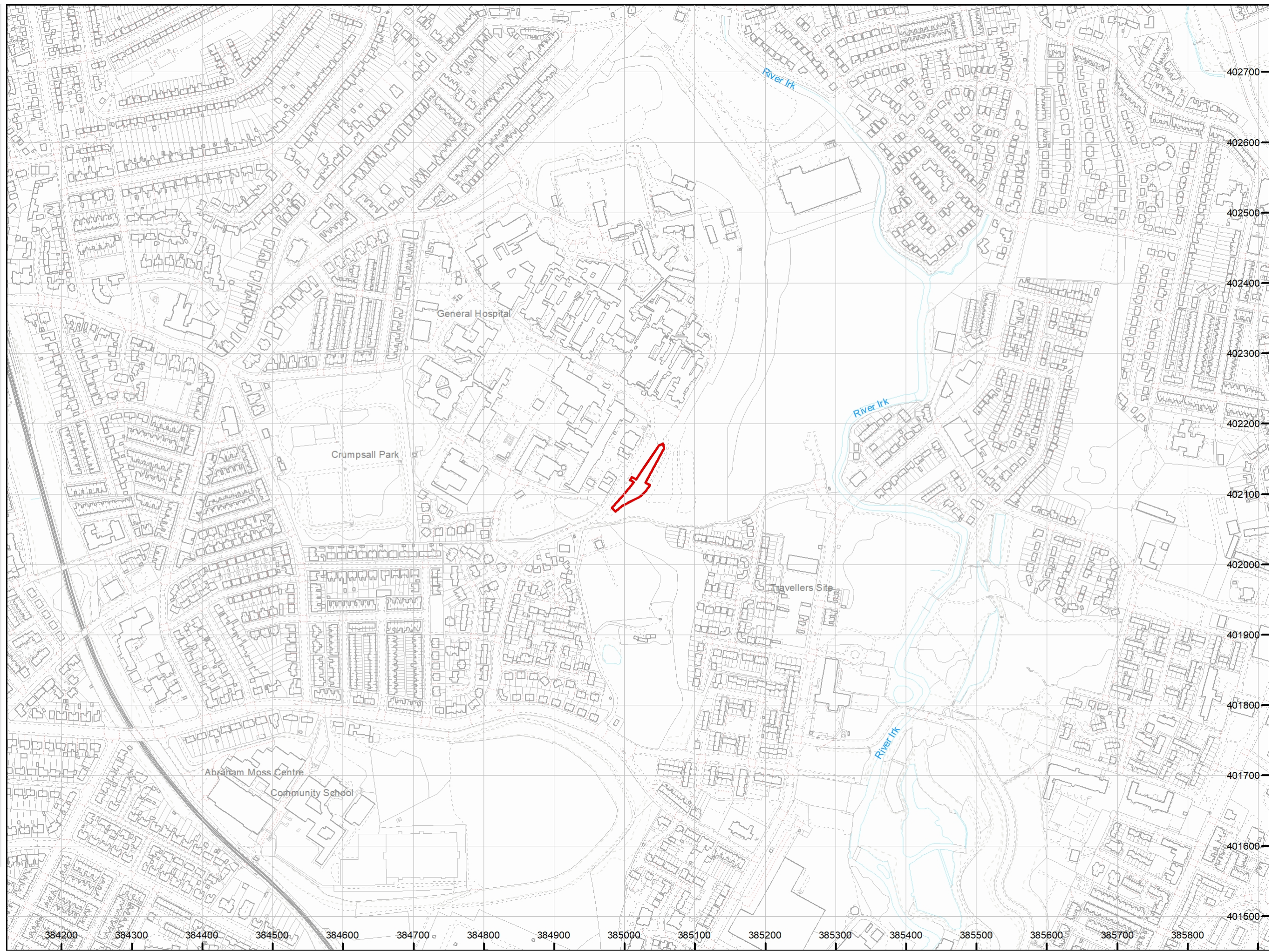


The map highlights any specific surface or subsurface features within or near to the boundary of the site.

Key

Approximate position of the enquiry boundary shown 

How to contact us
0345 762 6848 (UK)
+44 (0)1623 637 000 (International)
www.groundstability.com



Appendix E Exploratory hole location plan, exploratory hole logs and photographs

Exploratory hole location plan

Exploratory hole logs

Hydrock now Stantec							Project: North Manchester General Hospital					Borehole No CP101				
							Page No. 1 of 2									
Method: Cable Percussion							Date(s): 30/10/2024 - 31/10/2024			Logged By: AE		Drilled By: DMW Ltd.				
Client: Manchester University NHS Foundation Trust							Co-ords: 385014.81, 402099.31			Checked By: JB		Flush:				
Hydrock Project No: 32425							Ground Level: 77.68m OD					Scale: 1:50				
Samples / Tests			Water-Strikes	Stratum Description	Depth m bgl	Thickness (m)	Level m OD	Legend	Instrumentation	Backfill						
Depth (m)	Type	Results														
0.30	ES			Dark grey ASPHALT. (MADE GROUND)	0.08	(0.08)	77.60									
0.50 - 1.00	B			Medium dense brown clayey slightly sandy very angular to subangular fine to coarse GRAVEL of brick, concrete, mudstone and limestone with fragments of metal and wood. Hydrocarbon odour. (MADE GROUND)		(0.92)										
1.20	SPT	N=13 (1,1,1,2,4,6)		Firm to stiff brown sandy slightly gravelly CLAY. Gravel is very angular to subangular fine to coarse of brick, mudstone and lignite. (MADE GROUND)	1.00		76.68									
1.20	B					(1.20)										
1.20 - 1.65	B															
1.20 - 1.65	D															
2.00	SPT	N=7 (2,2,2,1,2,2)		Firm to stiff brown sandy CLAY. (GLACIOFLUVIAL SHEET DEPOSITS)	2.20		75.48									
2.00	D					(1.10)										
2.00 - 2.45	D															
2.00 - 2.50	B															
3.00	SPT	N=13 (1,2,2,3,3,5)		Medium dense orange brown fine to coarse SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	3.30		74.38									
3.00	B															
3.00 - 3.45	D															
3.00 - 3.50	B															
4.00	SPT	N=27 (3,4,5,7,7,8)		Medium dense brown silty fine to coarse SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	4.00											
4.00	B					(2.20)										
4.00 - 4.50	B															
5.00	SPT	N=17 (3,3,3,4,5,5)		Medium dense brown silty fine to coarse SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	5.50		72.18									
5.00 - 5.50	B															
6.00	SPT	N=17 (2,3,3,4,4,6)		Medium dense brown fine to medium SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	7.50		70.18									
6.00 - 6.50	B					(2.00)										
7.50	SPT	N=15 (1,3,3,4,3,5)		Medium dense brown silty fine to medium SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	9.80		67.88									
7.50 - 8.00	B					(2.30)										
9.00	SPT	N=17 (2,2,3,5,4,5)														
9.00 - 9.50	B															
Progress and Observations				Chiselling			General Remarks:									
Rig	Date	Time	Borehole Depth (m)	Casing Depth (m)	Casing Diam.(mm)	Water Depth (m)	Flush Type	Returns (colour)	From (m)	To (m)	Duration (HH:MM)	1. Hand dug inspection pit to 1.2m bgl. 2. Cable percussive drilling to 15m bgl. 3. Terminated at target depth. 4. installed with monitoring well to 10m bgl. 5. No groundwater encountered.				

Logged in general accordance with BS5930:2015

Hydrock now Stantec							Project: North Manchester General Hospital					Borehole No CP101				
							Page No. 2 of 2									
Method: Cable Percussion							Date(s): 30/10/2024 - 31/10/2024			Logged By: AE		Drilled By: DMW Ltd.				
Client: Manchester University NHS Foundation Trust							Co-ords: 385014.81, 402099.31			Checked By: JB		Flush:				
Hydrock Project No: 32425							Ground Level: 77.68m OD					Scale: 1:50				
Samples / Tests						Water-Strikes	Stratum Description				Depth m bgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill	
Depth (m)	Type	Results														
10.00	SPT	N=11 (1,2,2,2,3,4)		Medium dense brown silty fine to medium SAND. (GLACIOFLUVIAL SHEET DEPOSITS)												
10.00 - 10.50	B															
11.00	SPT	N=9 (2,2,2,2,3,2)		... At 11m bgl: Becoming loose.				11		(2.20)						
12.00	SPT	N=4 (1,2,2,1,0,1)		Very loose brown sandy SILT. (GLACIOFLUVIAL SHEET DEPOSITS)				12	12.00		65.68					
12.00 - 12.50	B												(1.10)			
				Stiff brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine and medium of sandstone, mudstone and lignite. (GLACIAL TILL)				13	13.10		64.58					
13.50	SPT	N=15 (2,2,3,3,4,5)											(1.20)			
13.50 - 13.95	D			Brown fine to medium SAND. (GLACIAL TILL)				14								
13.50 - 14.00	B												14.30		63.38	
				Very stiff brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine and medium of sandstone, mudstone and lignite. (GLACIAL TILL)				15								
15.00	SPT	N=26 (2,2,3,7,8,8)											15.30		62.38	
				End of Borehole at 15.30m				16								
								17								
								18								
								19								
								20								
Progress and Observations										Chiselling			General Remarks: 1. Hand dug inspection pit to 1.2m bgl. 2. Cable percussive drilling to 15m bgl. 3. Terminated at target depth. 4. installed with monitoring well to 10m bgl. 5. No groundwater encountered.			
Rig	Date	Time	Borehole Depth (m)	Casing Depth (m)	Casing Diam.(mm)	Water Depth (m)	Flush Type	Returns (colour)	From (m)	To (m)	Duration (HH:MM)					

Logged in general accordance with BS5930:2015

Hydrock now Stantec		Project: North Manchester General Hospital				Borehole No CP102						
						Page No. 1 of 1						
Method: Cable Percussion		Date(s): 31/10/2024		Logged By: AE		Drilled By: DMW Ltd.						
Client: Manchester University NHS Foundation Trust		Co-ords: 385038.24, 402092.32		Checked By: JB								
Hydrock Project No: 32425		Ground Level: 71.16m OD				Scale: 1:50						
Samples / Tests			Water-Strikes	Stratum Description	Depth m bgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill			
Depth (m)	Type	Results										
0.50 - 1.00	B			Dark grey ASPHALT. (MADE GROUND) Very loose brown clayey slightly sandy very angular to subangular fine to coarse GRAVEL of brick, concrete, mudstone and limestone with fragments of metal and wood. (MADE GROUND)	0.08	(0.08)	71.08					
1.20	SPT	N=2 (1,1,0,0,1,1)			1	(1.72)						
1.20 - 1.65	B				1.80		69.36					
2.00	SPT	N=16 (2,3,5,5,3,3)		Medium dense brown fine to coarse SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	2	(1.00)						
2.00 - 2.50	B				2.80		68.36					
3.00	SPT	N=9 (1,2,2,2,2,3)		Loose brown silty fine to medium SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	3	(0.80)						
3.00 - 3.45	D				3.60		67.56					
3.00 - 3.50	B											
4.00	SPT	N=5 (1,1,1,1,1,2)		Loose to medium dense brown fine to coarse SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	4							
4.00 - 4.50	B											
5.00	SPT	N=7 (1,1,2,2,1,2)			5							
5.00 - 5.50	B					(3.90)						
6.00	SPT	N=15 (3,2,4,3,4,4)		... At 6m bgl: Becoming medium dense.	6							
6.00 - 6.50	B				7							
7.50	SPT	N=17 (2,3,3,3,5,6)		Very stiff to stiff brown slightly sandy slightly gravelly CLAY. Gravel is angular to subangular fine and medium of sandstone, mudstone and lignite. (GLACIAL TILL)	7.50		63.66					
7.50 - 7.95	D				8							
7.50 - 8.00	B					(2.50)						
9.00	SPT	N=12 (1,2,2,3,3,4)		... At 9m bgl: Becoming stiff.	9							
9.00 - 9.45	D											
9.00 - 9.50	B											
10.00 - 10.45	UT	(24,100%)		End of Borehole at 10.00m	10		61.16					
Progress and Observations									Chiselling		General Remarks: 1. Hand dug inspection pit to 1.2m bgl. 2. Cable percussive drilling to 10m bgl. 3. Terminated at target depth. 4. installed with monitoring well to 7m bgl. 5. No groundwater encountered.	
Rig	Date	Time	Borehole Depth (m)	Casing Depth (m)	Casing Diam.(mm)	Water Depth (m)	Flush Type	Returns (colour)	From (m)	To (m)		Duration (HH:MM)

Logged in general accordance with BS5930:2015

Hydrock now Stantec			Project: North Manchester General Hospital			Borehole No WS101						
						Page No. 1 of 1						
Method: Dynamic (Windowless) Sampler			Date(s): 30/10/2024		Logged By: AE		Drilled By: DMW Ltd.					
Client: Manchester University NHS Foundation Trust			Co-ords: 384994.31, 402087.86		Checked By: JB		Rig: Dart					
Hydrock Project No: 32425			Ground Level: 77.10m OD				Scale: 1:30					
Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth m bgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
1.20 - 2.00	110mm	100%	0.20	ES	N=13 (1,3,3,3,3,4)		Dark grey ASPHALT. (MADE GROUND) Medium dense brown clayey sandy angular to subangular fine to coarse GRAVEL of brick, concrete, slate, mudstone and sandstone. (MADE GROUND)	0.05	(0.05)	77.05		
			0.50 0.50 - 0.90	B B			(1.45)	1				
2.00 - 3.00	110mm	100%	1.20	SPT	N=11 (3,3,4,2,2,3)		Medium dense light brown slightly clayey slightly gravelly SAND. Gravel is angular to subangular fine to coarse of brick, sandstone and siltstone. (MADE GROUND)	1.50		75.60		
			2.00	SPT			(0.70)	2				
3.00 - 4.00	110mm	100%	2.50	ES	N=2 (1,0,0,1,0,1)		Very loose to loose orange brown slightly gravelly SAND with rare bands of clay. Gravel is subangular to subrounded fine to medium of siltstone and sandstone. (GLACIOFLUVIAL SHEET DEPOSITS)	2.20		74.90		
			3.00	SPT			(2.10)	3				
4.00 - 5.00	110mm	100%	4.00	SPT	N=6 (1,0,1,2,1,2)		... At 4m bgl: Loose.	4.30		72.80		
			4.60	D			(0.70)	4				
			5.00	SPT	N=1 (1,0,0,1,0,0)		End of Borehole at 5.00m	5.00		72.10		
General Remarks: 1. Hand dug inspection pit to 1.2m bgl. 2. Windowless sampler drilling to 5m bgl. 3. Terminated at target depth. 4. Installed with monitoring well to 2m bgl. 5. No groundwater encountered.												
Logged in general accordance with BS5930:2015												

 now 			Project: North Manchester General Hospital			Borehole No WS102						
						Page No. 1 of 1						
Method: Dynamic (Windowless) Sampler			Date(s): 30/10/2024		Logged By: AE		Drilled By: DMW Ltd.					
Client: Manchester University NHS Foundation Trust			Co-ords: 385010.82, 402101.09		Checked By: JB		Rig:					
Hydrock Project No: 32425			Ground Level: 77.86m OD				Scale: 1:30					
Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth m bgl	Thickness (m)	Level m OD	Legend	Instrum- entation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
1.20 - 2.00	110mm	100%	0.50	ES B	N=7 (2,3,1,2,2,2)		Dark grey ASPHALT. (MADE GROUND)	0.06	(0.06)	77.80		
			0.50 - 1.00				Brown slightly clayey sandy very angular to subangular fine to coarse GRAVEL of brick, concrete and sandstone with fragments of metal and wood. (MADE GROUND)	0.40	(0.34)	77.46		
2.00 - 3.00	110mm	100%	1.20	SPT	N=7 (1,2,1,2,2,2)		Loose dark brown clayey sandy angular to subangular fine to coarse GRAVEL of brick, slate, sandstone and lignite. occasional angular cobbles of brick. (MADE GROUND)	1.00	(1.00)	76.46		
			1.70	ES			2.00	Loose brown slightly clayey fine to coarse SAND with frequent rootlets. (GLACIOFLUVIAL SHEET DEPOSITS)	2.10	(0.70)		
3.00 - 4.00	110mm	100%	2.50	D	N=15 (3,3,4,3,4,4)		Firm orange brown sandy CLAY. (GLACIOFLUVIAL SHEET DEPOSITS)	2.70	(0.60)	75.16		
			3.00	SPT			3.20	Medium dense orange brown fine to coarse SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	3.20	(0.50)		
4.00 - 5.00	110mm	100%	4.00	SPT	N=17 (3,4,3,4,5,5)		Medium dense yellow brown fine to coarse SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	4.00	(1.80)	72.86		
			5.00	SPT			5.00	End of Borehole at 5.00m	5.00	72.86		
General Remarks: 1. Hand dug inspection pit to 1.2m bgl. 2. Windowless sampler drilling to 5m bgl. 3. Terminated at target depth. 4. Backfilled with arisings upon completion. 5. No groundwater encountered.												

Drilled By: DMW Ltd.

Rig:

Scale: 1:30

General Remarks:
1. Hand dug inspection pit to 1.2m bgl. 2. Windowless sampler drilling to 5m bgl. 3. Terminated at target depth. 4. Backfilled with arisings upon completion. 5. No groundwater encountered.

Method: Dynamic (Windowless) Sampler

Date(s): 30/10/2024

Logged By: AE

Drilled By: DMW Ltd.

Client: Manchester University NHS Foundation Trust

Co-ords: 385027.05, 402131.22

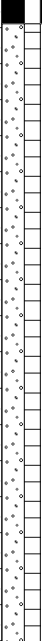
Checked By: JB

Rig:

Hydrock Project No: 32425

Ground Level: 78.29m OD

Scale: 1:30

Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth mbgl	Thickness (m)	Level m OD	Legend	Instrum- entation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
1.20 - 2.00	110mm	100%	0.50	B	N=15 (1,3,3,3,4,5)		Dark grey ASPHALT. (MADE GROUND)	0.07	(0.07)	78.22		
			0.50 - 1.00	ES B			Light brown sandy subangular to rounded fine to coarse GRAVEL of mudstone and limestone. (MADE GROUND)	0.15	(0.08)	78.14		
			1.00	D			Medium dense dark grey gravelly clayey SAND. Gravel is angular to subrounded fine to coarse of brick, mudstone, limestone and lignite with fragments of metal and wood. organic odour. (MADE GROUND)	1	(1.25)	76.89		
			1.20	SPT								
2.00 - 3.00	110mm	100%	1.80	ES	N=17 (3,3,4,4,4,5)		Medium dense orange brown fine to coarse SAND. (GLACIOFLUVIAL SHEET DEPOSITS)	2				
			2.00 - 3.00	SPT B								
3.00 - 4.00	110mm	100%	3.00	SPT	N=13 (2,1,3,3,4,3)			3	(3.60)			
4.00 - 5.00	110mm	100%	4.00	SPT	N=15 (2,3,3,4,4,4)			4				
			5.00	SPT	N=12 (1,3,3,3,3,3)		End of Borehole at 5.00m	5		73.29		
								6				

General Remarks:

1. Hand dug inspection pit to 1.2m bgl. 2. Windowless sampler drilling to 5m bgl. 3. Terminated at target depth. 4. Installed with monitoring well to 4m bgl. 5. No groundwater encountered.

Hydrock now Stantec			Project: North Manchester General Hospital			Borehole No WS105						
						Page No. 1 of 1						
Method: Dynamic (Windowless) Sampler			Date(s): 30/10/2024			Logged By: AE						
Client: Manchester University NHS Foundation Trust			Co-ords: 385045.87, 402158.57			Checked By: JB						
Hydrock Project No: 32425			Ground Level: 77.66m OD			Scale: 1:30						
Sample Run Info			Testing			Water-Strikes	Stratum Description	Depth m bgl	Thickness (m)	Level m OD	Legend	Instrumentation / Backfill
Sample Run	Run Ø	Recovery	Depth (m)	Type	Results							
1.20 - 2.00	110mm	100%	0.30	ES	N=25 (2,4,3,3,10,9)		Dark grey ASPHALT. (MADE GROUND)	0.08	(0.08)	77.58		
			0.60 0.70 - 0.90	ES B			Dark brown clayey sandy very angular to subangular fine to coarse GRAVEL of brick, concrete and limestone. (MADE GROUND)	0.45	(0.37)	77.21		
2.00 - 3.00	110mm	100%	1.20	SPT	N=2 (1,2,1,0,0,1)		Medium dense brown clayey slightly sandy very angular to subangular fine to coarse GRAVEL of brick, mudstone and sandstone. occasional angular cobbles of brick. (MADE GROUND)	1.70	(1.25)	75.96		
			2.20	ES			Very loose dark brown slightly clayey gravelly SAND with frequent rootlets. Gravel is angular to subangular fine and medium of mudstone, sandstone and coal. (MADE GROUND)	2.60	(0.90)	75.06		
3.00 - 4.00	110mm	100%	3.00	SPT	N=7 (1,0,1,1,2,3)		Loose to medium dense orange brown fine to medium SAND with occasional rootlets. (GLACIOFLUVIAL SHEET DEPOSITS)	3				
4.00 - 5.00	110mm	100%	4.00	SPT	N=24 (4,3,5,6,6,7)		... Between 3.0 and 3.3m bgl: Occasional subangular to subrounded fine to medium gravels of sandstone and siltstone.	4	(2.40)			
			5.00	SPT	N=16 (2,3,3,3,4,6)	... Below 4m bgl: Becoming medium dense.	5.00		72.66			
End of Borehole at 5.00m												
General Remarks: 1. Hand dug inspection pit to 1.2m bgl. 2. Windowless sampler drilling to 5m bgl. 3. Terminated at target depth. 4. Installed with monitoring well to 2.5m bgl. 5. No groundwater encountered.												
Logged in general accordance with BS5930:2015												

Exploratory hole photographs

Photograph 1 Date: 30/10/2024 Direction Photograph Taken: N/A Easting: 385045 Northing: 402158 Description: Surface hardstanding core at WS105.	
Photograph 2 Date: 31/10/24 Direction Photograph Taken: N/A Easting: 385045 Northing: 402158 Description: Arisings from WS105 1.2m – 5m.	

Photograph 3	
Date: 30/10/24	
Direction Photograph Taken: N/A	
Easting: 385027	
Northing: 402131	
Description: Surface hardstanding core at WS104.	
Photograph 4	
Date: 30/10/24	
Direction Photograph Taken: N/A	
Easting: 385027	
Northing: 402131	
Description: WS104 hand dug inspection pit arisings.	

Photograph 5	
Date: 31/10/24	
Direction Photograph Taken: N/A	
Easting: 385027	
Northing: 402131	
Description: Arisings from WS104 1.2m – 5m.	

Photograph 6	
Date: 30/10/24	
Direction Photograph Taken: N/A	
Easting: 385025	
Northing: 402112	
Description: Surface hardstanding core at WS103.	

Photograph 7	
Date: 30/10/24	
Direction Photograph Taken: N/A	
Easting: 385025	
Northing: 402112	
Description: WS103 hand dug inspection pit arising.	
Photograph 8	
Date: 31/10/24	
Direction Photograph Taken: N/A	
Easting: 385025	
Northing: 402112	
Description: Arising from WS103 1.2m – 5m.	

Photograph 9	
Date: 31/10/24	
Direction Photograph Taken: N/A	
Easting: 385010	
Northing: 402101	
Description: Arisings from WS102 1.2m – 5m.	

Photograph 10	
Date: 31/10/24	
Direction Photograph Taken: N/A	
Easting: 385010	
Northing: 402101	
Description: Arisings from WS102 - Glaciofluvial Sheet Deposits at 2.5m.	

Photograph 11	
Date: 30/10/24	
Direction Photograph Taken: N/A	
Easting: 384994	
Northing: 402087	
Description: Broken out surface hardstanding at WS101.	
Photograph 12	
Date: 31/10/24	
Direction Photograph Taken: N/A	
Easting: 384994	
Northing: 402087	
Description: Arisings from WS101 1.2m – 5m.	

Photograph 13	
Date: 31/10/24	
Direction Photograph Taken: N/A	
Easting: 385010	
Northing: 402101	
Description: WS102 surface reinstatement.	
Photograph 14	
Date: 31/10/24	
Direction Photograph Taken: N/A	
Easting: 385027	
Northing: 402131	
Description: Headworks of WS104 installation.	

Appendix F Geotechnical test results and geotechnical plots

Geotechnical laboratory test results



TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022,
cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022,
cl 5.3, 6

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

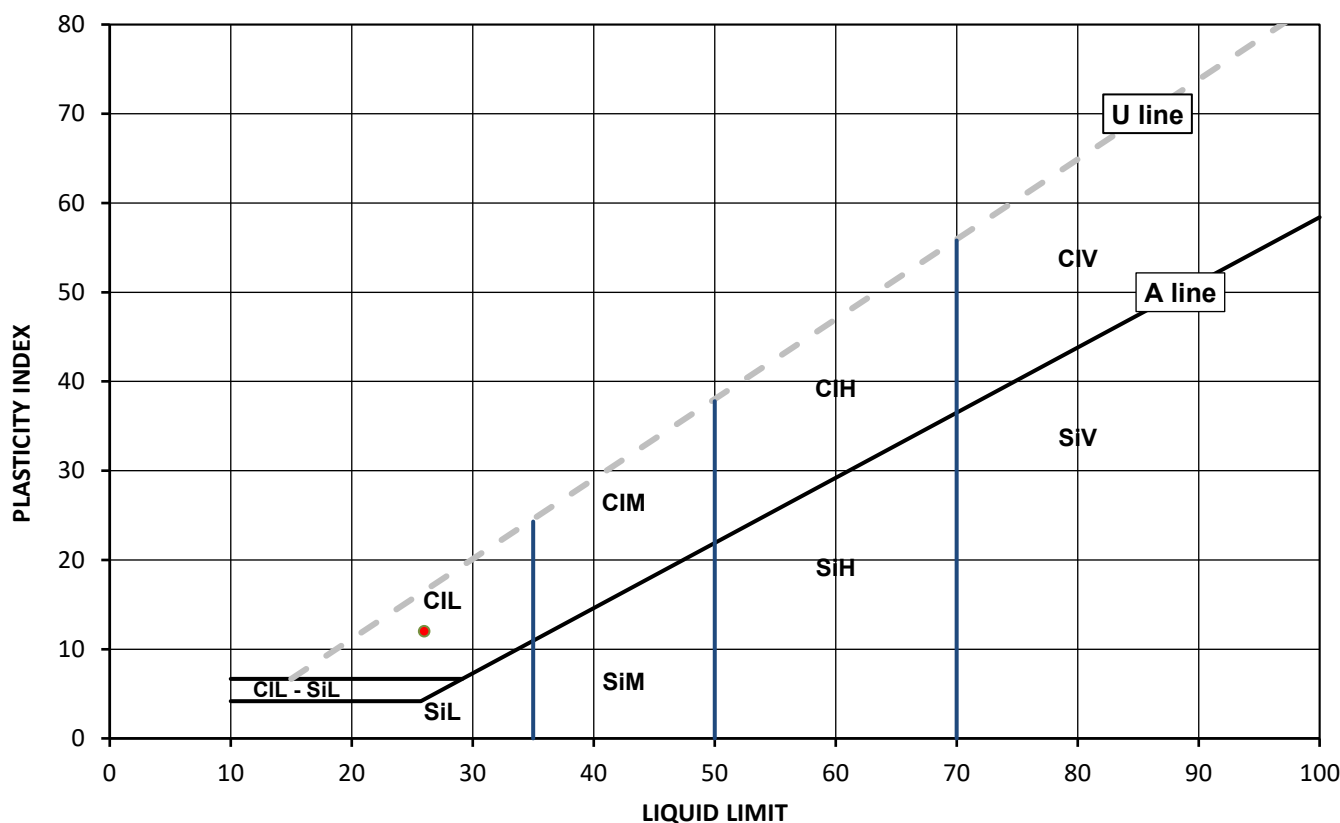
Test Results:

Laboratory Reference: 372560
Hole No.: CP101
Sample Reference: Not Given
Sample Description: Brown slightly gravelly very sandy CLAY

Depth Top [m]: 2.00
Depth Base [m]: Not Given
Sample Type: D

Sample Preparation: Tested after washing to remove >0.425 mm;
Cone Type: 80g/30deg

As Received Water Content [W] %	Corrected Liquid Limit [WL] %	Correlation Factor	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity index [IL] % #	Consistency index [IC] % #	% Passing 425µm BS Test Sieve
17.6	26	1.015	14	12	0.33	0.67	92



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	below 35
Si	Silt	35 to 50
	L Low	50 to 70
	M Medium	exceeding 70
	H High	append to classification for organic material (eg ClHO)
	V Very high	
	O Organic	

Note: Water Content by BS EN 17892-1:2014+A1:2022, BS 1377-2:2022; Correlation Factor by Clayton C.R.I and Jukes A.W (1978); # Non accredited

Remarks: Not enough the material to carry out 4 Point Atterberg test/A 1-point test was performed.

Signed:

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation. This report may not be reproduced other than in full without the prior written approval of the issuing laboratory. The results included within the report relate only to the sample(s) submitted for testing.



TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022,
cl 5.3 and 5.5, Fall Cone Method, 4 Pt Test, BS 1377-2:2022,
cl 5.2 and 6

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

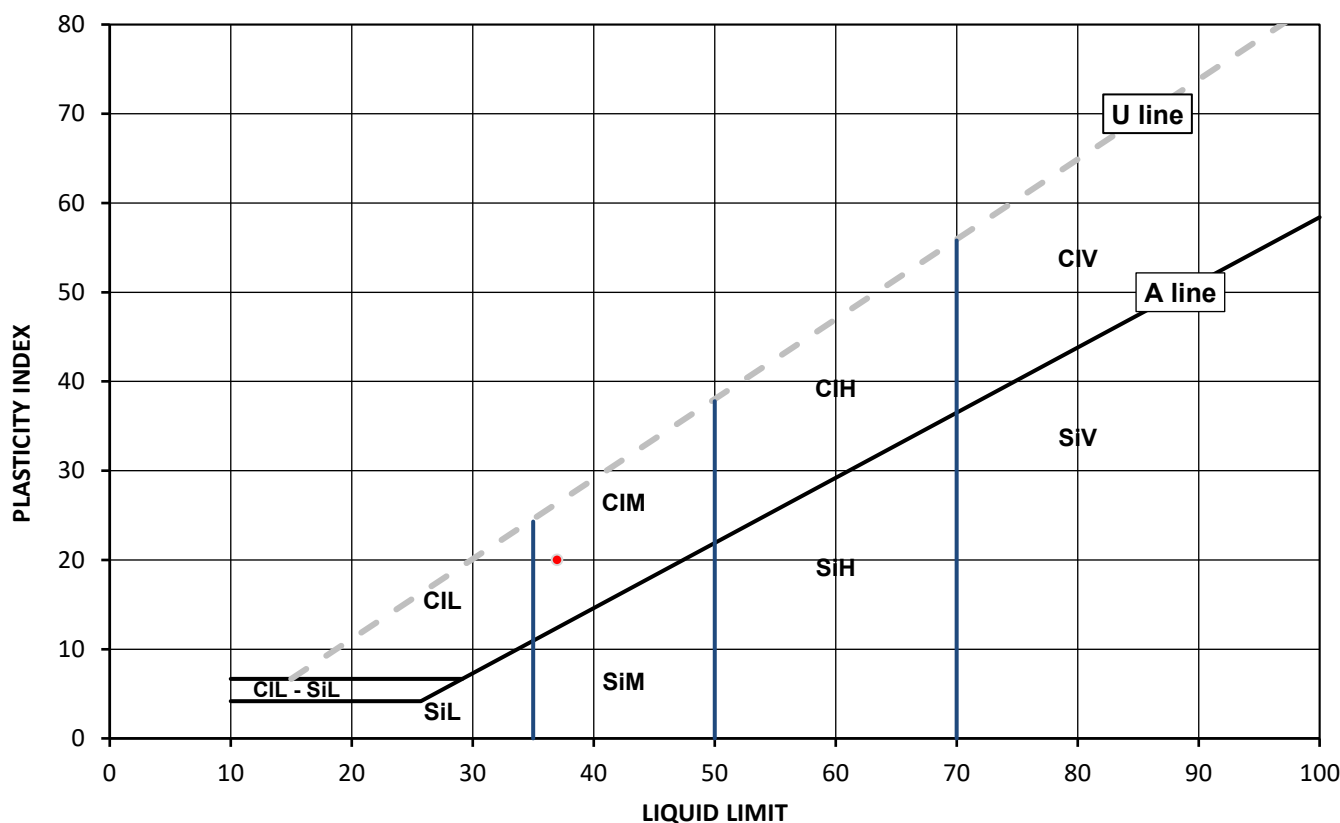
Test Results:

Laboratory Reference: 372557
Hole No.: CP101
Sample Reference: Not Given
Sample Description: Grey slightly gravelly slightly sandy CLAY

Depth Top [m]: 1.20
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested after washing to remove >0.425mm; The water content in the sample was increased
Cone Type: 80g/30deg

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity Index [IL] % #	Consistency Index [IC] % #	% Passing 425µm BS Test Sieve
21.5	37	17	20	0.25	0.75	85



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	L Low below 35
Si	Silt	M Medium 35 to 50
		H High 50 to 70
		V Very high exceeding 70
	O Organic	append to classification for organic material (eg CIHO)

Note: Water Content by BS EN ISO 17892-1:2014+A1:2022, BS 1377-2:2022; # Non accredited

Remarks:

Signed:

Katarzyna Koziel

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS

Tested in Accordance with: BS EN ISO 17892-12:2018+A2:2022,
cl 5.3 and 5.5, Fall Cone Method, 4 Pt Test, BS 1377-2:2022,
cl 5.2 and 6

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

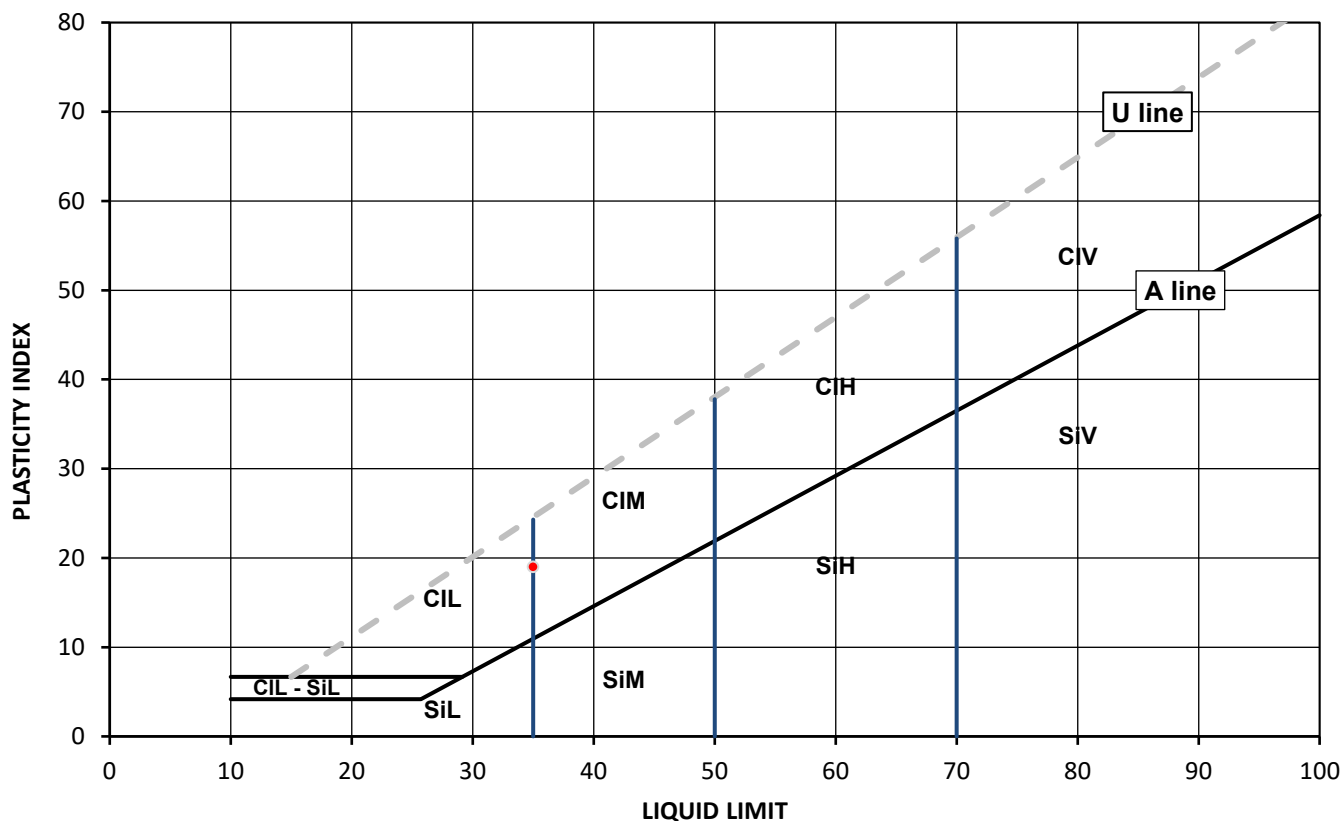
Test Results:

Laboratory Reference: 372558
Hole No.: CP101
Sample Reference: Not Given
Sample Description: Orangish brown slightly gravelly very sandy CLAY

Depth Top [m]: 3.00
Depth Base [m]: Not Given
Sample Type: B

Sample Preparation: Tested after washing to remove >0.425mm; The water content in the sample was increased
Cone Type: 80g/30deg

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	Liquidity Index [IL] % #	Consistency Index [IC] % #	% Passing 425µm BS Test Sieve
13.4	35	16	19	-0.16	1.16	94



Legend, based on BS EN ISO 14688 2:2018 Geotechnical investigation and testing – Identification and classification of soil

	Plasticity	Liquid Limit
Cl	Clay	below 35
Si	Silt	35 to 50
	L	Low
	M	Medium
	H	High
	V	Very high
	O	Organic
		append to classification for organic material (eg ClHO)

Note: Water Content by BS EN ISO 17892-1:2014+A1:2022, BS 1377-2:2022; # Non accredited

Remarks:

Signed:

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

Tested in Accordance with:

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: Hydrock Consultants Ltd

Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY

Contact: Jason Bradley

Site Address: North Manchester General Hospital

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

BS EN ISO 17892-12:2018+A2:2022, cl 5.3.14, 5.5, Fall Cone Method, 1 Pt Test, BS 1377-2:2022, cl 5.3, 6. BS EN ISO 17892-12:2018+A2:2022 cl 5.3 and 5.5, Fall Cone Method, 4 Pt Test, BS 1377-2:2022, cl 5.2 and 6. Correlation Factor by Clayton C.R.I and Jukes A.W (1978). W by BS EN ISO 17892-1:2014+A1:2022.

Client Reference: 23267

Job Number: 24-052539-1

Date Sampled: Not Given

Date Received: 01/11/2024

Date Tested: 15/11/2024

Sampled By: Client - AE

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	W	Liquid & Plastic Limit								Density		
		Reference	Depth Top	Depth Base	Type				% Passing 425um	WL*	Correlation Factor	Wp	Ip	Cone type	Sample Preparation	bulk	dry	PD	
			m	m					%	%		%	%			Mg/m3	Mg/m3	Mg/m3	
372557	CP101	Not Given	1.20	Not Given	B	Grey slightly gravelly slightly sandy CLAY	Atterberg 4 Point	21.5	85	37	-	17	20	80g/30 deg	WR / I				
372558	CP101	Not Given	3.00	Not Given	B	Orangish brown slightly gravelly very sandy CLAY	Atterberg 4 Point	13.4	94	35	-	16	19	80g/30 deg	WR / I				
372560	CP101	Not Given	2.00	Not Given	D	Brown slightly gravelly very sandy CLAY	Atterberg 1 Point	17.6	92	26	1.015	14	12	80g/30 deg	WR				
372561	CP102	Not Given	2.00	Not Given	B	Brown very sandy CLAY		20.4											
372562	CP102	Not Given	4.00	Not Given	B	Brown sandy CLAY		23.8											
372564	WS101	Not Given	0.50	Not Given	B	Dark brown slightly gravelly slightly sandy CLAY with fragments of bricks		19.0											
372566	WS104	Not Given	0.50	Not Given	B	Dark brown slightly gravelly CLAY		25.6											

Note: # Non accredited; NP - Non plastic; N - Tested in natural condition, R - Tested after >0.425mm removed by hand, WR - Tested after washing to remove >425mm; I - The water content in the sample was increased, D - The water content in the sample was decreased; * - One point liquid limit corrected as per the report Correlation Factor by Clayton C.R.I and Jukes A.W (1978)

Comments:

Signed:

Katarzyna Koziel

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS EN ISO 17892-1:2014+A1:2022, BS 1377-2: 2022, clause 4.1

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041
Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY

Contact: Jason Bradley
Site Address: North Manchester General Hospital

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC											
		Reference	Depth Top m	Depth Base m	Type														
372557	CP101	Not Given	1.20	Not Given	B	Grey slightly gravelly slightly sandy CLAY		21.5											
372558	CP101	Not Given	3.00	Not Given	B	Orangish brown slightly gravelly very sandy CLAY		13.4											
372560	CP101	Not Given	2.00	Not Given	D	Brown slightly gravelly very sandy CLAY		17.6											
372561	CP102	Not Given	2.00	Not Given	B	Brown very sandy CLAY		20.4											
372562	CP102	Not Given	4.00	Not Given	B	Brown sandy CLAY		23.8											
372564	WS101	Not Given	0.50	Not Given	B	Dark brown slightly gravelly slightly sandy CLAY with fragments of bricks		19.0											
372566	WS104	Not Given	0.50	Not Given	B	Dark brown slightly gravelly CLAY		25.6											

Comments:

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Signed:

Katarzyna Koziel

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd



4041

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS EN ISO 17892-4:2016,
BS 1377-2:2022 cl. 10

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

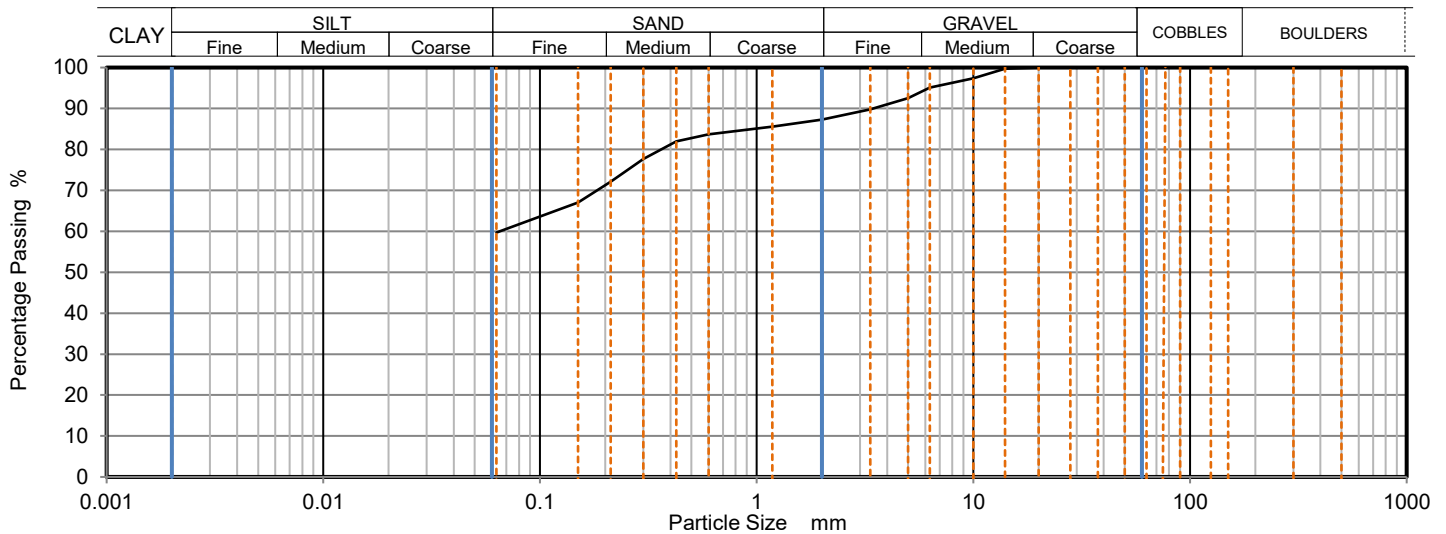
Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 372557
Hole No.: CP101
Sample Reference: Not Given
Sample Description: Grey slightly gravelly slightly sandy CLAY
Sample Preparation: Sample was quartered, oven dried at 108.8 °C and broken down by hand.

Depth Top [m]: 1.20
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	97		
6.3	95		
5	93		
3.35	90		
2	87		
1.18	86		
0.6	84		
0.425	82		
0.3	78		
0.212	72		
0.15	67		
0.063	60		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	13.00
Sand	27.00
Fines <0.063 mm	60.00

Grading Analysis	
D100	mm 20
D60	mm 0.0654
D30	mm
D10	mm
Uniformity Coefficient	1
Curvature Coefficient	

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks:

Signed:

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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4041

**TEST CERTIFICATE****DETERMINATION OF PARTICLE
SIZE DISTRIBUTION**Tested in Accordance with: BS EN ISO 17892-4:2016,
BS 1377-2:2022 cl. 10i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Environmental Science

Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

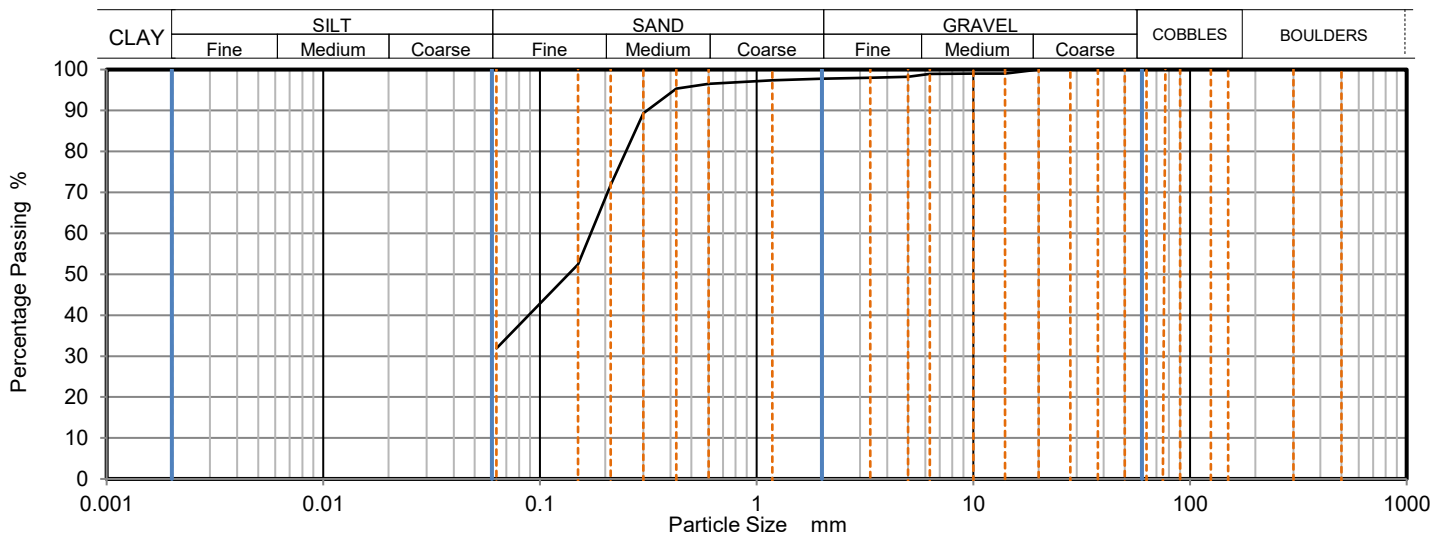
Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 372558
Hole No.: CP101
Sample Reference: Not Given
Sample Description: Orangish brown slightly gravelly very sandy CLAY
Sample Preparation: Sample was quartered, oven dried at 108.8 °C and broken down by hand.

Depth Top [m]: 3.00
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	99		
10	99		
6.3	99		
5	98		
3.35	98		
2	98		
1.18	97		
0.6	97		
0.425	95		
0.3	89		
0.212	72		
0.15	52		
0.063	32		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	2.00
Sand	66.00
Fines <0.063 mm	32.00

Grading Analysis	
D100	mm 20
D60	mm 0.172
D30	mm
D10	mm
Uniformity Coefficient	2.7
Curvature Coefficient	

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks:**Signed:**

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

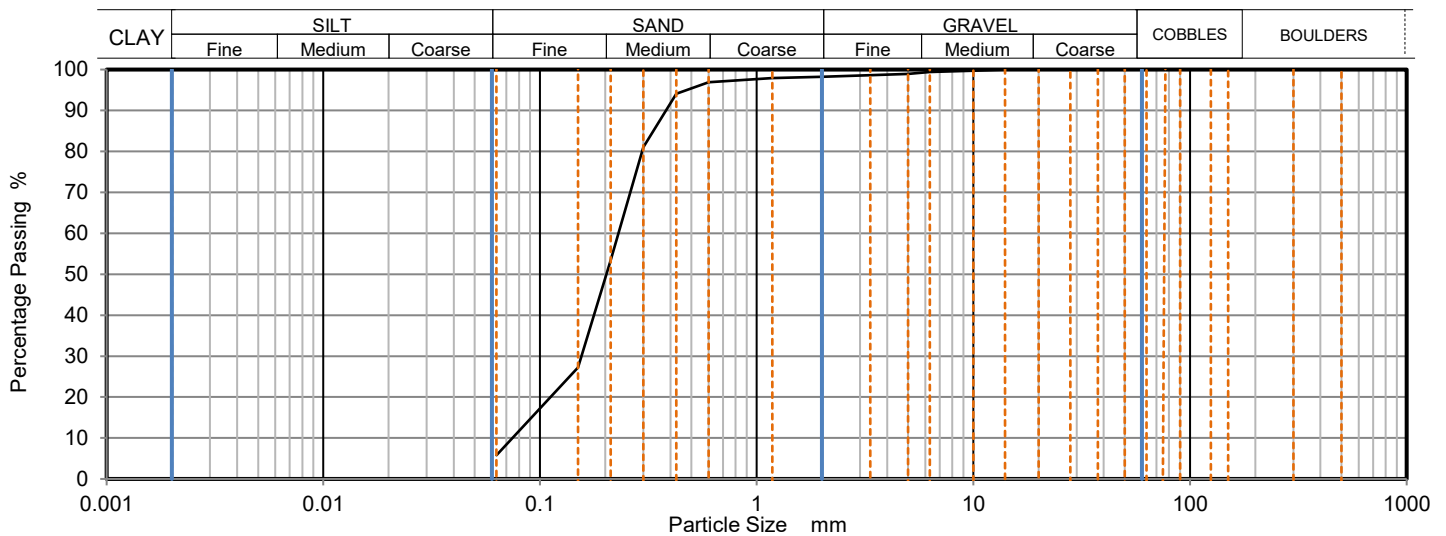
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4041

**TEST CERTIFICATE****DETERMINATION OF PARTICLE
SIZE DISTRIBUTION**Tested in Accordance with: BS EN ISO 17892-4:2016,
BS 1377-2:2022 cl. 10i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EBClient: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General HospitalClient Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:Laboratory Reference: 372559
Hole No.: CP101
Sample Reference: Not Given
Sample Description: Brown clayey SAND
Sample Preparation: Sample was quartered, oven dried at 108.8 °C and broken down by hand.Depth Top [m]: 4.00
Depth Base [m]: Not Given
Sample Type: B

Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	99		
5	99		
3.35	99		
2	98		
1.18	98		
0.6	97		
0.425	94		
0.3	81		
0.212	53		
0.15	27		
0.063	6		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	2.00
Sand	92.00
Fines <0.063 mm	6.00

Grading Analysis	
D100	mm 14
D60	mm 0.23
D30	mm 0.156
D10	mm 0.0748
Uniformity Coefficient	3.1
Curvature Coefficient	1.4

Uniformity and Curvature Coefficient calculated in accordance
with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks:

Signed:

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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4041

**TEST CERTIFICATE****DETERMINATION OF PARTICLE
SIZE DISTRIBUTION**Tested in Accordance with: BS EN ISO 17892-4:2016,
BS 1377-2:2022 cl. 10i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

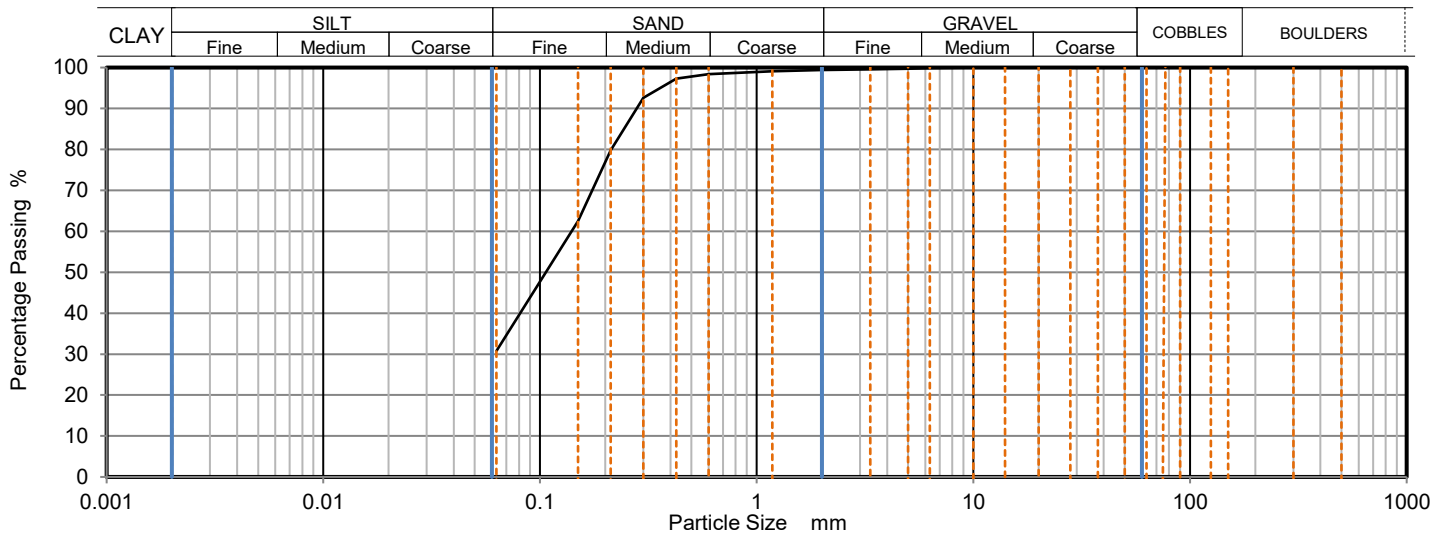
Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 372561
Hole No.: CP102
Sample Reference: Not Given
Sample Description: Brown very sandy CLAY
Sample Preparation: Sample was quartered, oven dried at 108.8 °C and broken down by hand.

Depth Top [m]: 2.00
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	99		
1.18	99		
0.6	98		
0.425	97		
0.3	93		
0.212	80		
0.15	63		
0.063	31		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	1.00
Sand	68.00
Fines <0.063 mm	31.00

Grading Analysis	
D100	mm 10
D60	mm 0.14
D30	mm
D10	mm
Uniformity Coefficient	2.2
Curvature Coefficient	

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks:

Signed:

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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4041

**TEST CERTIFICATE****DETERMINATION OF PARTICLE
SIZE DISTRIBUTION**Tested in Accordance with: BS EN ISO 17892-4:2016,
BS 1377-2:2022 cl. 10i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

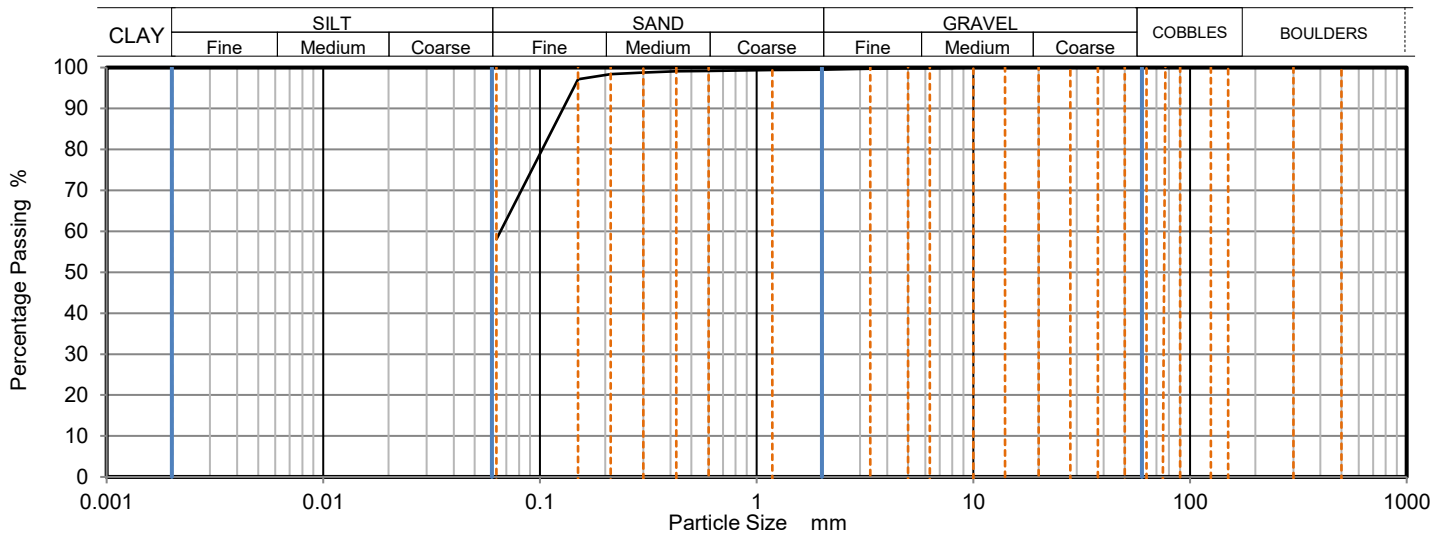
Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 372562
Hole No.: CP102
Sample Reference: Not Given
Sample Description: Brown sandy CLAY
Sample Preparation: Sample was quartered, oven dried at 108.8 °C and broken down by hand.

Depth Top [m]: 4.00
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	99		
0.6	99		
0.425	99		
0.3	99		
0.212	98		
0.15	97		
0.063	58		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.00
Sand	42.00
Fines <0.063 mm	58.00

Grading Analysis	
D100	mm
D60	mm
D30	mm
D10	mm
Uniformity Coefficient	1
Curvature Coefficient	

Uniformity and Curvature Coefficient calculated in accordance
with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks:

Signed:

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS EN ISO 17892-4:2016,
BS 1377-2:2022 cl. 10

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

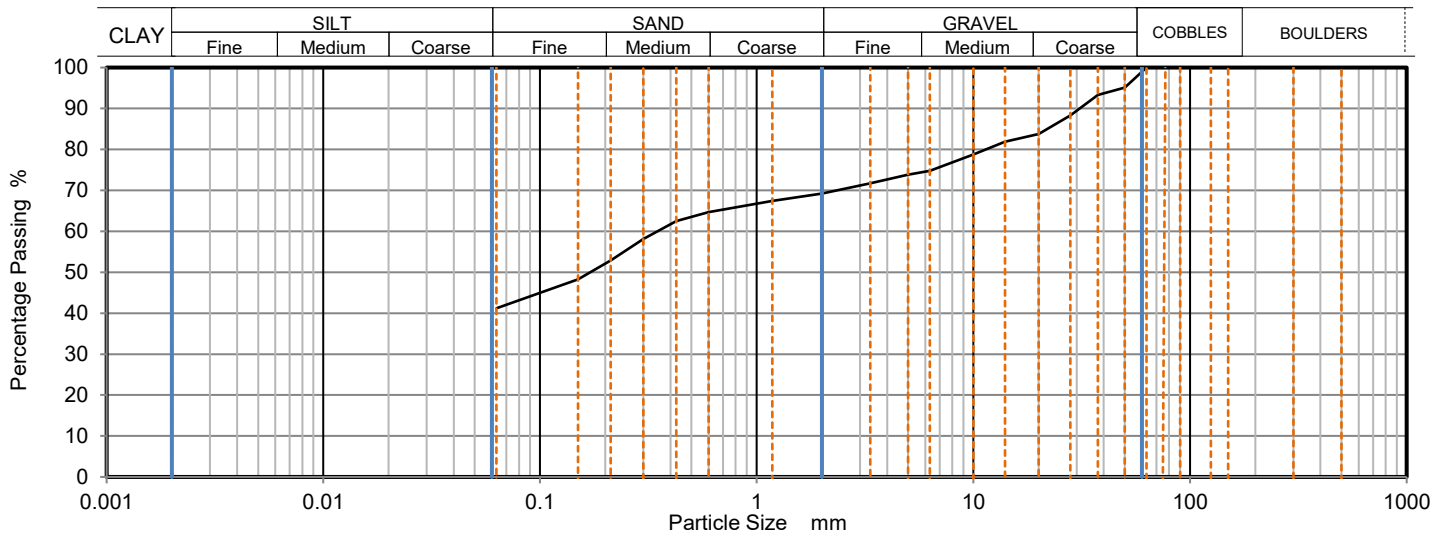
Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 372564
Hole No.: WS101
Sample Reference: Not Given
Sample Description: Dark brown slightly gravelly slightly sandy CLAY with fragments of bricks
Sample Preparation: Sample was whole tested, oven dried at 108.8 °C and broken down by hand.

Depth Top [m]: 0.50
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	95		
37.5	93		
28	88		
20	84		
14	82		
10	79		
6.3	75		
5	74		
3.35	72		
2	69		
1.18	67		
0.6	65		
0.425	63		
0.3	58		
0.212	53		
0.15	48		
0.063	41		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	31.00
Sand	28.00
Fines <0.063 mm	41.00

Grading Analysis		
D100	mm	63
D60	mm	0.349
D30	mm	
D10	mm	
Uniformity Coefficient		5.5
Curvature Coefficient		

Uniformity and Curvature Coefficient calculated in accordance with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks:

Signed:

Katarzyna Koziel

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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4041

**TEST CERTIFICATE****DETERMINATION OF PARTICLE
SIZE DISTRIBUTION**Tested in Accordance with: BS EN ISO 17892-4:2016,
BS 1377-2:2022 cl. 10i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB

Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

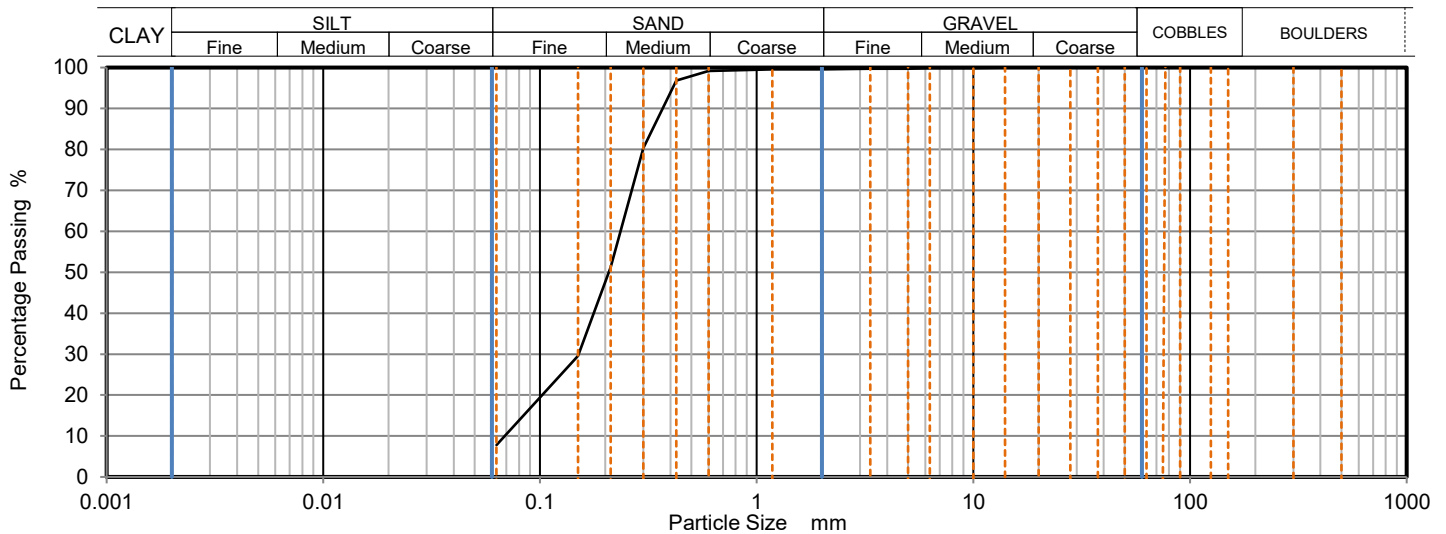
Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 15/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 372565
Hole No.: WS103
Sample Reference: Not Given
Sample Description: Brown clayey SAND
Sample Preparation: Sample was quartered, oven dried at 107.7 °C and broken down by hand.

Depth Top [m]: 2.00
Depth Base [m]: Not Given
Sample Type: B



Sieving		Sedimentation	
Particle Size mm	% Passing	Particle Size mm	% Passing
500	100		
300	100		
150	100		
125	100		
90	100		
75	100		
63	100		
50	100		
37.5	100		
28	100		
20	100		
14	100		
10	100		
6.3	100		
5	100		
3.35	100		
2	100		
1.18	100		
0.6	99		
0.425	97		
0.3	80		
0.212	51		
0.15	30		
0.063	8		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	0.00
Sand	92.00
Fines <0.063 mm	8.00

Grading Analysis		
D100	mm	14
D60	mm	0.235
D30	mm	0.151
D10	mm	0.0687
Uniformity Coefficient		3.4
Curvature Coefficient		1.4

Uniformity and Curvature Coefficient calculated in accordance
with BS EN ISO 14688-2:2018

Note: Tested in Accordance with ISO 17892 -4, by sieving on as received or wet sample

Remarks:

Signed:

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

UNCONSOLIDATED UNDRAINED TRIAXIAL TEST

Tested in Accordance with: BS EN ISO 17982-8:2018,
BS 1377-2 Cl. 28:2022

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Environmental Science

4041

Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 18/11/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

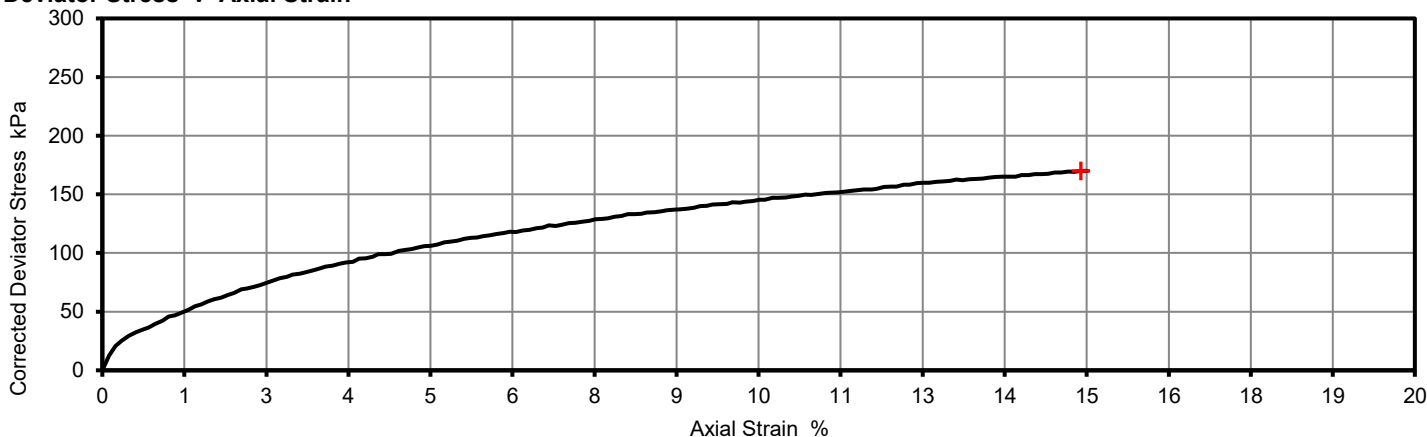
Laboratory Reference: 372563
Hole No.: CP102
Sample Reference: Not Given
Sample Description: Brown slightly gravelly CLAY
Sample Preparation: Sample prepared in accordance with BS EN ISO 17892-8: 2018 Clause 6.2.

Depth Top [m]: 10.00
Depth Base [m]: Not Given
Sample Type: U

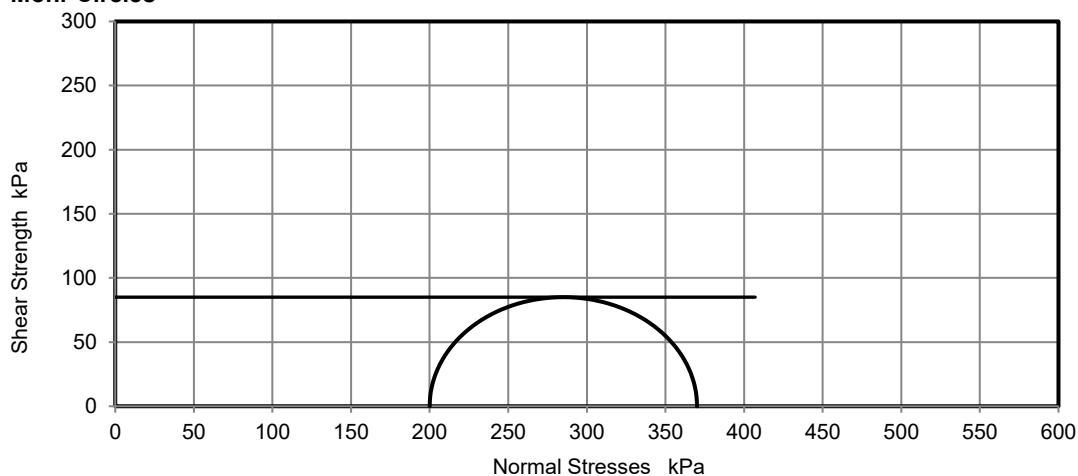
Test Number	1
Depth within Sample	- m
Length	138.85 mm
Diameter	70.00 mm
Length Prior to Shearing	138.84 mm
Bulk Density	2.18 Mg/m3
Initial Water Content	15.9 %
Final Water Content	16.2 %
Dry Density	1.88 Mg/m3

Rate of Strain	2.00 %/min
Cell Pressure	200 kPa
Axial Strain at Failure	14.9 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	170 kPa
Undrained Shear Strength, cu	85 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)$ f
Mode of Failure	Compound
Membrane Thickness	0.26 mm
Membrane Correction	3.20 kPa

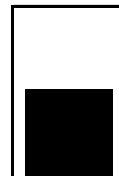
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects.

Remarks:

Signed:

Katarzyna Koziel

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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4041

TEST CERTIFICATE

DIRECT SHEAR TEST USING THE SHEARBOX
Tested in Accordance with: BS EN ISO 17892-10:2018,
BS 1377-2 Cl. 25.2:2022

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 06/12/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 372567
Hole No.: COMBINE
Sample Reference: CP101 at 4m + 5m + 6m
Sample Description: Brown gravelly SAND

Depth Top [m]: 4.00
Depth Base [m]: 6.00
Sample Type: B

Preparation Details Sample prepared from loose material

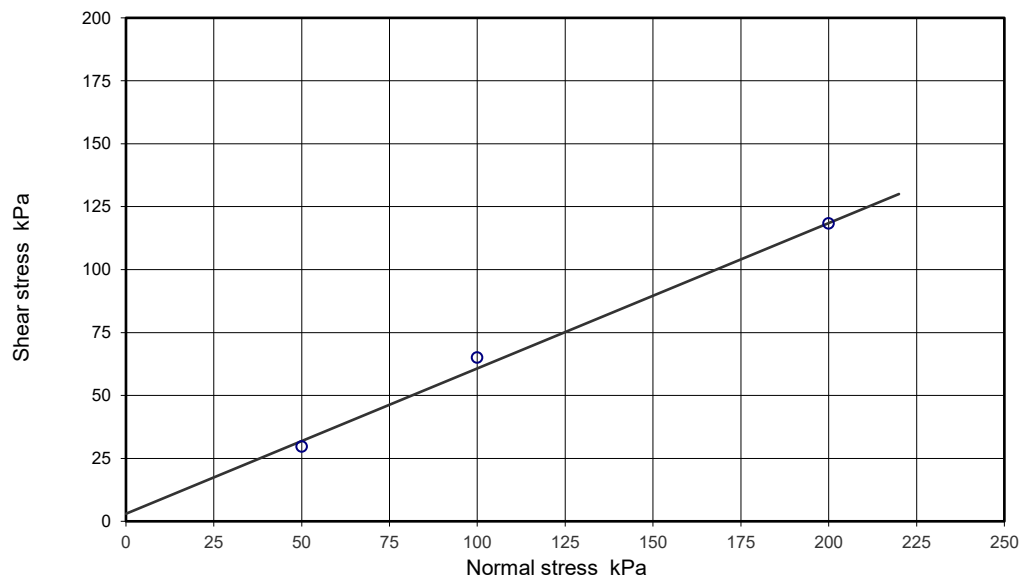
Specimen Details

Test No.

		1	2	3			
Initial	Height	20.1	20.1	20.1			mm
	Length	60.1	60.1	60.1			mm
	Breadth	60.1	60.1	60.1			mm
	Particle Density - (assumed)	2.65	2.65	2.65			Mg/m ³
	Bulk Density	1.98	1.98	1.98			Mg/m ³
	Water Content	19.9	19.9	19.9			%
	Dry density	1.65	1.65	1.65			Mg/m ³
	Voids ratio	0.606	0.606	0.606			
Consolidation	Degree of Saturation	87	87	87			%
	Consolidation / Normal Stress applied	50	100	200			kPa
	Change in height during consolidation	0.583	0.987	1.758			mm
After test	Voids ratio after consolidation	0.559	0.527	0.466			
	Final Water content	24.3	23.8	23.1			%

Shearing stage(s)

Rate of displacement	Peak	0.01000	0.01000	0.01000			mm/min
	Residual						mm/min
Peak values, (o)	Relative horizontal displacement	2.65	5.47	8.78			mm
	Shear stress	29.6	65.0	118.3			kPa
	Vertical Movement at peak shear stress	0.83	1.38	2.60			mm
Residual values, (x)	No. of traverses (including peak run)	1	1	1			
	Relative horizontal displacement						mm
	Shear stress						kPa
	Vertical movement at residual shear stress						mm



Total test time 2 days

Shear Strength Parameters

Peak strength, (o)	Regression	Manual
c'	kPa	3.00
Ø'	degrees	30.0

Residual strength, (x)

c'R	kPa	not assessed
Ø'R	degrees	not assessed

Remarks:

Signed:

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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TEST CERTIFICATE

DIRECT SHEAR TEST USING THE SHEARBOX
Tested in Accordance with: BS EN ISO 17892-10:2018,
BS 1377-2 Cl. 25.2:2022

i2 Analytical Ltd
Unit 8 Harrowden Road
Brackmills Industrial Estate
Northampton NN4 7EB



4041

Client: Hydrock Consultants Ltd
Client Address: 4 Lakeside, Festival Park,
Stoke on Trent, ST1 5RY
Contact: Jason Bradley
Site Address: North Manchester General Hospital

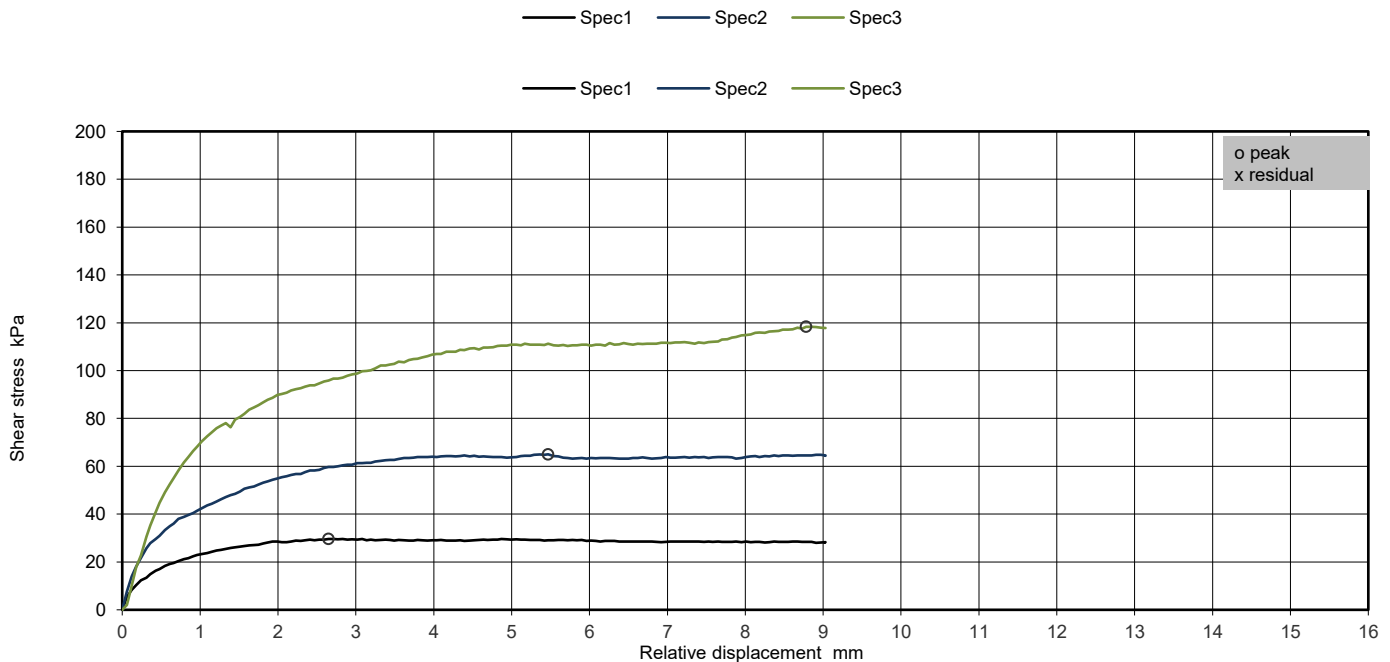
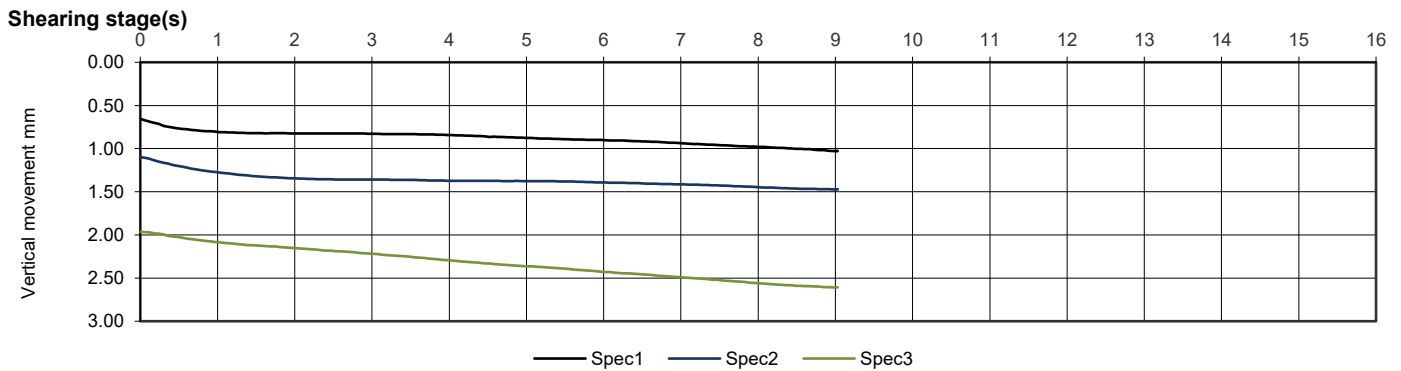
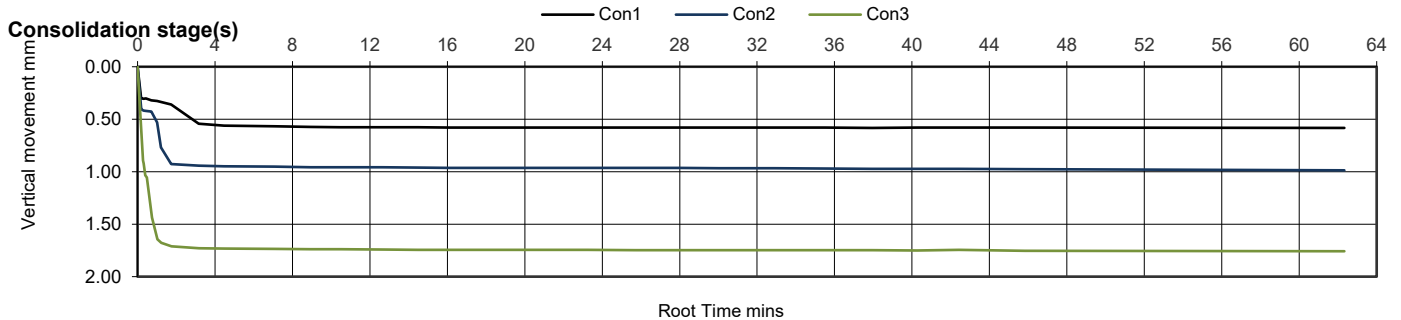
Client Reference: 23267
Job Number: 24-052539-1
Date Sampled: Not Given
Date Received: 01/11/2024
Date Tested: 06/12/2024
Sampled By: Client - AE

Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference: 372567
Hole No.: COMBINE
Sample Reference: CP101 at 4m + 5m + 6m
Sample Description: Brown gravelly SAND

Depth Top [m]: 4.00
Depth Base [m]: 6.00
Sample Type: B



Remarks:

Signed:

Katarzyna Koziel
Geotechnical Reporting Team Leader
for and on behalf of i2 Analytical Ltd

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WD18 8YS

t: 01923 225404
f: 01923 237404
e: reception@i2analytical.com

Analytical Report Number : 24-052541

Project / Site name:	North Manchester General Hospital	Samples received on:	01/11/2024
Your job number:	23267	Samples instructed on/ Analysis started on:	07/11/2024
Your order number:	PO37997	Analysis completed by:	18/11/2024
Report Issue Number:	1	Report issued on:	19/11/2024
Samples Analysed:	5 soil samples		

Signed: 

Adan Cazas Garcia
Key Account Manager
For & on behalf of i2 Analytical Ltd.

Standard Geotechnical, Asbestos and Chemical Testing Laboratory located at: ul. Pionierów 39, 41-711 Ruda Śląska, Poland.

Accredited tests are defined within the report, opinions and interpretations expressed herein are outside the scope of accreditation.

Standard sample disposal times, unless otherwise agreed with the laboratory, are :

soils - 4 weeks from reporting
leachates - 2 weeks from reporting
waters - 2 weeks from reporting
asbestos - 6 months from reporting

Excel copies of reports are only valid when accompanied by this PDF certificate.

Any assessments of compliance with specifications are based on actual analytical results with no contribution from uncertainty of measurement.
Application of uncertainty of measurement would provide a range within which the true result lies.
An estimate of measurement uncertainty can be provided on request.

Analytical Report Number: 24-052541
 Project / Site name: North Manchester General Hospital
 Your Order No: PO37997

Lab Sample Number	372593	372594	372595	372596	372597
Sample Reference	CP101	CP101	WS101	WS103	WS104
Sample Number	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)	1.20	3.00	0.50	2.00	0.50
Date Sampled	Deviating	Deviating	Deviating	Deviating	Deviating
Time Taken	None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status		

Stone Content	%	0.1	NONE	48.9	< 0.1	57.8	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	14	13	16	5	18
Total mass of sample received	kg	0.1	NONE	0.4	0.5	0.5	0.5	0.5

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	10.7	7.5	8	6.7	7.3
Total Sulphate as SO ₄	mg/kg	50	MCERTS	4500	780	1300	270	800
Total Sulphate as SO ₄	%	0.005	MCERTS	0.452	0.077	0.135	0.027	0.08
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	1600	480	820	23	330
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.779	0.238	0.408	0.0116	0.167
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	779	238	408	11.6	167
Water Soluble Chloride (2:1)	mg/kg	1	MCERTS	960	84	180	210	80
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	480	42	92	100	40
Total Sulphur	mg/kg	50	MCERTS	2100	240	980	88	510
Total Sulphur	%	0.005	MCERTS	0.212	0.024	0.098	0.009	0.051
Ammoniacal Nitrogen as NH ₄ ⁺	mg/kg	0.5	MCERTS	6.3	< 0.5	7.4	< 0.5	< 0.5
Ammonium as NH ₄ ⁺ (10:1 leachate equivalent)	mg/l	0.05	MCERTS	0.42	< 0.05	0.48	< 0.05	< 0.05
Organic Matter (automated)	%	0.1	MCERTS	1.5	0.9	-	-	-
Water Soluble Nitrate (2:1) as NO ₃	mg/kg	2	NONE	< 2.0	18	2.1	3.3	15
Water Soluble Nitrate (2:1) as NO ₃ (leachate equivalent)	mg/l	5	NONE	< 5.0	8.9	< 5.0	< 5.0	7.3

Heavy Metals / Metalloids

Magnesium (leachate equivalent)	mg/l	2.5	NONE	4.4	16	20	2.7	14
Magnesium (water soluble)	mg/kg	5	NONE	8.7	32	41	5.4	27

U/S = Unsuitable Sample I/S = Insufficient Sample ND = Not detected



Analytical Report Number : 24-052541
Project / Site name: North Manchester General Hospital

* These descriptions are only intended to act as a cross check if sample identities are questioned. The major constituent of the sample is intended to act with respect to MCERTS validation. The laboratory is accredited for sand, clay and loam (MCERTS) soil types. Data for unaccredited types of solid should be interpreted with care.

Stone content of a sample is calculated as the % weight of the stones not passing a 10 mm sieve. Results are not corrected for stone content.

Lab Sample Number	Sample Reference	Sample Number	Depth (m)	Sample Description *
372593	CP101	None Supplied	1.2	Brown clay and sand with gravel and stones
372594	CP101	None Supplied	3	Brown clay and sand
372595	WS101	None Supplied	0.5	Brown loam and clay with gravel and stones
372596	WS103	None Supplied	2	Brown sand
372597	WS104	None Supplied	0.5	Brown loam and clay with gravel

Analytical Report Number : 24-052541
Project / Site name: North Manchester General Hospital

Water matrix abbreviations:
Surface Water (SW) Potable Water (PW) Ground Water (GW) Process Waters (PrW) Final Sewage Effluent (FSE) Landfill Leachate (LL)

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate (Walkley Black Method)	In-house method	L009B	D	MCERTS
Moisture Content	Moisture content, determined gravimetrically (up to 30°C)	In-house method	L019B	W	NONE
Stones content of soil	Standard preparation for all samples unless otherwise detailed. Gravimetric determination of stone > 10 mm as % dry weight	In-house method based on British Standard Methods and MCERTS requirements.	L019B	D	NONE
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES	In-house method based on TRL 447	L038B	D	NONE
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES	In-house method	L038B	D	MCERTS
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES	In-house method	L038B	D	MCERTS
Water Soluble Nitrate (leachate equivalent)	Determination of nitrate by reaction with sodium salicylate and colorimetry	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction	L078-PL	W	NONE
Nitrate, water soluble, in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry	In-house method based on Examination of Water and Wastewater & Polish Standard Method PN-82/C-04579.08, 2:1 extraction	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser	In-house method	L082B	D	MCERTS
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082B	W	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099-PL	D	MCERTS

For method numbers ending in 'UK' or 'A' analysis have been carried out in our laboratory in the United Kingdom (Watford).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL' or 'B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 30°C.
Unless otherwise indicated, site information, order number, project number, sampling date, time, sample reference and depth are provided by the client. The instructed on date indicates the date on which this information was provided to the laboratory.

Quality control parameter failure associated with individual result applies to calculated sum of individuals.
The result for sum should be interpreted with caution

Analytical Report Number : 24-052541
 Project / Site name: North Manchester General Hospital
 This deviation report indicates the sample and test deviations that apply to the samples submitted for analysis. Please note that the associated result(s) may be unreliable and should be interpreted with care.

Key: a - No sampling date b - Incorrect container c - Holding time d - Headspace e - Temperature

Sample ID	Other ID	Sample Type	Lab Sample Number	Sample Deviation	Test Name	Test Ref	Test Deviation
CP101	N/A	S	372593	a	Ammonium as NH4 in soil	L082B	a
CP101	N/A	S	372593	a	Chloride, water soluble, in soil	L082B	a
CP101	N/A	S	372593	a	Magnesium, water soluble, in soil	L038B	a
CP101	N/A	S	372593	a	Nitrate, water soluble, in soil	L078-PL	a
CP101	N/A	S	372593	a	Organic matter (Automated) in soil	L009B	a
CP101	N/A	S	372593	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
CP101	N/A	S	372593	a	Total Sulphur in soil	L038B	a
CP101	N/A	S	372593	a	Total sulphate (as SO4 in soil)	L038B	a
CP101	N/A	S	372593	a	Water Soluble Nitrate (leachate equivalent)	L078-PL	a
CP101	N/A	S	372593	a	pH in soil (automated)	L099-PL	a
CP101	N/A	S	372594	a	Ammonium as NH4 in soil	L082B	a
CP101	N/A	S	372594	a	Chloride, water soluble, in soil	L082B	a
CP101	N/A	S	372594	a	Magnesium, water soluble, in soil	L038B	a
CP101	N/A	S	372594	a	Nitrate, water soluble, in soil	L078-PL	a
CP101	N/A	S	372594	a	Organic matter (Automated) in soil	L009B	a
CP101	N/A	S	372594	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
CP101	N/A	S	372594	a	Total Sulphur in soil	L038B	a
CP101	N/A	S	372594	a	Total sulphate (as SO4 in soil)	L038B	a
CP101	N/A	S	372594	a	Water Soluble Nitrate (leachate equivalent)	L078-PL	a
CP101	N/A	S	372594	a	pH in soil (automated)	L099-PL	a
WS101	N/A	S	372595	a	Ammonium as NH4 in soil	L082B	a
WS101	N/A	S	372595	a	Chloride, water soluble, in soil	L082B	a
WS101	N/A	S	372595	a	Magnesium, water soluble, in soil	L038B	a
WS101	N/A	S	372595	a	Nitrate, water soluble, in soil	L078-PL	a
WS101	N/A	S	372595	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS101	N/A	S	372595	a	Total Sulphur in soil	L038B	a
WS101	N/A	S	372595	a	Total sulphate (as SO4 in soil)	L038B	a
WS101	N/A	S	372595	a	Water Soluble Nitrate (leachate equivalent)	L078-PL	a
WS101	N/A	S	372595	a	pH in soil (automated)	L099-PL	a
WS103	N/A	S	372596	a	Ammonium as NH4 in soil	L082B	a
WS103	N/A	S	372596	a	Chloride, water soluble, in soil	L082B	a
WS103	N/A	S	372596	a	Magnesium, water soluble, in soil	L038B	a
WS103	N/A	S	372596	a	Nitrate, water soluble, in soil	L078-PL	a
WS103	N/A	S	372596	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS103	N/A	S	372596	a	Total Sulphur in soil	L038B	a
WS103	N/A	S	372596	a	Total sulphate (as SO4 in soil)	L038B	a
WS103	N/A	S	372596	a	Water Soluble Nitrate (leachate equivalent)	L078-PL	a
WS103	N/A	S	372596	a	pH in soil (automated)	L099-PL	a
WS104	N/A	S	372597	a	Ammonium as NH4 in soil	L082B	a
WS104	N/A	S	372597	a	Chloride, water soluble, in soil	L082B	a
WS104	N/A	S	372597	a	Magnesium, water soluble, in soil	L038B	a
WS104	N/A	S	372597	a	Nitrate, water soluble, in soil	L078-PL	a
WS104	N/A	S	372597	a	Sulphate, water soluble, in soil (16hr extraction)	L038B	a
WS104	N/A	S	372597	a	Total Sulphur in soil	L038B	a
WS104	N/A	S	372597	a	Total sulphate (as SO4 in soil)	L038B	a
WS104	N/A	S	372597	a	Water Soluble Nitrate (leachate equivalent)	L078-PL	a
WS104	N/A	S	372597	a	pH in soil (automated)	L099-PL	a

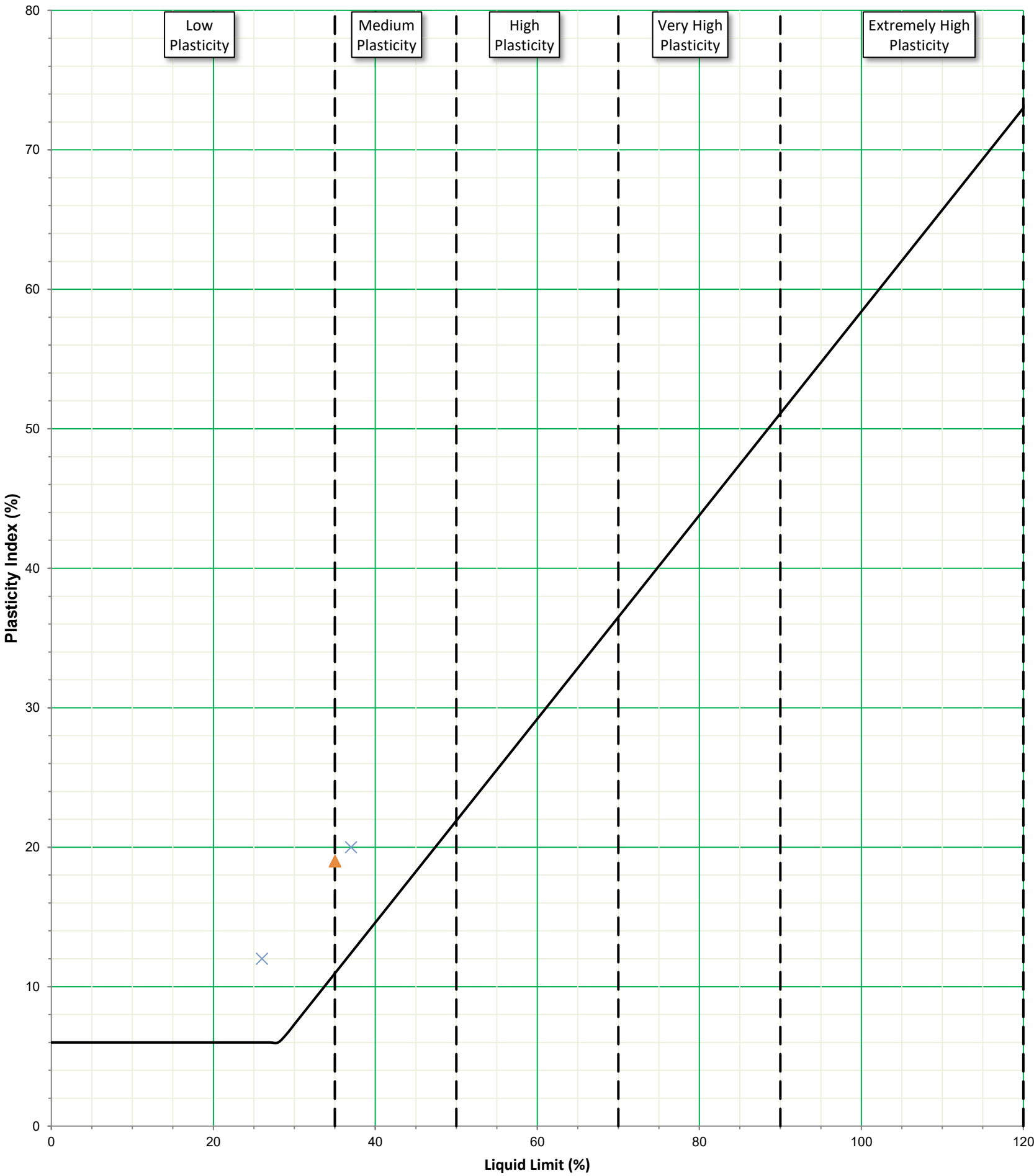
Geotechnical plots

PLASTICITY CLASSIFICATION CHART

Site:
North Manchester General Hospital

Client:
Manchester University NHS Foundation Tr

Contract No. 32425
All Data

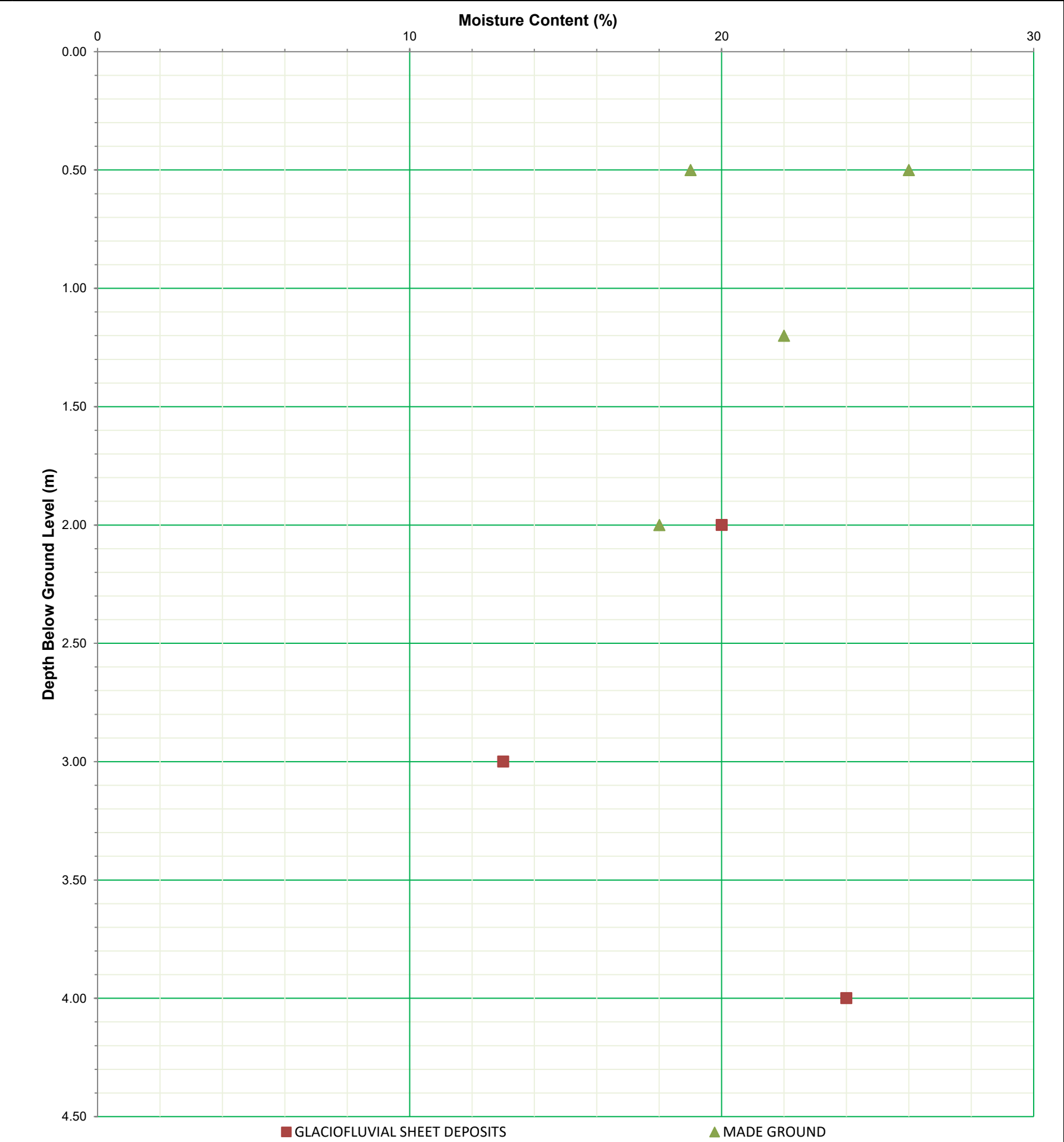


▲ GLACIOFLUVIAL SHEET DEPOSITS × MADE GROUND



MOISTURE CONTENT vs DEPTH

Site: North Manchester General Hospital	Client: Manchester University NHS Foundation Tr	Contract No.	32425
		All Data	





SPT 'N₆₀' VALUES vs DEPTH

Site: North Manchester General Hospital	Client: Manchester University NHS Foundation Tr	Contract No.	32425
		All Data	

