

Mr Tom Botterill
MyPad 2020 Ltd.
The Quadrant
Nuart Road
Beeston
Nottingham
NG9 2NH

Dear Tom,

Re: Land At Barton Road, Barlestone – Ground Investigation To Assist With Vibro Foundation Design

Background

Erda Associates Ltd. were requested by MyPad 2020 Ltd. (hereafter referred to as the client) to undertake a supplementary ground investigation to assist with vibro stone column design at the site known as *land at Barton Road, Barlestone*.

Site location and proposed development plans are included in **Appendix A**.

A previous Phase II ground investigation for the subject site has been completed and referenced below;

- Erda Associates Ltd., Land At Barton Road, Barlestone - Phase II Geo-Environmental Assessment, (Ref:EAL.288.22), dated July 2023.

A copy of the above report is not available herein; however, it is available upon request. In summary, the previous investigation identified that either a piled or vibro stone column foundation would be required for the proposed development due to the presence of variable superficial deposits at shallow depth across the site.

It is understood that the client's appointed vibro contractor required a deeper ground investigation in the form of cable percussive boreholes to be commissioned. In addition, it was also recommended that the extents of a former infilled pond were delineated on site with the infill material tested for organic content.

The client had also requested that soakaway testing was undertaken at the site in order to confirm its suitability for soakaway drainage.

Site Works

Erda Associates Ltd. (Erda) were asked to attend the subject site between 11th and 17th June 2024 in order to undertake the required additional investigation works. The work comprised the following;

- The advancing of five cable percussive boreholes to determine the depth to rockhead with in situ testing (standard penetration tests) and disturbed sampling.
- Soakaway testing in three positions.
- Delineation of a former infilled pond by trial trenching (including confirmation of the depth of the backfill).
- Geotechnical and chemical laboratory analysis of the samples retrieved from the ground investigation.

An exploratory hole location plan is included in **Appendix A**.

Ground Conditions

Topsoil was encountered in the majority of exploratory holes and generally comprised dark brown slightly gravelly clayey sand. The topsoil was recorded to extend to depths of between 0.20m and 0.30mbgl.

Made ground was encountered in the vicinity of a former pond (situated in the north-western corner of the site). The made ground was noted to comprise reworked topsoil and natural cohesive deposits. Trial trenching to determine the extents and depth of the made ground was undertaken by mechanical excavator. The maximum depth of the made ground was determined to be 2.10mbgl. A plan showing the approximate extents and location of the infilled pond is included in **Appendix B**.

Superficial strata were encountered directly beneath the topsoil and made ground in all exploratory holes. The superficial strata were noted to be variable in nature but generally comprised firm to stiff slightly gravelly sandy clay and light brown/reddish brown sand and gravel. Blowing sand horizons were noted in conjunction with the sand and gravel deposits at depth of between 5.50m and 5.90mbgl. These deposits are considered to be representative of the superficial glaciofluvial and Oadby member deposits that are recorded to underlie the site.

Suspected solid bedrock deposits comprising extremely weak reddish-brown mudstone were encountered at depths of between 9.00m and 11.30mbgl. These deposits are considered to be representative of the Gunthorpe Member that is recorded to underlie the site.

Groundwater was generally encountered in conjunction with the shallow granular deposits and recorded at depths of between 1.30m and 2.90mbgl.

Exploratory borehole logs are contained in **Appendix C**, for reference.

Soakaway Testing

Soakaway testing targeted within the shallow superficial deposits was undertaken in three positions. In summary, insufficient drainage has been recorded during the testing and soakaway drainage is not considered to be suitable for the site.

Previous and recent groundwater monitoring has shown that groundwater is present at depths of between 0.60m and 2.90mbgl (generally at a depth of 1.00m). Again, the presence, of shallow groundwater makes soakaway drainage unviable and alternative drainage strategies should be sought.

Laboratory Testing

Based on the laboratory analysis results (including those obtained during the previous Phase II investigation, a medium plasticity should be assumed for the shallow cohesive deposits.

A quick undrained triaxial test undertaken on the shallow cohesive deposits encountered in BH02 has returned an undrained shear strength of 43kPa.

Water Soluble Sulphate and pH analysis (including those from the previous Phase II investigation) revealed results of 4.4-418mg/ISO4 and 6.2-8.7, respectively. Therefore, it is considered appropriate to adopt a Basic Design Sulphate Class of DS-1, together with an Aggressive Chemical Environment Concrete (ACEC) of AC-2z.

Laboratory test results obtained during the deeper borehole investigation are contained in **Appendix D**. Previous laboratory test results undertaken during the Phase II Investigation can be found in the previous Phase II Report (available upon request).

Organic matter testing of selected samples of the made ground from within the former pond returned results of between 1.7% and 5.4%.

Conclusion

The ground investigation works were undertaken by Erda Associates Ltd on behalf of MyPad 2020 Ltd. in general accordance with the ground investigation requirements to determine ground conditions for vibro foundations.

The investigation has identified that the site is generally underlain by topsoil/made ground overlying superficial glaciofluvial and Oadby member deposits which, in turn, overlie a weathered top horizon of the Gunthorpe Member.

Soakaway drainage is not considered to be suitable for the site and alternative drainage strategies should be sought.

In-situ and laboratory geotechnical testing has been completed in accordance with general requirements of the client.

Should you have any queries, or require any further information, please do not hesitate to contact us.

Yours Sincerely

A handwritten signature in black ink, appearing to read 'P. Devitt'.

Phil Devitt, BSc MSc MRICS
Director

Encl.

Appendix A – Site Plans

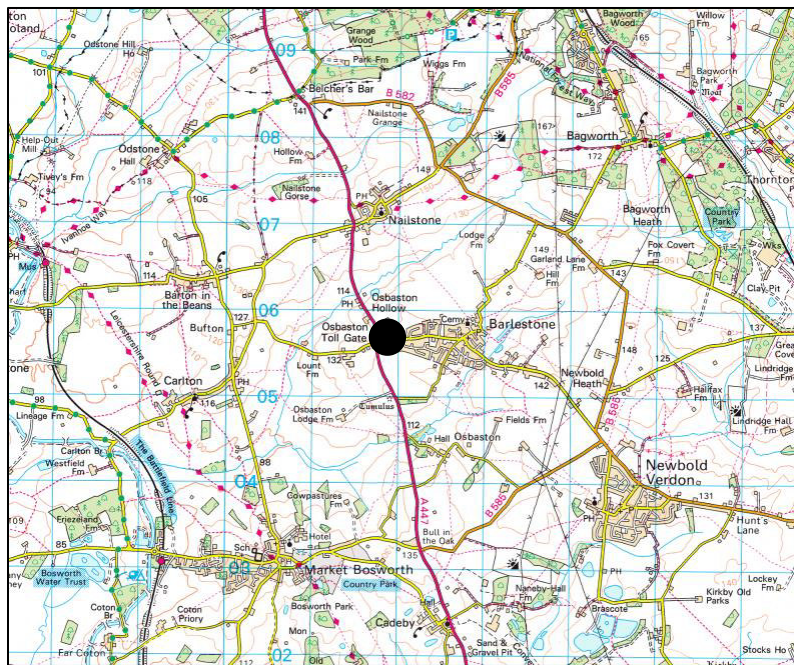
Appendix B – Pond Delineation Plan

Appendix C – Exploratory Hole Logs

Appendix D – Laboratory Analysis Results

Appendix A





KEY:

● Approximate Site Location

DO NOT SCALE



TITLE:

Site Location Plan

PROJECT:

Barton Road, Barlestone

PROJECT No:

EAL.288.22

DATE:

07/2024

SCALE:

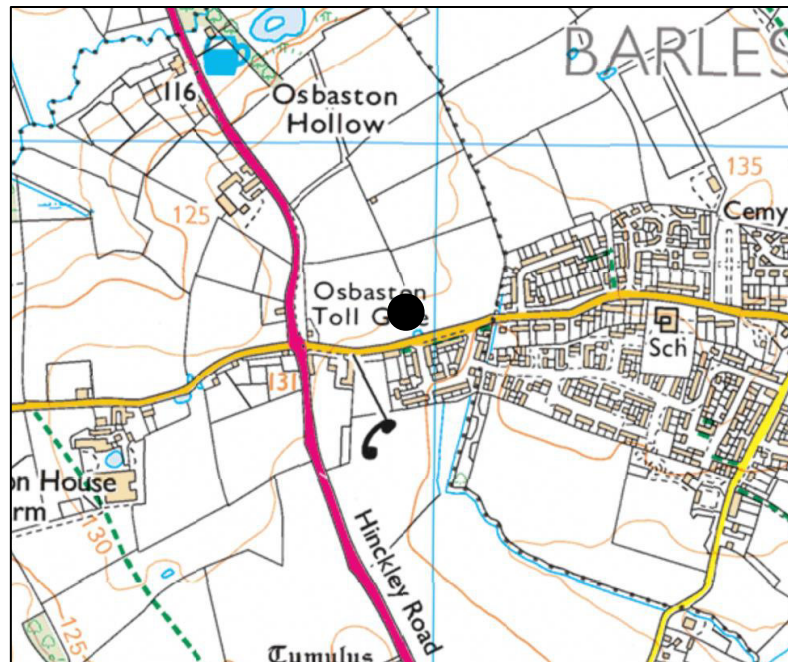
NTS

DRAWN:

PD

DWG No:

Figure 1

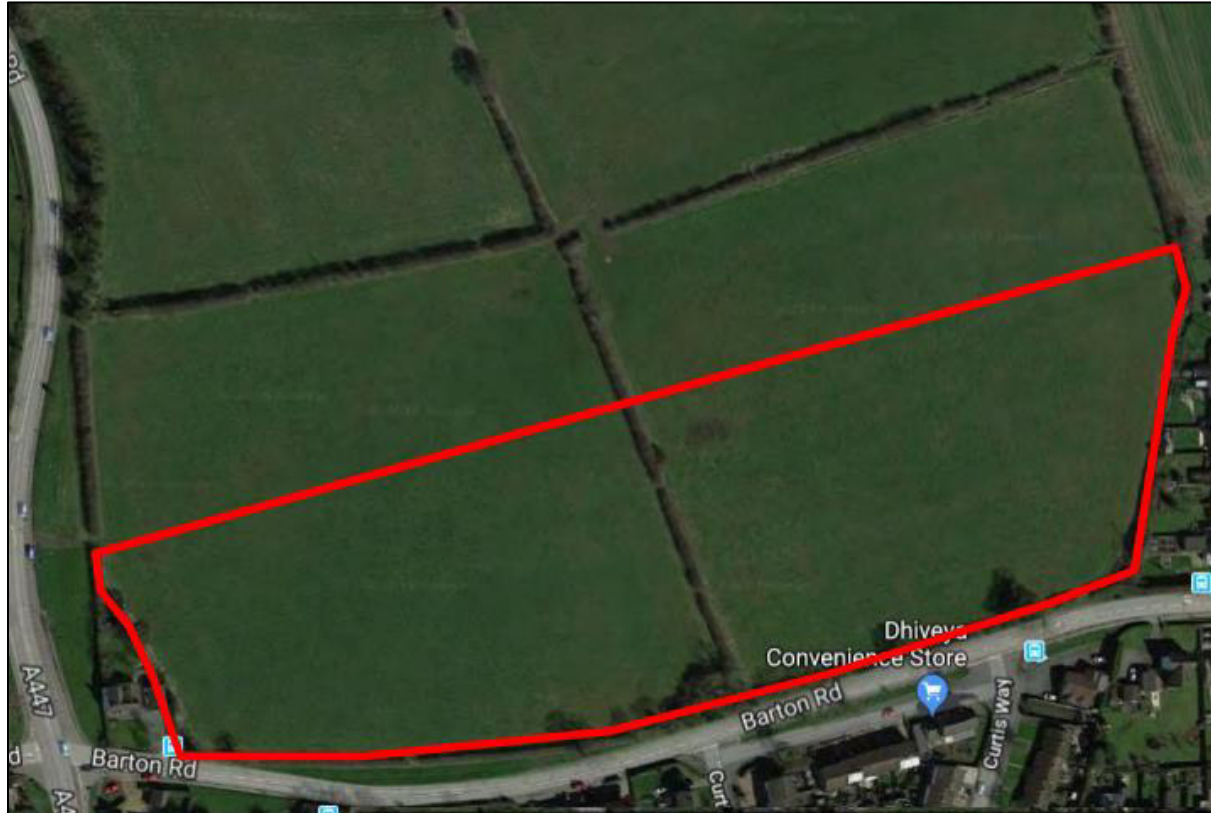




KEY:



Site Boundary



DO NOT SCALE



TITLE:

Site Layout

PROJECT:

Barton Road, Barlestone

PROJECT No:

EAL.288.22

DATE:

07/2024

SCALE :

NTS

DRAWN :

PD

DWG No:

Figure 2



KEY:

DO NOT SCALE



TITLE:

Development Proposal

PROJECT:

Barton Road, Barlestone

PROJECT No:

EAL.288.22

DATE:

07/2024

SCALE:

NTS

DRAWN:

PD

DWG No:

Figure 3



KEY:



Soakaway Test Pit



Cable Percussive Borehole

DO NOT SCALE



TITLE:

Exploratory Hole Location Plan

PROJECT:

Barton Road, Barlestone

PROJECT No:

EAL.288.22

DATE:

07/2024

SCALE:

NTS

DRAWN:

PD

DWG No:

Figure 4

Appendix B





KEY:



Approx. pond extents

Grid Reference for
approximate centre of
pond = SK 41967 05747

10.00m

9.00m

DO NOT SCALE



TITLE:

Exploratory Hole Location Plan

PROJECT:

Barton Road, Barlestone

PROJECT No:

EAL.288.22

DATE:

07/2024

SCALE :

NTS

DRAWN :

PD

DWG No:

Figure 5



Appendix C





Web: www.erda-ltd.co.uk

Email: p.devitt@erda-ltd.co.uk

Mob: 07531 051197

CLIENT

MyPad 2020 Ltd.

SITE LOCATION

Land at Barton Road, Barlestone

Date: 11.06.2024

Ground Level:

Orientation:

Coordinates:

Plant: Dando Cable Percussive Rig

Dimensions:

BOREHOLE NO.

CP01

Sheet No. 1 of 3

Job No.

EAL.288.22

Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results						Test Sample Details
				Depth	No	Type	Sealing	Test Drive					
							75mm	75mm	75mm	75mm	75mm	75mm	
Dark brown slightly gravelly clayey sandy TOPSOIL.	0.10		0.20 (0.20)										
	0.20												
Soft light brown sandy gravelly CLAY. Gravel is fine to coarse rounded to sub-rounded quartzite.	0.30		2.40 (2.20)	1.00	1	D	1	0	1	1	2	1	5
	0.40												
	0.50												
	0.60												
	0.70												
	0.80												
	0.90												
	1.00												
	1.10												
	1.20												
	1.30												
	1.40												
	1.50												
	1.60												
	1.70												
	1.80												
	1.90												
... becoming firm from 2.00mbgl.	2.00		2.00	2	D	3	3	5	5	5	6	21	
	2.10												
	2.20												
	2.30												
	2.40												
Medium dense light brown SAND & GRAVEL. Gravel is fine to coarse rounded to sub-rounded quartzite.	2.50			5.00	3	D	1	2	2	2	2	2	8
	2.60												
	2.70												
	2.80												
	2.90												
	3.00												
	3.10												
	3.20												
	3.30												
	3.40												
	3.50												
	3.60												
	3.70												
	3.80												
	3.90												
	4.00												
	4.10												
	4.20												
	4.30												
	4.40												
	4.50												
	4.60												
	4.70												
	4.80												
	4.90												
	5.00												

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Borehole reinstated with arisings upon completion. 2. Groundwater encountered at 2.40mbgl and rose to 1.73mbgl overnight. 3. Blowing snads noted from 5.50mbgl.									Logged By:	Checked By:	Date	Scale
									PD	PD	12.07.2024	NTS

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks:												
1. Borehole reinstated with arisings upon completion. 2. Groundwater encountered at 2.40mbgl and rose to 1.73mbgl overnight. 3. Blowing snads noted from 5.50mbgl.									Logged By:	Checked By:	Date	Scale
									PD	PD	12.07.2024	NTS

			Web: www.erda-ltd.co.uk Email: p.devitt@erda-ltd.co.uk Mob: 07531 051197			Date: 11.06.2024 Ground Level: Orientation: Coordinates: Plant: Dando Cable Percussive Rig Dimensions:			BOREHOLE NO. CP01 Sheet No. 3 of 3 Job No. EAL.288.22					
CLIENT MyPad 2020 Ltd.						SITE LOCATION Land at Barton Road, Barlestone								
Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results						Test Sample Details	
				Depth	No	Type	Seating	Test Drive						N Value
Extremely weak reddish brown MUDSTONE.	10.10 10.20 10.30 10.40 10.50 10.60 10.70 10.80 10.90 11.00		11.00 (1.00)	11.00	7	D	9	10	12	13	13	12	50	
Borehole terminated at 11.00mbgl in mudstone.	11.10 11.20 11.30 11.40 11.50 11.60 11.70 11.80 11.90 12.00 12.10 12.20 12.30 12.40 12.50 12.60 12.70 12.80 12.90 13.00 13.10 13.20 13.30 13.40 13.50 13.60 13.70 13.80 13.90 14.00 14.10 14.20 14.30 14.40 14.50 14.60 14.70 14.80 14.90 15.00													

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Borehole reinstated with arisings upon completion. 2. Groundwater encountered at 2.40mbgl and rose to 1.73mbgl overnight. 3. Blowing snads noted from 5.50mbgl.									Logged By:	Checked By:	Date	Scale
									PD	PD	12.07.2024	NTS

 Web: www.erda-ltd.co.uk Email: p.devitt@erda-ltd.co.uk Mob: 07531 051197			Date: 12.06.2024 Ground Level: Orientation: Coordinates: Plant: Dando Cable Percussive Rig Dimensions:		BOREHOLE NO. CP02 Sheet No. 1 of 3 Job No. EAL.288.22									
CLIENT MyPad 2020 Ltd.														
SITE LOCATION Land at Barton Road, Barlestone														
Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS		SPT Results							Test Sample Details	
				Depth	No Type	Sealing	Test Drive					N Value		Installation
Dark brown slightly gravelly clayey sandy TOPSOIL.	0.10 0.20 0.30		0.30 (0.30)											
Soft light brown sandy gravelly CLAY. Gravel is fine to coarse rounded to sub-rounded quartzite.	0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60		2.60 (2.30)	1.20	1	U100								
... becoming firm from 2.00mbgl.				1.65	2	D								
				2.00	3	D	2	2	2	2	3	3	10	
Medium dense light brown SAND & GRAVEL. Gravel is fine to coarse rounded to sub-rounded quartzite.	2.70 2.80 2.90 3.00 3.10 3.20 3.30 3.40 3.50 3.60 3.70 3.80 3.90 4.00 4.10 4.20 4.30 4.40 4.50 4.60 4.70 4.80 4.90 5.00			3.00	4	D	4	5	6	7	9	12	34	
							3	4	5	5	6	6	23	
							3	3	4	4	5	7	20	

Casing record				Chiselling records								
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Borehole reinstated with arisings upon completion. 2. Groundwater encountered at 2.60mbgl and rose to 2.17 overnight. 3. Blowing sand noted from 5.90mbgl.									Logged By:	Checked By:	Date	Scale
									PD	PD	12.07.2024	NTS

			Web: www.erda-ltd.co.uk Email: p.devitt@erda-ltd.co.uk Mob: 07531 051197			Date: 12.06.2024 Ground Level: Orientation: Coordinates: Plant: Dando Cable Percussive Rig Dimensions:			BOREHOLE NO. CP02			
CLIENT MyPad 2020 Ltd.									Sheet No. 3 of 3			
SITE LOCATION Land at Barton Road, Barlestone									Job No. EAL.288.22			
Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS		SPT Results						Test Sample Details
				Depth	No Type	Seating	Test Drive					
... continued from page 2.	10.10		10.50 (0.30)									
	10.20											
Extremely weak reddish brown MUDSTONE.	10.30											
	10.40											
Borehole terminated at 10.50m in mudstone.	10.50											
	10.60											
	10.70											
	10.80											
	10.90											
	11.00											
	11.10											
	11.20											
	11.30											
	11.40											
	11.50											
	11.60											
	11.70											
	11.80											
	11.90											
	12.00											
	12.10											
	12.20											
	12.30											
	12.40											
	12.50											
	12.60											
	12.70											
	12.80											
	12.90											
	13.00											
	13.10											
	13.20											
	13.30											
	13.40											
	13.50											
	13.60											
	13.70											
	13.80											
	13.90											
	14.00											
	14.10											
	14.20											
	14.30											
	14.40											
	14.50											
	14.60											
	14.70											
	14.80											
	14.90											
	15.00											

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Borehole reinstated with arisings upon completion. 2. Groundwater encountered at 2.60mbgl and rose to 2.17 overnight. 3. Blowing sand noted from 5.90mbgl.									Logged By:	Checked By:	Date	Scale
									PD	PD	12.07.2024	NTS

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks:												
1. Borehole reinstated with arisings upon completion. 2. Groundwater encountered at 2.60mbgl and rose to 1.70m overnight). 3. Blowing sands from 5.60mbgl.									Logged By:	Checked By:	Date	Scale
									PD	PD	12.07.2024	NTS

 Web: www.erda-ltd.co.uk Email: p.devitt@erda-ltd.co.uk Mob: 07531 051197			Date: 13.06.2024 Ground Level: Orientation: Coordinates: Plant: Dando Cable Percussive Rig Dimensions:			BOREHOLE NO. CP03 Sheet No. 3 of 3 Job No. EAL.288.22								
CLIENT MyPad 2020 Ltd.			SITE LOCATION Land at Barton Road, Barlestone											
Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results						Test Sample Details	
				Depth	No	Type	Seating	Test Drive						N Value
... continued from page 2.	10.10 10.20 10.30 10.40 10.50 10.60 10.70 10.80 10.90 11.00 11.10 11.20			11.00	5	D	3	5	8	10	10	12	40	
Extremely weak reddish brown MUDSTONE.	11.30 11.40 11.50		11.50 (0.30)											
Borehole terminated at 11.50m in mudstone.	11.60 11.70 11.80 11.90 12.00 12.10 12.20 12.30 12.40 12.50 12.60 12.70 12.80 12.90 13.00 13.10 13.20 13.30 13.40 13.50 13.60 13.70 13.80 13.90 14.00 14.10 14.20 14.30 14.40 14.50 14.60 14.70 14.80 14.90 15.00													

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Borehole reinstated with arisings upon completion. 2. Groundwater encountered at 2.60mbgl and rose to 1.70m overnight). 3. Blowing sands from 5.60mbgl.									Logged By:	Checked By:	Date	Scale
									PD	PD	12.07.2024	NTS



Web: www.erda-ltd.co.uk
Email: p.devitt@erda-ltd.co.uk
Mob: 07531 051197

CLIENT
MyPad 2020 Ltd.

SITE LOCATION
Land at Barton Road, Barlestone

Date: 14.06.2024
Ground Level:
Orientation:
Coordinates:
Plant: Dando Cable Percussive Rig
Dimensions:

BOREHOLE NO.
CP04
Sheet No. 1 of 3
Job No.
EAL.288.22

Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS		SPT Results						Test Sample Details
				Depth	No Type	Seating	Test Drive					
Dark brown slightly gravelly clayey sandy TOPSOIL.	0.10 0.20 0.30		0.30 (0.30)									
Soft reddish brown sandy gravelly CLAY. Gravel is fine to coarse rounded to sub-rounded quartzite.	0.40 0.50 0.60 0.70 0.80 0.90 1.00 1.10 1.20 1.30 1.40 1.50 1.60 1.70 1.80 1.90 2.00 2.10 2.20 2.30 2.40 2.50 2.60 2.70 2.80 2.90 3.00 3.10 3.20 3.30 3.40 3.50 3.60 3.70 3.80		3.80 (3.50)	1.20	1 D	1	1	1	1	2	2	6
				2.00	2 D	1	2	2	2	2	2	8
				3.00	3 D	2	2	3	3	4	4	14
				3.80	4 D							
Stiff grey slightly gravelly sandy CLAY. Gravel is fine to coarse rounded to sub-rounded quartzite.	3.90 4.00 4.10 4.20 4.30 4.40		4.40 (0.60)	4.00	5 D	8	8	10	9	10	13	42
Medium dense light brown SAND & GRAVEL. Gravel is fine to coarse rounded to sub-rounded quartzite.	4.50 4.60 4.70 4.80 4.90 5.00					2	3	4	5	5	5	19

Borehole terminated at 5.00mbgl.

Casing record			Chiselling records								
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks

Remarks:
1. Borehole reinstated with arisings upon completion.
2. Groundwater encountered at 2.60mbgl and rose to 1.70m overnight).
3. Blowing sands from 5.60mbgl.

Logged By:

Checked By:

Date

Scale

PD

PD

12.07.2024

NTS

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks:												
1. Borehole reinstated with arisings upon completion. 2. Groundwater encountered at 2.60mbgl and rose to 1.70m overnight. 3. Blowing sands from 5.60mbgl.									Logged By:	Checked By:	Date	Scale
									PD	PD	12.07.2024	NTS

 Web: www.erda-ltd.co.uk Email: p.devitt@erda-ltd.co.uk Mob: 07531 051197				Date: 14.06.2024 Ground Level: Orientation: Coordinates: Plant: Dando Cable Percussive Rig Dimensions:				BOREHOLE NO. CP04 Sheet No. 3 of 3 Job No. EAL.288.22						
CLIENT MyPad 2020 Ltd.				SITE LOCATION Land at Barton Road, Barlestone										
Description of Strata	Reduced level (m)	Legend	Depth (Thickness) m	SAMPLES/TESTS			SPT Results						Test Sample Details	
				Depth	No	Type	Sealing	Test Drive						N Value
... continued from page 2.	10.10			11.00	7	D	5	6	6	6	8	10	30	
	10.20													
	10.30													
	10.40													
	10.50													
	10.60													
	10.70													
	10.80													
	10.90													
	11.00													
Extremely weak reddish brown MUDSTONE.	11.40		11.50 (0.20)	11.40	8	D								
	11.50													
Borehole terminated at 11.50mbgl in mudstone.	11.60													
	11.70													
	11.80													
	11.90													
	12.00													
	12.10													
	12.20													
	12.30													
	12.40													
	12.50													
	12.60													
	12.70													
	12.80													
	12.90													
	13.00													
	13.10													
	13.20													
	13.30													
	13.40													
	13.50													
	13.60													
	13.70													
	13.80													
13.90														
14.00														
14.10														
14.20														
14.30														
14.40														
14.50														
14.60														
14.70														
14.80														
14.90														
15.00														

Casing record			Chiselling records									
Date	Diameter (mm)	Depth (m)	Time	From (m)	To (m)	Date	Water strike	Water level (after 20mins)	Flow	Standing level	Remarks	
Remarks: 1. Gas/groundwater monitoring standpipe installed to 5m (GL to 1.0m plain/bentonite, 1.0m to 5.0m slotted/gravel). 2. Groundwater encountered at 3.00mbgl. 3. Borehole remained stable throughout drilling.									Logged By:	Checked By:	Date	Scale
									PD	PD	12.07.2024	NTS

Appendix D



Erda Associates Ltd
102 Scalpcliffe Road, Burton Upon Trent, Staffs, DE15 9AB

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

e: p.devitt@erda-ltd.co.uk

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

Analytical Report Number : 24-026003

Project / Site name:	Barlestone	Samples received on:	19.06.2024
Your job number:	EAL.288.22	Samples instructed on/ Analysis started on:	19.06.2024
Your order number:	EAL.288.22	Analysis completed by:	26.06.2024
Report Issue Number:	1	Report issued on:	01.07.2024
Samples Analysed:	10 soil samples		

Signed:



Rafał Szczepańczyk
Technical Reviewer
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: 24-026003

Project / Site name: Barlestone

Your Order No: EAL288.22

Lab Sample Number				232613	232614	232615	232617	232618
Sample Reference				Pond 1	Pond 2	Pond 3	BH01	BH02
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				0.50	0.70	2.00	5.00	3.00-3.45
Date Sampled				14/06/2024	14/06/2024	14/06/2024	14/06/2024	14/06/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	28	27	17	7.4	7.9
Total mass of sample received	kg	0.1	NONE	0.5	0.5	0.5	0.5	0.5

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	-	-	-	8.7	8.2
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	-	-	53	25
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	-	-	-	26.5	12.7
Organic Matter (automated)	%	0.1	MCERTS	4.4	5.4	1.7	-	-

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

Analytical Report Number: 24-026003

Project / Site name: Barlestone

Your Order No: EAL288.22

Lab Sample Number				232619	232620	232621	232622	232623
Sample Reference				BH03	BH04	BH05	BH01	BH04
Sample Number				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Depth (m)				10.00-10.45	7.00	2.00-2.45	9.00-9.45	3.80
Date Sampled				14/06/2024	14/06/2024	14/06/2024	14/06/2024	14/06/2024
Time Taken				None Supplied	None Supplied	None Supplied	None Supplied	None Supplied
Analytical Parameter (Soil Analysis)				Units	Limit of detection	Accreditation Status		

Stone Content	%	0.1	NONE	< 0.1	< 0.1	< 0.1	< 0.1	< 0.1
Moisture Content	%	0.01	NONE	15	9.3	9.4	17	15
Total mass of sample received	kg	0.1	NONE	0.5	0.5	0.5	0.5	0.5

General Inorganics

pH (L099)	pH Units	N/A	MCERTS	8.6	8.3	8.3	8.3	7.7
Water Soluble Sulphate as SO ₄ 16hr extraction (2:1)	mg/kg	2.5	MCERTS	27	67	49	51	840
Water Soluble SO ₄ 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	13.3	33.6	24.7	25.5	418
Organic Matter (automated)	%	0.1	MCERTS	-	-	-	-	-

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

Analytical Report Number : 24-026003
Project / Site name: Barlestone

* 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 *
232613	Pond 1	None Supplied	0.5	Brown clay and sand with gravel
232614	Pond 2	None Supplied	0.7	Brown loam and clay with gravel and vegetation
232615	Pond 3	None Supplied	2	Brown clay and sand
232617	BH01	None Supplied	5	Brown sand with gravel and vegetation
232618	BH02	None Supplied	3.00-3.45	Brown sandy clay with gravel and vegetation
232619	BH03	None Supplied	10.00-10.45	Brown sand with gravel and vegetation
232620	BH04	None Supplied	7	Brown sand with gravel and vegetation
232621	BH05	None Supplied	2.00-2.45	Brown clay with gravel
232622	BH01	None Supplied	9.00-9.45	Brown clay with gravel
232623	BH04	None Supplied	3.8	Brown clay with gravel

Analytical Report Number : 24-026003

Project / Site name: Barlestone

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
Sulphate, water soluble, in soil (16hr extraction)	Sulphate, water soluble, in soil (16hr extraction)	In-house method	L038B	D	MCERTS
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement	In-house method	L099	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



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: Erda Associates Ltd
Client Address: 102 Scalpcliffe Road, Burton Upon Trent, Staffs, DE15 9AB
Contact: Philip Devitt
Site Address: Barlestone
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: EAL.288.22
Job Number: 24-026002-1
Date Sampled: 11/06/2024
Date Received: 19/06/2024
Date Tested: 26/06/2024
Sampled By: Client - PD

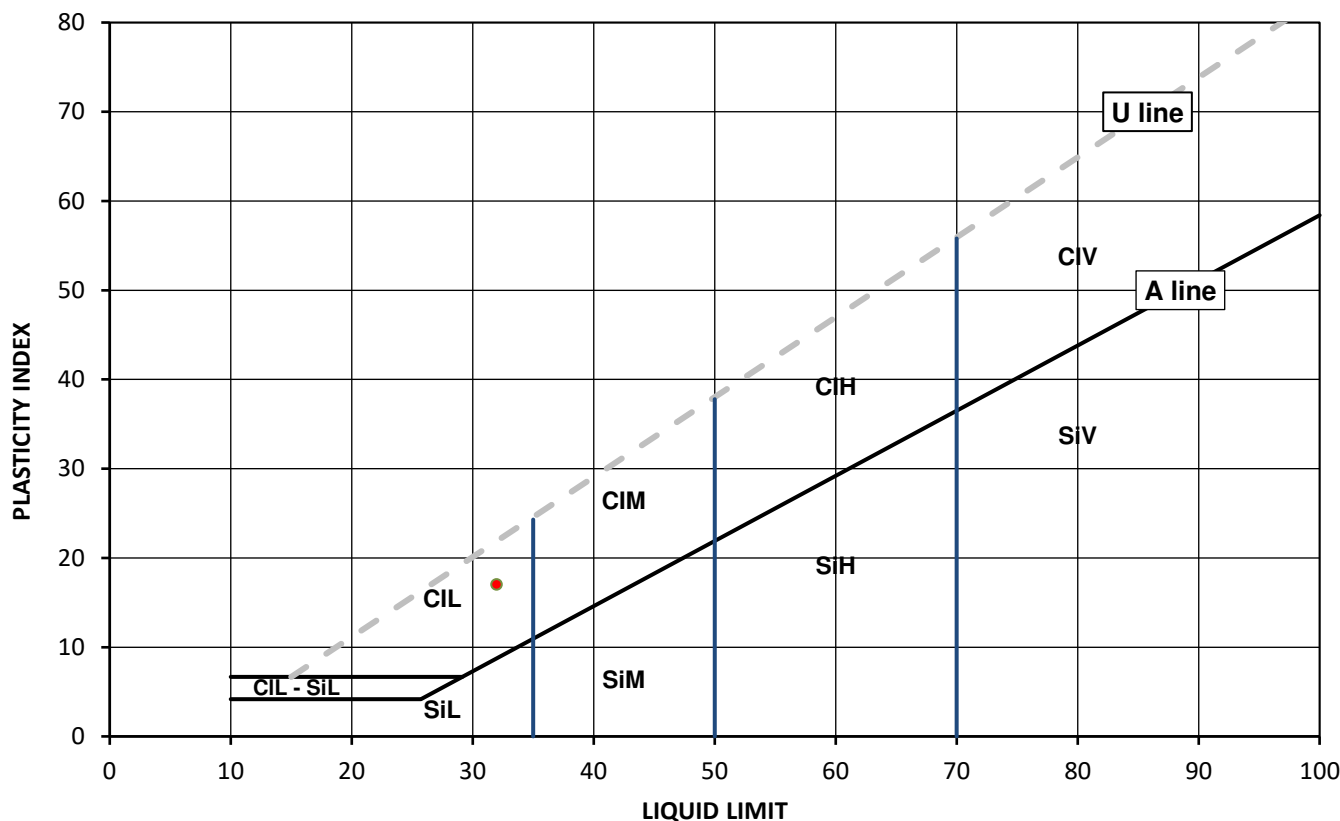
Test Results:

Laboratory Reference: 232624
Hole No.: BH01
Sample Reference: Not Given
Sample Description: Yellowish brown very sandy CLAY

Depth Top [m]: 6.00
Depth Base [m]: Not Given
Sample Type: D

Sample Preparation: Tested in natural condition;
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
27.5	32	1.000	15	17	0.76	0.24	100



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 ClHO)

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

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
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 5.3.14, 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: Erda Associates Ltd
Client Address: 102 Scalpcliffe Road, Burton Upon Trent, Staffs, DE15 9AB
Contact: Philip Devitt
Site Address: Barlestone
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Client Reference: EAL.288.22
Job Number: 24-026002-1
Date Sampled: 14/06/2024
Date Received: 19/06/2024
Date Tested: 26/06/2024
Sampled By: Client - PD

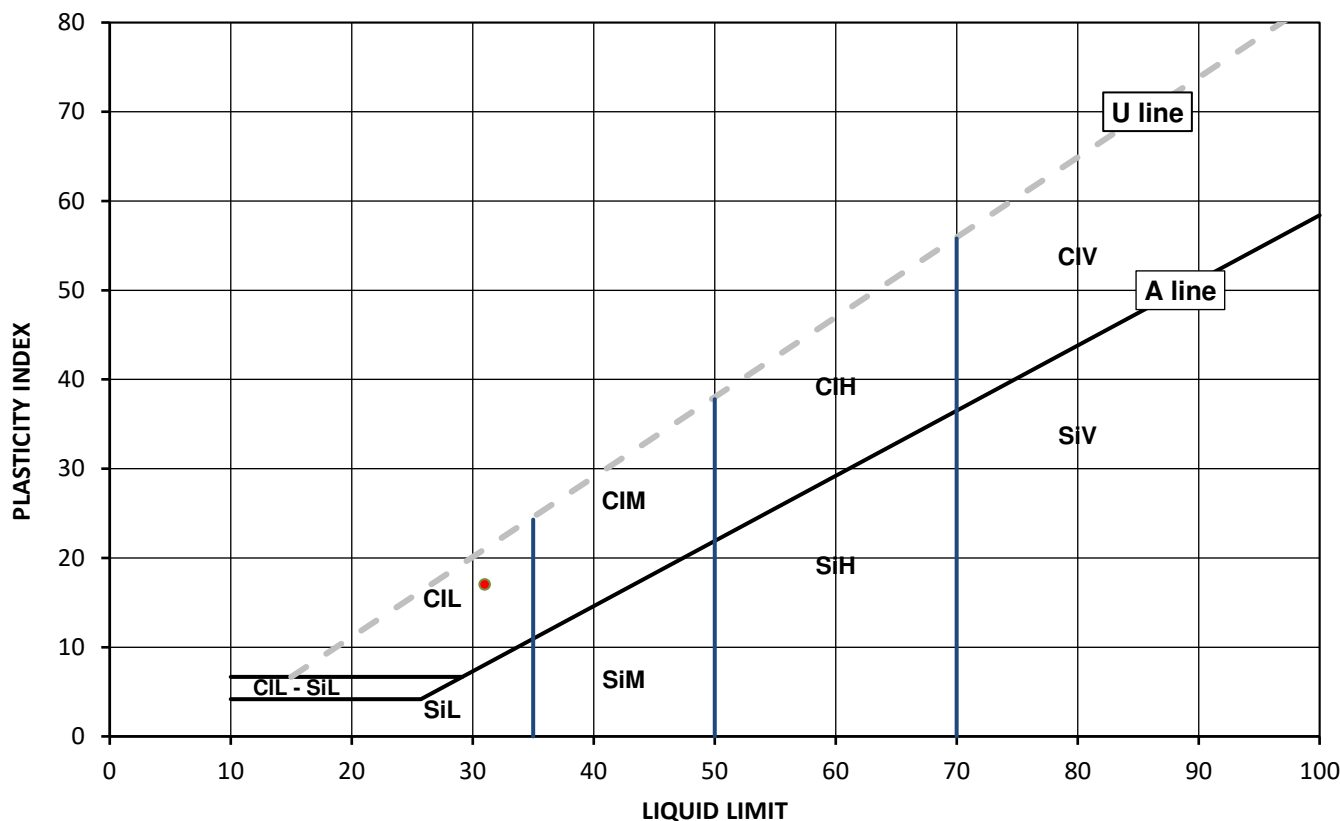
Test Results:

Laboratory Reference: 232627
Hole No.: BH04
Sample Reference: Not Given
Sample Description: Yellowish brown slightly gravelly very sandy CLAY

Depth Top [m]: 4.00
Depth Base [m]: 4.45
Sample Type: D

Sample Preparation: Tested after >0.425 mm removed by hand;
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
13.4	31	1.000	14	17	-0.06	1.06	81



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 ClHO)

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

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
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 5.3.14, 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: Erda Associates Ltd
Client Address: 102 Scalpcliffe Road, Burton Upon Trent, Staffs, DE15 9AB
Contact: Philip Devitt
Site Address: Barlestone
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

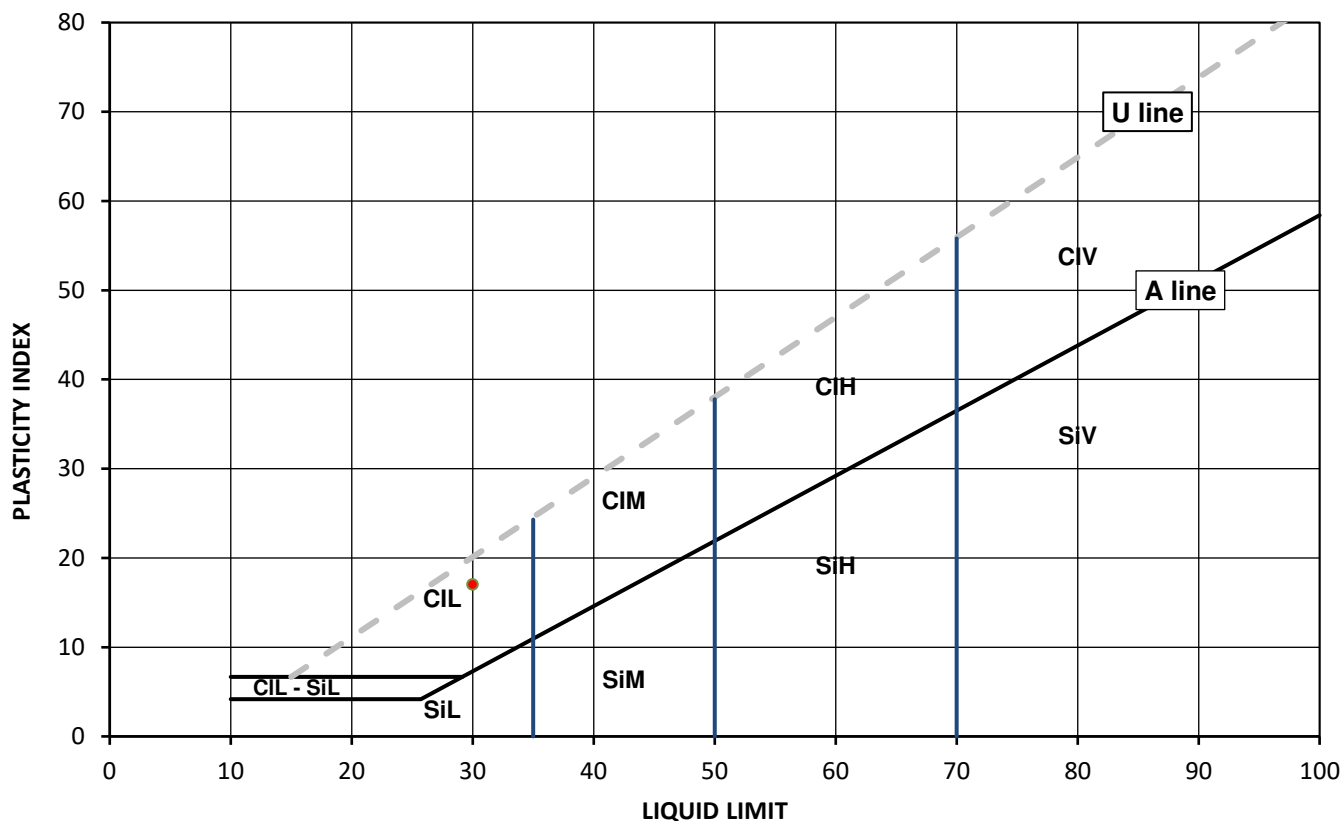
Client Reference: EAL.288.22
Job Number: 24-026002-1
Date Sampled: 17/06/2024
Date Received: 19/06/2024
Date Tested: 26/06/2024
Sampled By: Client - PD

Test Results:

Laboratory Reference: 232628
Hole No.: BH05
Sample Reference: Not Given
Sample Description: Grey slightly gravelly very sandy CLAY
Sample Preparation: Tested after >0.425 mm removed by hand;
Cone Type: 80g/30deg

Depth Top [m]: 3.00
Depth Base [m]: 3.45
Sample Type: D

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
13.4	30	1.042	13	17	0.00	1.00	96



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 CIHO)

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

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
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.



SUMMARY REPORT

SUMMARY OF CLASSIFICATION TEST RESULTS

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



Environmental Science

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. Correlation Factor by Clayton C.R.I and Jukes A.W (1978). W by BS EN ISO 17892-1:2014+A1:2022.

Client Reference: EAL.288.22
Job Number: 24-026002-1
Date Sampled: 11/06 - 17/06/2024
Date Received: 19/06/2024
Date Tested: 26/06/2024
Sampled By: Client - PD

4041

Client: Erda Associates Ltd
Client Address: 102 Scalpcliffe Road, Burton Upon Trent, Staffs, DE15 9AB

Contact: Philip Devitt
Site Address: Barlestone

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

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														
232624	BH01	Not Given	6.00	Not Given	D	Yellowish brown very sandy CLAY	Atterberg 1 Point	27.5	100	32	1.000	15	17	80g/30 deg	N			
232627	BH04	Not Given	4.00	4.45	D	Yellowish brown slightly gravelly very sandy CLAY	Atterberg 1 Point	13.4	81	31	1.000	14	17	80g/30 deg	R			
232628	BH05	Not Given	3.00	3.45	D	Grey slightly gravelly very sandy CLAY	Atterberg 1 Point	13.4	96	30	1.042	13	17	80g/30 deg	R			

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

Comments:

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.

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
for and on behalf of i2 Analytical Ltd



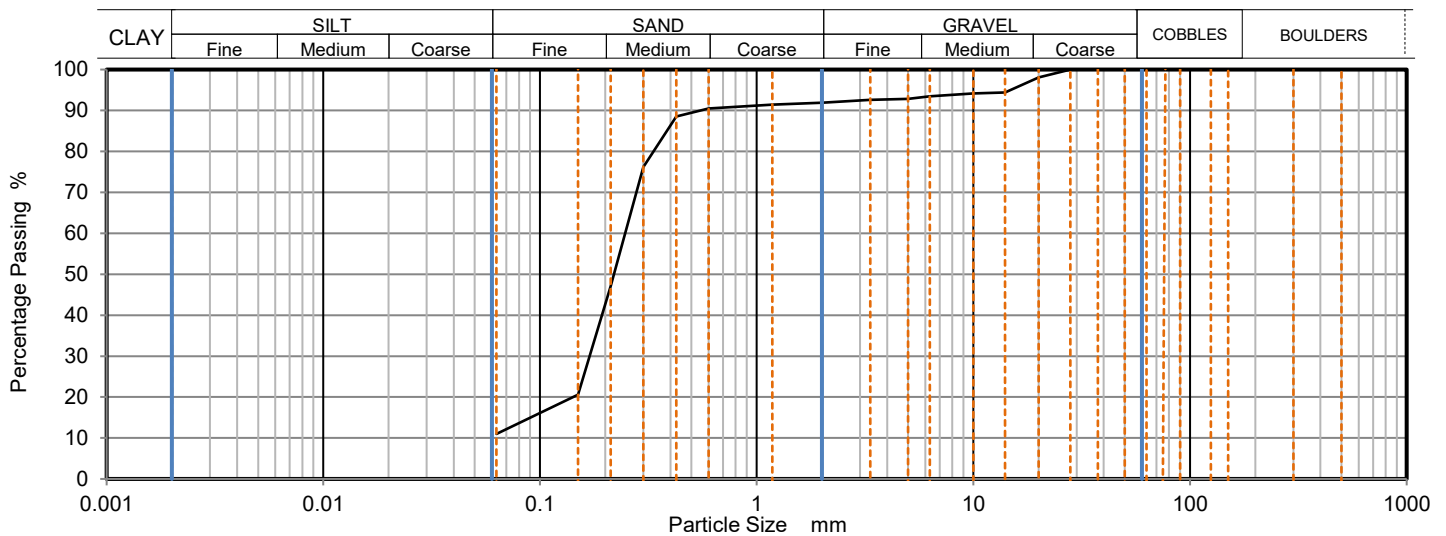
4041

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

Environmental Science

Client: Erda Associates Ltd
Client Address: 102 Scalpcliffe Road, Burton Upon Trent, Staffs, DE15 9ABClient Reference: EAL.288.22
Job Number: 24-026002-1
Date Sampled: 12/06/2024
Date Received: 19/06/2024
Date Tested: 26/06/2024
Sampled By: Client - PDContact: Philip Devitt
Site Address: Barlestone

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

Test Results:Laboratory Reference: 232625
Hole No.: BH02
Sample Reference: Not Given
Sample Description: Brown clayey SAND
Sample Preparation: Sample was quartered, oven dried at 108.2 °C and broken down by hand.Depth Top [m]: 9.00
Depth Base [m]: Not Given
Sample Type: D

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	98		
14	94		
10	94		
6.3	94		
5	93		
3.35	93		
2	92		
1.18	91		
0.6	91		
0.425	89		
0.3	76		
0.212	47		
0.15	21		
0.063	11		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	8.00
Sand	81.00
Fines <0.063 mm	11.00

Grading Analysis	
D100	mm 28
D60	mm 0.247
D30	mm 0.17
D10	mm
Uniformity Coefficient	3.9
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:

*Monika Siewior*Monika Siewior
Reporting Specialist
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.

Page 1 of 1

Date Reported: 04/07/2024

GF 366.11



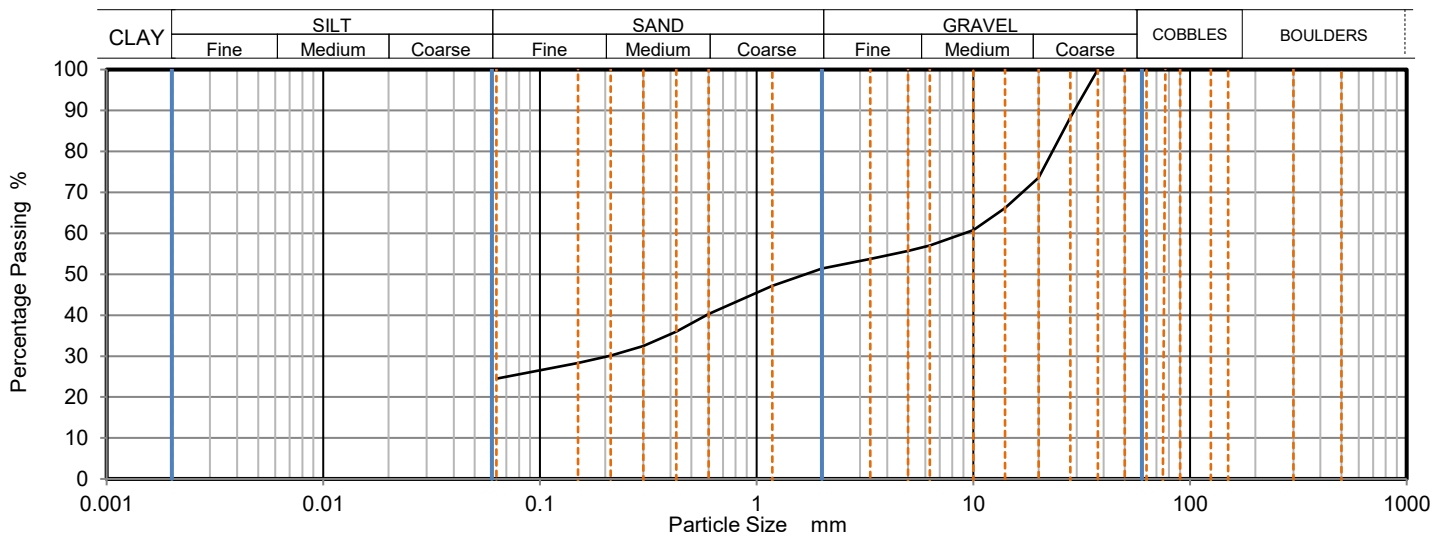
4041

**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: Erda Associates Ltd
Client Address: 102 Scalpcliffe Road, Burton Upon Trent, Staffs, DE15 9ABClient Reference: EAL.288.22
Job Number: 24-026002-1
Date Sampled: 13/06/2024
Date Received: 19/06/2024
Date Tested: 26/06/2024
Sampled By: Client - PDContact: Philip Devitt
Site Address: Barlestone

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

Test Results:Laboratory Reference: 232626
Hole No.: BH03
Sample Reference: Not Given
Sample Description: Brown gravelly slightly sandy CLAY
Sample Preparation: Sample was quartered, oven dried at 108.2 °C and broken down by hand.Depth Top [m]: 5.70
Depth Base [m]: Not Given
Sample Type: D

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	88		
20	74		
14	66		
10	61		
6.3	57		
5	56		
3.35	54		
2	51		
1.18	47		
0.6	40		
0.425	36		
0.3	33		
0.212	30		
0.15	28		
0.063	25		

Sample Proportions	% dry mass
Very coarse	0.00
Gravel	49.00
Sand	27.00
Fines <0.063 mm	24.00

Grading Analysis	
D100	mm 37.5
D60	mm 9.07
D30	mm 0.208
D10	mm
Uniformity Coefficient	140
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: The material submitted - fails to meet the minimum mass requirements as stated in BS EN ISO 17892-4:2016 Table 1.

Signed:

Monika Siewior
Reporting Specialist
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

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: Erda Associates Ltd
Client Address: 102 Scalpolcliffe Road, Burton Upon Trent, Staffs, DE15 9AB

Client Reference: EAL.288.22
Job Number: 24-026002-1
Date Sampled: 12/06/2024
Date Received: 19/06/2024
Date Tested: 01/07/2024
Sampled By: Client - PD

Contact: Philip Devitt
Site Address: Barlestone

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

Test Results:

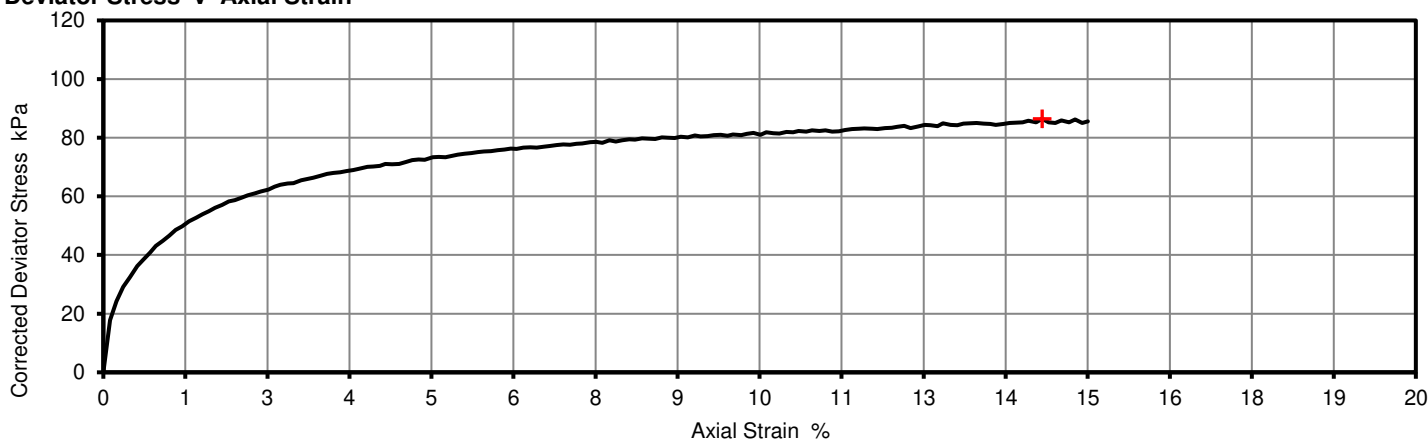
Laboratory Reference: 232616
Hole No.: BH02
Sample Reference: Not Given
Sample Description: Brown slightly gravelly CLAY
Sample Preparation: Sample prepared in accordance with BS EN ISO 17892-8: 2018 Clause 6.2.

Depth Top [m]: 1.20
Depth Base [m]: 1.65
Sample Type: U

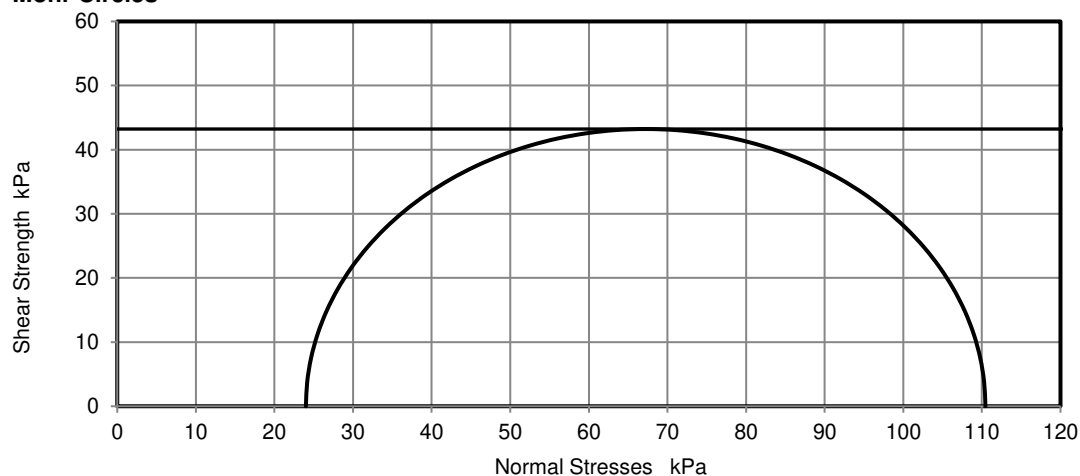
Test Number	1
Depth within Sample	- m
Length	139.11 mm
Diameter	69.85 mm
Length Prior to Shearing	139.11 mm
Bulk Density	2.02 Mg/m ³
Initial Water Content	22.7 %
Final Water Content	23.3 %
Dry Density	1.65 Mg/m ³

Rate of Strain	2.00 %/min
Cell Pressure	24 kPa
Axial Strain at Failure	14.3 %
Deviator Stress, ($\sigma_1 - \sigma_3$) _f	86 kPa
Undrained Shear Strength, c_u	43 kPa $\frac{1}{2}(\sigma_1 - \sigma_3)_f$
Mode of Failure	Compound
Membrane Thickness	0.26 mm
Membrane Correction	3.04 kPa

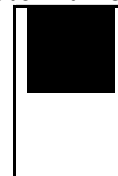
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



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

Remarks:

Signed:

Monika Siewior

Monika Siewior
Reporting Specialist
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.