Title:	The Birtles (Plot C2), Wythenshawe – Summary Report on Pre-Demolition Supplementary Site Investigations		
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Introduction

Civic Earth have been appointed by Civic Engineers (the Client's Structural and Civil Engineer) on behalf of Muse Places (the Client) to undertake supplementary site investigations for a parcel within the Wythenshawe masterplan known as The Birtles (Plot C2) in Wythenshawe town centre (herein referred to as "the site"), prior to the demolition of the existing buildings. Civic Earth have previously undertaken a preliminary ground investigation across The Birtles in August 2025 and produced a Phase 1 Desk Study and Preliminary Site Investigation Interpretative Report[1]. Civic Engineers subsequently requested supplementary investigations to further inform the structural design for the proposed redevelopment, including foundation inspection pitting, infiltration testing and assessment of the presence of coal tar. In addition, the Contractor requested two additional rotary boreholes to further inform pile design.

This revision of the report is an update to include the findings of the rotary cored holes, along with a summary of the foundation inspection pitting, infiltration testing and assessment of the presence of coal tar.

It is understood that the current proposal for the development site includes the construction of 81 Nr residential apartments (use Class C3a) with retail uses at ground floor level (use Class E), associated landscaping, servicing, car and cycle parking and other associated works following demolition of the existing buildings.

Site Location and Description

The site comprises an area of approximately 0.3 ha in size and is located to the north of 'The Birtles' within Wythenshawe town centre. The approximate postcode for the site is M22 5RE and the National Grid Reference for the approximate centre of the site is 382600E, 387080N.

The site forms a generally rectangular shaped parcel of land which currently comprises Birtles House, which is a vacant two to three story L-shaped building with office space and storage uses above a retail ground floor. It is located immediately southeast of the Metrolink, adjacent to Wythenshawe town centre and Poundswick Lane.

Historical Development

With reference to historical mapping reviewed as part of the Civic Earth Phase 1 Desk Study and Preliminary Site Investigation Interpretive Report previously produced for the site[1], earliest available mapping of 1876 indicates the area is undeveloped greenfield land. No significant changes are noted until c.1960 when a footpath was indicated to extend across the central site area from north-northeast to south-southwest. By c.1971 the area had been redeveloped into a similar layout to the present day. Ainley Road had been constructed to the west of the area, leading into the *car parking* area in the south. A pedestrian area (The Birtles) is indicated to the east of the area, running north-south. Several buildings (likely retail) had been constructed across the area between the road and pedestrian route including a B*ank* and an *Electrical Substation*. Between c.2000 and c.2009 an outdoor market area is recorded to the immediate north of the site and by c.2013, Ainley Road had been modified by the construction of the *Manchester Metrolink*.

Anticipated Geology

Published BGS mapping indicates the site to be underlain by Glacial Till overlying bedrock of the Bollin Mudstone Member. Made Ground, whilst not formally mapped, is considered to be present associated with the previous development of the site. A geological fault is recorded c.270m to the south of the site, orientated north to south/southeast.

Previous Investigations

A preliminary Phase 2 ground investigation was undertaken by Civic Earth between 6 August and 29 August 2025 and included 3 window sample boreholes up to a maximum depth of 3.45m below ground level (mbgl), 1 cored rotary borehole up to a maximum depth of 15.00mbgl and 1 inspection pit excavated to a maximum depth of 1.20mbgl. A total of 3 ground gas and groundwater monitoring rounds were subsequently carried out. It is noted that access for

[1] Civic Earth (2025) C.2 The Birtles, Wythenshawe. Phase 1 Desk Study and Preliminary Site Investigation Interpretative Report. Reference 51143-CIV-01-XX-R-G-1002. Revision C04. 28 November 2025.

the preliminary site investigation was limited by the presence of buildings and underground services, and 3 inspection trial pits (TP06, TP07 and TP08) were unable to be completed due to access constraints.

The ground conditions across the site were found to comprise of a variable thickness of Made Ground (between at least 0.10m and 1.50m in thickness) overlying superficial deposits of Glacial Till. The superficial soils were recorded in each exploratory hole where the base of the Made Ground was proven, with the upper surface recorded between +59.35mOD and + 58.37mOD and found to be between at least 1.65m and at least 3.20m in thickness (proven to be 1.70m thick in borehole RC05). The bedrock of the Bollin Mudstone Member was only encountered in borehole RC05, with the upper surface recorded at +56.67mOD. The bedrock was proven to a depth of +44.87mOD.

Review of the groundwater monitoring results across the wider Wythenshawe masterplan area indicates that the perched water within the Made Ground is inconsistent in nature. Similarly, a pervasive shallow aquifer within the Glacial Till was not recorded, with groundwater considered likely to be constrained by the predominantly cohesive deposits of the stratum. Groundwater levels within the Bollin Mudstone Member were recorded to range between 0.00mbgl and 3.04mbgl (59.87mOD and 56.29mOD) across the wider masterplan area (between 0.00mbgl and 2.10mbgl / 59.87mOD and 57.73mOD within the site), and the groundwater levels suggest that there is a degree of sub-artesian groundwater present as groundwater levels have been recorded above the surface of the bedrock. Groundwater flow direction may be towards the west or southwest; however, further investigation of the groundwater levels was recommended to further confirm the groundwater regime beneath the site.

The preliminary site investigation at the site concluded that there is considered to be a potential risk to future site users and construction workers from the Made Ground soils due to the elevated concentrations of beryllium encountered within window sample WS19A, which was considered to present a risk via direct contact/ingestion. The overall risk to controlled waters, plants, vegetation and buried water supply pipes was considered to be low, based on the findings of the preliminary site investigation and the proposed development plans.

The preliminary ground gas monitoring indicated a low risk from ground gases. Further site investigation(s) was recommended to be undertaken to further investigate the potential risk to controlled waters and provide further information to inform the assessment of risk to human health and ground gas regime.

Scope of Works

The pre-demolition supplementary site investigation was undertaken between 22 and 25 June and between 8 and 10 July 2026, and the works comprised the following:

- 4 Nr internal foundation inspection pits (FIP01 to FIP04) up to 1.35mbgl to investigate the foundations of the existing building in the southeast of the site;
- 3 Nr falling head tests within existing groundwater monitoring wells (installed during the preliminary site investigations; locations RC05, WS19A and WS20) in order to investigate soil infiltration rates;
- 5 Nr concrete cores (CC01 to CC05) to facilitate the collection of tarmacadam samples, which were then submitted to i2 Analytical Limited (a UKAS and MCERTS accredited laboratory) for coal tar testing, with concrete subsequently reinstated; and
- 2 Nr rotary cored boreholes (RC101 and RC102) to 19.50mbgl to extend into the bedrock for geotechnical testing, including the installation of 2 groundwater monitoring wells.

The exploratory hole records are included in Appendix A. The exploratory hole location plan, including the preliminary site investigation locations, is included in Appendix B. The following sections detail the results of the works.

Foundation Inspection Pits

A summary of the foundation details and depths encountered in inspection pits FIP01 to FIP04 is provided in Table 1, and details are illustrated in the drawings presented in Appendix C.

Table 1. Summary of Foundation Inspection Pit Findings

Location	Foundation Depth (mbgl)	Foundation Type	Details
FIP01	0.60	Concrete pads	Brick wall in the corner of the structure is underlain by 2 layers of concrete pads, each 200mm in thickness; the upper extending 200mm beyond the wall and the lower which extends 600mm beyond the brick wall to the east and at least 1200mm beyond to the south.
FIP02	? 1.20	Concrete pad Concrete ring	A structural column had been exposed behind a plaster wall 350mm thick. A concrete pad is present underlying the column of unknown thickness, which extends at least 1100mm beyond the column. A second excavation to the west revealed further concrete 600mm in thickness (presumed concrete ring foundation adjacent to the concrete pad) underlying the opposite brick wall, which extended to 760mm

			beyond this wall. The gap between the concrete pad and concrete ring was not confirmed; however is less than 320mm (the distance between the proven edge of the ring foundation and the excavation beneath the column).
FIP03	[?] 1.20	[Concrete pad?] Concrete ring	While no excavation was undertaken directly beneath the column in this location, the similar conditions encountered at inspection pit FIP02 indicate that a concrete pad of unknown extent and thickness exists beneath this column. A presumed concrete ring foundation was encountered 600mm in thickness, underlying the opposite brick wall, located 550mm west of the column, which extended to 700mm beyond the brick wall (350mm beyond the plaster wall in front of this brick wall).
FIP04	-	-	No foundation pad(s) or ring(s) were encountered in this location, which was expected due to its location adjacent to an internal wall and not near a column.

Infiltration Testing

Falling head tests were undertaken within the shallow Made Ground and Glacial Till soils in boreholes RC05, WS19A and WS20 in the existing monitoring wells which were installed during the preliminary site investigation. It is noted that a single test was undertaken in borehole WS19A for a duration of 2 hours due to the slow rate of water level change observed. A summary of each test is provided in Table 2, and the results are included in Appendix D.

Table 2. Summary of Infiltration Testing Results

Borehole	Stratum	Base of Response Zone (mbgl)	Initial Groundwater Level (mbgl)	Test Nr	Water Level at Start of Test (mbgl)	Water Level at End of Test (mbgl)	Infiltration Rate (ms^{-1})
RC05	Glacial Till / WBMM / BMM	15.00[a]	2.10	1	0.15	1.95	6.92×10^{-6}
				2	0.15	1.97	1.38×10^{-5}
				3	0.15	2.10	1.54×10^{-5}
WS19A	Glacial Till	1.80[b]	1.63	1	0.63	0.73	-
WS20	Made Ground	1.00	0.56	1	0.11	0.56	-
				2	0.11	0.56	-
				3	0.11	0.56	-

WBMM = Weathered Bollin Mudstone Member; BMM = Bollin Mudstone Member; a = well depth recorded as 14.50mbgl; b = well depth recorded as 1.65mbgl; "-" indicates infiltration rate was unable to be calculated due to lack of infiltration.

The calculated infiltration rate for the tests undertaken across the bottom of the Glacial Till and into the Weathered Bollin Mudstone Member / Bollin Mudstone Member are representative of low to medium permeability with reference to CIRIA C515[2]. This is considered to represent the effect of fractures in the weathered bedrock increasing the permeability of the mudstone, which is known to be of variable permeability dependent on the silt content, varied grain sizes or overburden stress[3].

An infiltration rate was unable to be calculated for the Made Ground due to lack of infiltration in location WS20. It is noted that the Made Ground is heterogeneous in nature and, as such, this is considered to be specific to the soils encountered within location WS20, and are likely to differ within the Made Ground across the site. An infiltration rate was also unable to be calculated for the Glacial Till in location WS19A, which corresponds with the generally impermeable nature of the stratum[4].

[2] CIRIA (2000) Groundwater Control – Design and Practice. C515.

[3] Geological Society (1999) Permeability and fluid flow in natural mudstones. David N. Dewhurst, Yunlai Yang and Andrew C. Aplin. Geological Society, London, Special Publications No. 158.

[4] BGS (1997) The Hydrogeological Classification of Superficial Clay. R&D Technical Report W29.

Coal Tar Testing

Concrete coring was undertaken from 5 locations within the existing car park in the central site area to facilitate the collection of tarmacadam samples, which were subsequently sent to i2 Analytical Limited. Samples from locations CC01 to CC04 were analysed for the presence of coal tar as well as for polycyclic aromatic hydrocarbons (PAHs). The chemical laboratory certificate is included in Appendix E.

Coal tar and bitumen have distinct ratios of parent to alkyl PAHs, which serve as key source indicators. Coal tar is dominated by parent (unsubstituted) PAHs as it is a product of high- temperature combustion (pyrogenic source), a process that tends to destroy alkyl chains, resulting in a 'slope-shaped' gas chromatogram profile. Bitumen (asphalt) is a petroleum-related (petrogenic) material and contains a significantly higher proportion of alkylated PAHs compared to parent PAHs, resulting in a 'bell-shaped' gas chromatogram profile. This difference in the parent/alkyl PAH ratio is a primary method used in environmental forensics to distinguish between contamination from coal tar and bitumen.

The laboratory results indicate total PAH concentrations between 3.12mg/kg to 43.5mg/kg, with total residue concentrations of 2,300mg/kg to 3,100mg/kg, where the measurement of total residue is used to indicate hydrocarbon content (all hexane-extractable hydrocarbons in the boiling range from 170°C to 520°C (EC10-EC40)). Assessment of the PAH source has been assessed by the laboratory using the ratio of parent PAHs to alkylated PAHs to indicate if it is from a likely pyrogenic (coal tar-related) or petrogenic (bitumen-related) origin; the results conclude that each of the samples tested is indicative of the presence of coal tar, rather than bitumen.

Rotary Boreholes and Rock Geotechnical Testing

Ground Conditions

Two rotary boreholes were drilled within the footprint of the existing building to depths of 15.00mbgl and 19.50mbgl (45.00mOD and 40.50mOD). The ground conditions recorded within the boreholes were found to be similar to those recorded during the preliminary site investigation within the plot, with a limited thickness of Made Ground recorded beneath a layer of concrete hardstanding.

Made Ground

The Made Ground (including surfacing and concrete hardstanding) was recorded to range between 0.80m and 1.20m in thickness, with the Made Ground soils recorded to range between 0.40m and 0.90m in thickness. The Made Ground was recorded to be variable in composition and described as a gravelly clay, silty gravel and ashy gravel. Due to the limited thickness of deposits encountered, no in-situ testing was undertaken within the stratum.

Glacial Till

The Made Ground was recorded to be underlain by cohesive deposits of Glacial Till which ranged between 1.20m and 1.80m in thickness. The superficial deposits comprised soft to stiff, red brown mottled grey, gravelly clay. A total of 3 SPTs were undertaken within the stratum with N60 values between 12 and 22 recorded, correlating to undrained shear strengths of approximately 54kPa to 99kPa (based on f1 = 4.5[5]).

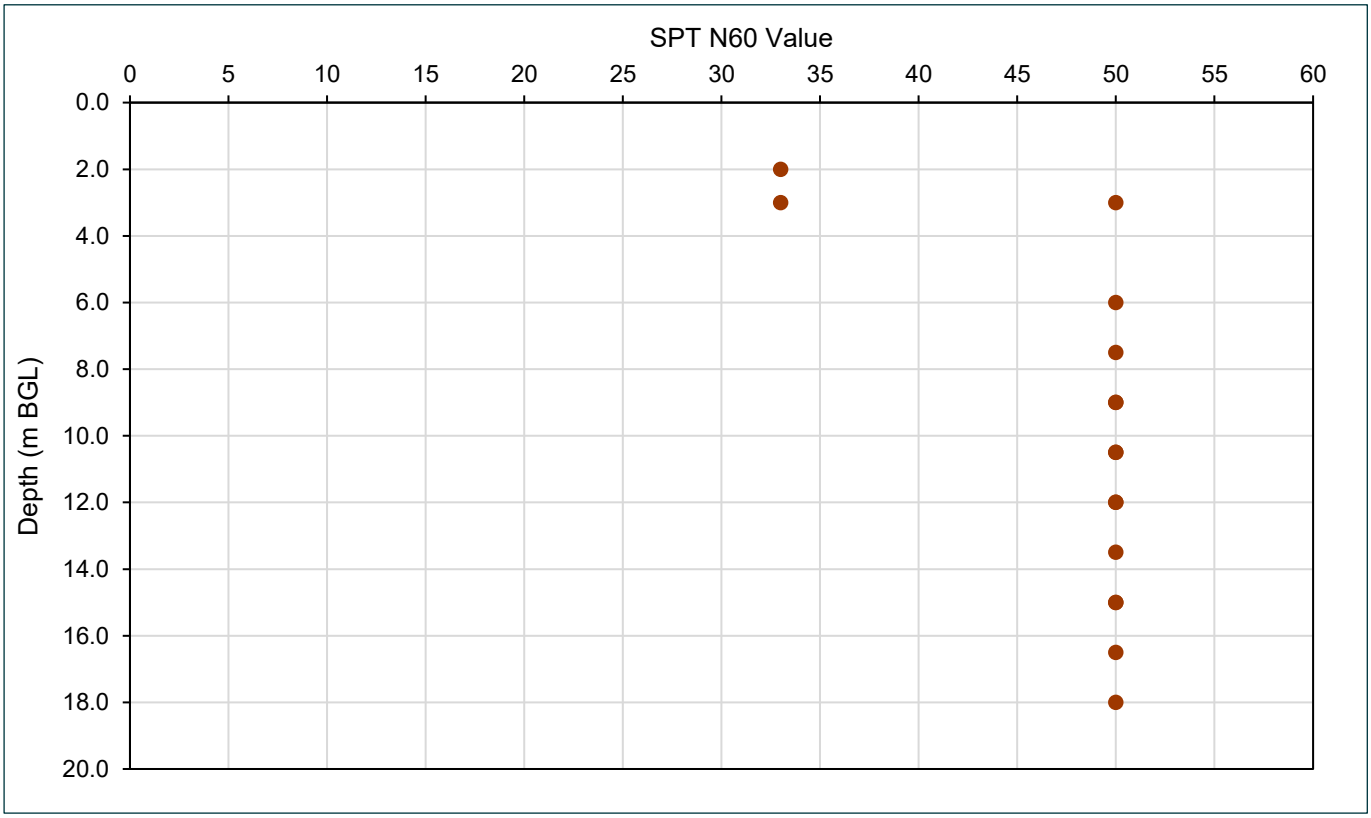
Bollin Mudstone Member

The upper surface Bollin Mudstone Member was encountered between 2.00mbgl and 3.00mbgl (58.00mOD and 57.00mOD). The thickness of the stratum was confirmed to be >17.50m and typically comprised extremely weak to weak, distinctly weathered to deconstructed mudstone. Interbedded horizons of soft gravelly clay were recorded in each of the boreholes, between 10.50mbgl and 10.65mbgl (49.50mOD and 49.35mOD) in borehole RC101, and between 9.00mbgl and 9.40mbgl (51.00mOD and 50.60mOD) and 11.10mbgl and 11.30mbgl (48.90mOD and 48.70mOD) in borehole RC102.

Rock coring of the bedrock was carried out; however, due to the poor recovery of the low strength material, a total of 16 SPTs were undertaken within the Bollin Mudstone Member, where SPT N60 values were typically recorded as >50 as illustrated in Plate 1. Two lower values of 33 were recorded at the top of the bedrock at 3.00mbgl in each borehole.

[5] Stroud, M, A (2015). The Standard Penetration Test in Insensitive Clays and Soft Rocks. Proceedings of the European on Penetration Testing, Stockholm, June 5-7, 1974 2(2): 367-375

Plate 1. Summary of SPT N60 Values versus Level – Bollin Mudstone Member



Geotechnical testing was carried out on rock samples obtained from the rotary boreholes and the results are included in Appendix F. Point load testing was undertaken on 6 samples of siltstone from depths between 8.50mbgl and 14.20mbgl across the site. Each sample was subject to one determination. The results of the 6 samples of siltstone recorded Is(50) values ranging between 0.01MPa and 1.68MPa (average of 0.37MPa) with a general increase in strength with depth. Applying the Broch and Franklin conversion of 24 to the point load test results, a corresponding UCS of between 0.24MPa and 40.32MPa with an average of 8.76MPa is estimated. However, it is noted that 1 of the 6 samples returned a higher value than the rest, with the typical Is(50) range between 0.01MPa and 0.26MPa (correlating to estimated UCS between 0.24MPa and 6.96MPa, average of 2.44MPa).

One sample of siltstone from RC101 underwent UCS testing, and one sample was sent for UCS testing with Young's Modulus; the results are summarised in Table 3.

Table 3: Summary of Geotechnical Testing – Bollin Mudstone Member

Location	Stratum (Sandstone)	Depth (mbgl)	UCS (MPa)	Young's Modulus (GPa)	
				Tangential at 50% failure load	Tangential at 10% failure load
RC101	Bollin Mudstone Member (Siltstone)	13.75 to 13.96	3.66	-	-
RC102	Bollin Mudstone Member (Siltstone)	11.79 to 12.00	9.11	0.936	0.377

The UCS testing returned values of 3.66MPa and 9.11MPa which correlates with the strength of the material retrieved on site and the estimated UCS values from the point load tests (excluding the anomalous result of Is(50) 1.68MPa /estimated UCS of 40.32MPa.

It is therefore considered that a design UCS of 3MPa is considered appropriate for the Bollin Mudstone Member encountered. On this basis, and where structural loads permit, piles may be designed to derive capacity through end bearing within the mudstone, with pile sockets extending into competent rockhead. It is noted that thin bands of softer clay have been recorded interbedded with the mudstone.

At this stage, it is anticipated that piles will require socketing to approximately 5m within the Bollin Mudstone Member to achieve the required capacity. In accordance with Tomlinson's guidance[6], a preliminary allowable bearing capacity of 150kPa is recommended for design purposes, although pile type, socket length and achievable working loads should be confirmed through detailed design and consultation with a specialist piling contractor.

Appendices

Appendix A – Exploratory Hole Records
Appendix B – Exploratory Hole Location Plan
Appendix C – Foundation Inspection Pit Drawings
Appendix D – Infiltration Testing Results
Appendix E – Chemical Laboratory Analysis Results
Appendix F – Geotechnical Laboratory Analysis Results

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[6] Tomlinson, M.J. (1995) Foundation Design and Construction. Sixth Edition.

Appendix A – Exploratory Hole Records

CIVIC	Project Title: **The Birtles (Plot C2), Wythenshawe**		Client: **Muse Places and Wythenshawe Community Housing Group**
	Project Number: **51143/02**	Logged By: KIA Checked By: KP	
Location ID: **RC101**	Location Type: Rotary cored		
	Coords: 382650.00E/387102.00N	Level: 60.00mOD	
Status: FINAL	Scale: 1:50	Final Depth: 19.50	
Sheet 1 of 2	Date Start: 06/07/2026	Date End: 08/07/2026	

Method and Plant Used				Groundwater		
From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
0.00	1.20	IP	Hand Tools			
1.20	19.50	RC	Beretta GT			

Inst/ Backfill	Depth (m)	Sample Depth (m)	Type/Ref	Tests/Results	Water Level (m)	Level (mOD)	Strata Depth (m)	Legend / Cover	Strata Description	Core Run	TCR (%)	SCR (%)	RQD (%)	Fract (mm) min avg max
						59.95	0.05		Linoleum. [MADE GROUND]					
						59.60	0.40		Pale grey concrete. 70% subangular to subrounded fine to medium gravel, 30% cement, <1% voids. [MADE GROUND]					
						59.20	0.80		Light orangish brown gravelly clay. Gravel is fine to coarse angular to subrounded of sandstone and brick. [MADE GROUND]					
	1.0			SPT(S) 1.20m N=20 (4,4/3,5,6,6)					Firm red brown mottled grey slightly silty gravelly CLAY. Gravel is fine to medium subangular to rounded of chalk, sandstone, mudstone and coal. [GLACIAL TILL]					
	2.0			SPT(S) 2.00m N=33 (3,6/7,7,9,10)		58.00	2.00		Very weak red brown partially to distinctly weathered MUDSTONE. [BOLLIN MUDSTONE MEMBER]					
	3.0			SPT(S) 3.00m N=50 (7,11/50 for 250mm)		57.00	3.00		No recovery. [BOLLIN MUDSTONE MEMBER]	3.00 4.50	33	12	0	
	4.0					55.90	4.10		Very weak red brown highly weathered MUDSTONE with closely spaced rough discountinuities infilled with red clay. [BOLLIN MUDSTONE MEMBER]					
						55.50	4.50		No recovery. [BOLLIN MUDSTONE MEMBER]					
	5.0					54.90	5.10		Very weak red brown partially to distinctly weathered MUDSTONE with undulating layers. [BOLLIN MUDSTONE MEMBER]	4.50 6.00	66	20	0	
	6.0			SPT(S) 6.00m 50 (25 for 75mm/50 for 75mm)		53.80	6.20		No recovery. [BOLLIN MUDSTONE MEMBER]	6.00 7.50	20	0	0	
	7.0			SPT(S) 7.50m 50 (25 for 75mm/50 for 75mm)		52.50	7.50		Weak red brown partially weathered MUDSTONE with closely spaced undulating discountinuities infilled with red clay. [BOLLIN MUDSTONE MEMBER]					
						52.30	7.70		Very weak to weak red brown mottled grey destructured MUDSTONE. [BOLLIN MUDSTONE MEMBER]					
	8.0	8.50 - 8.60	C 1			52.10	7.90		Weak red brown partially weathered MUDSTONE with closely spaced rough undulating discountinuities infilled with red clay. [BOLLIN MUDSTONE MEMBER]	7.50 9.00	87	29	9	
	9.0			SPT(C) 9.00m 50 (25 for 75mm/50 for 75mm)		51.00	9.00		Very weak pale grey partially weathered MUDSTONE with rough stepped discountities filled with grey and red clay. Relatively fissile. [BOLLIN MUDSTONE MEMBER]	9.00 10.50	100	33	9	
	10.0													

Stratum continues onto next page

Notes:

1. Groundwater not encountered.
2. C = Core Sample.
3. Installation Details: 0.00m to 10.50m plain 63mm diameter pipe with bentonite; 10.50m to 19.50m slotted 63mm diameter pipe with gravel filter and geosock. Gas tap, bung and flush cover.
4. Borehole location measured in from topographic survey.

Hole Diameter		Casing	
Depth (m)	Dia (mm)	Depth (m)	Dia (mm)
19.50	102	3.00	115

Hammer Information	
Energy Ratio	Serial No.
60%	BBL7

Install Response Zones		
Ref	From (m)	To (m)
Pipe1	10.50	19.50

CIVIC	Project Title: **The Birtles (Plot C2), Wythenshawe**		Client: **Muse Places and Wythenshawe Community Housing Group**
	Project Number: **51143/02**	Logged By: KIA Checked By: KP	
Location ID: **RC101**	Location Type: Rotary cored		
	Coords: 382650.00E/387102.00N	Level: 60.00mOD	
Status: FINAL	Scale: 1:50	Final Depth: 19.50	
Sheet 2 of 2	Date Start: 06/07/2026	Date End: 08/07/2026	

Method and Plant Used				Groundwater		
From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
0.00	1.20	IP	Hand Tools			
1.20	19.50	RC	Beretta GT			

Inst/ Backfill	Depth (m)	Samples & Tests: Sample Depth (m)	Type/Ref	Tests/Results	Water Level (m)	Level (mOD)	Strata Depth (m)	Legend / Cover	Strata Description	Rotary Coring: Core Run	TCR (%)	SCR (%)	RQD (%)	Fract (mm) min avg max
		10.20 - 10.30	C 2			49.60	10.40		Very weak pale grey partially weathered MUDSTONE with rough stepped discountities filled with grey and red clay. Relatively fissile. [BOLLIN MUDSTONE MEMBER]					
				SPT(C) 10.50m 50 (25 for 75mm/50 for 75mm)		49.50	10.50		No recovery. [BOLLIN MUDSTONE MEMBER]					
						49.35	10.65		Soft red gravelly CLAY. Gravel is fine to medium subangular to subrounded of mudstone. [BOLLIN MUDSTONE MEMBER]					
	11.0	11.30	C 3						Extremely weak to weak pale grey distinctly weathered to destructured MUDSTONE with rough undulating discontinuities infilled with clay.	10.50 12.00	80	21	18	
						48.30	11.70		[BOLLIN MUDSTONE MEMBER]					
						48.00	12.00		No recovery. [BOLLIN MUDSTONE MEMBER]					
	12.0			SPT(C) 12.00m 50 (25 for 75mm/50 for 75mm)					Very weak pale grey residually weathered to destructured MUDSTONE. [BOLLIN MUDSTONE MEMBER]	12.00 13.50	100	19	0	
	13.0					46.90	13.10		Extremely weak to weak dark red brown MUDSTONE with closely spaced discontiniuities infilled with red clay. [BOLLIN MUDSTONE MEMBER]					
		13.60 - 13.75	C 4											
		13.75 - 13.96	C 5											
	14.0	14.00 - 14.20	C 6							13.50 15.00	100	54	47	
	15.0			SPT(C) 15.00m 50 (25 for 75mm/50 for 75mm)		45.00	15.00		Very weak to weak red brown mottled grey distinctly weathered to destructured MUDSTONE. [BOLLIN MUDSTONE MEMBER]	15.00 16.50	100	0	0	
	16.0			SPT(C) 16.50m 50 (25 for 75mm/50 for 75mm)										
	17.0									16.50 18.00	100	0	0	
	18.0			SPT(C) 18.00m 50 (25 for 75mm/50 for 75mm)		42.00	18.00		Very weak to weak red brown mottled grey distinctly weathered to destructured MUDSTONE. [BOLLIN MUDSTONE MEMBER]	18.00 19.50	100	0	0	
	19.0					40.50	19.50		EOH at 19.50m - Achieved target depth					
	20.0													

Notes:

1. Groundwater not encountered.
2. C = Core Sample.
3. Installation Details: 0.00m to 10.50m plain 63mm diameter pipe with bentonite; 10.50m to 19.50m slotted 63mm diameter pipe with gravel filter and geosock. Gas tap, bung and flush cover.
4. Borehole location measured in from topographic survey.

Hole Diameter		Casing		Hammer Information	
Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Energy Ratio	Serial No.
19.50	102	3.00	115	60%	BBL7

Install Response Zones		
Ref	From (m)	To (m)

CIVIC	Project Title: **The Birtles (Plot C2), Wythenshawe**		Client: **Muse Places and Wythenshawe Community Housing Group**
	Project Number: **51143/02**	Logged By: KIA Checked By: KP	
Location ID: **RC102**	Location Type: Rotary cored		
	Coords: 382604.00E/387136.00N	Level: 60.00mOD	
Status: FINAL	Scale: 1:50	Final Depth: 15.00	
Sheet 1 of 2	Date Start: 09/07/2026	Date End: 10/07/2026	

Method and Plant Used				Groundwater		
From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
0.00	1.20	IP	Hand Tools			
1.20	15.00	RC	Beretta GT			

Inst/ Backfill	Depth (m)	Samples & Tests: Sample Depth (m)	Type/Ref	Tests/Results	Water Level (m)	Level (mOD)	Strata Depth (m)	Legend / Cover	Strata Description	Rotary Coring: Core Run	TCR (%)	SCR (%)	RQD (%)	Fract (mm) min avg max
						59.98	0.02		Linoleum. [MADE GROUND]					
						59.95	0.05		Plaster. [MADE GROUND]					
						59.70	0.30		Pale grey concrete. 70% subangular to subrounded fine to medium gravel, 30% cement, <1% voids. [MADE GROUND]					
	1.0			SPT(C) 1.20m N=12 (2,3/3,3,3,3)		59.40	0.60		Pale brown to grey silty gravel. Gravel is fine to coarse subrounded to angular of dolomite. [MADE GROUND]					
						58.80	1.20		Dark grey ashy gravel. Gravel is fine to coarse angular to subrounded of sandstone and brick. Ash is fine to coarse. [MADE GROUND]	1.20 2.00	100	0	0	
	2.0			SPT(C) 2.00m N=22 (3,5/5,5,5,7)		58.00	2.00		Stiff red brown mottled grey gravelly CLAY. Gravel is fine to medium subrounded to rounded of coal, sandstone, mudstone and chalk. [GLACIAL TILL]					
						57.00	3.00		Soft to firm red brown gravelly CLAY. Gravel is fine to coarse angular to subrounded of mudstone, chalk and sandstone. [GLACIAL TILL]	2.00 3.00	100	0	0	
	3.0			SPT(C) 3.00m N=33 (5,6/6,8,8,11)					Extremely weak red brown residually weathered to de-structured MUDSTONE. Gravel is fine to coarse angular to rounded of mudstone. [BOLLIN MUDSTONE MEMBER]	3.00 4.50	100	0	0	
	4.0													
	5.0									4.50 6.00	100	0	0	
	6.0					53.80	6.20							
						53.50	6.50		Weak pale grey distinctly weathered SILTSTONE with planar rough discontinuities. Discountinuities are infilled with red clay. [BOLLIN MUDSTONE MEMBER]					
						53.20	6.80		Very weak red brown destructured MUDSTONE. [BOLLIN MUDSTONE MEMBER]	6.00 7.50	100	11	0	
	7.0					52.90	7.10		Extremely weak to very weak red brown distinctly to partially weathered MUDSTONE. Fractures are closely spaced, blocky with multiple fracture planes. [BOLLIN MUDSTONE MEMBER]					
						52.75	7.25		Very weak red brown destructured MUDSTONE. [BOLLIN MUDSTONE MEMBER]					
	8.0								Extremely weak to weak red brown distinctly to partially weathered MUDSTONE with rough undulating to planar discontinuities infilled with red clay. [BOLLIN MUDSTONE MEMBER]	7.50 9.00	87	31	0	
	9.0			SPT(C) 9.00m 50 (25 for 85mm/50 for 35mm)		51.00	9.00		Soft red brown gravelly CLAY. Gravel is fine to coarse subangular to angular of mudstone. [BOLLIN MUDSTONE MEMBER]					
						50.60	9.40		Weak red brown distinctly to partially weathered MUDSTONE with rough undulating discontinuities infilled with red clay. [BOLLIN MUDSTONE MEMBER]	9.00 10.50	93	30	15	
	10.0	10.00 - 10.10	C 1											

Stratum continues onto next page

Notes:

1. Groundwater not encountered.
2. C = Core Sample.
3. Installation Details: 0.00m to 5.00m plain 63mm diameter pipe with bentonite; 5.00m to 15.00m slotted 63mm diameter pipe with gravel filter and geosock. Gas tap, bung and flush cover.
4. Borehole location measured in from topographic survey.

Hole Diameter		Casing	
Depth (m)	Dia (mm)	Depth (m)	Dia (mm)
15.00	102	3.00	115

Hammer Information	
Energy Ratio	Serial No.
60%	BBL7

Install Response Zones		
Ref	From (m)	To (m)
Pipe1	5.00	15.00

CIVIC	Project Title: **The Birtles (Plot C2), Wythenshawe**		Client: **Muse Places and Wythenshawe Community Housing Group**
	Project Number: **51143/02**	Logged By: KIA Checked By: KP	
Location ID: **RC102**	Location Type: Rotary cored		
	Coords: 382604.00E/387136.00N	Level: 60.00mOD	
Status: FINAL	Scale: 1:50	Final Depth: 15.00	
Sheet 2 of 2	Date Start: 09/07/2026	Date End: 10/07/2026	

Method and Plant Used				Groundwater		
From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
0.00	1.20	IP	Hand Tools			
1.20	15.00	RC	Beretta GT			

Inst/ Backfill	Depth (m)	Samples & Tests: Sample Depth (m)	Type/Ref	Tests/Results	Water Level (m)	Level (mOD)	Strata Depth (m)	Legend / Cover	Strata Description	Rotary Coring: Core Run	TCR (%)	SCR (%)	RQD (%)	Fract (mm) min avg max
									Weak red brown distinctly to partially weathered MUDSTONE with rough undulating discontinuities infilled with red clay. [BOLLIN MUDSTONE MEMBER]					
		10.60 - 10.75	C 2	SPT(C) 10.50m 50 (25 for 15mm/50 for 20mm)										
	11.0					48.90	11.10							
						48.70	11.30		Soft red brown gravelly CLAY. Gravel is fine to coarse subangular to angular of mudstone. [BOLLIN MUDSTONE MEMBER]	10.50 12.00	100	61	29	
		11.80 - 11.95	C 3						Weak red brown distinctly to partially weathered MUDSTONE with rough undulating discontinuities infilled with red clay. [BOLLIN MUDSTONE MEMBER]					
	12.0			SPT(C) 12.00m 50 (25 for 15mm/50 for 15mm)		48.00	12.00							
						47.90	12.10	× × × ×	Very weak grey partially weathered SILTSTONE with smooth planar discontinuities. [BOLLIN MUDSTONE MEMBER]					
						47.80	12.20		No recovery. [BOLLIN MUDSTONE MEMBER]	12.00 13.50	93	22	0	
									Weak red brown distinctly to partially weathered MUDSTONE with rough undulating discontinuities infilled with red clay. Fractures are inipent and closely spaced, blocky with multiple fracture planes. [BOLLIN MUDSTONE MEMBER]					
	13.0			SPT(C) 13.50m 50 (25 for 15mm/50 for 0mm)										
		13.80 - 13.90	C 4			46.20	13.80							
	14.0	14.10 - 14.20	C 5					× × × ×	Very weak grey partially weathered SILTSTONE with smooth planar discontinuities. [BOLLIN MUDSTONE MEMBER]	13.50 15.00	100	52	17	
	15.0			SPT(C) 15.00m 50 (25 for 15mm/50 for 0mm)		45.00	15.00		EOH at 15.00m - Achieved target depth					
	16.0													
	17.0													
	18.0													
	19.0													
	20.0													

Notes:

1. Groundwater not encountered.
2. C = Core Sample.
3. Installation Details: 0.00m to 5.00m plain 63mm diameter pipe with bentonite; 5.00m to 15.00m slotted 63mm diameter pipe with gravel filter and geosock. Gas tap, bung and flush cover.
4. Borehole location measured in from topographic survey.

Hole Diameter		Casing		Hammer Information	
Depth (m)	Dia (mm)	Depth (m)	Dia (mm)	Energy Ratio	Serial No.
15.00	102	3.00	115	60%	BBL7

Install Response Zones		
Ref	From (m)	To (m)

CIVIC	Project Title: **The Birtles (Plot C2), Wythenshawe**		Client: **Muse Places and Wythenshawe Community Housing Group**
	Project Number: **51143/02**	Logged By: KIA Checked By: KP	
Location ID: **FIP01**	Location Type: Inspection pit		
	Coords: 382634.99E/387108.29N	Level: 60.00mOD	
Status: FINAL	Scale: 1:10	Final Depth: 0.80	
Sheet 1 of 1	Date Start: 23/06/2026	Date End: 24/06/2026	

Method and Plant Used				Groundwater		
From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
0.00	0.80	IP	Hand Dug			

Inst/ Backfill	Depth (m)	Samples & Tests: Sample Depth (m)	Samples & Tests: Type/Ref	Samples & Tests: Tests/Results	Water Level (m)	Level (mOD)	Strata Depth (m)	Legend / Cover	Strata Description
						59.93	0.07		Pale grey concrete. 20% subrounded fine gravel, 70% cement, 10% voids. [MADE GROUND]
						59.20	0.80		Pale brown ashy gravel. Gravel is fine to coarse angular to subrounded of brick, concrete, rubber and metal. [MADE GROUND]
	1.0								EOH at 0.80m - Terminated on engineer's instruction due to limited access and services
	2.0								

Notes:

1. Inspection Pit terminated on engineer's instruction due to limited access space and the presence of potential services.
2. No groundwater encountered.
3. Inspection Pit backfilled with arisings in reverse order upon completion with concrete reinstated at surface.
4. Ground level estimated from adjacent external exploratory hole locations, and coordinates taken from internal positioning estimated by on site engineer.

Soakaway Tests

Test Number	Date	Duration (hh:mm)	Infiltration Rate

Pit Details

Stability	Shoring Used	Length (m)	Width (m)
Stable	None	0.45	0.30

CIVIC	Project Title: **The Birtles (Plot C2), Wythenshawe**		Client: **Muse Places and Wythenshawe Community Housing Group**
	Project Number: **51143/02**	Logged By: KIA Checked By: KP	
Location ID: **FIP02**	Location Type: Inspection pit		
	Coords: 382642.33E/387099.70N	Level: 60.00mOD	
Status: FINAL	Scale: 1:10	Final Depth: 1.30	
Sheet 1 of 1	Date Start: 22/06/2026	Date End: 24/06/2026	

Method and Plant Used				Groundwater		
From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
0.00	1.30	IP	Hand Dug	0.30	-	-

Inst/ Backfill	Depth (m)	Samples & Tests: Sample Depth (m)	Type/Ref	Tests/Results	Water Level (m)	Level (mOD)	Strata Depth (m)	Legend / Cover	Strata Description
						59.95	0.05		Linoleum. [MADE GROUND]
						59.78	0.22		Pale grey concrete. 70% subangular to subrounded fine to medium gravel, 30% cement, <1% voids. [MADE GROUND]
	1.0				▼				Soft light orangish brown gravelly clay. Gravel is fine to coarse angular to subrounded of sandstone and brick. [MADE GROUND]
						58.70	1.30		EOH at 1.30m - Terminated on engineer's instruction due to limited access
	2.0								

Notes:

1. Inspection Pit terminated on engineer's instruction due to limited access.
2. Groundwater encountered at 0.30mbgl, noted as slow seepage.
3. Inspection Pit backfilled with arisings in reverse order upon completion with concrete reinstated at surface.
4. Ground level estimated from adjacent external exploratory hole locations, and coordinates taken from internal positioning estimated by on site engineer.

Soakaway Tests

Test Number	Date	Duration (hh:mm)	Infiltration Rate

Pit Details

Stability	Shoring Used	Length (m)	Width (m)
Stable	None	0.80	0.30

CIVIC	Project Title: **The Birtles (Plot C2), Wythenshawe**			Client: **Muse Places and Wythenshawe Community Housing Group**							
	Project Number: **51143/02**	Logged By: KIA Checked By: KP		Method and Plant Used				Groundwater			
				From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To	
Location ID: **FIP03**	Location Type: Inspection pit			0.00	1.35	IP	Hand Dug	0.30	-	-	
	Coords: 382646.76E/387099.35N	Level: 60.00mOD									
Status: FINAL	Scale: 1:10	Final Depth: 1.35									
Sheet 1 of 1	Date Start: 23/06/2026	Date End: 24/06/2026									

Inst/ Backfill	Depth (m)	Samples & Tests: Sample Depth (m)	Type/Ref	Tests/Results	Water Level (m)	Level (mOD)	Strata Depth (m)	Legend / Cover	Strata Description
						59.95	0.05		Linoleum. [MADE GROUND]
						59.78	0.22		Pale grey concrete. 70% subangular to subrounded fine to medium gravel, 30% cement, <1% voids. [MADE GROUND]
	1.0				▼				Soft light orangish brown gravelly clay. Gravel is fine to coarse angular to subrounded of sandstone and brick. [MADE GROUND]
						58.65	1.35		EOH at 1.35m - Terminated on engineer's instruction
	2.0								

Notes:

1. Inspection Pit terminated on engineer's instruction following exposure of foundation.
2. Groundwater encountered at 0.30mbgl, noted as slow seepage.
3. Inspection Pit backfilled with arisings in reverse order upon completion with concrete reinstated at surface.
4. Ground level estimated from adjacent external exploratory hole locations, and coordinates taken from internal positioning estimated by on site engineer.

Soakaway Tests

Test Number	Date	Duration (hh:mm)	Infiltration Rate

Pit Details

Stability	Shoring Used	Length (m)	Width (m)
Stable	None	1.10	0.90

CIVIC	Project Title: **The Birtles (Plot C2), Wythenshawe**		Client: **Muse Places and Wythenshawe Community Housing Group**
	Project Number: **51143/02**	Logged By: KIA Checked By: KP	
Location ID: **FIP04**	Location Type: Inspection pit		
	Coords: 382649.16E/387098.07N	Level: 60.00mOD	
Status: FINAL	Scale: 1:10	Final Depth: 0.70	
Sheet 1 of 1	Date Start: 24/06/2026	Date End: 24/06/2026	

Method and Plant Used				Groundwater		
From (m)	To (m)	Type	Plant Used	Strike (m)	Time (min)	Rose To
0.00	0.70	IP	Hand Dug			

Inst/ Backfill	Depth (m)	Samples & Tests: Sample Depth (m)	Type/Ref	Tests/Results	Water Level (m)	Level (mOD)	Strata Depth (m)	Legend / Cover	Strata Description
						59.96	0.04		Linoleum. [MADE GROUND]
						59.79	0.21		Pale grey concrete. 70% subrounded fine to medium gravel, 30% cement, <1% voids. [MADE GROUND]
						59.60	0.40		Soft to firm pale reddish brown slightly gravelly clay. Gravel is fine to coarse subangular to subrounded of concrete, brick, dolomite, coal and sandstone. [MADE GROUND]
						59.30	0.70		Firm to stiff red mottled grey gravelly CLAY. Gravel is fine to medium subangular to rounded of coal, sandstone and mudstone. [GLACIAL TILL]
									EOH at 0.70m - Terminated on engineer's instruction
	1.0								
	2.0								

Notes:

1. Inspection Pit terminated on engineer's instruction due to limited access. Base of foundation not encountered.
2. No groundwater encountered.
3. Inspection Pit backfilled with arisings in reverse order upon completion with concrete reinstated at surface.
4. Ground level estimated from adjacent external exploratory hole locations, and coordinates taken from internal positioning estimated by on site engineer.

Soakaway Tests

Test Number	Date	Duration (hh:mm)	Infiltration Rate

Pit Details

Stability	Shoring Used	Length (m)	Width (m)
Stable	None	1.30	1.00

Appendix B – Exploratory Hole Location Plan



KEY

Site Boundary

Exploratory Holes

- Previous Foundation Inspection Pit
- Previous SI Wells
- Previous Concrete Cores
- Proposed Rotary Cored Boreholes

Rev	Date	Comments
C02	17/08/26	Addition of Rotary Cored Boreholes

CIVIC

Civic Earth
77 Dale Street
Manchester
M1 2HG
T: 01612286757

Project	Wythenshawe Plot C2
Client	MUSE Places
Drawing title	Exploratory Hole Location Plan
Scale(s)	1:250
Job no.	51143/02

Drawn	AP	17/08/2026
Checked	KP	17/08/2026
Approved	KP	17/08/2026

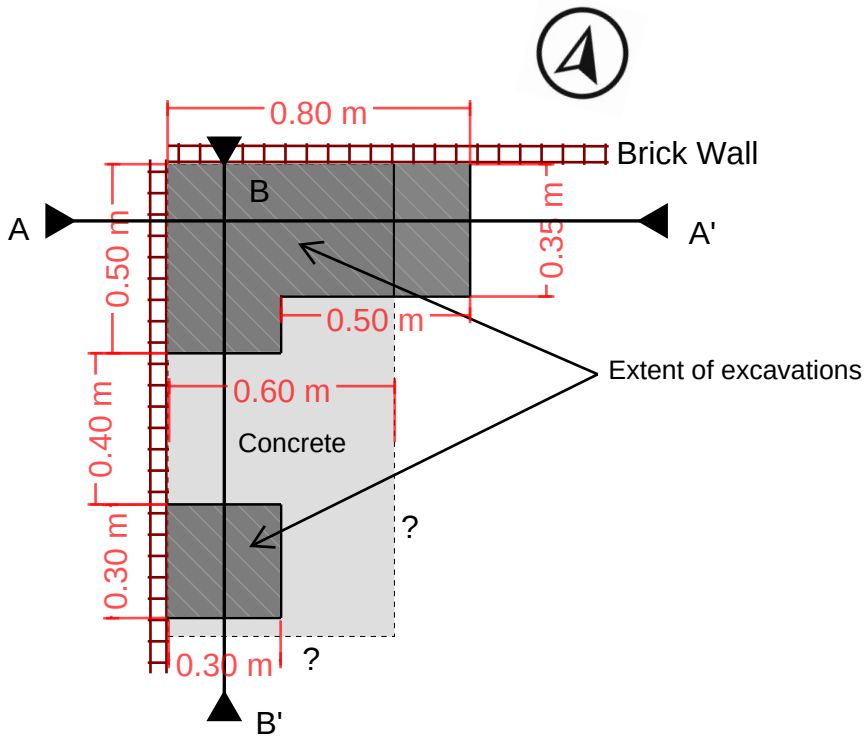
Dwg No. 51143-CIV-02-XX-D-G-1001

Rev. C02

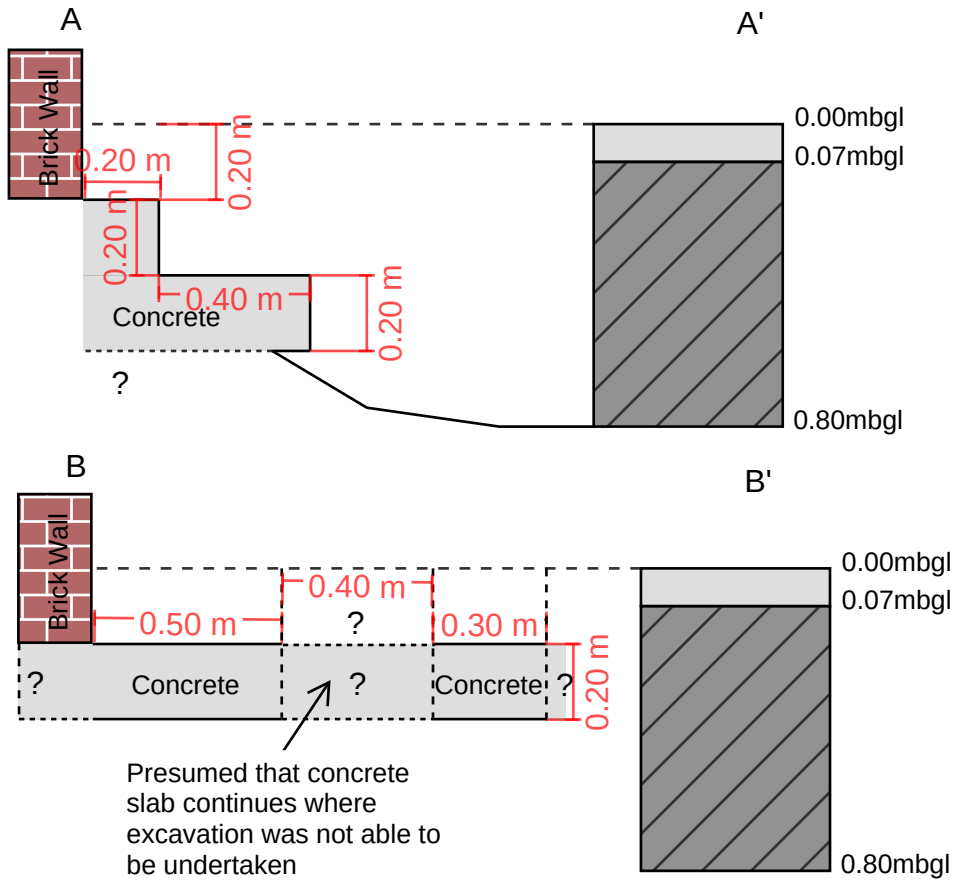
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Appendix C – Foundation Inspection Pit Drawings

Plan of Excavation



Section of Excavation



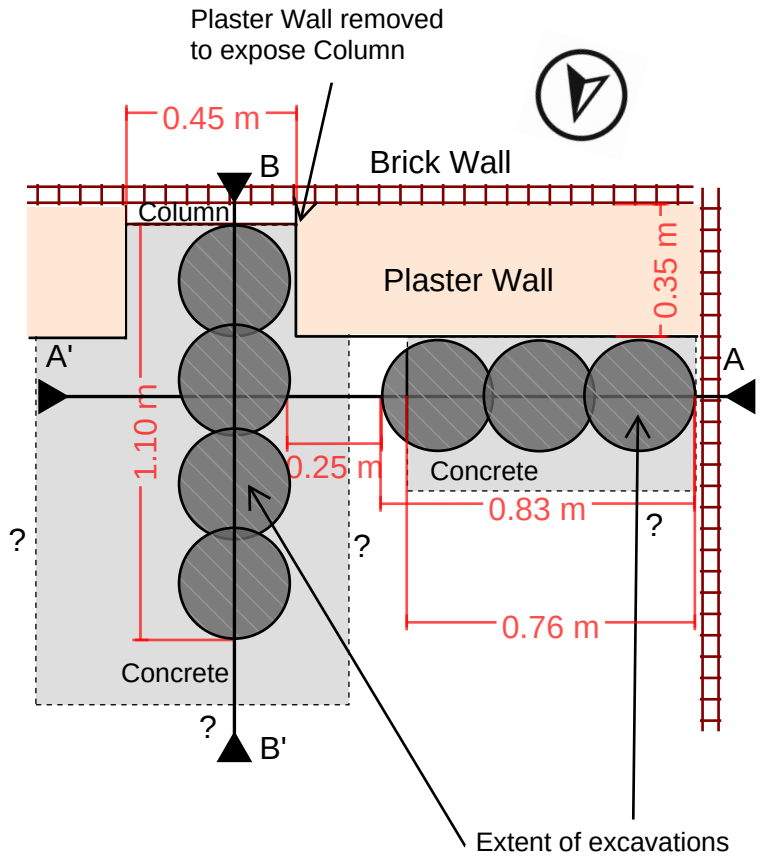
Notes:
No groundwater recorded.
Pit excavated between 23.06.26 - 24.06.26.

0.00 to 0.07mbgl:	Pale grey concrete. 20% subrounded fine gravel, 70% cement, 10% voids. [MADE GROUND]
0.07 to 0.80mbgl:	Pale brown ashy gravel. Gravel is fine to coarse angular to subrounded of brick, concrete, rubber and metal. [MADE GROUND]

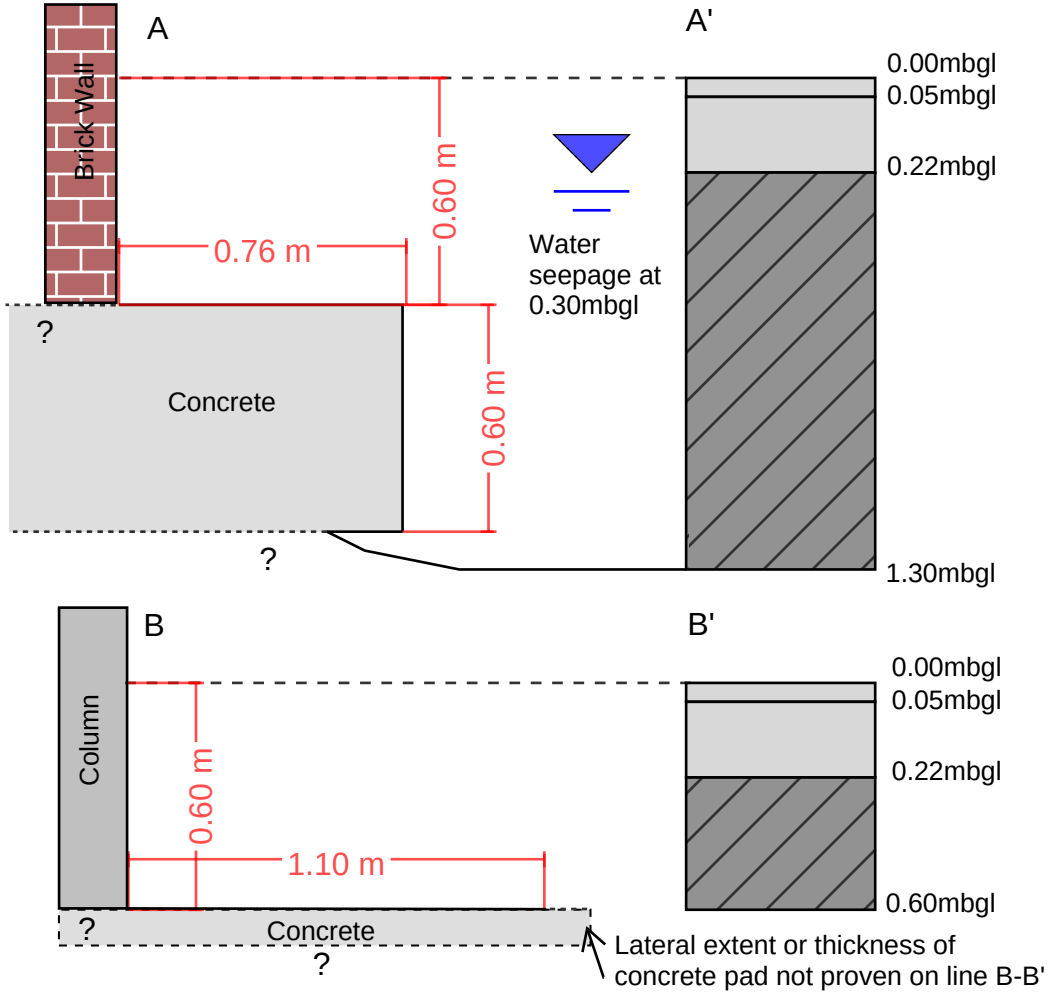
PROJECT NAME						DRAWING STATUS	SCALE
Wythenshawe C2 - Pre Demo						FOR INFORMATION	1 : 20
TITLE	DRAWING No.	PROJECT No.	DATE CREATED	DRAWN	REV		
Foundation Inspection Pit - FIP01	51143-CIV-02-XX-D-G-1005	51143/02	25/06/26	KIA	C01	CIVIC	

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Plan of Excavation



Section of Excavation



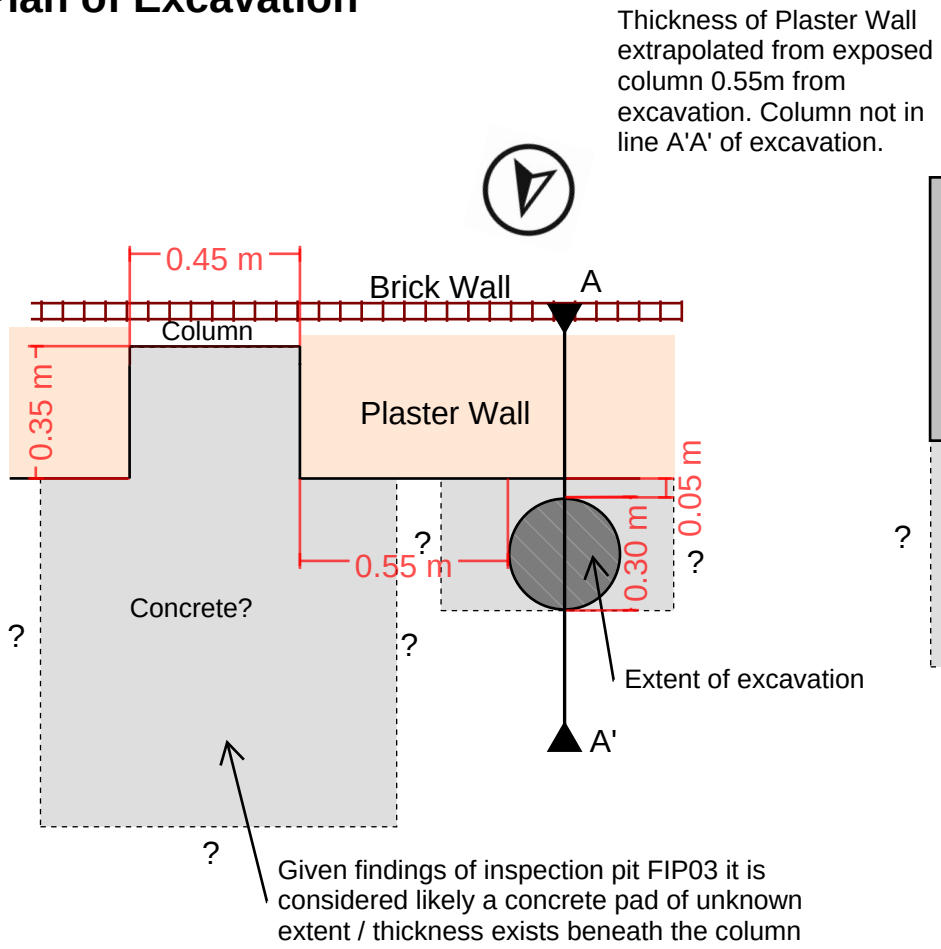
Notes:
Groundwater seepage recorded at 0.30mbgl.
Pit excavated between 22.06.2026 - 24.06.2026.

0.00 to 0.05mbgl:	Linoleum. [MADE GROUND]
0.05 to 0.22mbgl:	Pale grey concrete. 70% subangular to subrounded fine to medium gravel, 30% cement, <1% voids. [MADE GROUND]
0.22 to 1.30mbgl:	Soft light orangish brown gravelly clay. Gravel is fine to coarse angular to subrounded of sandstone and brick. [MADE GROUND]

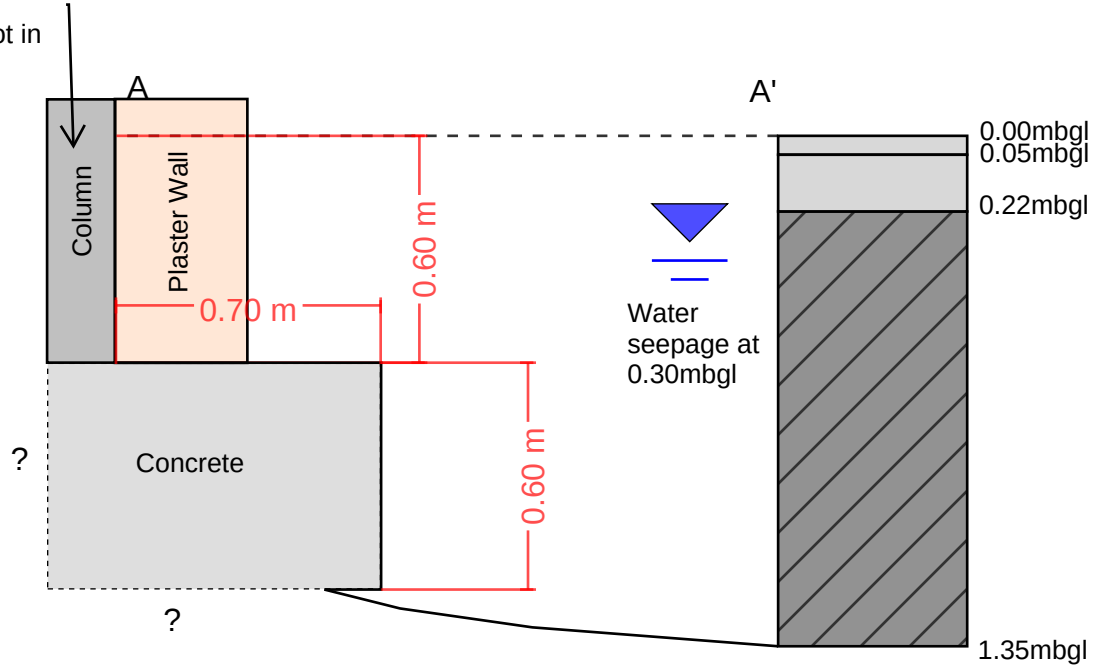
PROJECT NAME						DRAWING STATUS	SCALE
Wythenshawe C2 - Pre Demo						FOR INFORMATION	1 : 20
TITLE	DRAWING No.	PROJECT No.	DATE CREATED	DRAWN	REV		
Foundation Inspection Pit - FIP02	51143-CIV-02-XX-D-G-1006	51143/02	30/06/26	KIA	C01	CIVIC	

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Plan of Excavation



Section of Excavation



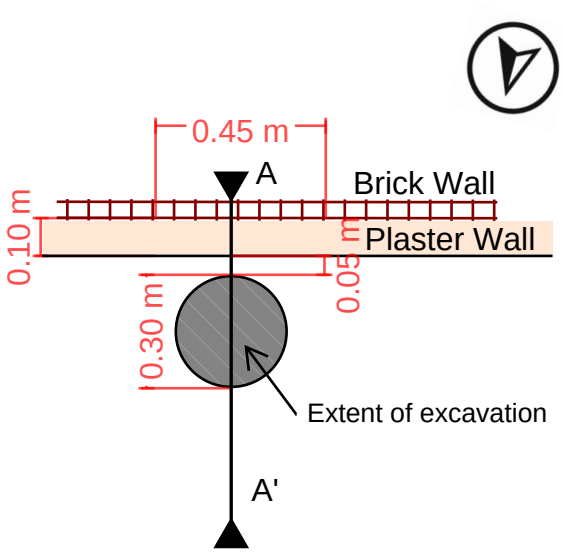
Notes:
Groundwater seepage recorded at 0.30mbgl.
Pit excavated between 23.06.26 - 24.06.26.

0.00 to 0.05mbgl:	Linoleum. [MADE GROUND]
0.05 to 0.22mbgl:	Pale grey concrete. 70% subangular to subrounded fine to medium gravel, 30% cement, <1% voids. [MADE GROUND]
0.22 to 1.35mbgl:	Soft light orangish brown gravelly clay. Gravel is fine to coarse angular to subrounded of sandstone and brick. [MADE GROUND]

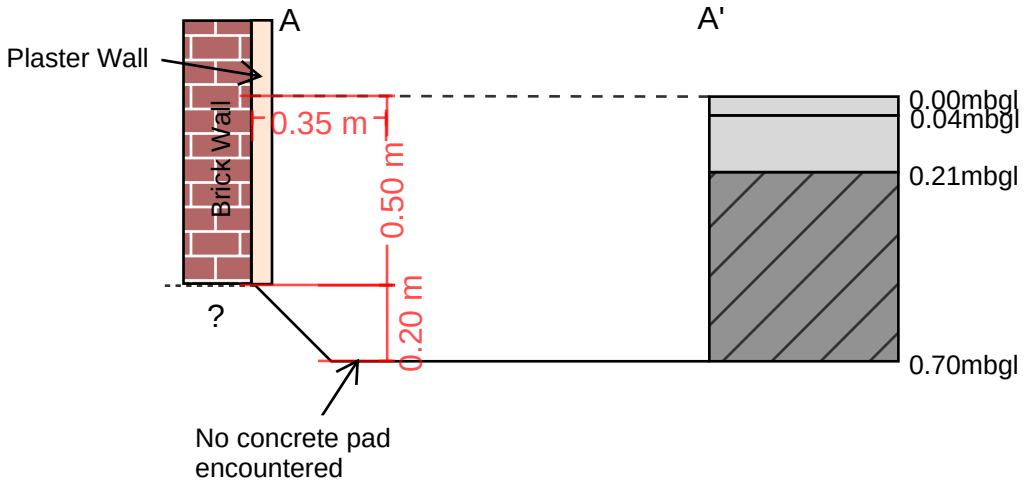
PROJECT NAME						DRAWING STATUS	SCALE
Wythenshawe C2 Trial Pits						FOR INFORMATION	1 : 20
TITLE	DRAWING No.	PROJECT No.	DATE CREATED	DRAWN	REV		
Foundation Inspection Pit - FIP03	51143-CIV-02-XX-D-G-1007	51143/02	30/06/26	KIA	C01	CIVIC	

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Plan of Excavation



Section of Excavation



Notes:
No groundwater recorded.
Strength / density based on site engineers observations only.
Pit excavated between 24.06.26.

0.00 to 0.04mbgl:	Linoleum. [MADE GROUND]
0.04 to 0.21mbgl:	Pale grey concrete. 70% subrounded fine to medium gravel, 30% cement, <1% voids. [MADE GROUND]
0.21 to 0.40mbgl:	Soft to firm pale reddish brown slightly gravelly clay. Gravel is fine to coarse subangular to subrounded of concrete, brick, dolomite, coal and sandstone. [MADE GROUND]
0.40 to 0.70mbgl:	Firm to stiff red mottled grey gravelly CLAY. Gravel is fine to medium subangular to rounded of coal, sandstone and mudstone. [GLACIAL TILL]

PROJECT NAME						DRAWING STATUS	SCALE
Wythenshawe C2 Trial Pits						FOR INFORMATION	1 : 20
TITLE	DRAWING No.	PROJECT No.	DATE CREATED	DRAWN	REV		
Foundation Inspection Pit - FIP04	51143-CIV-02-XX-D-G-1008	51143/02	29/09/26	KIA	C01	CIVIC	

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Appendix D – Infiltration Testing Results

Borehole Falling Head Test

CIVIC

Project Name	Wythenshawe C2 Trial Pits	**Date**	25/06/2026
Project Reference	51143/02	**Engineer**	KIA
Borehole ID	RC05	**Test No.**	1

Monitoring Details	
Groundwater Depth	2.10 mbgl
Base of Well	14.50 mbgl
Diameter of Well (D)	0.05 m
Length of Tested Section (L)	14.35 m
L/D Ratio	287.0
Test Located in Saturated Zone	Yes

Calculation

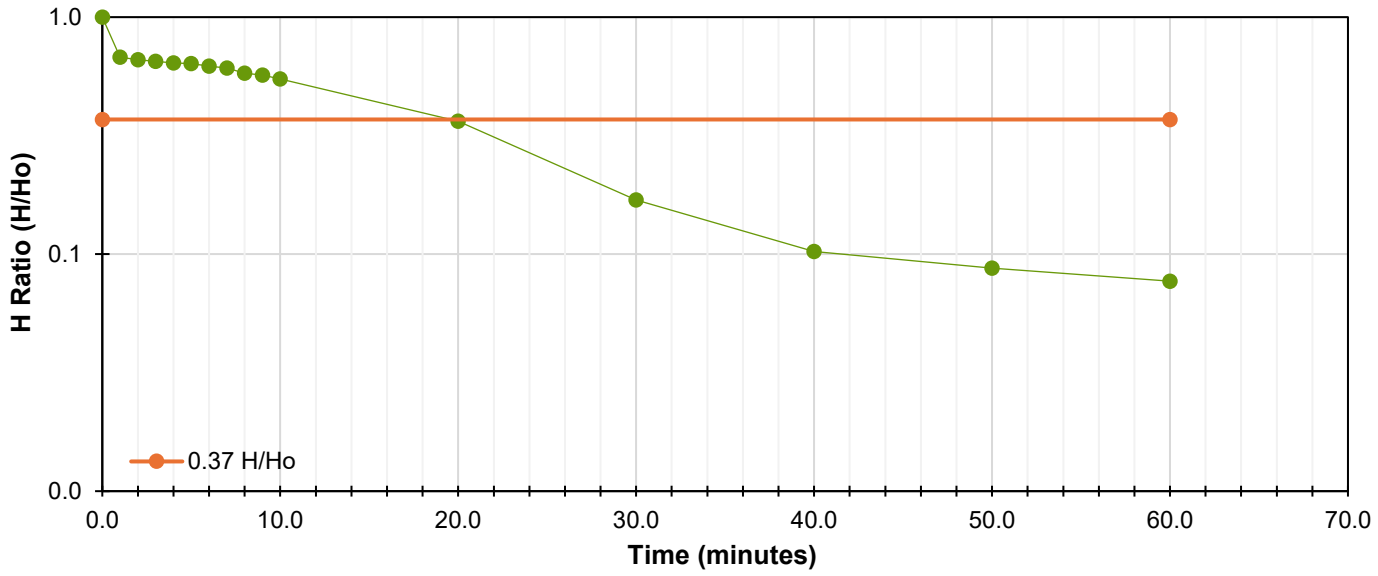
$$k = \frac{A}{FT}$$

Well Type (BS:5930/BS EN ISO 22282-1)	d.2
F = Intake Factor	14.1931
H_1 = Variable Head (H) measured at t_1 (m)	1.95
H_2 = Variable Head (H) measured at t_2 (m)	0.15
t_1 = Time at H_1 (minutes)	0.0
t_2 = Time at H_2 (minutes)	60.0
A = Cross sectional area (m^2)	0.002
T = Basic Time Lag Factor where H/Ho = 0.37	20.0

Permeability (k)	**6.92E-06**	m/s
	5.98E-01	m/day

Test Results

Time (minutes)	Time (seconds)	Depth (mbgl)	Head, H (m)	H Ratio H/Ho
0.0	0	0.15	1.95	1.000
1.0	60	0.78	1.32	0.677
2.0	120	0.81	1.29	0.662
3.0	180	0.83	1.27	0.651
4.0	240	0.85	1.25	0.641
5.0	300	0.86	1.24	0.636
6.0	360	0.89	1.21	0.621
7.0	420	0.91	1.19	0.610
8.0	480	0.97	1.13	0.579
9.0	540	0.99	1.11	0.569
10.0	600	1.03	1.07	0.549
20.0	1200	1.39	0.71	0.364
30.0	1800	1.77	0.33	0.169
40.0	2400	1.90	0.20	0.103
50.0	3000	1.93	0.17	0.087
60.0	3600	1.95	0.15	0.077



Infiltration testing undertaken in general accordance with Variable Head Test in Open System (BS EN ISO 22282-2:2012).

Borehole Falling Head Test

CIVIC

Project Name	Wythenshawe C2 Trial Pits	**Date**	25/06/2026
Project Reference	51143/02	**Engineer**	KIA
Borehole ID	RC05	**Test No.**	2

Monitoring Details	
Groundwater Depth	2.10 mbgl
Base of Well	14.50 mbgl
Diameter of Well (D)	0.05 m
Length of Tested Section (L)	14.35 m
L/D Ratio	287.0
Test Located in Saturated Zone	Yes

Calculation

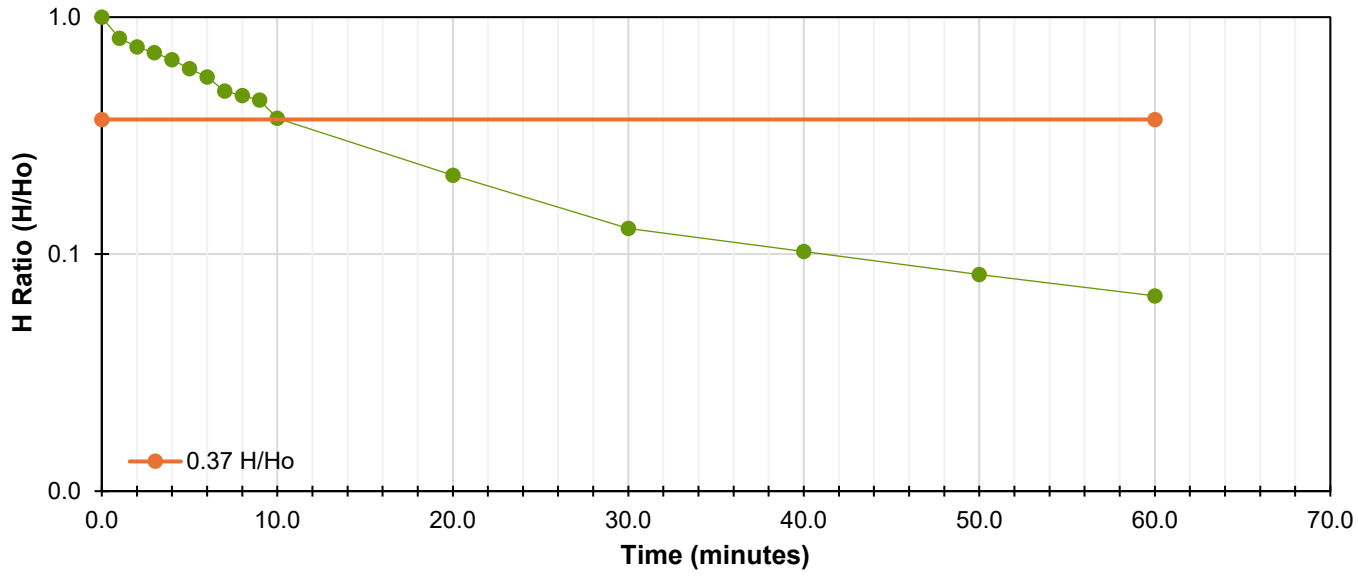
$$k = \frac{A}{FT}$$

Well Type (BS:5930/BS EN ISO 22282-1)	d.2
F = Intake Factor	14.1931
H_1 = Variable Head (H) measured at t_1 (m)	1.95
H_2 = Variable Head (H) measured at t_2 (m)	0.13
t_1 = Time at H_1 (minutes)	0.0
t_2 = Time at H_2 (minutes)	60.0
A = Cross sectional area (m^2)	0.002
T = Basic Time Lag Factor where H/Ho = 0.37	10.0

Permeability (k)	**1.38E-05**	m/s
	1.20E+00	m/day

Test Results

Time (minutes)	Time (seconds)	Depth (mbgl)	Head, H (m)	H Ratio H/Ho
0.0	0	0.15	1.95	1.000
1.0	60	0.51	1.59	0.815
2.0	120	0.64	1.46	0.749
3.0	180	0.72	1.38	0.708
4.0	240	0.81	1.29	0.662
5.0	300	0.92	1.18	0.605
6.0	360	1.01	1.09	0.559
7.0	420	1.15	0.95	0.487
8.0	480	1.19	0.91	0.467
9.0	540	1.23	0.87	0.446
10.0	600	1.37	0.73	0.374
20.0	1200	1.68	0.42	0.215
30.0	1800	1.85	0.25	0.128
40.0	2400	1.90	0.20	0.103
50.0	3000	1.94	0.16	0.082
60.0	3600	1.97	0.13	0.067



Infiltration testing undertaken in general accordance with Variable Head Test in Open System (BS EN ISO 22282-2:2012).

Borehole Falling Head Test

CIVIC

Project Name	Wythenshawe C2 Trial Pits	**Date**	25/06/2026
Project Reference	51143/02	**Engineer**	KIA
Borehole ID	RC05	**Test No.**	3

Monitoring Details	
Groundwater Depth	2.10 mbgl
Base of Well	14.50 mbgl
Diameter of Well (D)	0.05 m
Length of Tested Section (L)	14.35 m
L/D Ratio	287.0
Test Located in Saturated Zone	Yes

Calculation

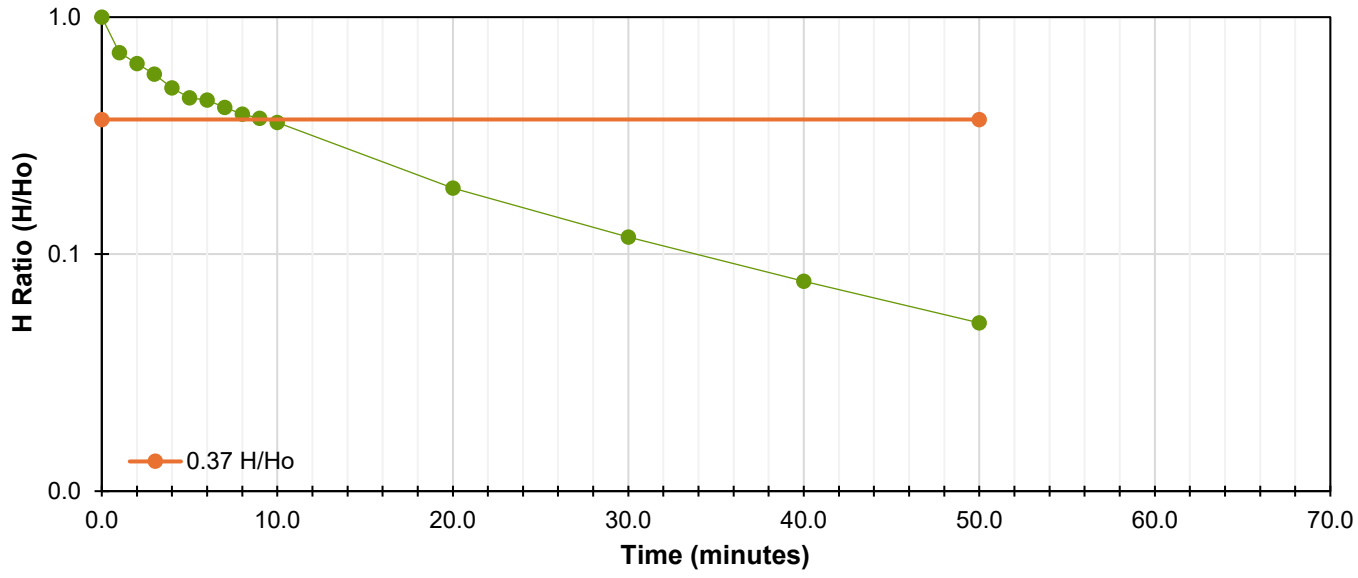
$$k = \frac{A}{FT}$$

Well Type (BS:5930/BS EN ISO 22282-1)	d.2
F = Intake Factor	14.1931
H_1 = Variable Head (H) measured at t_1 (m)	1.95
H_2 = Variable Head (H) measured at t_2 (m)	0.00
t_1 = Time at H_1 (minutes)	0.0
t_2 = Time at H_2 (minutes)	60.0
A = Cross sectional area (m^2)	0.002
T = Basic Time Lag Factor where H/Ho = 0.37	9.0

Permeability (k)	**1.54E-05**	m/s
	1.33E+00	m/day

Test Results

Time (minutes)	Time (seconds)	Depth (mbgl)	Head, H (m)	H Ratio H/Ho
0.0	0	0.15	1.95	1.000
1.0	60	0.72	1.38	0.708
2.0	120	0.86	1.24	0.636
3.0	180	0.98	1.12	0.574
4.0	240	1.12	0.98	0.503
5.0	300	1.21	0.89	0.456
6.0	360	1.23	0.87	0.446
7.0	420	1.29	0.81	0.415
8.0	480	1.34	0.76	0.390
9.0	540	1.37	0.73	0.374
10.0	600	1.40	0.70	0.359
20.0	1200	1.73	0.37	0.190
30.0	1800	1.87	0.23	0.118
40.0	2400	1.95	0.15	0.077
50.0	3000	2.00	0.10	0.051
60.0	3600	2.10	0.00	0.000



Infiltration testing undertaken in general accordance with Variable Head Test in Open System (BS EN ISO 22282-2:2012).

Borehole Falling Head Test

CIVIC

Project Name	Wythenshawe C2 Trial Pits	**Date**	24/06/2026
Project Reference	51143/02	**Engineer**	KIA
Borehole ID	WS19A	**Test No.**	1

Monitoring Details	
Groundwater Depth	1.63 mbgl
Base of Well	1.65 mbgl
Diameter of Well (D)	0.05 m
Length of Tested Section (L)	1.02 m
L/D Ratio	20.4
Test Located in Saturated Zone	No

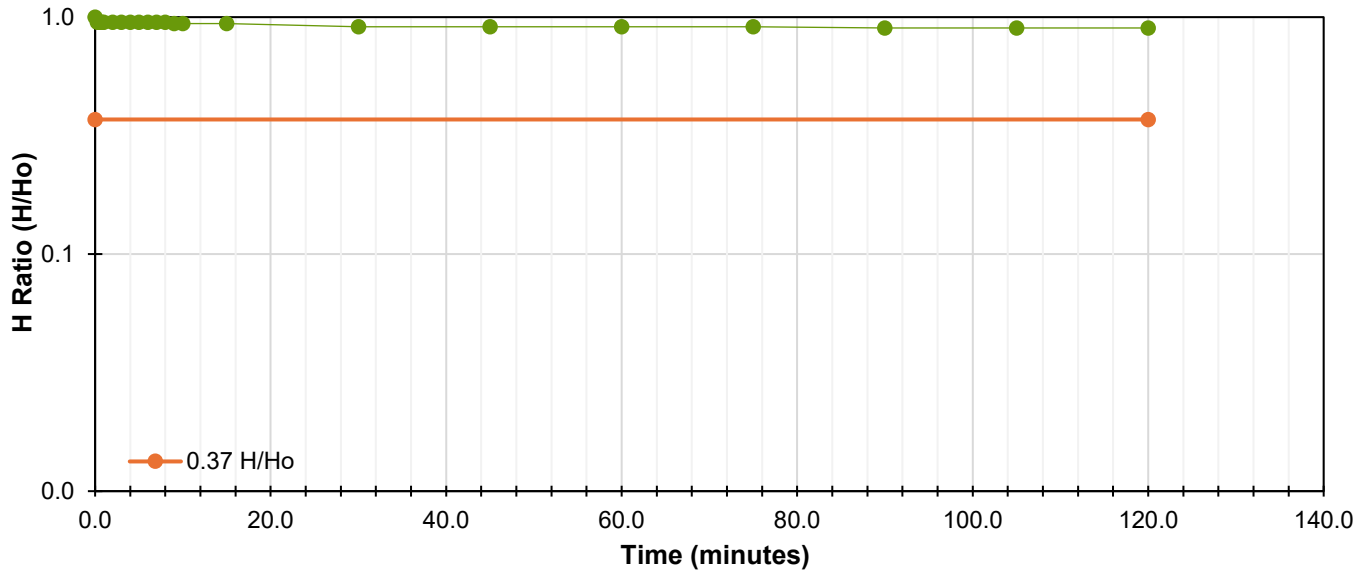
Calculation

$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

Well Type (BS:5930/BS EN ISO 22282-1)	d.2
F = Intake Factor	1.7281
H_1 = Variable Head (H) measured at t_1 (m)	1.00
H_2 = Variable Head (H) measured at t_2 (m)	0.91
t_1 = Time at H_1 (minutes)	0.0
t_2 = Time at H_2 (minutes)	120.0
A = Cross sectional area (m^2)	0.002
T = Basic Time Lag Factor where H/Ho = 0.37	Fail

Permeability (k)		
	Fail	m/s
	Fail	m/day

Test Results				
Time (minutes)	Time (seconds)	Depth (mbgl)	Head, H (m)	H Ratio H/Ho
0.0	0	0.63	1.00	1.000
0.3	15	0.68	0.95	0.950
0.5	30	0.68	0.95	0.950
0.8	45	0.68	0.95	0.950
1.0	60	0.68	0.95	0.950
2.0	120	0.68	0.95	0.950
3.0	180	0.68	0.95	0.950
4.0	240	0.68	0.95	0.950
5.0	300	0.68	0.95	0.950
6.0	360	0.68	0.95	0.950
7.0	420	0.68	0.95	0.950
8.0	480	0.68	0.95	0.950
9.0	540	0.69	0.94	0.940
10.0	600	0.69	0.94	0.940
15.0	900	0.69	0.94	0.940
30.0	1800	0.72	0.91	0.910
45.0	2700	0.72	0.91	0.910
60.0	3600	0.72	0.91	0.910
75.0	4500	0.72	0.91	0.910
90.0	5400	0.73	0.90	0.900
105.0	6300	0.73	0.90	0.900
120.0	7200	0.73	0.90	0.900



Infiltration testing undertaken in general accordance with Variable Head Test in Open System (BS EN ISO 22282-2:2012).

Borehole Falling Head Test

CIVIC

Project Name	Wythenshawe C2 Trial Pits	**Date**	25/06/2026
Project Reference	51143/02	**Engineer**	KIA
Borehole ID	WS20A	**Test No.**	1

Monitoring Details	
Groundwater Depth	0.56 mbgl
Base of Well	1.00 mbgl
Diameter of Well (D)	0.05 m
Length of Tested Section (L)	0.89 m
L/D Ratio	17.8
Test Located in Saturated Zone	No

Calculation

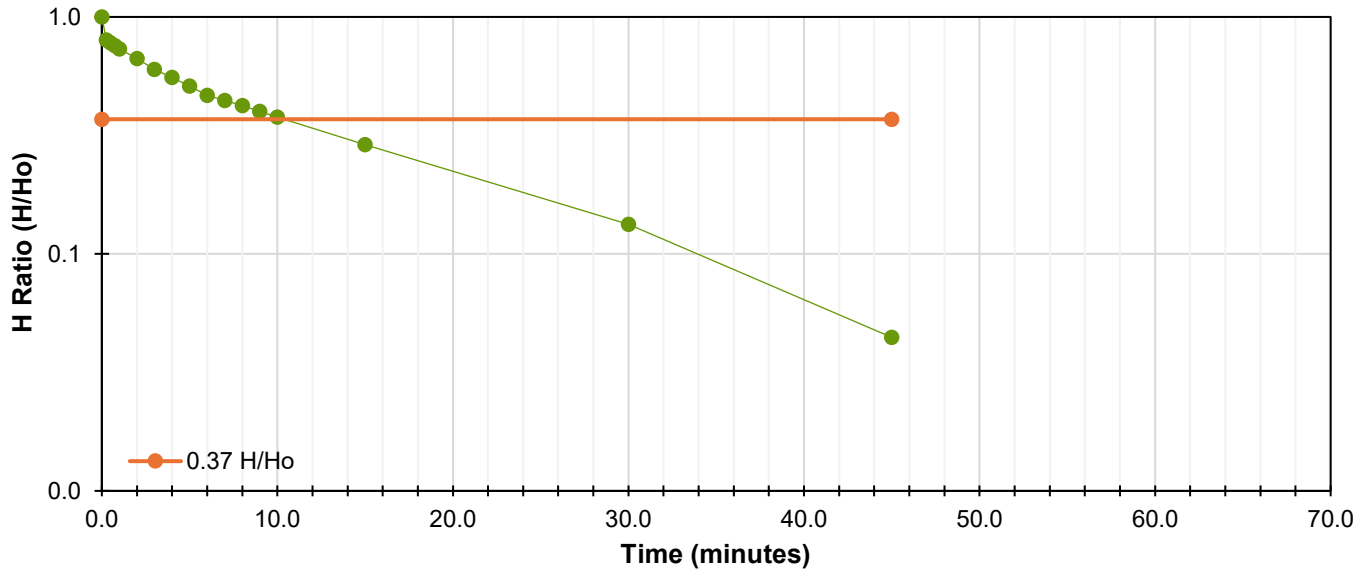
$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

Well Type (BS:5930/BS EN ISO 22282-1)	d.2
F = Intake Factor	1.5654
H_1 = Variable Head (H) measured at t_1 (m)	0.45
H_2 = Variable Head (H) measured at t_2 (m)	0.00
t_1 = Time at H_1 (minutes)	0.0
t_2 = Time at H_2 (minutes)	60.0
A = Cross sectional area (m^2)	0.002
T = Basic Time Lag Factor where H/Ho = 0.37	10.0

Permeability (k)		
	Fail	m/s
	Fail	m/day

Test Results

Time (minutes)	Time (seconds)	Depth (mbgl)	Head, H (m)	H Ratio H/Ho
0.0	0	0.11	0.45	1.000
0.3	15	0.20	0.36	0.800
0.5	30	0.21	0.35	0.778
0.8	45	0.22	0.34	0.756
1.0	60	0.23	0.33	0.733
2.0	120	0.26	0.30	0.667
3.0	180	0.29	0.27	0.600
4.0	240	0.31	0.25	0.556
5.0	300	0.33	0.23	0.511
6.0	360	0.35	0.21	0.467
7.0	420	0.36	0.20	0.444
8.0	480	0.37	0.19	0.422
9.0	540	0.38	0.18	0.400
10.0	600	0.39	0.17	0.378
15.0	900	0.43	0.13	0.289
30.0	1800	0.50	0.06	0.133
45.0	2700	0.54	0.02	0.044
60.0	3600	0.56	0.00	0.000



Infiltration testing undertaken in general accordance with Variable Head Test in Open System (BS EN ISO 22282-2:2012).

Borehole Falling Head Test

CIVIC

Project Name	Wythenshawe C2 Trial Pits	**Date**	25/06/2026
Project Reference	51143/02	**Engineer**	KIA
Borehole ID	WS20A	**Test No.**	2

Monitoring Details	
Groundwater Depth	0.56 mbgl
Base of Well	1.00 mbgl
Diameter of Well (D)	0.05 m
Length of Tested Section (L)	0.89 m
L/D Ratio	17.8
Test Located in Saturated Zone	No

Calculation

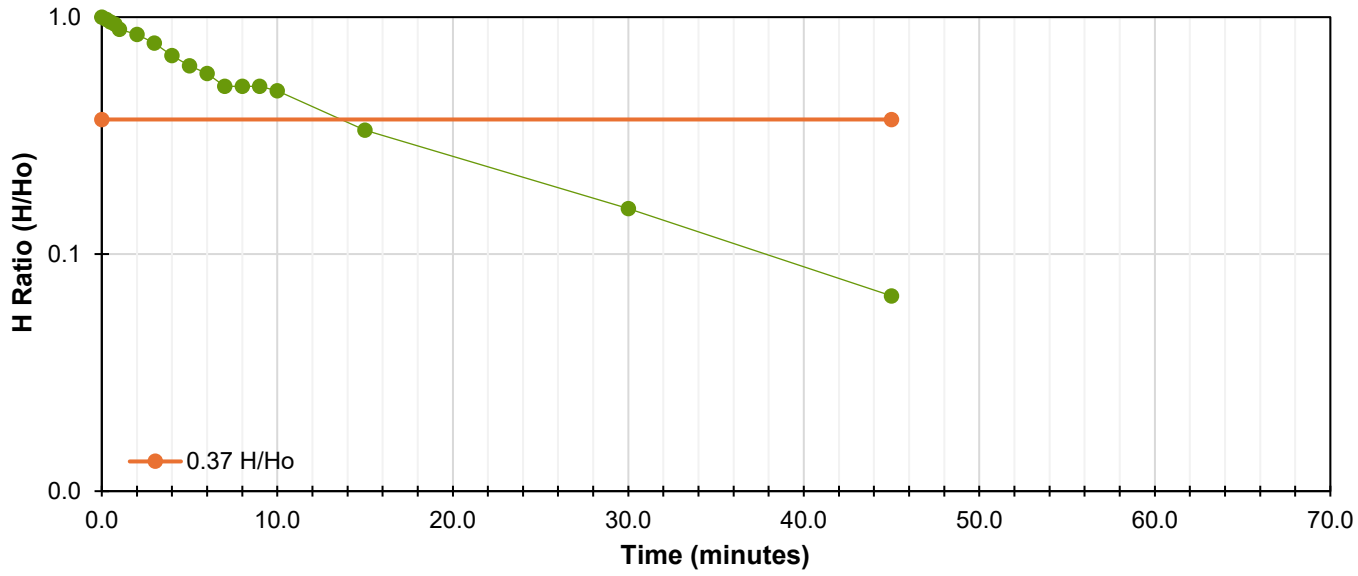
$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

Well Type (BS:5930/BS EN ISO 22282-1)	d.2
F = Intake Factor	1.5654
H_1 = Variable Head (H) measured at t_1 (m)	0.45
H_2 = Variable Head (H) measured at t_2 (m)	0.00
t_1 = Time at H_1 (minutes)	0.0
t_2 = Time at H_2 (minutes)	60.0
A = Cross sectional area (m^2)	0.002
T = Basic Time Lag Factor where H/Ho = 0.37	14.0

Permeability (k)		
	Fail	m/s
	Fail	m/day

Test Results

Time (minutes)	Time (seconds)	Depth (mbgl)	Head, H (m)	H Ratio H/Ho
0.0	0	0.11	0.45	1.000
0.3	15	0.12	0.44	0.978
0.5	30	0.13	0.43	0.956
0.8	45	0.14	0.42	0.933
1.0	60	0.16	0.40	0.889
2.0	120	0.18	0.38	0.844
3.0	180	0.21	0.35	0.778
4.0	240	0.25	0.31	0.689
5.0	300	0.28	0.28	0.622
6.0	360	0.30	0.26	0.578
7.0	420	0.33	0.23	0.511
8.0	480	0.33	0.23	0.511
9.0	540	0.33	0.23	0.511
10.0	600	0.34	0.22	0.489
15.0	900	0.41	0.15	0.333
30.0	1800	0.49	0.07	0.156
45.0	2700	0.53	0.03	0.067
60.0	3600	0.56	0.00	0.000



Infiltration testing undertaken in general accordance with Variable Head Test in Open System (BS EN ISO 22282-2:2012).

Borehole Falling Head Test

CIVIC

Project Name	Wythenshawe C2 Trial Pits	**Date**	25/06/2026
Project Reference	51143/02	**Engineer**	KIA
Borehole ID	WS20A	**Test No.**	3

Monitoring Details	
Groundwater Depth	0.56 mbgl
Base of Well	1.00 mbgl
Diameter of Well (D)	0.05 m
Length of Tested Section (L)	0.89 m
L/D Ratio	17.8
Test Located in Saturated Zone	No

Calculation

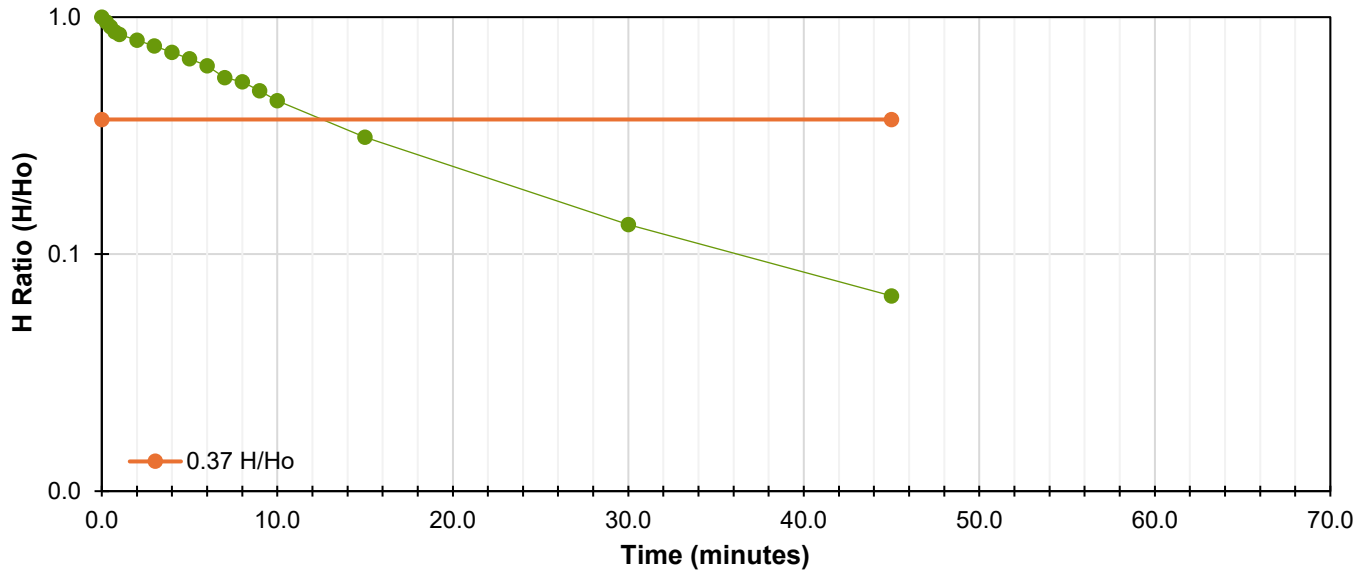
$$k = \frac{A}{F(t_2 - t_1)} \log_e \frac{H_1}{H_2}$$

Well Type (BS:5930/BS EN ISO 22282-1)	d.2
F = Intake Factor	1.5654
H_1 = Variable Head (H) measured at t_1 (m)	0.45
H_2 = Variable Head (H) measured at t_2 (m)	0.00
t_1 = Time at H_1 (minutes)	0.0
t_2 = Time at H_2 (minutes)	60.0
A = Cross sectional area (m^2)	0.002
T = Basic Time Lag Factor where H/Ho = 0.37	13.0

Permeability (k)		
	Fail	m/s
	Fail	m/day

Test Results

Time (minutes)	Time (seconds)	Depth (mbgl)	Head, H (m)	H Ratio H/Ho
0.0	0	0.11	0.45	1.000
0.3	15	0.13	0.43	0.956
0.5	30	0.15	0.41	0.911
0.8	45	0.17	0.39	0.867
1.0	60	0.18	0.38	0.844
2.0	120	0.20	0.36	0.800
3.0	180	0.22	0.34	0.756
4.0	240	0.24	0.32	0.711
5.0	300	0.26	0.30	0.667
6.0	360	0.28	0.28	0.622
7.0	420	0.31	0.25	0.556
8.0	480	0.32	0.24	0.533
9.0	540	0.34	0.22	0.489
10.0	600	0.36	0.20	0.444
15.0	900	0.42	0.14	0.311
30.0	1800	0.50	0.06	0.133
45.0	2700	0.53	0.03	0.067
60.0	3600	0.56	0.00	0.000



Infiltration testing undertaken in general accordance with Variable Head Test in Open System (BS EN ISO 22282-2:2012).

Appendix E – Chemical Laboratory Analysis Results

Normec i2 Analytical

Civic Earth Limited
Carvers Warehouse
77 Dale Street
Manchester
M1 2HG

t: [redacted]

i2 Analytical Ltd.
7 Woodshots Meadow,
Croxley Green
Business Park,
Watford,
Herts,
WD18 8YS

[redacted]

Analytical Report Number : 26-034694

Project / Site name:	Wythenshawe C2 Trial Pits	**Samples received on:**	26/06/2026
Your job number:	51143 02	**Samples instructed on/ Analysis started on:**	26/06/2026
Your order number:		**Analysis completed by:**	10/07/2026
Report Issue Number:	1	**Report issued on:**	10/07/2026
Samples Analysed:	4 non soil samples		

[redacted]

Signed:

Eric Crociquia
Customer Service
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
air	- once the analysis is complete

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

Retention period for records and reports is minimum 6 years from the date of issue of the final report.
Some records may be kept for longer according to other legal/best practice requirements.

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.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number: 26-034694
Project / Site name: Wythenshawe C2 Trial Pits

Lab Sample Number				965934	965935	965936	965937
Sample Reference				CC01	CC02	CC03	CC04
Sample Number				1	1	1	1
Water Matrix				N/A	N/A	N/A	N/A
Depth (m)				0.00	0.00	0.00	0.00
Date Sampled				25/06/2026	25/06/2026	25/06/2026	25/06/2026
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)	Units	Test Limit of detection	Test Accreditation Status				
Mass of stone >10mm	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	0.7	0.64	0.06	0.11
Total mass of sample received	kg	0.1	NONE	0.2	0.2	0.1	0.1
Speciated PAHs							
Naphthalene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	0.12
Acenaphthylene	mg/kg	0.05	NONE	< 0.05	< 0.05	< 0.05	< 0.05
Acenaphthene	mg/kg	0.05	NONE	< 0.05	< 0.05	0.29	0.37
Fluorene	mg/kg	0.05	NONE	< 0.05	< 0.05	0.3	0.16
Phenanthrene	mg/kg	0.05	NONE	0.17	0.2	10	4.1
Anthracene	mg/kg	0.05	NONE	0.06	< 0.05	2.3	1.1
Fluoranthene	mg/kg	0.05	NONE	0.38	0.2	10	3.1
Pyrene	mg/kg	0.05	NONE	0.59	0.38	7.2	2.1
Benzo(a)anthracene	mg/kg	0.05	NONE	0.19	0.09	3.4	0.47
Chrysene	mg/kg	0.05	NONE	0.27	0.26	2.8	0.56
Benzo(b)fluoranthene	mg/kg	0.05	NONE	0.45	0.5	2.5	0.36
Benzo(k)fluoranthene	mg/kg	0.05	NONE	0.17	0.1	1	0.09
Benzo(a)pyrene	mg/kg	0.05	NONE	0.23	0.21	1.7	< 0.05
Indeno(1,2,3-cd)pyrene	mg/kg	0.05	NONE	0.23	0.26	0.68	0.2
Dibenz(a,h)anthracene	mg/kg	0.05	NONE	0.08	0.09	0.2	< 0.05
Benzo(ghi)perylene	mg/kg	0.05	NONE	0.3	0.32	0.59	0.31
Total PAH							
Speciated Total EPA-16 PAHs	mg/kg	0.8	NONE	3.12	2.62	43.5	13.1
Miscellaneous Organics							
Coal Tar		N/A	NONE	Indicative	Indicative	Indicative	Indicative
Total Residue	mg/kg	10	NONE	2500	2700	3100	2300

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

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 26-034694
Project / Site name: Wythenshawe C2 Trial Pits

* 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 *
965934	CC01	1	0	Non Soil. [*g]
965935	CC02	1	0	Non Soil. [*g]
965936	CC03	1	0	Non Soil. [*g]
965937	CC04	1	0	Non Soil. [*g]

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The results included within the report are representative of the samples submitted for analysis.

Analytical Report Number : 26-034694
Project / Site name: Wythenshawe C2 Trial Pits

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

Analytical Test Name	Analytical Method Description	Analytical Method Reference	Method number	Wet / Dry Analysis	Accreditation Status
Moisture Content (Wet Weight)	Moisture content (% wet weight), determined gravimetrically (up to 30°C)	In-house-procedure based on BS EN 12880:2000	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
Speciated PAHs and/or Semi-volatile organic compounds in soil	Determination of semi-volatile organic compounds (including PAH) in soil by extraction in dichloromethane and hexane followed by GC-MS	In-house method based on USEPA 8270	L064B	D	NONE
Coal Tar in soil	In-house method by GC-MS, by calculation of discrete polyaromatic content	In-house method by calculation	L064B	D	NONE
Soil Descriptions	Textural classification	In-house method	L019B	W	NONE

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 30oC.
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

*g - Unaccredited sample matrix.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report are representative of the samples submitted for analysis.

Appendix F – Geotechnical Laboratory Analysis Results

GEOLABS Limited
Bucknalls Lane
Garston
Watford
Hertfordshire
WD25 9XX

[redacted]

Civic Earth Limited
Carvers Warehouse
77 Dale Street
Manchester
M1 2HG

15 August 2026
Report No : GEO/45880/01

For the attention of Mr A Petts / Ms K l'Anson

Our ref	**GEO / 45880**	Date samples received	16/07/2026
Your ref	**51143/02**	Date written instructions received	16/07/2026
		Date testing commenced	17/07/2026
		Date of sample disposal	**12/09/2026**

Project **PLOT C2 (PRE DEMO RC BHS)**

Further to your instructions we have pleasure in enclosing the results of the tests you requested in the attached figures.

LABORATORY TEST REPORT

Item No	Test Quantity	Description
1	~	Unconfined Compressive Strength Summary
	1	Unconfined Compressive Strength with Young's Modulus
	1	Unconfined Compressive Strength
2	6	Point Load Strength Index

Any opinions or interpretations expressed herein are outside the scope of UKAS accreditation. All results contained in this report are provisional and may be subject to change unless signed by an approved signatory. The results contained in this report relate only to samples received in the laboratory and are tested 'as received' unless otherwise stated. This report should not be reproduced, except in full, without the written approval of the laboratory. The results reported are applicable only to the test items received by the laboratory.

All the necessary data required by the documented test procedures has been recorded and will be stored for a period of not less than 6 years. This data will be issued to yourselves at your request. All samples will be disposed of after the date shown above. Written confirmation will be required to retain the samples beyond this period and a storage charge may be applied.

We trust that the above meets your requirements and should you require any further information or assistance, please do not hesitate to contact us.

Yours faithfully
on behalf of **GEOLABS Limited**

[redacted]

I Tabios
Laboratory Manager

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ISRM Suggested Methods - Rock Characterization Testing and Monitoring 1974 - 2006

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Sample details				Density				Uniaxial Compression Test (LF0879C (1000kN) compression frame used)							
								Mean after prep.							
Borehole Ref.	Sample Ref.	Depth (m)	Description	MC (%)	Degree of Saturation (%)	Bulk (Mg/m³)	Dry (Mg/m³)	Diameter (mm)	Height (mm)	H/D Ratio	Load at Failure (kN)	UCS (MPa) 3 sig. fig.	Failure Sketch	D. Tested	Remarks
RC101		13.75-13.96	Very weak thinly laminated brown SILTSTONE. Moderately weathered	8.7	82.0	2.41	2.22	71.80	215.10	3.0	14.8	3.66		12/08/26	
RC102		11.79-12.00	Weak thinly laminated brown and grey SILTSTONE. Moderately weathered	3.6	40.6	2.39	2.31	72.30	191.30	2.6	37.4	9.11		13/08/26	

Note: The dimensional requirements of flatness (<0.02 mm), perpendicularity (<0.05 / 50 mm) and straightness (0.3 mm deviation) are all met. Specific Gravity used for Degree of Saturation is assumed unless specified by the client.

Checked and Approved by

[redacted]

H Brown (Geologist)

Date: 15/08/2026

Project Number:

GEO / 45880

Project Name:

PLOT C2 (PRE DEMO RC BHS)
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ISRM Suggested Methods - Rock Characterization Testing and Monitoring 1974 - 2006

UNIAXIAL COMPRESSIVE STRENGTH OF ROCK MATERIALS

Borehole Ref.:	RC101
Sample Ref.:	-
Depth (m):	13.75-13.96

Description:
Very weak thinly laminated brown SILTSTONE. Moderately weathered

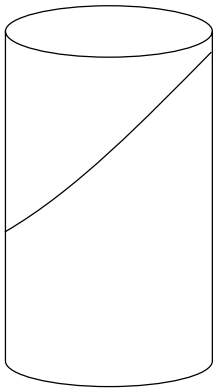
LF0879C (1000kN) compression frame used

Diameter	71.80 mm
Height	215.10 mm
Bulk Density	2.41 Mg/m³
Dry Density	2.22 Mg/m³
Water Content	8.7 %

Degree of Saturation: 82.0 % Specific Gravity: 2.9 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Diagonal shearing



Solid lines for material failures.
Dashed lines for apparent weakness failure.

Date tested: 12/08/2026

Test results

Unconfined Compressive Strength Maximum load (kN): 14.80	3.66 MPa
Young's Modulus (tangential at 50% failure load)	n/a
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	n/a
Poisson's Ratio (secant at 10% failure load)	n/a

Angle of foliation/Axis of loading: n/a
Angle of shear plane/Axis of loading: 25º

Sample type	**C**

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are all met.

Checked and Approved by

[redacted]

H Brown (Geologist)

Date: 15/08/2026

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UNCONFINED COMPRESSIVE STRENGTH WITH YOUNG'S MODULUS

Borehole Ref.:	RC102
Sample Ref.:	-
Depth (m):	11.79-12.00

Description:
Weak thinly laminated brown and grey SILTSTONE. Moderately weathered

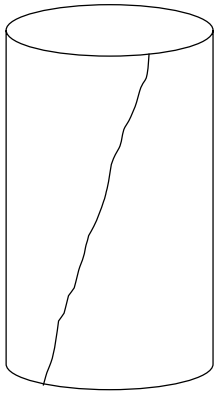
LF0879C (1000kN) compression frame used

Diameter	72.30 mm
Height	191.30 mm
Bulk Density	2.39 Mg/m³
Dry Density	2.31 Mg/m³
Water Content	3.6 %

Degree of Saturation: 40.6 % Specific Gravity: 2.9 Mg/m³ (Assumed)

Failure Sketch

Mode of failure: Diagonal shearing



Solid lines for material failures.
Dashed lines for apparent weakness failure.

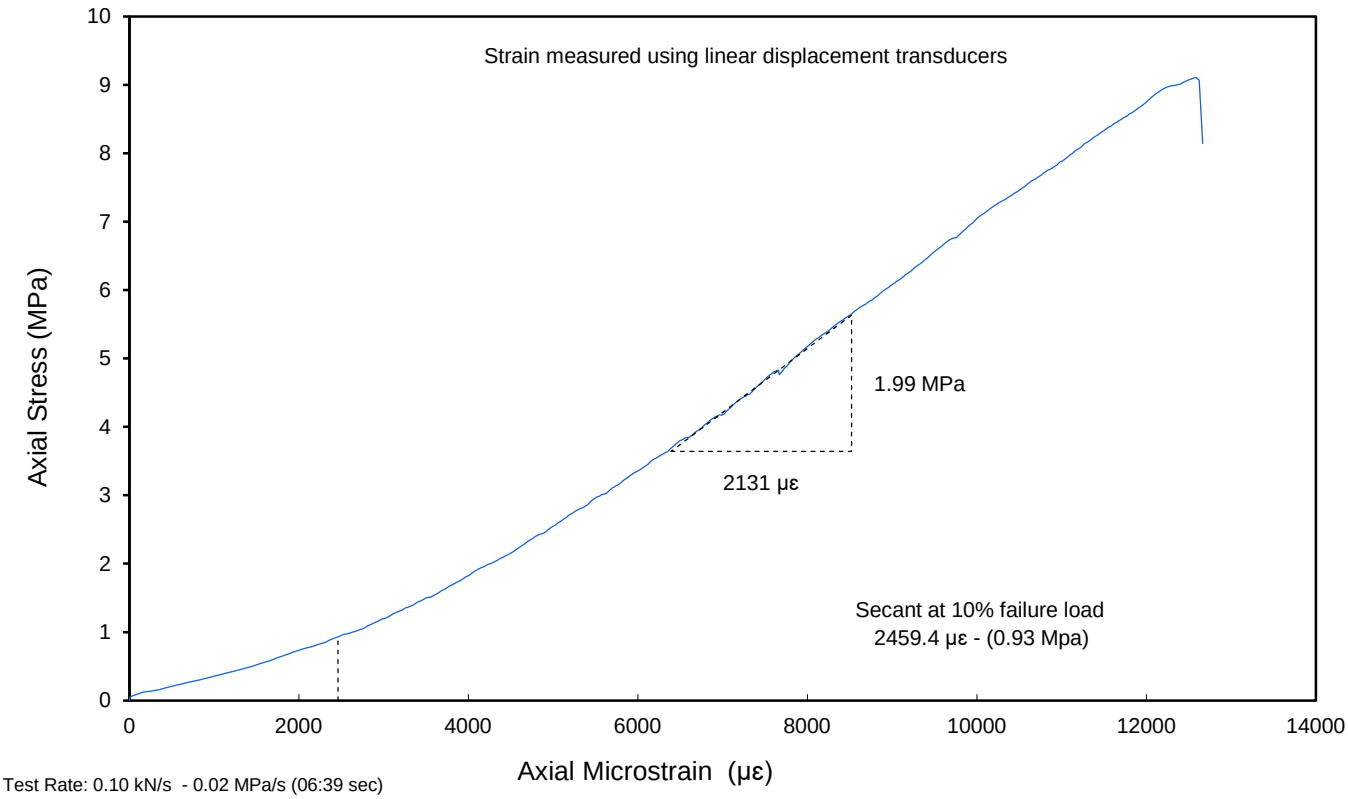
Date tested: 13/08/2026

Angle of foliation/Axis of loading: n/a
Angle of shear plane/Axis of loading: 10º

Sample type	C

Test results

Unconfined Compressive Strength (Maximum load (kN): 37.40)	9.11 MPa
Young's Modulus (tangential at 50% failure load)	0.936 GPa
Poisson's Ratio (tangential at 50% failure load)	n/a
Young's Modulus (secant at 10% failure load)	0.377 GPa
Poisson's Ratio (secant at 10% failure load)	n/a



Test Rate: 0.10 kN/s - 0.02 MPa/s (06:39 sec)

Note: The dimensional requirements of Flatness (<0.02 mm), Perpendicularity (<0.05 / 50 mm) and Straightness (0.3 mm deviation) are all met.

Checked and Approved by

[redacted]

H Brown (Geologist)

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DETERMINATION OF POINT LOAD STRENGTH ON ROCK

Sample details				Point Load test											
Borehole Ref.	Sample Ref.	Depth (m)	Description	D. Tested	Test type & Direction		Sample width W (mm)	Platen separation (mm) Start D	Platen separation (mm) End D'	Water Content (%)	Equiv. Diameter D_e (mm)	Failure Load P (kN)	I_s P/De^2 (MPa)	Correction Factor F	Point Load Index $I_{s(50)}$ (MPa)
RC101		8.50-8.60	Very weak thinly laminated brown micaceous SILTSTONE. Slightly to moderately weathered	13/08/26	D	L	72.8	72.7	71.1		71.9	0.55	0.11	1.18	0.13
RC101		10.20-10.30	Very weak thinly laminated greenish grey SILTSTONE. Moderately weathered	13/08/26	D	L	71.6	71.3	69.2		70.2	0.23	0.05	1.17	0.06
RC101		13.60-13.75	Extremely weak thinly laminated reddish brown SILTSTONE. Moderately weathered	13/08/26	D	L	73.4	73.1	71.8		72.4	0.07	0.01	1.18	0.01
RC101		14.00-14.20	Extremely weak thinly laminated reddish brown SILTSTONE. Moderately weathered	13/08/26	D	L	72.5	72.0	70.3		71.1	0.09	0.02	1.17	0.02
RC102		10.00-10.10	Weak thinly laminated brown slightly micaceous SILTSTONE. Slightly to moderately weathered	13/08/26	D	L	71.9	71.5	70.1		70.8	1.26	0.25	1.17	0.29
RC102		14.10-14.20	Medium strong thinly laminated light brown and brown SILTSTONE. Slightly weathered	13/08/26	D	L	72.1	72.0	70.8		71.4	7.30	1.43	1.17	1.68

(*) Sample failed on weakness

Test type and direction: **D** - Diametral **A** - Axial **B** - Block **I** - Irregular lump **P** - Perpendicular to planes of weakness **U** - Random or unknown orientation **L** - Parallel to planes of weakness

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