

19.90

C7

20.10

Weak to medium strong black COAL with one discontinuity set. (SOUTH WALES COAL MEASURES)
..... between 20.5 and 20.67mbgl highly weathered to fine to coarse angular Gravel

219.29

20.10

Sub-horizontal discontinuity set extremely closely spaced, smooth and rough planar, partly open, locally highly weathered to fine to medium angular gravel upto 10mm penetration.

100

85

62

40

120

140

10

21.40 - 21.70

C8

20.70

Strong grey SILTSTONE with one discontinuity set. (SOUTH WALES COAL MEASURES)

218.69

20.70

Sub-horizontal to 15 degree discontinuity set (bedding) extremely close to medium spaced, rough planar to undulating, open, generally clean / fresh locally with silt surface coating.
Between 20.9 and 21.2mbgl and 21.6 and 22.0mbgl 70 degree discontinuities rough planar, undlating, partly open with silt surface coating.

Hole Progress / Water Obs

Date / Time

H. Depth

C. Depth

Water

Casing

Depth

Diam.

Groundwater

Struck

Rose To

Behaviour

Sealed

Flush

Depth

Type

Returns

Colour

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken.
ODEX GL-7.2mbgl, Rotary coring 7.2-30.7mbgl

Quantum Geotech

Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

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All measurements in metres unless otherwise stated

AGS

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 1/12/21 - 3/12/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 239.39 m A.O.D.
Level to Ordnance Datum

Coordinates: 282375.78 E
210348.29 N
Co-ordinates to National Grid

Orientation & Inclination:
Orientation: N/A
Inclination: N/A

Borehole No.
BH05

23m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities						Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description			
	22.00 - 23.50								22.15 - 22.80	C9			(3.00)		XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX		3.00				Between 22.4 and 22.94mbgl sub-horizontal to 70 degree discontinuity rough undulating, partly open, clean.			
		97	97	92	80	162	430	8																
	23.50 - 24.70				10	100	190	1																
								NI																
		47	16	16	ACZL								23.70 (0.36)	Strong dark grey MUDSTONE with one discontinuity set. (SOUTH WALES COAL MEASURES)		215.69	23.70				Sub-horizontal to 15 degree discontinuity set (bedding) extremely close to closely spaced, smooth planar, partly open to open, highly weathered to fine to coarse angular gravel and slightly gravelly clay up to 70mm penetration.			
													24.06 (0.64)	Actual Zone of Core Loss		215.33								
	24.70 - 26.20								25.10	C10				24.70	Strong dark grey MUDSTONE with one discontinuity set. (SOUTH WALES COAL MEASURES)		214.69							
		67	28	0	10	80	90	13																
	26.20 - 27.70																							
								NI																
		98	58	17					27.00	C12			(4.74)											
					20	77	120	13																
	27.70 - 29.20																							
							NI																	
	69	33	33	30	140	210	3	28.15 - 28.35	C13															
29.20 - 30.70																								
	98	89	71	15	134	350	10	29.95 - 30.30	C11			(1.26)	29.44	Medium strong grey thinly laminated MUDSTONE with one discontinuity set. (SOUTH WALES COAL MEASURES)		209.95					Below 29.4mbgl discontinuities close to medium spaced. Between 29.75 and 29.9mbgl 70 to 80 degree discontinuity rough planar, partly open, clean.			
30.7													30.70	Terminated at 30.7mbgl (Scheduled Depth)		208.69								

Hole Progress / Water Obs

Casing

Groundwater

Flush

Date / Time

H. Depth

C. Depth

Water

Depth

Diam.

Struck

Rose To

Behaviour

Sealed

Depth

Type

Returns

Colour

02/12/2021 16:00

30.70

10.20

1.20

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-7.2mbgl, Rotary coring 7.2-30.7mbgl

Quantum

Geotech

Plas Newydd

Swansea

Tel: 01554744880

email: enquiries@quantumgeotechnic.co.uk

Operator:

QGL

Logged By:

P Darby

Logged Date:

Equipment Used:

Rig: Commachio 600.

Sheet No.

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m Per Page

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All measurements in metres unless otherwise stated

AGS

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH05

Dates : 1/12/21 - 3/12/21

Job Number : Q0652

Ground Level : 239.39 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 282375.78E
210348.29 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

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Page
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All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH05

Dates : 1/12/21 - 3/12/21

Job Number : Q0652

Ground Level : 239.39 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 282375.78E
210348.29 N
Co-ordinates to National
Grid



Plas Newydd
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All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH05

Dates : 1/12/21 - 3/12/21

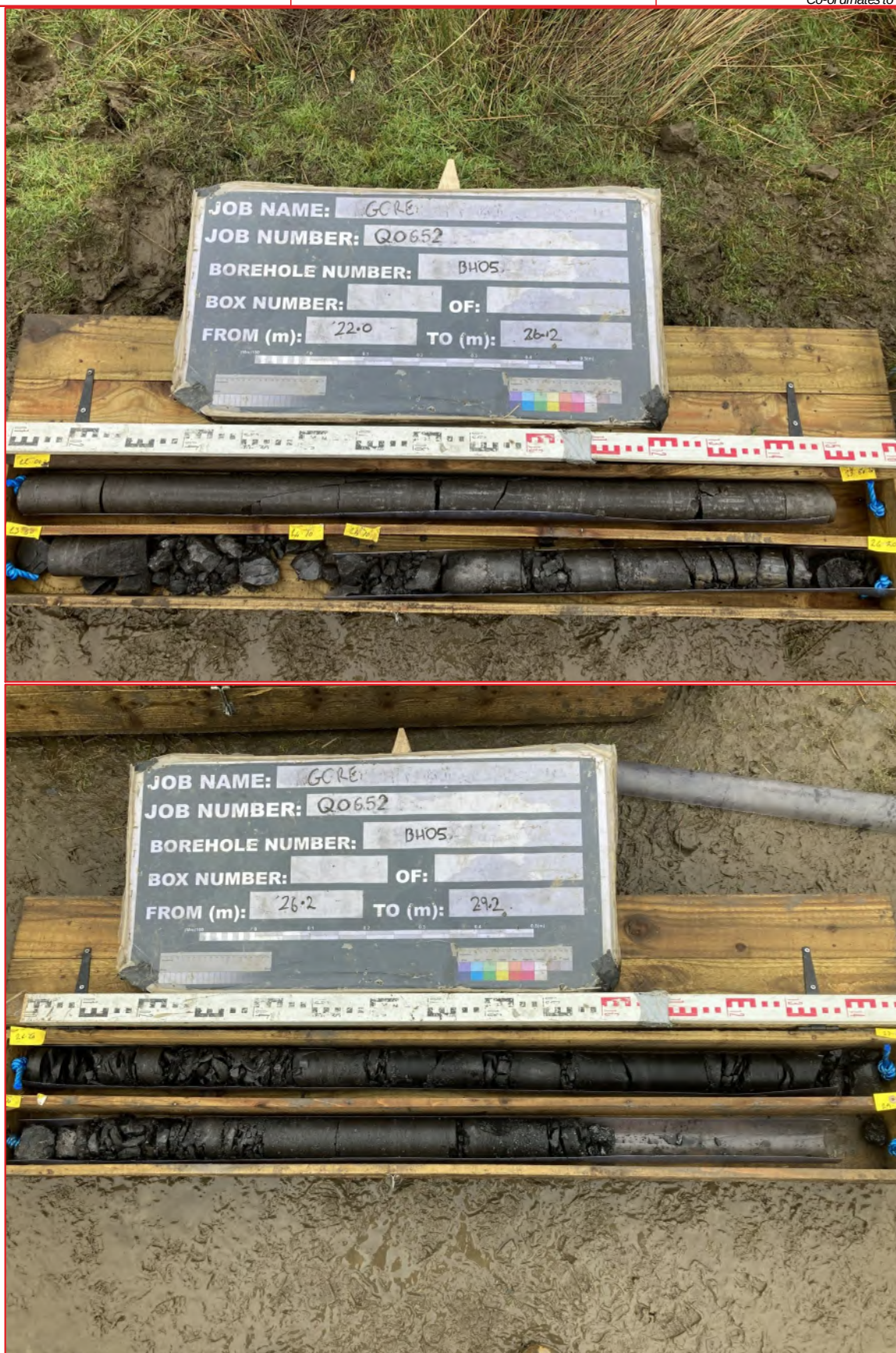
Job Number : Q0652

Ground Level : 239.39 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 282375.78E
210348.29 N
Co-ordinates to National Grid



Plas Newydd
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Operator:
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Sheet No.
3 Of 4

m Per Page
2

All measurements in metres unless otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH05

Dates : 1/12/21 - 3/12/21

Job Number : Q0652

Ground Level : 239.39 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 282375.78E
210348.29 N
Co-ordinates to National Grid



Plas Newydd
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Operator:
QGL

Logged By:
P Darby

Sheet No.
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**m Per
Page**
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates : 24/11/21 - 26/11/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 263.08 m A.O.D.
Level to Ordnance Datum

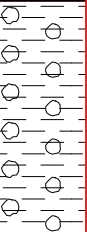
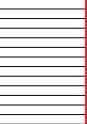
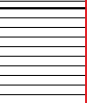
Coordinates: 281804.05 E
210415.34 N
Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No. BH06

0m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities						Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description			
									1.20 - 2.70	D1	1.2	SPT (S) 23 (3-3-4-5-7-7)	(2.00)	Clay and Cobbles (Drillers Description) sample between 1.2 and 2.7mbgl CLAY										
													2.00	Weathered Mudstone (Drillers Description)		261.08								
	2.70 - 3.70										2.7	SPT (S) 50/189mm (5-10-15-15-20/39mm-)	(1.70)											
		0	0	0																				
	3.70 - 5.20							NI	4.00	C8	3.7	SPT (S) 50/167mm (5-7-12-17-21/17mm-)	3.70	Medium strong grey MUDSTONE with two discontinuity sets. (SOUTH WALES COAL MEASURES) Between 3.7 and 4.3mbgl completely weathered to fine to coarse angular Gravel		259.38	3.70				Sub-horizontal to 10 degree discontinuity set (bedding) closely spaced, smooth to rough planar locally planar to undulating, open, clean / fresh locally with silt surface coating sub-vertical discontinuity set (joint) rough planar to undulating, partly open, clean / fresh locally completely weathered to fine angular gravel up to 10mm penetration.			
		93	44	13	60	100	100	7	4.70 - 4.78	C1														
	5.20 - 6.70																							
		97	75	18	20	69	140	20	6.00 - 6.05	C2											Between 6.05 and 6.8mbgl sub-vertical discontinuity.			
	6.70 - 7.70																							
	90	64	33	10	75	120	11																	
7.70 - 8.70								7.70 - 7.80	C3															
	99	99	33	25	76	120	12													Between 8.2 and 8.35mbgl sub-vertical to 80 degree discontinuity. possibly drilling induced.				
8.70 - 10.20								8.75 - 8.90	C4				(10.20)											
	95	67	31	5	55	130	25													Between 9.65 and 9.97mbgl sub-vertical discontinuity between 9.65 and 9.97mbgl sub-horizontal discontinuities extremely closely spaced.				
10.20 - 10.90								10.25 - 10.40	C5															
	100	89	33	15	79	130	10													Between 10.67 and 10.9mbgl sub-vertical discontinuity.				
10.90 -																								

Hole Progress / Water Obs				Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Strike Observed. ODEX GL-2.7mbgl, Rotary coring 2.7-13.9mbgl, Rotary 'open hole' 13.9-30.0mbgl
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour	
26/11/2021 07:00	6.00	3.70	5.75	3.70	115.00					0.00 - 30.00	Mist	100		



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

Sheet No.
1 Of 3

m Per Page
11

All measurements in metres unless otherwise stated



Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 24/11/21 - 26/11/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 263.08 m A.O.D.
Level to Ordnance Datum

Coordinates: 281804.05 E
210415.34 N
Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No. BH06

11m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities						Water		
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description					
	12.40	100	62	9	15	83	130	17	11.35 - 11.50	C6				 between 12.4 and 12.7mbgl weak dark grey to black carbonaceous MUDSTONE with thin coal bands Below 12.7mbgl weak to medium strong grey and light grey thinly laminated MUDSTONE							Between 12.1 and 12.4mbgl sub-vertical discontinuity. Below 12.4mbgl sub-horizontal discontinuities extremely closely spaced and locally completely weathered to fine angular gravel and reduction in strength to weak upto 50mm penetration.					
12	12.40 - 13.90				10	27	40	10	13.20 - 13.40	C7						249.18										
13					15	85	160	13																		
14	13.9												13.90	Mudstone (Drillers Description)												
15																										
16																										
17																										
18																										
19																										
20																										
21													(13.10)													
Hole Progress / Water Obs					Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Strike Observed. ODEX GL-2.7mbgl, Rotary coring 2.7-13.9mbgl, Rotary 'open hole' 13.9-30.0mbgl											
Date / Time		H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour												
Quantum Geotech Plas Newydd Swansea Tel: 01554744880 email: enquiries@quantumgeotechnic.co.uk										Operator: QGL		Logged By: P Darby		Logged Date:		Equipment Used: Rig: Commachio 600.				Sheet No. 2 Of 3		m Per Page 11		All measurements in metres unless otherwise stated		AGS

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH06

Dates : 24/11/21 - 26/11/21

Job Number : Q0652

Ground Level : 263.08 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 281804.05E
210415.34 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
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Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH06

Dates : 24/11/21 - 26/11/21

Job Number : Q0652

Ground Level : 263.08 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 281804.05E
210415.34 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
2 Of 2

m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates : 29/11/21 - 30/11/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 271.28 m A.O.D.
Level to Ordnance Datum

Coordinates: 281544.88 E
210721.08 N
Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No.
BH07

0 m B.G.L.

1

2

3

4

5

6

7

8

9

10

Run Details				Fracture Details				Samples		Insitu Tests		Strata				Discontinuities						Water	Install/ Backfill
Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description			
4.20 - 5.70	47	26	0	20	50	50	13	4.40	C1	1.2	SPT (S) 6 (2-1-2-1-1-2)	(0.30)	MADE GROUND - Grey clayey GRAVEL. Gravel is fine to coarse angular mudstone.		270.98								
												0.30	Soft grey and light brown slightly gravelly CLAY. Gravel is fine to coarse sub-rounded to angular mudstone. (Description from SPT sample).										
												(1.70)											
												2.00	Clay and Sandstone Boulders (Drillers Description). Arisings are grey gravelly Clay. Gravel is fine to medium angular mudstone										
5.70 - 7.20	44	22	7	20	59	110	6	5.90	C2	2.7	SPT (S) 45/97mm (3-22-6-39/22mm--)	(2.20)		267.08	4.20					Sub-horizontal to 10 degree discontinuity set (bedding) extremely close to closely spaced, rough planar, partly open to open, locally with brown silt coating and highly weathered to fine to medium angular gravel up to 20mm penetration.			
												4.20	Weak to medium strong grey SILTSTONE with one discontinuity set. (SOUTH WALES COAL MEASURES)										
7.20 - 8.70	95	90	37	30	84	130	16	7.40	C3	4.2	SPT (S) 50/73mm (25/31mm-100/42mm----	5.70	Medium strong dark grey MUDSTONE with one discontinuity set (SOUTH WALES COAL MEASURES) Between 5.7 and 5.95mbgl highly to completely weathered to fine to coarse angular Gravel	265.58	5.70					Sub-horizontal to 10 degree discontinuity set (bedding) extremely close to closely spaced, smooth to rough planar, partly open, generally clean / fresh locally with yellowish brown clay surface coating..			
8.70 - 10.20	100	85	10	50	79	150	18	8.90	C4											Between 7.35 and 8.2mbgl sub-vertical to 80 degree discontinuity smooth planar, partly open, with yellowish brown clay surface coating.			
10.20 - 11.70	97	79	47	40	91	120	15													Between 8.8 and 8.95mbgl sub-vertical discontinuity smooth undulating to stepped, tight, clean / fresh. possibly drilling induced. Between 9.23 and 9.95mbgl sub-vertical to 80 degree discontinuity smooth planar, partly open, locally with orange surface staining and yellowish brown clay surface coating. At 9.4mbgl sub-horizontal discontinuity highly weathered to coarse angular gravel upto 50mm penetration. Between 9.75 and 10.1mbgl sub-vertical to 80 degree discontinuity smooth planr, tightto partly open, clean / fresh.			
													 between 10.2 and 10.6mbgl thinly to thickly laminated with strong light grey Sandstone laminae.										

Hole Progress / Water Obs				Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-4.2mbgl, Rotary coring 4.2-16.2mbgl, Rotary 'open hole' 16.2-35.0mbgl
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour	
				7.20	115.00									

Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

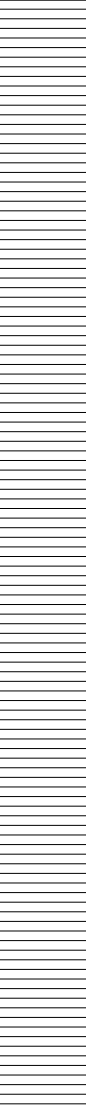
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All measurements in metres unless otherwise stated

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Form Name: ROTARY A3 Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence																			Borehole No. BH07							
Client : Global Centre of Rail Excellence										Job Number : Q0652					Ground Level : 271.28 m A.O.D. Level to Ordnance Datum			Coordinates: 281544.88 E 210721.08 N Co-ordinates to National Grid			Orientation & Inclination: Orientation: N/A Inclination: N/A					
Dates: 29/11/21 - 30/11/21					Location :					Engineer : ARUP																
22m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities							Water	Install/ Backfill
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description					
22													22.00	Coal (Drillers Description)		249.28										
23													(1.50)													
24													23.50	Mudstone with Sandstone bands (Drillers Description)		247.78										
25																										
26																										
27																										
28																										
29																										
30																										
31																										
32																										
Hole Progress / Water Obs					Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-4.2mbgl, Rotary coring 4.2-16.2mbgl, Rotary 'open hole' 16.2-35.0mbgl											
Date / Time		H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour												
							28.00	21.00	Fast groundwater inflow																	
Operator: QGL										Logged By: P Darby		Logged Date:		Equipment Used: Rig: Commachio 600.												
 Plas Newydd Swansea Tel: 01554744880 email: enquiries@quantumgeotechnic.co.uk										Sheet No. 3 Of 4		m Per Page 11		All measurements in metres unless otherwise stated												

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 29/11/21 - 30/11/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level :
271.28 m A.O.D.
Level to Ordnance Datum

Coordinates: 281544.88 E
210721.08 N
Co-ordinates to National Grid

Orientation & Inclination:
Orientation: N/A
Inclination: N/A

Borehole No.
BH07

33m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata				Discontinuities							Water	Install/ Backfill
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description				
33																									
34																									
35													35.00	Terminated at 35.0mbgl (Investigation Supervisors Instruction)		236.28									
36																									
37																									
38																									
39																									
40																									
41																									
42																									
43																									

Hole Progress / Water Obs

Casing

Groundwater

Flush

Date / Time

H. Depth

C. Depth

Water

Depth

Diam.

Struck

Rose To

Behaviour

Sealed

Depth

Type

Returns

Colour

30/11/2021 14:00

35.00

7.20

21.00

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-4.2mbgl, Rotary coring 4.2-16.2mbgl, Rotary 'open hole' 16.2-35.0mbgl

Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

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Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH07

Dates : 29/11/21 - 30/11/21

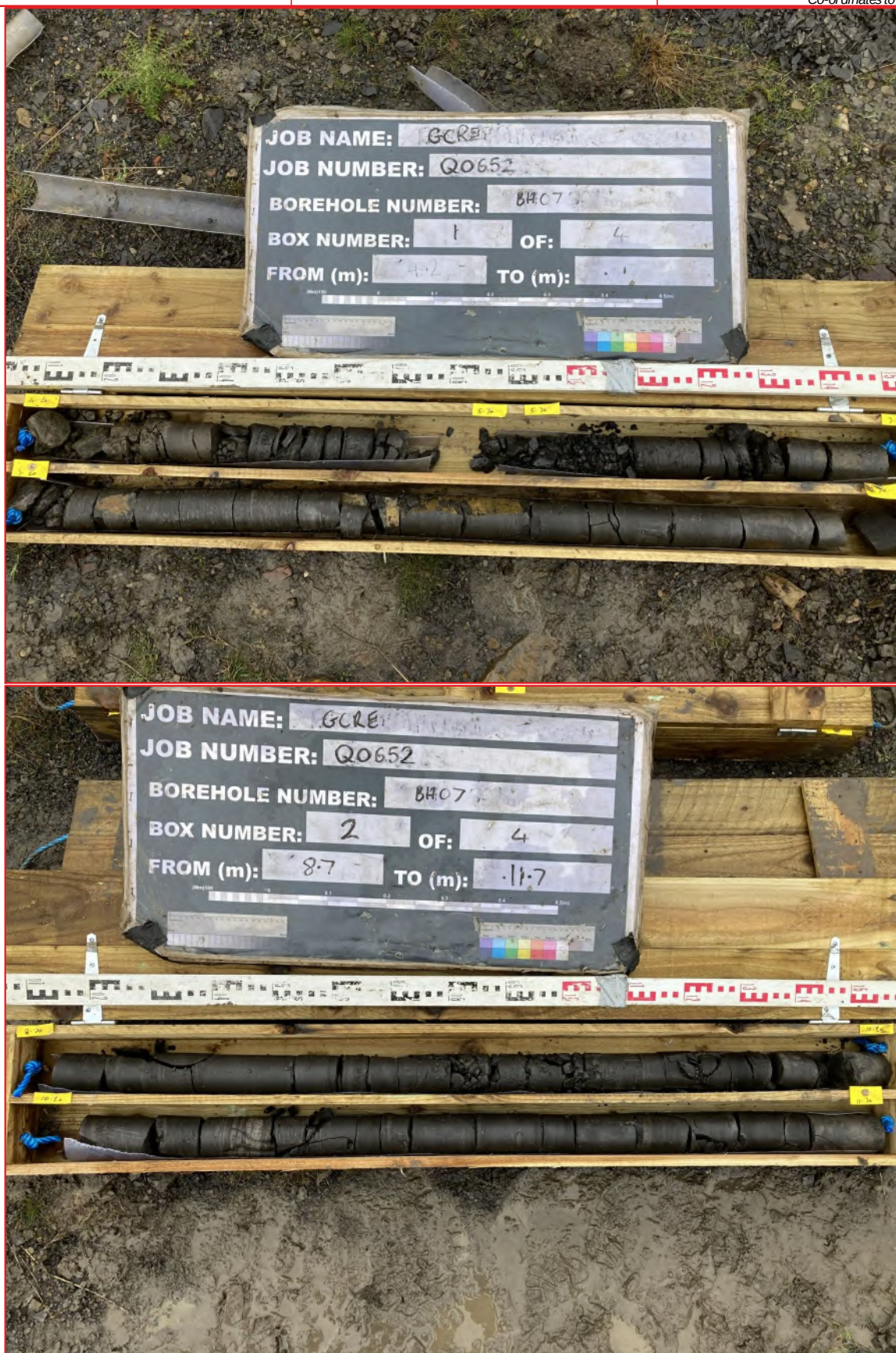
Job Number : Q0652

Ground Level : 271.28 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 281544.88E
210721.08 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

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All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH07

Dates : 29/11/21 - 30/11/21

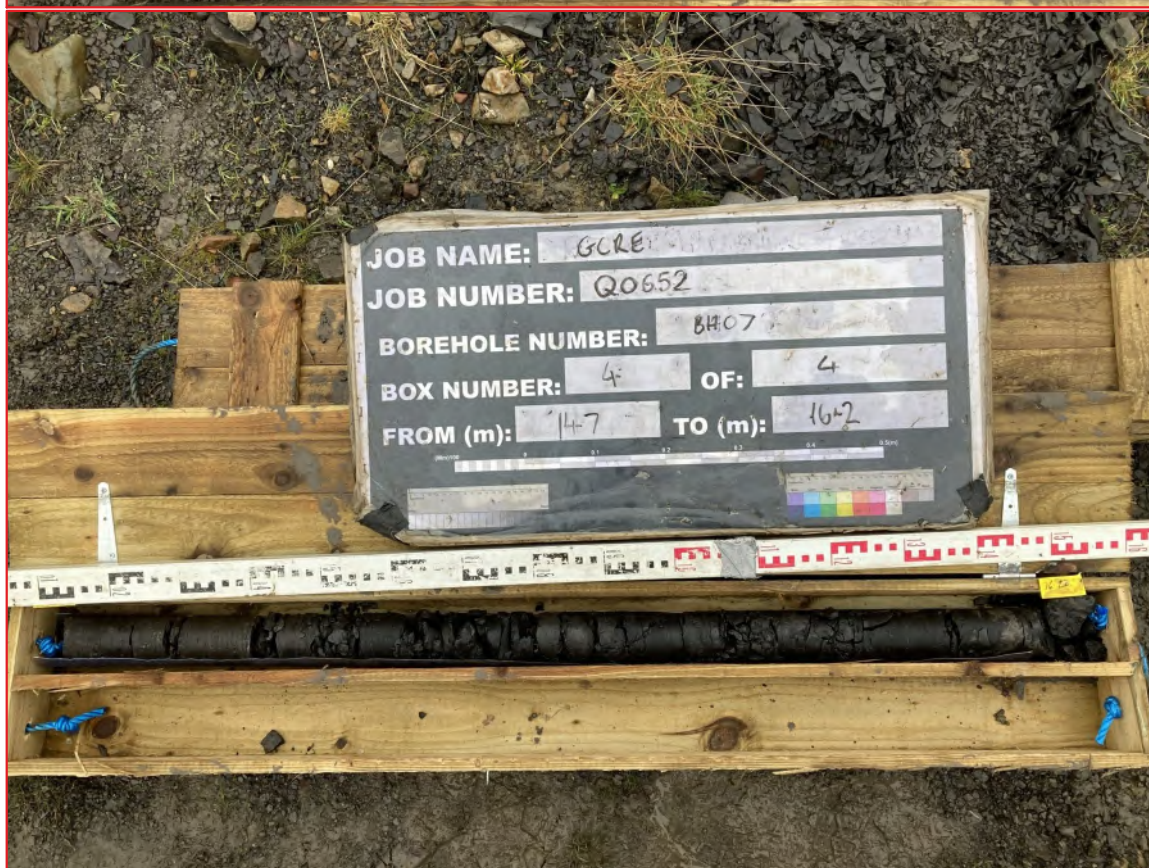
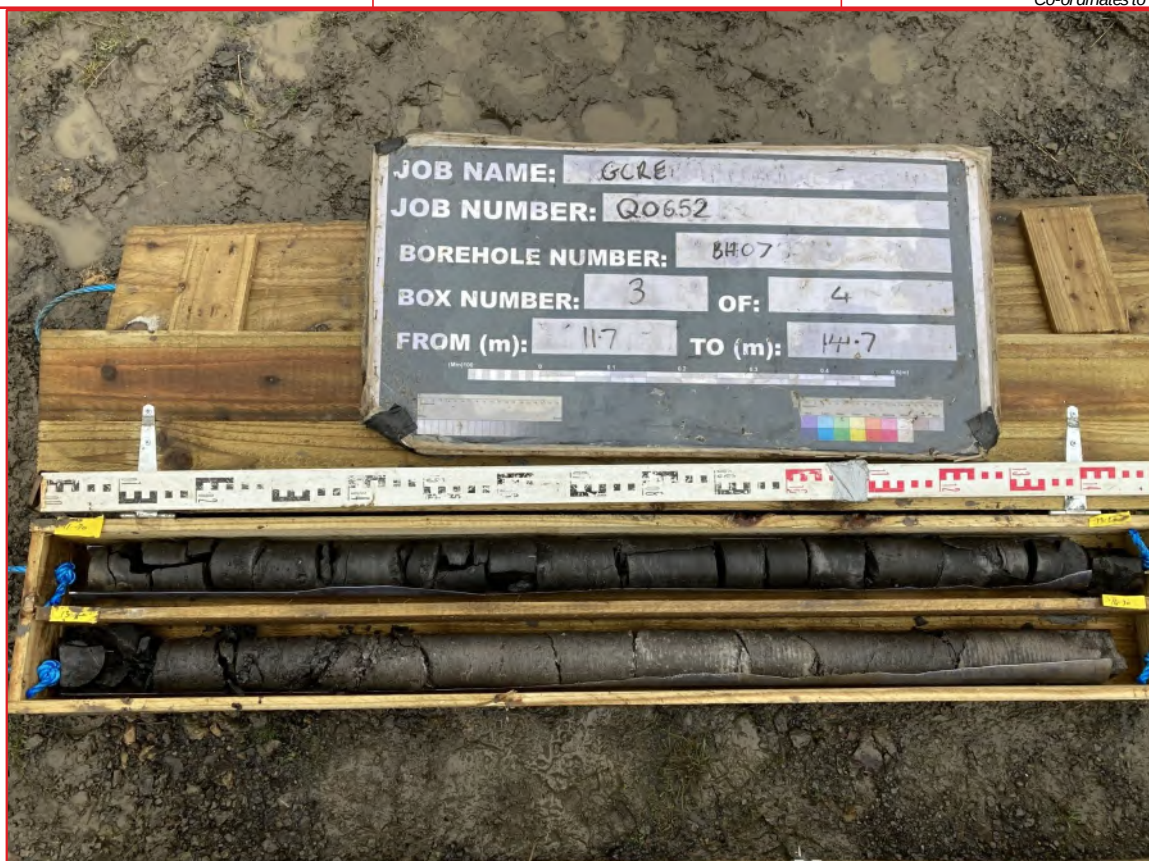
Job Number : Q0652

Ground Level : 271.28 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 281544.88E
210721.08 N
Co-ordinates to NationalGrid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
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Page
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All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence											Borehole No. BH08	
Client : Global Centre of Rail Excellence												
Dates : 7/12/21 - 8/12/21					Job Number : Q0652					Ground Level : 236.31 m A.O.D. Level to Ordnance Datum		
Location :					Engineer : ARUP					Coordinates: 282776.08 E 211918.35 N Co-ordinates to National Grid		

m B.G.L.	Run Details				Fractures		Samples		Strata				
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Type No. Blows	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Water
0										Colliery Spoil (Drillers Description)			
1													
2													
3													
4													
5													
6									(12.00)				
7													
8													
9													
10													
11													
12									12.00	Clay (Drillers Description)		224.31	
13									(1.50)				
14									13.50	Clay with quartz cobbles (Drillers Description)		222.81	
15													
16													
17									(6.50)				
18													
19													
20									20.00	Black silty Clay (Drillers Description)		216.31	
21									(2.00)				
22									22.00	Mudstone with Sandstone bands (Drillers Description)		214.31	
23													
24													
25													
26													
27													
28													
29													
30													
31													
32									(20.00)				
33													
34													
35													
36													
37													
38													
39													
40													
41													
42									42.00	Terminated at 42.0mgl (Investigation SUPervisors Instruction)		194.31	
43													
44													

Hole Progress / Water Obs				Casing		Groundwater				Flush		
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns
08/12/2021 16:00	42.00	20.50	23.00	20.50	115.00	9.00	8.75	Seepage between 9.0 and 13.5mbgl	13.50	0.00 - 42.00	Mist	100

Plant: Commachio 600
Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-20.5mbgl, Rotary 'open hole' 20.5-42.0mbgl

	Plas Newydd Swansea Tel: 01554744880 email: enquiries@quantumgeotechnic.co.uk	Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	
		QGL	P Darby	1 Of 1	45		

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Contract : Global Centre of Rail Excellence											Borehole No. BH09	
Client : Global Centre of Rail Excellence												
Dates : 9/12/21 - 9/12/21					Job Number : Q0652					Ground Level : 230.86 m A.O.D. Level to Ordnance Datum		
Location :					Engineer : ARUP					Coordinates: 283119.53 E 211903.09 N Co-ordinates to National Grid		

m B.G.L.	Run Details				Fractures		Samples		Strata				Water
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Type No. Blows	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	
0									(0.50)	Topsoil (Drillers Description)		230.36	
1								0.50	Clay and Boulders (Drillers Description) - Probable / Possible Made Ground				
2								(4.40)					
3													
4													
5								4.90	Colliery Spoil (Drillers Description)		225.96		
6								(0.80)	Mudstone and Siltstone (Drillers Description)		225.16		
7								5.70					
8													
9													
10													
11													
12													
13													
14								(15.70)					
15													
16													
17													
18													
19													
20													
21													
22								21.40	Coal and Mudstone (Drillers Description)		209.46		
23								(1.70)					
24								23.10	Siltstone (Drillers Description)		207.76		
25													
26													
27								(6.90)					
28													
29													
30								30.00	Terminated at 30.0mbgl (Scheduled Depth)		200.86		
31													
32													
33													
34													
35													
36													
37													
38													
39													

Hole Progress / Water Obs				Casing		Groundwater				Flush		
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns
				7.50	115.00	4.70		Fast groundwater inflow at 4.7mbgl		0.00 - 30.00	Mist	100

Plant: Commachio 600
Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-7.2mbgl, Rotary 'open hole' 7.2-30.0mbgl

	Plas Newydd Swansea Tel: 01554744880 email: enquiries@quantumgeotechnic.co.uk	Operator:	Logged By.	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	
		QGL	P Darby	1 Of 1	40		

Contract : Global Centre of Rail Excellence											Borehole No.		
Client : Global Centre of Rail Excellence											BH10		
Dates : 13/12/21 - 13/12/21					Job Number : Q0652					Ground Level : 236.95 m A.O.D. Level to Ordnance Datum			
Location :					Engineer : ARUP					Coordinates: 283369.50 E 211901.56 N Co-ordinates to National Grid			

m B.G.L.	Run Details				Fractures		Samples		Strata					Water
	Core Run	TCR %	SCR %	RQD %	Min Avg Max	FI	Depth	Type No. Blows	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.		
0									(0.70)	Topsoil (Drillers Description)		236.25		
1									0.70	Mudstone (Drillers Description)				
2														
3														
4														
5														
6														
7														
8														
9														
10														
11									(19.30)					
12														
13														
14														
15														
16														
17														
18														
19														
20									20.00	Mudstone with Sandstone Bands		216.95		
21									(4.00)					
22														
23														
24									24.00	Coal (Drillers Description)		212.95		
25									(1.20)					
26									25.20	Sandstone (Drillers Description)		211.75		
27														
28									(4.80)					
29														
30									30.00	Terminated at 30.0mbgl (Scheduled Depth)		206.95		
31														
32														
33														
34														
35														
36														
37														
38														
39														

Hole Progress / Water Obs				Casing		Groundwater				Flush		
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns
13/12/2021 14:30	30.00	9.25	9.25	7.50	115.00	7.75	4.20					

Plant: Commachio 600

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-7.2mbgl, Rotary 'open hole' 7.2-30.0mbgl

	Plas Newydd Swansea Tel: 01554744880 email: enquiries@quantumgeotechnic.co.uk	Operator:	Logged By:	Sheet No.	m Per Page	All measurements in metres unless otherwise stated	
		QGL	P Darby	1 Of 1	40		

Form Name: ROTARY. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 16/12/21 - 17/12/21

Location: Around washery area

Job Number : Q0652

Engineer : ARUP

Ground Level : 258.79 m A.O.D.
Level to Ordnance Datum

Coordinates: 283659.50 E
211793.72 N
Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No. BH11

0m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata				Discontinuities						Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description		
											1.2	SPT (C) 50/35mm (25/15mm-50/35mm--)		Grass over brown grey Sandstone boulders with clay bands (Drillers Description)									
											2.7	SPT (C) 50/140mm (11-16/50mm-31-19/65mm--)	(5.40)										
											4.2	SPT (C) 50/60mm (10-15/45mm-50/60mm--)											
	5.20 - 7.20										5.7	SPT (C) 50/65mm (25/20mm-50/65mm--)	5.40 (0.30) 5.70	Grey weathered MUDSTONE (Drillers Description) Weak to strong dark grey MUDSTONE with one discontinuity set (SOUTH WALES COAL MEASURES)		253.39 253.09	5.70			1	Bedding fracture set, undulating smooth, matt, clay, fresh, horizontal, partly open.		
	7.20 - 8.70	75	75	0	3	5	14	26															
	8.70 - 10.20	100	100	0	2	4	13	23					(4.95)										
	10.20 - 11.70							10															
		100	97	27				NI															
	11.70 - 13.20				4	12	15	14															
		100	100	20																			
	13.20 - 14.70							0 NI															
	100	87	23	3	17	20	7					(5.00)											
14.70 - 16.20							NI																
	100	67	0	2	6	18	15																

Hole Progress / Water Obs				Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-5.7mbgl, Rotary coring 5.7-16.2mbgl, Rotary 'open hole' 16.2-30.0mbgl
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour	
16/12/2021 16:30 17/12/2021 07:30	8.70 8.70	5.70 5.70		5.70	115.00	14.70	11.90	Medium ground water strike at 14.70mbgl		0.00 - 30.00	Air Mist	100	Grey brown	

Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
G Blades

Logged By:
S Picton

Logged Date:

Equipment Used:
Rig: Commachio MC600.

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1 Of 2

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All measurements in metres unless otherwise stated

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 16/12/21 - 17/12/21

Location: Around washery area

Job Number : Q0652

Engineer : ARUP

Ground Level : 258.79 m A.O.D.
Level to Ordnance Datum

Coordinates: 283659.50 E
211793.72 N
Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No. BH11

m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities					Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description		
16	16.2							NI 3					16.20	Grey MUDSTONE with Sandstone bands (Drillers Description)	x x x x	242.59							
17																							
18																							
19																							
20																							
21																							
22																							
23													(13.80)										
24																							
25																							
26																							
27																							
28																							
29																							
30													30.00	Terminated at 30.00mbgl (Scheduled Depth)		228.79							
31																							

Hole Progress / Water Obs

Date / Time

H. Depth

C. Depth

Water

Casing

Depth

Diam.

Groundwater

Struck

Rose To

Behaviour

Sealed

Flush

Depth

Type

Returns

Colour

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-5.7mbgl, Rotary coring 5.7-16.2mbgl, Rotary 'open hole' 16.2-30.0mbgl



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
G Blades

Logged By:
S Picton

Logged Date:

Equipment Used:
Rig: Commachio MC600.

Sheet No.
2 Of 2

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16

All measurements in metres unless otherwise stated



Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH11

Dates : 16/12/21 - 17/12/21

Job Number : Q0652

Ground Level : 258.79 m A.O.D.
Level to Ordnance Datum

Location : Around washery area

Engineer : ARUP

Coordinates: 283659.50E
211793.72 N
Co-ordinates to National Grid



Plas Newydd
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Operator:
G Blades

Logged By:
S Picton

Sheet No.
1 Of 2

m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH11

Dates: 16/12/21 - 17/12/21

Job Number : Q0652

Ground Level : 258.79 m A.O.D.
Level to Ordnance Datum

Location : Around washery area

Engineer : ARUP

Coordinates: 283659.50E
211793.72 N
Co-ordinates to National Grid



Plas Newydd
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Operator:
G Blades

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S Picton

Sheet No.
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m Per
Page
2

All measurements in
metres unless
otherwise stated



Form Name: ROTARY A3 Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence																			Borehole No. BH12								
Client : Global Centre of Rail Excellence										Job Number : Q0652				Ground Level : 258.21 m A.O.D. Level to Ordnance Datum			Coordinates: 283925.43 E 211066.30 N Co-ordinates to National Grid			Orientation & Inclination: Orientation: N/A Inclination: N/A							
Dates: 14/12/21 - 15/12/21					Location :					Engineer : ARUP																	
11 m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata						Discontinuities						Water		
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description						
11	11.20 - 12.70	97	87	55	30	115	230	12	11.70 - 11.85	C6					xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx xxxxxx					Below 11.2mbgl discontinuities locally highly weathered to medium angular gravel upto 100mm penetration.							
12		93	73	37	40	100	160	13																			
12.7																											
13													12.70	Mudstone with Sandstone bands (Drillers Description)		245.51											
14													(2.30)														
15													15.00	Coal (Drillers Description)		243.21											
16													(1.25)														
17													16.25	Mudstone with Sandstone bands (Drillers Description)		241.96											
18																											
19																											
20																											
21																											
Hole Progress / Water Obs					Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Strike Observed. ODEX GL-2.7mbgl, Rotary coring 2.7-12.7mbgl, Rotary 'open hole' 12.7-30.0mbgl												
Date / Time		H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour													
Quantum Geotech Plas Newydd Swansea Tel: 01554744880 email: enquiries@quantumgeotechnic.co.uk										Operator: QGL		Logged By: P Darby		Logged Date:		Equipment Used: Rig: Commachio 600.				Sheet No. 2 Of 3		m Per Page 11		All measurements in metres unless otherwise stated		AGS	

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH12

Dates : 14/12/21 - 15/12/21

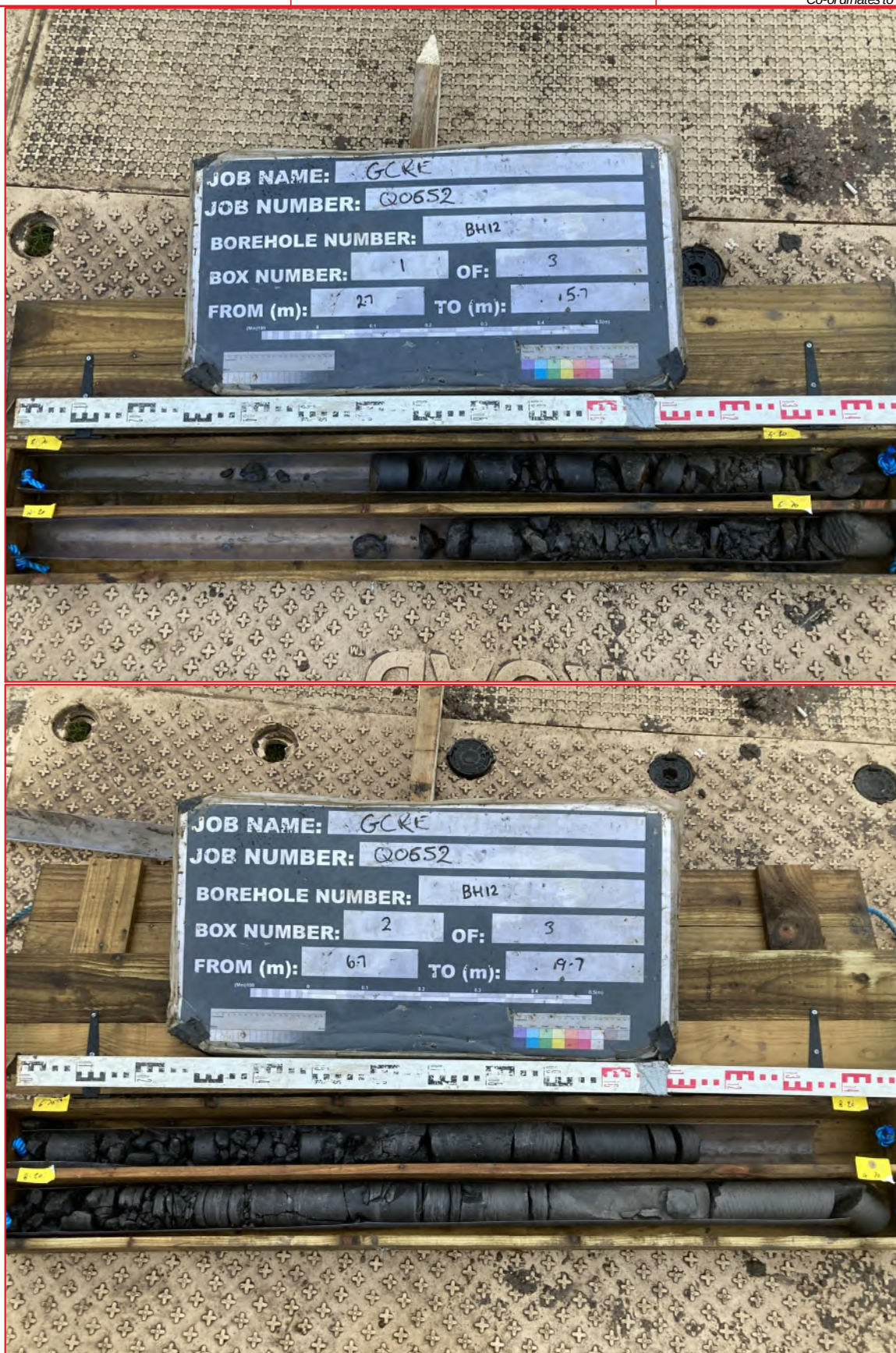
Job Number : Q0652

Ground Level : 258.21 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283925.43E
211066.30 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
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m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH12

Dates : 14/12/21 - 15/12/21

Job Number : Q0652

Ground Level : 258.21 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283925.43E
211066.30 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
2 Of 2

m Per Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 16/12/21 - 4/1/22

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 259.34 m A.O.D.
Level to Ordnance Datum

Coordinates: 283817.80 E
210965.72 N
Co-ordinates to National Grid

Orientation & Inclination:
Orientation: N/A
Inclination: N/A

Borehole No. BH13

0 m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities					Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description		
														Topsoil (Drillers Description)									
													(0.50)	MADE GROUND - Mudstone Fill (Drillers Description)		258.84							
									1.20	SPTLS1	1.2	SPT (S) 16 (2-2-4-4-4-4)		Clay (Drillers Description). SPT sample firm brown and grey slightly gravelly silty CLAY. Gravel is fine to medium sub-rounded mudstone		258.34							
													(1.70)										
									2.70 - 4.20	D1 SPTLS2	2.7	SPT (S) 5 (4-2-2-1-1-1)		Cobbles, Boulders and Clay (Drillers Description)		256.64							
													(2.50)										
									4.20 - 5.70	D2	4.2	SPT (C) 50/150mm (10-10/19mm-17-33--)											
													5.20	Weathered Mudstone (Drillers Description)		254.14							
											5.7	SPT (C) 50/18mm (17-8/14mm-50/18mm--)		Fractured Mudstone (Drillers Description)		253.64							
													(1.00)										
	6.70 - 7.20	100	0	0				NI					6.70	Weak to medium strong grey MUDSTONE with two discontinuity sets. (SOUTH WALES COAL MEASURES)		252.64	6.70				Sub-horizontal to 10 degree discontinuity set (bedding) extremely closely spaced, rough planar, partly open, locally with clay surface coating and weathered to medium gravel up to 20mm penetration sub-vertical discontinuity set (joints) rough planar, partly open, clean.		
	7.20 - 8.70							NI															
	8.70 - 10.00	83	41	0	10	59	80	18	8.20 - 8.29	C1				 between 8.7 and 9.3mbgl highly weathered to fine to coarse angular Gravel									
10.00 - 10.30	92	27	8	10	64	100	11	9.55 - 9.60	C2				 between 10.0 and 10.3mbgl highly weathered to fine to coarse angular Gravel										
10.30 - 11.60	67	0	0				NI																
	92	81	8	30	65	100	19																

Hole Progress / Water Obs

Casing

Groundwater

Flush

Date / Time

H. Depth

C. Depth

Water

Depth

Diam.

Struck

Rose To

Behaviour

Sealed

Depth

Type

Returns

Colour

16/12/2021 07:30

10.20

5.70

5.70

115.00

0.00 - 30.00

Mist

100

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Strike Observed. ODEX GL-5.7mbgl, Rotary coring 5.7-29.7mbgl



Plas Newydd

Swansea

Tel: 01554744880

email: enquiries@quantumgeotechnic.co.uk

Operator:

QGL

Logged By:

P Darby

Logged Date:

Equipment Used:

Rig: Commachio 600.

Sheet No.

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All measurements in metres unless otherwise stated



Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 16/12/21 - 4/1/22

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 259.34 m A.O.D.

Level to Ordnance Datum

Coordinates: 283817.80 E

210965.72 N

Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No. BH13

11m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities						Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description			
	11.60 - 13.10	92	81	8	30	65	100	19	11.15 - 11.25	C3				 between 11.6 and 11.9mbgl highly weathered to fine to coarse angular Gravel										
								NI																
		90	51	0	10	55	80	21	12.40 - 12.48	C4				 between 11.6 and 13.1mbgl thinly laminated										
	13.10 - 13.80	100	0	0				NI	13.50	C5				 between 13.1 and 13.8mbgl highly weathered to fine to coarse angular Gravel							Between 12.8 and 13.1mbgl sub-vertical discontinuity locally with silt surface coating.			
								NI																
	13.80 - 15.30	100	53	7	10	71	110	11	14.80 - 14.90	C6				 between 14.1 and 14.35mbgl highly weathered to fine to coarse angular Gravel							Between 13.8 and 14.1mbgl sub-vertical discontinuity.			
	15.30 - 16.70							NI	16.30	C7				(17.50)							Between 15.3 and 15.94mbgl sub-vertical discontinuity.			
100		53	0	30	58	70	12																	
16.70 - 18.20							NI	17.98 - 18.10	C8				 below 16.7mbgl medium strong, locally weak							Between 16.7 and 19.7mbgl sub-horizontal to 10 degree discontinuities closely spaced.				
	93	80	8	10	81	120	17																	
18.20 - 19.70								19.30 - 19.42	C9											Between 18.9 and 19.05mbgl sub-vertical discontinuity and smooth.				
	93	87	19	20	79	150	18																	
19.70 - 21.20							NI	20.35 - 20.50	C10											Between 19.7 and 21.3mbgl sub-horizontal discontinuities locally with clay surface coating. At 20.28mbgl 30 degree discontinuity smooth planar, open, clean.				
	90	43	11	50	64	150	14																	
21.20 - 22.70	93	60	45	40	250	300	5	21.80 -	C11											Between 21.35 and 22.05mbgl sub-horizontal to 10 degree discontinuities close to medium spaced.				
Hole Progress / Water Obs				Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Strike Observed. ODEX GL-5.7mbgl, Rotary coring 5.7-29.7mbgl										
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour											

Plas Newydd

Swansea

Tel: 01554744880

email: enquiries@quantumgeotechnic.co.uk

Operator:

QGL

Logged By:

P Darby

Logged Date:

Equipment Used:

Rig: Commachio 600.

Sheet No.

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m Per Page

11

All measurements in metres unless otherwise stated

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH13

Dates : 16/12/21 - 4/1/22

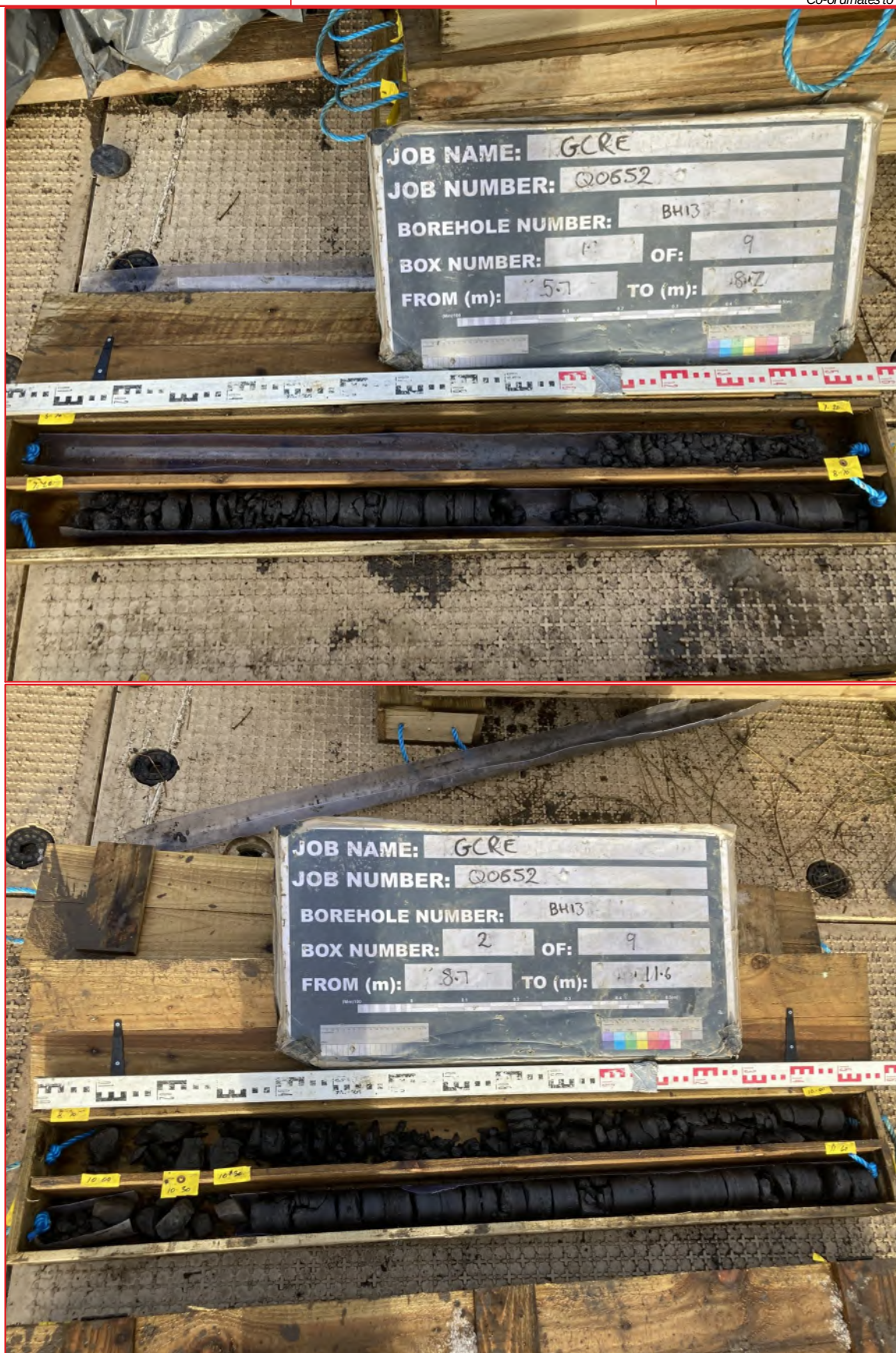
Job Number : Q0652

Ground Level : 259.34 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283817.80E
210965.72 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotech.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
1 Of 5

m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH13

Dates : 16/12/21 - 4/1/22

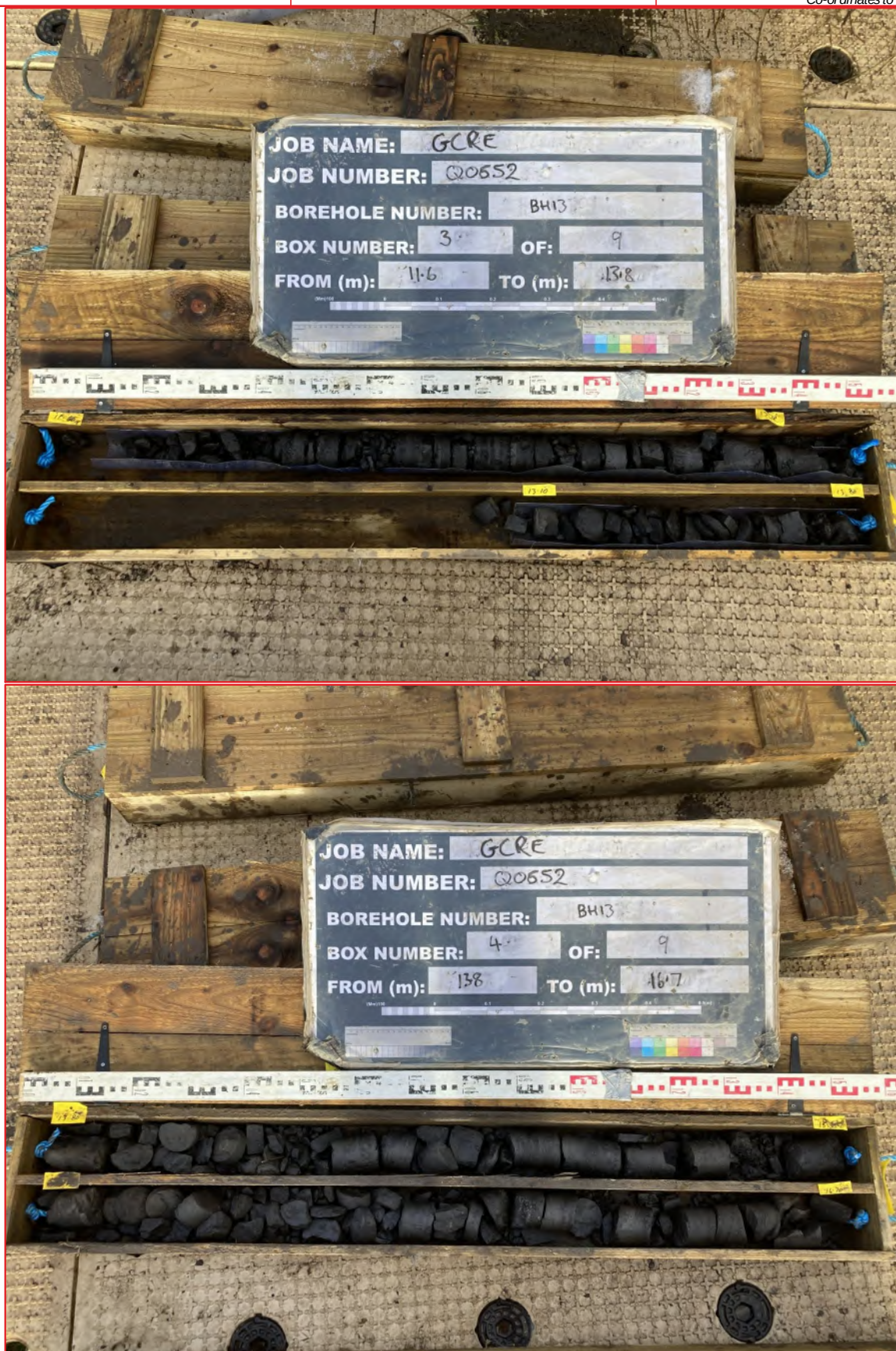
Job Number : Q0652

Ground Level : 259.34 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283817.80E
210965.72 N
Co-ordinates to National Grid



Plas Newydd
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QGL

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Sheet No.
2 Of 5

m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH13

Dates : 16/12/21 - 4/1/22

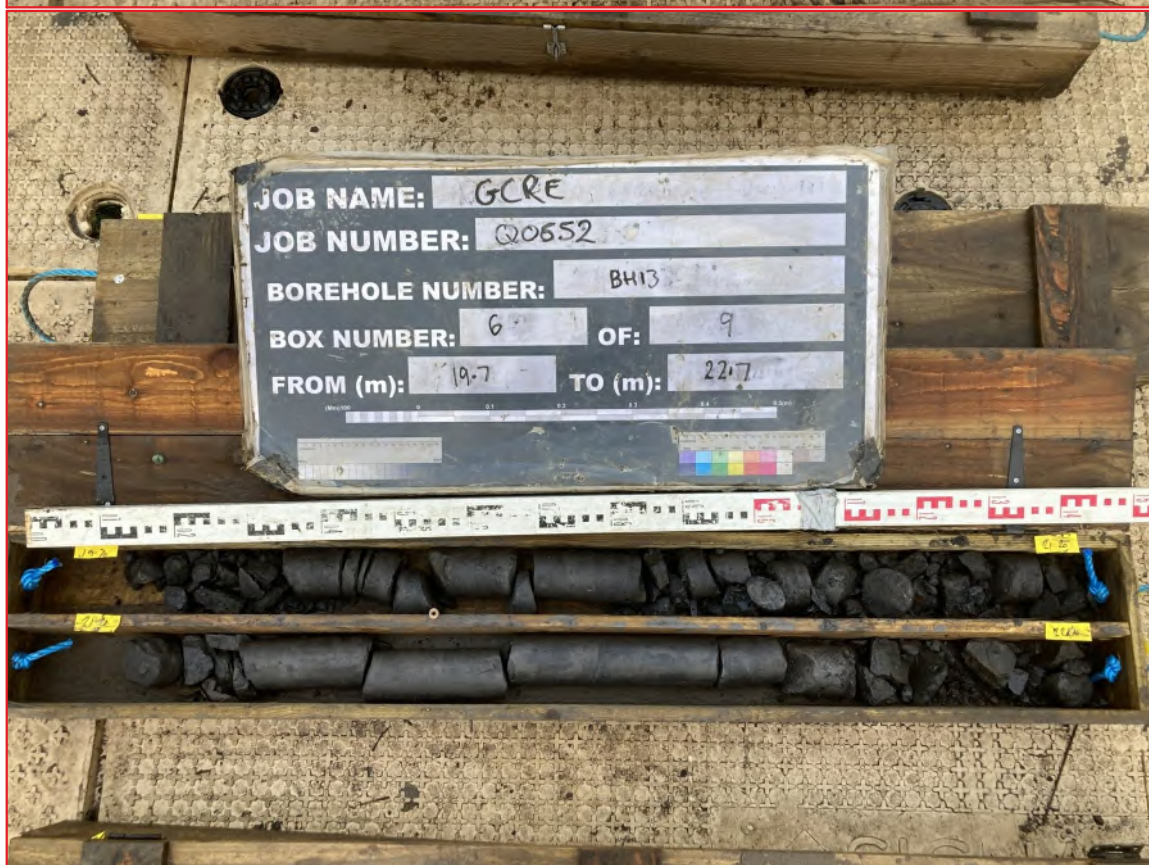
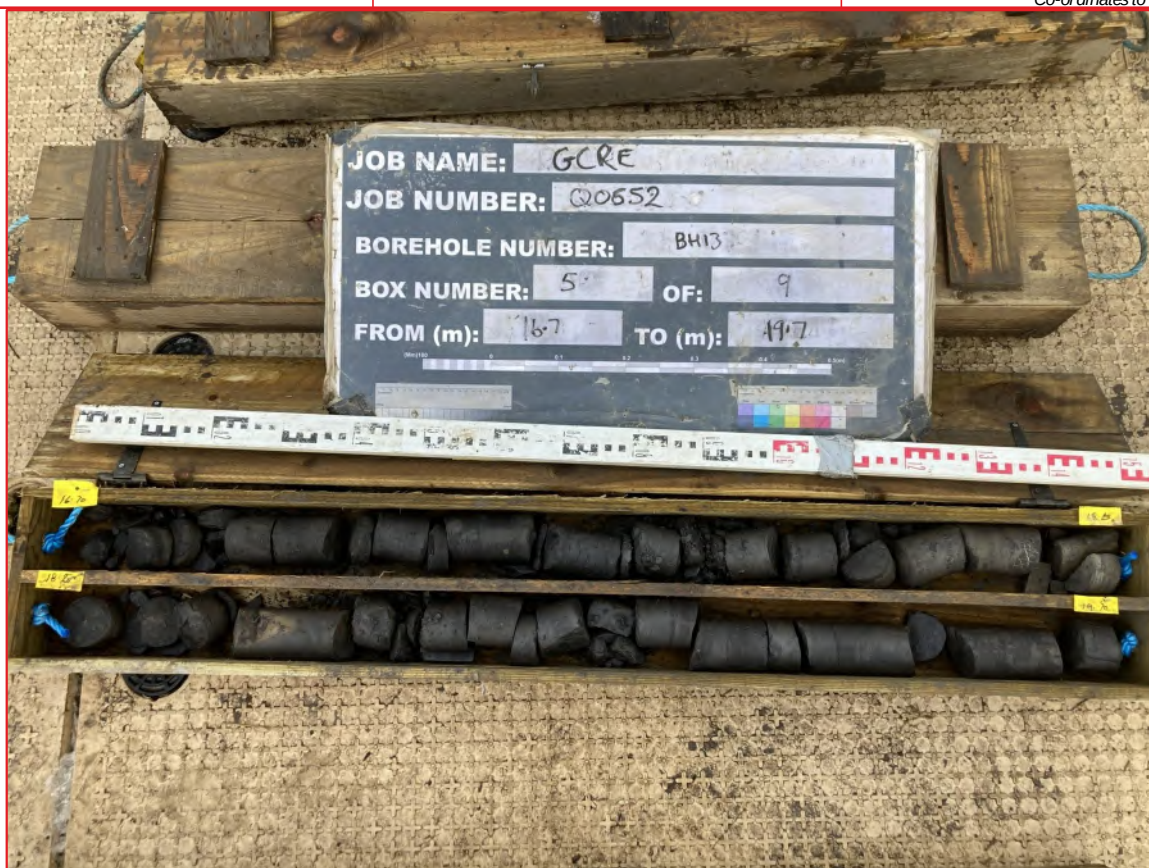
Job Number : Q0652

Ground Level : 259.34 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283817.80E
210965.72 N
Co-ordinates to Naional Grid



Plas Newydd
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QGL

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P Darby

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Page
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All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH13

Dates : 16/12/21 - 4/1/22

Job Number : Q0652

Ground Level : 259.34 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283817.80E
210965.72 N
Co-ordinates to National Grid



Plas Newydd
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Operator:
QGL

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P Darby

Sheet No.
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m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH13

Dates : 16/12/21 - 4/1/22

Job Number : Q0652

Ground Level : 259.34 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283817.80E
210965.72 N
Co-ordinates to National Grid



Plas Newydd
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Operator:
QGL

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P Darby

Sheet No.
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Page**
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 15/12/21 - 16/12/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 260.01 m A.O.D.
Level to Ordnance Datum

Coordinates: 283702.06 E
210915.06 N
Co-ordinates to National Grid

Orientation & Inclination:

Orientation: N/A

Inclination: N/A

Borehole No. BH14

1m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata					Discontinuities						Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thickness)	Description	Legend	Red. Level A.O.D.	Depth (Thickness)	Dip	Direction	Fracture Set	Discontinuity Description			
													(10.60)				10.60				open.			
	12.20 - 13.70	100	93	27	40	89	150	16	11.60 - 11.75	C5				 between 12.1 and 12.2mbgl weak black Coal highly weathered to coarse angular Gravel										
		100	93	27	10	88	200	16	13.10 - 13.25	C6				 weak below 13.0mbgl							Between 12.6 and 12.8mbgl 80 degree discontinuity smooth to rough planar, partly open, clean and fresh. At 13.0mbgl 30 degree discontinuity rough planar, tight, with silt surface coating. At 13.3mbgl sub-horizontal discontinuity open with silt / sand infill.			
	13.70 - 14.80	100	73	21	30	85	130	12	14.40 - 14.50	C7											Between 13.7 and 14.8mbgl discontinuities locally highly weatherd to fine to medium angular gravel upto 70mm penetration and locally with calcite deposits on discontinuity surfaces.			
	14.80 - 16.30				20	63	70	7																
		87	40	19				NI						 between 15.3 and 15.7mbgl highly weathered to fine to coarse angular Gravel										
					60	100	150	3	15.90 - 16.05	C8														
	16.3												16.30	Mudstone and Sandstone bands (Drillers Description)		243.71								
Hole Progress / Water Obs				Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Strike Observed. ODEX GL-5.7mbgl, Rotary coring 5.7-16.3mbgl, Rotary 'open hole' 16.3-30.0mbgl										
Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour											
16/12/2021 07:30	14.80	5.70	5.25																					
Quantum Geotech Plas Newydd Swansea Tel: 01554744880 email: enquiries@quantumgeotechnic.co.uk Operator: QGL Logged By: P Darby Logged Date: Equipment Used: Rig: Commachio 600.										Sheet No. 2 Of 3	m Per Page 11	All measurements in metres unless otherwise stated	AGS											

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence																				Borehole No. BH14							
Client : Global Centre of Rail Excellence																											
Dates : 15/12/21 - 16/12/21										Job Number : Q0652					Ground Level : 260.01 m A.O.D. <i>Level to Ordnance Datum</i>				Coordinates: 283702.06 E 210915.06 N <i>Co-ordinates to National Grid</i>				Orientation & Inclination: Orientation: N/A Inclination: N/A				
Location :										Engineer : ARUP																	
22m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata							Discontinuities							Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description						
22																											
23													(13.70)														
24																											
25																											
26																											
27																											
28																											
29																											
30													30.00	Terminated at 30.0mbgl (Scheduled Depth)		230.01											
31																											
32																											
Hole Progress / Water Obs				Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. No Groundwater Strike Observed. ODEX GL-5.7mbgl, Rotary coring 5.7-16.3mbgl, Rotary 'open hole' 16.3-30.0mbgl													
Date / Time		H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns											Colour			
Operator: QGL										Logged By: P Darby		Logged Date:		Equipment Used: Rig: Commachio 600.													
Sheet No. 3 Of 3										m Per Page 11		All measurements in metres unless otherwise stated		AGS													

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH14

Dates : 15/12/21 - 16/12/21

Job Number : Q0652

Ground Level : 260.01 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283702.06 E
210915.06 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
1 Of 2

m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH14

Dates : 15/12/21 - 16/12/21

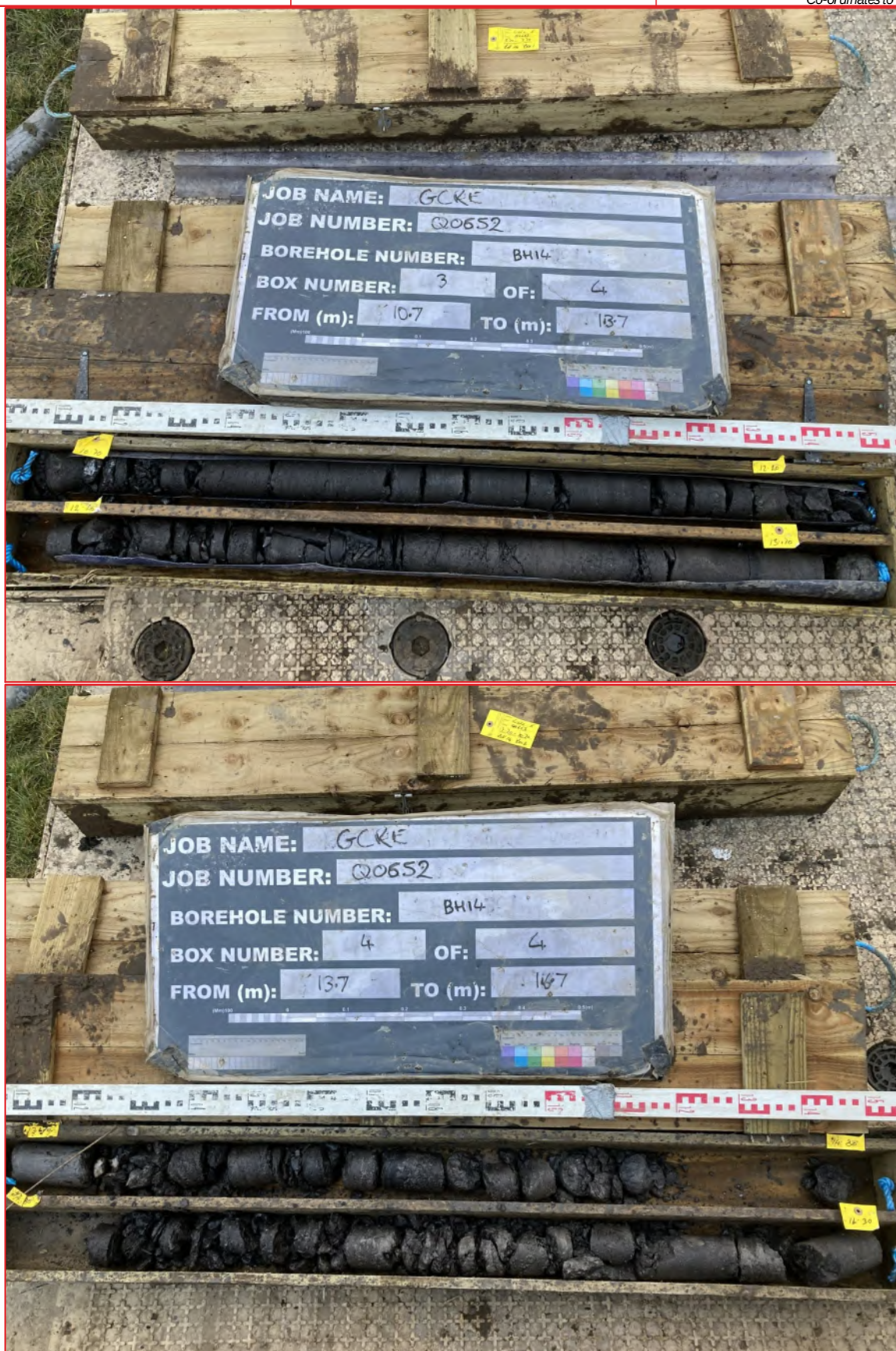
Job Number : Q0652

Ground Level : 260.01 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283702.06 E
210915.06 N
Co-ordinates to National Grid



Plas Newydd
Swansea
Tel: 01554744880
email: enquiries@quantumgeotechnic.co.uk

Operator:
QGL

Logged By:
P Darby

Sheet No.
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All measurements in
metres unless
otherwise stated



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Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH15

Dates : 5/12/21 - 6/12/21

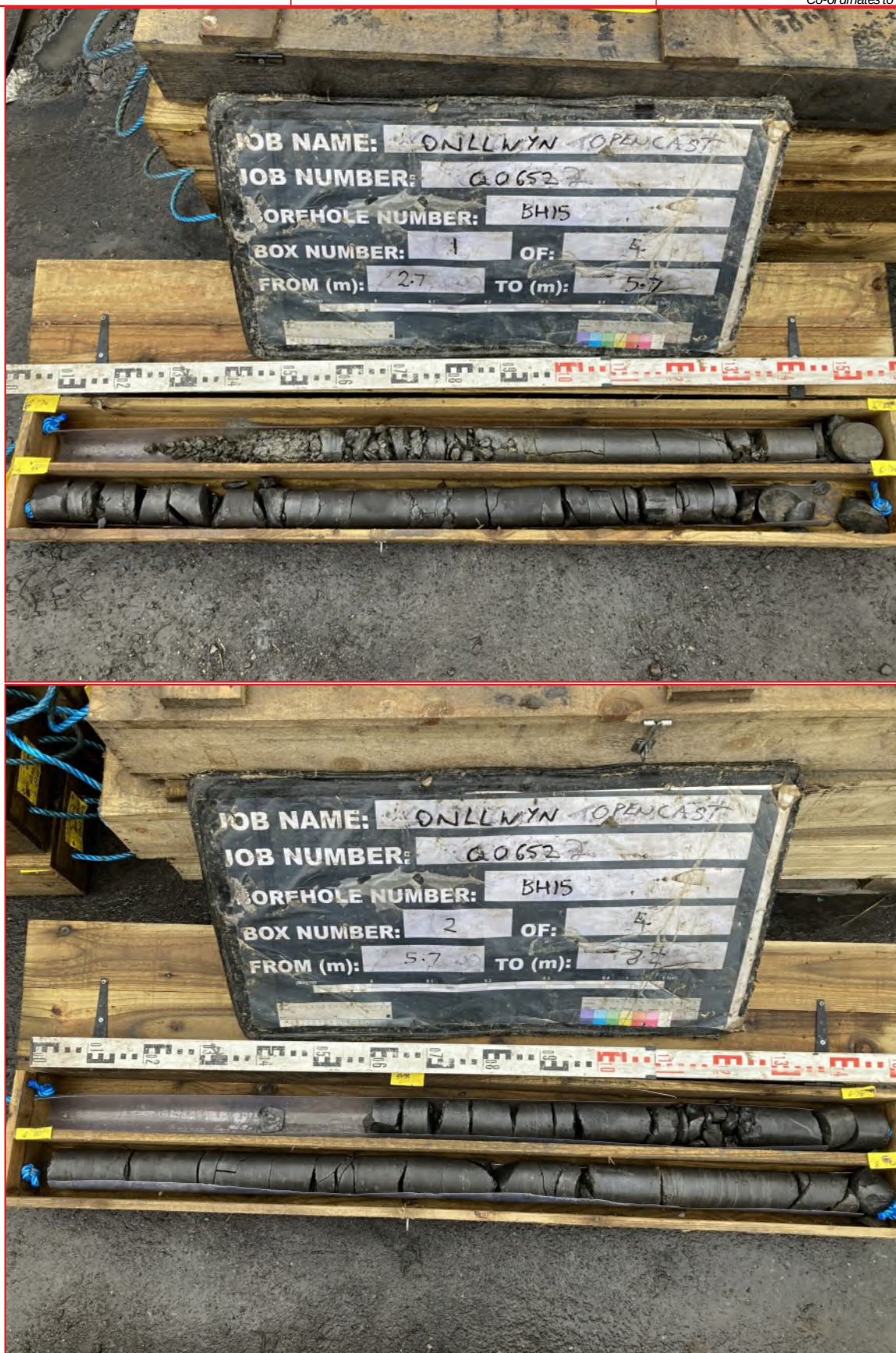
Job Number : Q0652

Ground Level : 249.63 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283332.65E
210758.18 N
Co-ordinates to National Grid



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All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH15

Dates : 5/12/21 - 6/12/21

Job Number : Q0652

Ground Level : 249.63 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283332.65E
210758.18 N
Co-ordinates to National Grid



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2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 14/12/21 - 16/12/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 280.71 m A.O.D.
Level to Ordnance Datum

Coordinates: 283439.29 E
211441.07 N
Co-ordinates to National Grid

Orientation & Inclination:
Orientation: N/A
Inclination: N/A

Borehole No.
BH16

0 m B.G.L.

1

2

3

4

5

6

7

8

9

10

Run Details				Fracture Details				Samples		Insitu Tests		Strata				Discontinuities						Water	Install/ Backfill
Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description			
													Clay and Gravel (Drillers Description)										
										1.2	SPT (S) 11 (3-3-3-2-3-3)	(2.70)											
										2.7	SPT (C) 50/35mm (25/60mm-50/35mm---)	2.70 (1.30)	Clay and Boulders (Drillers Description)		278.01								
								4.50	C1	4.2	SPT (C) 50/10mm (25/30mm-50/10mm---)	4.00 (0.20) 4.20 (0.70) 4.90	Weathered Mudstone (Drillers Description) Strong light grey SANDSTONE with two discontinuity sets. (SOUTH WALES COAL MEASURES) Weak to medium strong grey MUDSTONE with one discontinuity set. (SOUTH WALES COAL MEASURES) between 4.9 and 5.2mbgl highly weathered to fine to coarse angular Gravel between 5.2 and 5.6mbgl completely weathered to silty Sand		276.71 276.51 275.81	4.20 0.70				30 degree discontinuity set closely spaced, rough planar, open with black surface staining and locally highly weathered to sandy fine to coarse angular gravel. 60 to 70 degree discontinuity set closely spaced, rough planar, open with black surface staining and locally highly weathered to sandy fine to coarse angular gravel..			
5.70 - 7.20	44	0	0				NI																
7.20 - 8.70	73	21	0				NI	7.70	C2							7.20				Sub-horizontal to 10 degree discontinuity set (bediing) extremely closely spaced, smooth planar locally undulating, open, clean, highly weathered to fine to medium angular gravel up to 20mm penetration.. Below 7.9mbgl locally highly weathered at 7.9mbgl discontinuity with possible slickened surface between 7.9 and 8.3mbgl sub-horizontal discontinuities rough undulating to stepped, tight to partly open, clean, locally highly weathered to fine to medium angular gravel up to 5mm penetration..			
8.70 - 10.20	100	29	20				NI	9.20	C3														
				20	81	150	8									4.90				Below 9.55mbgl discontinuities extremely close to closely spaced.			
10.20 - 11.70	73	44	20	20	69	180	15	10.70	C4														

Hole Progress / Water Obs

Casing

Groundwater

Flush

Date / Time	H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour
15/12/2021 07:30	7.20	4.20	3.60	4.20	115.00	4.20	3.90	Medium groundwater inflow		0.00 - 40.20	Mist	100	

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-4.2mbgl, Rotary coring 4.2-40.2mbgl

Plas Newydd
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Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

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All measurements in metres unless otherwise stated

Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 14/12/21 - 16/12/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 280.71 m A.O.D.
Level to Ordnance Datum

Coordinates: 283439.29 E
211441.07 N
Co-ordinates to National Grid

Orientation & Inclination:
Orientation: N/A
Inclination: N/A

Borehole No.
BH16

11m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata				Discontinuities							Water	Install/ Backfill
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description				
	11.70 - 13.20	73	44	20	20	69	180	15	12.65 - 12.75	C5				Weak black COAL. Highly weathered to fine to coarse angular Gravel. (SOUTH WALES COAL MEASURES)		268.61									
		99	63	27				NI															12.10 (0.60)		
	13.20 - 14.70	88	41	9	30	79	160	6	14.10 - 14.25	C6			12.70	Weak to medium strong grey MUDSTONE with one discontinuity set. (SOUTH WALES COAL MEASURES)		268.01	12.70					Sub-horizontal to 10 degree discontinuity set (bediing) extremely closely spaced, smooth planar locally undulating, open, clean..			
					30	79	120	6															(1.30)		
	14.70 - 16.20	77	77	67	50	130	200	8	15.20 - 15.50	C7				Weak to medium strong black COAL. (SOUTH WALES COAL MEASURES)		266.71	14.28					Sub-horizontal to 10 degree discontinuity set (bediing) closely spaced, smooth planar locally, open, clean..			
																							20		
	16.20 - 17.70	93	77	31	20	107	230	12	16.90 - 17.00	C8												Between 15.85 and 16.0mbgl sub-vertical discontinuity rough undulating, partly open, clean.			
	17.70 - 19.20	97	87	11	40	112	180	12	18.00 - 18.20	C9												Below 17.7mbgl discontinuities roough and locally undulating.			
19.20 - 20.70	99	72	35	10	64	280	22	19.70 - 19.88	C10																
20.70 - 22.20	92	88	35	20	69	160	19	21.70 - 21.80	C11				 between 20.7 and 28.2mbgl fossiliferous			13.92					Between 20.7 and 28.2mbgl discontinuities extremely close to closely spaced.				
Hole Progress / Water Obs				Casing		Groundwater				Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-4.2mbgl, Rotary coring 4.2-40.2mbgl											
Date / Time		H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns											Colour	



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Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

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m Per Page
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All measurements in metres unless otherwise stated



Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Dates: 14/12/21 - 16/12/21

Location :

Job Number : Q0652

Engineer : ARUP

Ground Level : 280.71 m A.O.D.
Level to Ordnance Datum

Coordinates: 283439.29 E
211441.07 N
Co-ordinates to National Grid

Orientation & Inclination:
Orientation: N/A
Inclination: N/A

Borehole No.
BH16

23m B.G.L.

22m B.G.L.

23

24

25

26

27

28

29

30

31

32

Run Details				Fracture Details				Samples		Insitu Tests		Strata				Discontinuities							Water	Install/ Backfill
Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description				
22.20 - 23.70	92	88	35	20	69	160	19	23.05 - 23.20	C12												At 23.7mbgl 45 degree discontinuity rough undulating, open, clean.			
23.70 - 25.20								24.50 - 24.65	C13															
	97	77	25	10	60	140	24																	
25.20 - 26.70								25.90 - 26.00	C14															
	100	90	27	20	53	140	27																	
26.70 - 28.20								27.40 - 27.45	C15			(25.92)									Between 27.6 and 27.8mbgl sub-vertical discontinuity smooth planar, partly open, clean.			
	93	93	19	10	45	150	31																	
28.20 - 29.70								29.20 - 29.45	C16				 medium strong below 28.2mbgl								Sub-horizontal discontinuity set (bedding) closely spaced, smooth locally rough planar, tight to partly open, fresh. Sub-horizontal and sub-vertical discontinuity smooth stepped, open, clean.			
	97	93	63	50	122	300	11																	
29.70 - 31.20								30.50 - 30.65	C17															
	99	95	64	30	114	200	12																	
31.20 - 32.70								31.00 - 31.05	C18												Between 31.6 and 34.mbggl sub-horizontal discontinuities extremely closely spaced, rough planar, open clean.			
32.70 - 34.20	93	88	40	10	82	290	16																	

Hole Progress / Water Obs

Casing

Groundwater

Flush

Date / Time

H. Depth

C. Depth

Water

Depth

Diam.

Struck

Rose To

Behaviour

Sealed

Depth

Type

Returns

Colour

16/12/2021 07:30

28.20

4.20

4.20

Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-4.2mbgl, Rotary coring 4.2-40.2mbgl



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Operator:
QGL

Logged By:
P Darby

Logged Date:

Equipment Used:
Rig: Commachio 600.

Sheet No.
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m Per Page
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All measurements in metres unless otherwise stated



Form Name: ROTARY A3. Version 2.11.000, 22/05/15 Output By: Phil Darby. Library File: C:\USERS\PHIL DARBY\ONEDRIVE - QUANTUM GEOTECHNIC LTD\QUANTUM 4.GLB.

Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH16

Dates : 14/12/21 - 16/12/21

Job Number : Q0652

Ground Level : 280.71 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283439.29 E
211441.07 N
Co-ordinates to National Grid



Plas Newydd
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Operator:
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Sheet No.
1 Of 7

m Per
Page
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH16

Dates : 14/12/21 - 16/12/21

Job Number : Q0652

Ground Level : 280.71 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283439.29 E
211441.07 N
Co-ordinates to National Grid



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All measurements in
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Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH16

Dates : 14/12/21 - 16/12/21

Job Number : Q0652

Ground Level : 280.71 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283439.29 E
211441.07 N
Co-ordinates to National Grid



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH16

Dates : 14/12/21 - 16/12/21

Job Number : Q0652

Ground Level : 280.71 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283439.29 E
211441.07 N
Co-ordinates to National Grid



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Sheet No.
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Page
2

All measurements in
metres unless
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Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH16

Dates : 14/12/21 - 16/12/21

Job Number : Q0652

Ground Level : 280.71 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283439.29 E
211441.07 N
Co-ordinates to National Grid



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Sheet No.
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All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH16

Dates : 14/12/21 - 16/12/21

Job Number : Q0652

Ground Level : 280.71 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283439.29 E
211441.07 N
Co-ordinates to National Grid



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Sheet No.
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All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence

Client : Global Centre of Rail Excellence

Borehole No.

BH16

Dates : 14/12/21 - 16/12/21

Job Number : Q0652

Ground Level : 280.71 m A.O.D.
Level to Ordnance Datum

Location :

Engineer : ARUP

Coordinates: 283439.29 E
211441.07 N
Co-ordinates to National Grid



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Operator:
QGL

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Sheet No.
7 Of 7

**m Per
Page**
2

All measurements in
metres unless
otherwise stated



Contract : Global Centre of Rail Excellence																				Borehole No. BH17							
Dates : 25/11/21 - 26/11/21										Job Number : Q0652					Ground Level : 276.83 m A.O.D. Level to Ordnance Datum				Coordinates: 283274.06 E 211061.09 N Co-ordinates to National Grid				Orientation & Inclination: Orientation: N/A Inclination: N/A				
Location :										Engineer : ARUP																	
22m B.G.L.	Run Details				Fracture Details				Samples		Insitu Tests		Strata							Discontinuities							Water
	Core Run	TCR %	SCR %	RQD %	Min	Avg	Max	FI	Depth	Type No. Blows	Depth	Test Results	Depth (Thick-ness)	Description	Legend	Red. Level A.O.D.	Depth (Thick-ness)	Dip	Direction	Fracture Set	Discontinuity Description						
22													(15.30)														
23																											
24																											
25																											
26																											
27																											
28																											
29																											
30													30.00	Terminated at 30.0mbgl (Scheduled Depth)		246.83											
31																											
32																											
Hole Progress / Water Obs					Casing		Groundwater					Flush				Remarks: BH set out by QGL in liaison with ARUP. Services checked, area CAT scanned and hand dug pit to 1.20mbgl undertaken. ODEX GL-7.2mbgl, Rotary coring 7.2-14.7mbgl, Rotary 'open hole' 14.7-30.0mbgl											
Date / Time		H. Depth	C. Depth	Water	Depth	Diam.	Struck	Rose To	Behaviour	Sealed	Depth	Type	Returns	Colour													
Operator: QGL										Logged By: P Darby		Logged Date:		Equipment Used: Rig: Commachio 600.					Sheet No. 3 Of 3		m Per Page 11	All measurements in metres unless otherwise stated		AGS			