Earthworks (Collins)

Contents

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winvic
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winvic

winvic.co.uk

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Laboratory Report	ETS/1612	Contract Sample No	C1082/1
Report Date	18/10/2023	ETS Contract No	C1082/1

EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
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Tel: 07310 161694

Collins Earthworks Ltd
Whiteley Road
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Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Date Sampled	17/10/2023
Sample Location	See Below
Client Reference	C1082/1
Source	Ex-Site
Supplier	Ex-Site
Sampling Environment	Overcast
Material Description	Cemented Brown Clay
Date Received	17/10/2023
Date Tested	17/10/2023

TEST REPORT

Determination of Equivalent Shear Strength

Tested in accordance with In-House Test Procedure Based on BS1377, Part 9: 1990 & BS 5930: 1999

Calibration Constant:	1.000000	Equipment Ref.: HSV 095	Operator	JH

Test Reference	Test Location	Shear Vane Readings (Divisions)				Average Vane Reading	Equivalent Shear Strength (kPa)
		Test 1	Test 2	Test 3	Test 4		
C1082/1	D6 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	C6 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	B6 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	A6 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	A5 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	B5 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	C5 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	D5 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	D4 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	B4 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	A4 Formation	>150	>150	>150	>150	>150	**>150**
C1082/1	D6 Formation	>150	>150	>150	>150	>150	**>150**

Notes:

Authorised Signatory

Laboratory Report	ETS/1612	Contract Sample No	C1082/1
Report Date	18/10/2023	ETS Contract No	C1082/1

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Project:
Wingates - Bolton

Date Sampled	17/10/2023
Sample Location	See Below
Client Reference	C1082/1
Source	Ex-Site
Supplier	Ex-Site
Sampling Environment	Overcast
Material Description	Cemented Brown Clay
Date Received	17/10/2023
Date Tested	17/10/2023

TEST REPORT

Determination of Equivalent Shear Strength

Tested in accordance with In-House Test Procedure Based on BS1377, Part 9: 1990 & BS 5930: 1999

Calibration Constant:	1.000000	Equipment Ref.: HSV 095	Operator JH

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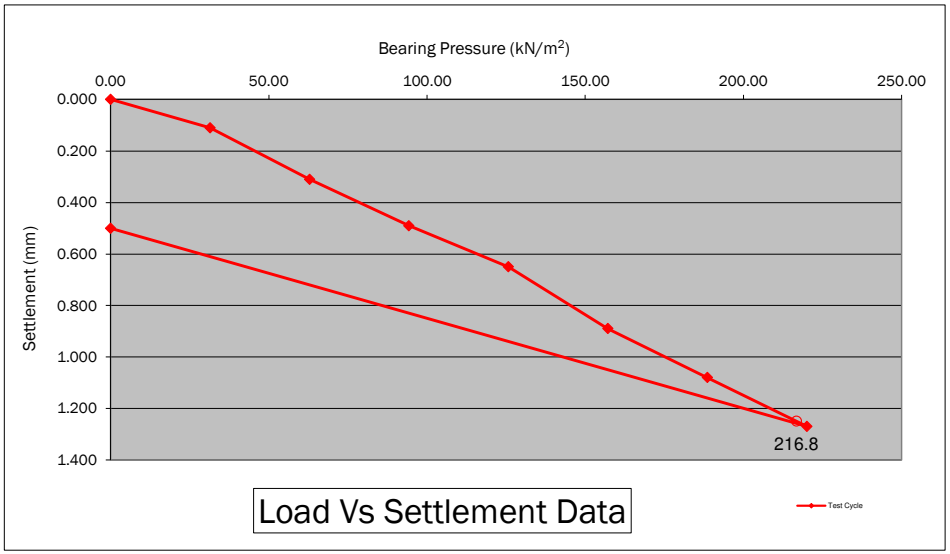
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1A	**REPORT NO:**	**ETS/1613A**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1A**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**D6 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.11
62.88	0.31
94.31	0.49
125.75	0.65
157.19	0.89
188.63	1.08
220.07	1.27
0.00	0.50
Recovery %	61



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	220.1	kN/m²	**32.3**	
Maximum Settlement	1.27	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	216.8	kN/m²		
Modulus of Subgrade Reaction K762	108.1	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

Results relate only to the sample(s) as tested.

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The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer.

Testing carried out at client's site location.

** End of report **

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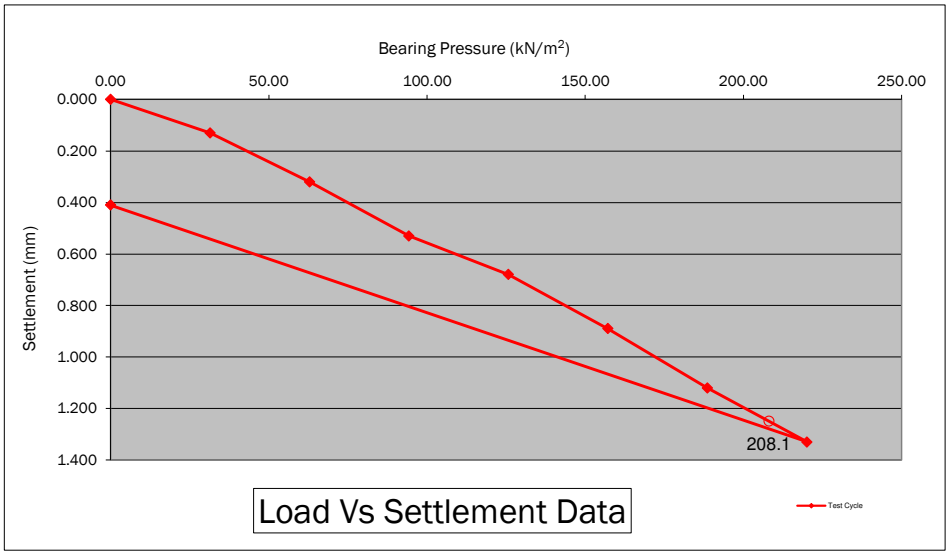
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1B	**REPORT NO:**	**ETS/1613B**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1B**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**C6 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.13
62.88	0.32
94.31	0.53
125.75	0.68
157.19	0.89
188.63	1.12
220.07	1.33
0.00	0.41
Recovery %	69



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	220.1	kN/m²	**30.1**	
Maximum Settlement	1.33	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	208.1	kN/m²		
Modulus of Subgrade Reaction K762	103.7	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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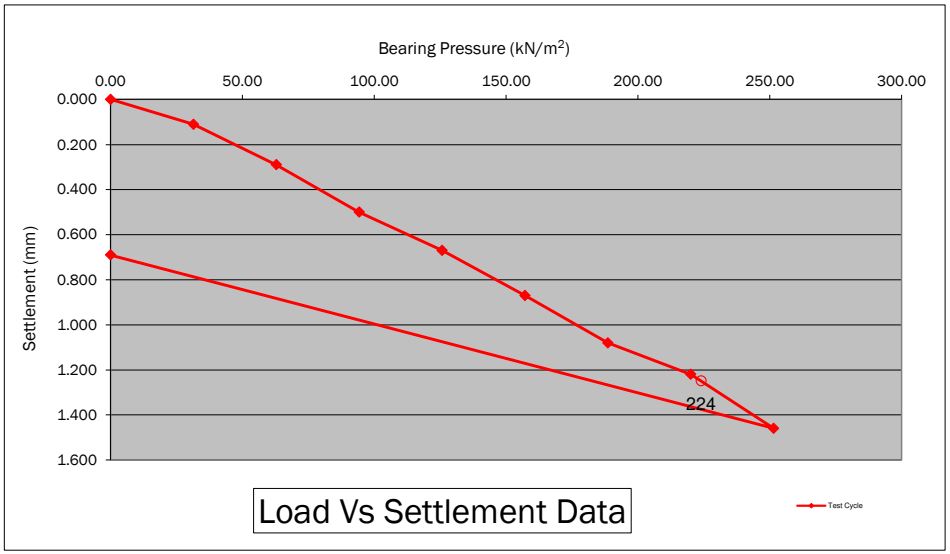
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1C	**REPORT NO:**	**ETS/1613C**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1C**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**B6 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.11
62.88	0.29
94.31	0.50
125.75	0.67
157.19	0.87
188.63	1.08
220.07	1.22
251.50	1.46
0.00	0.69
Recovery %	53



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²	**34.1**	
Maximum Settlement	1.46	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	224.0	kN/m²		
Modulus of Subgrade Reaction K762	111.7	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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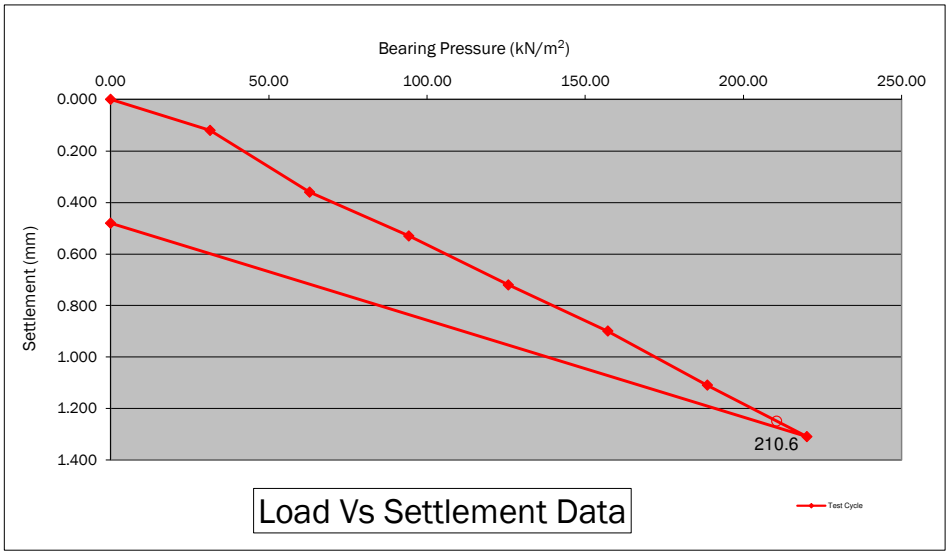
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1D	**REPORT NO:**	**ETS/1613D**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1D**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**A6 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.12
62.88	0.36
94.31	0.53
125.75	0.72
157.19	0.90
188.63	1.11
220.07	1.31
0.00	0.48
Recovery %	63



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	220.1	kN/m²	**30.7**	
Maximum Settlement	1.31	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	210.6	kN/m²		
Modulus of Subgrade Reaction K762	105.0	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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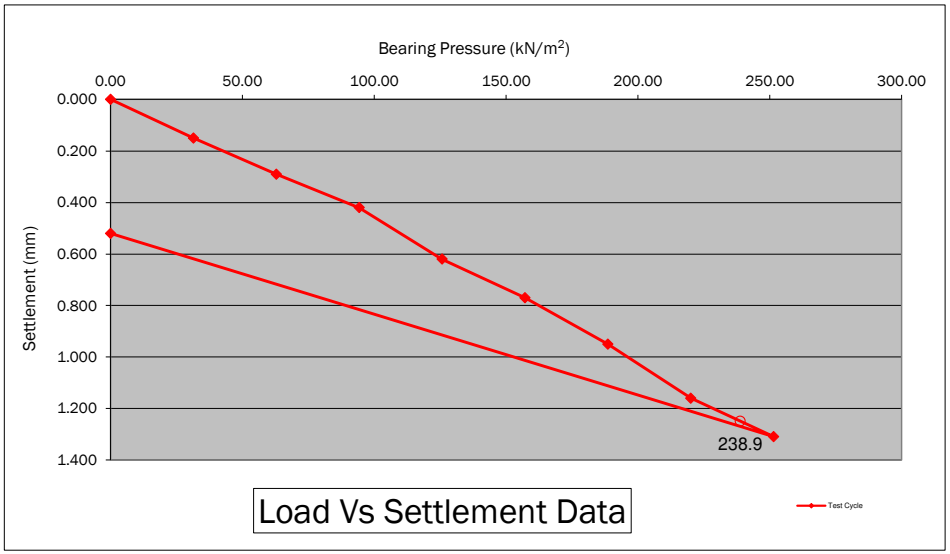
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1E	**REPORT NO:**	**ETS/1613E**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1E**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**A5 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.15
62.88	0.29
94.31	0.42
125.75	0.62
157.19	0.77
188.63	0.95
220.07	1.16
251.50	1.31
0.00	0.52
Recovery %	60



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²		
Maximum Settlement	1.31	mm	**38.2**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	238.9	kN/m²		
Modulus of Subgrade Reaction K762	119.1	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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** End of report **

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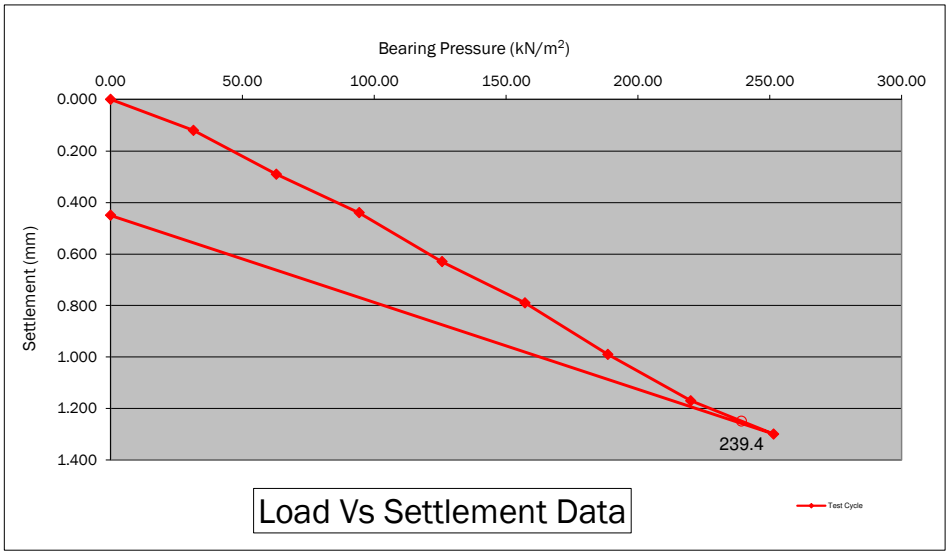
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1F	**REPORT NO:**	**ETS/1613F**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1F**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**B5 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.12
62.88	0.29
94.31	0.44
125.75	0.63
157.19	0.79
188.63	0.99
220.07	1.17
251.50	1.30
0.00	0.45
Recovery %	65



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²	**38.3**	
Maximum Settlement	1.3	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	239.4	kN/m²		
Modulus of Subgrade Reaction K762	119.3	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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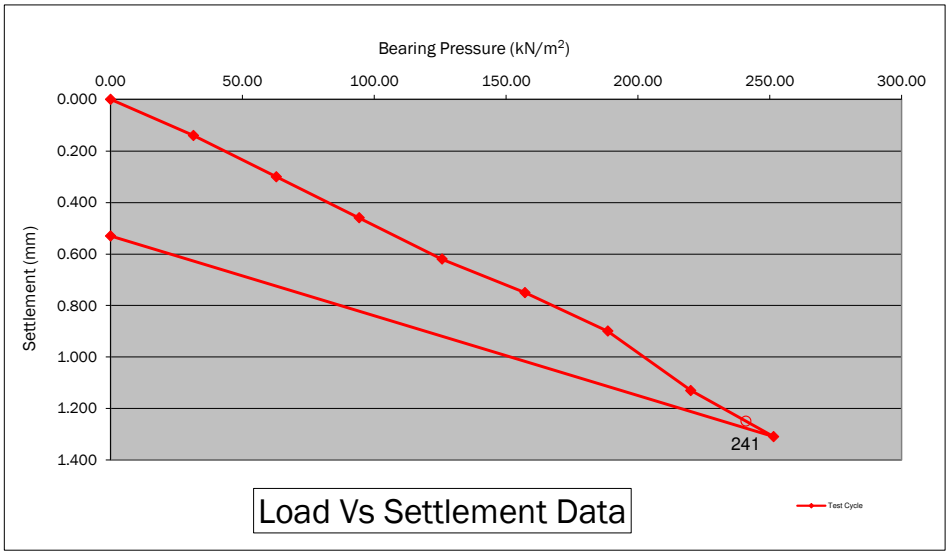
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1G	**REPORT NO:**	**ETS/1613G**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1G**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**C5 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.14
62.88	0.30
94.31	0.46
125.75	0.62
157.19	0.75
188.63	0.90
220.07	1.13
251.50	1.31
0.00	0.53
Recovery %	60



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²	**38.8**	
Maximum Settlement	1.31	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	241.0	kN/m²		
Modulus of Subgrade Reaction K762	120.1	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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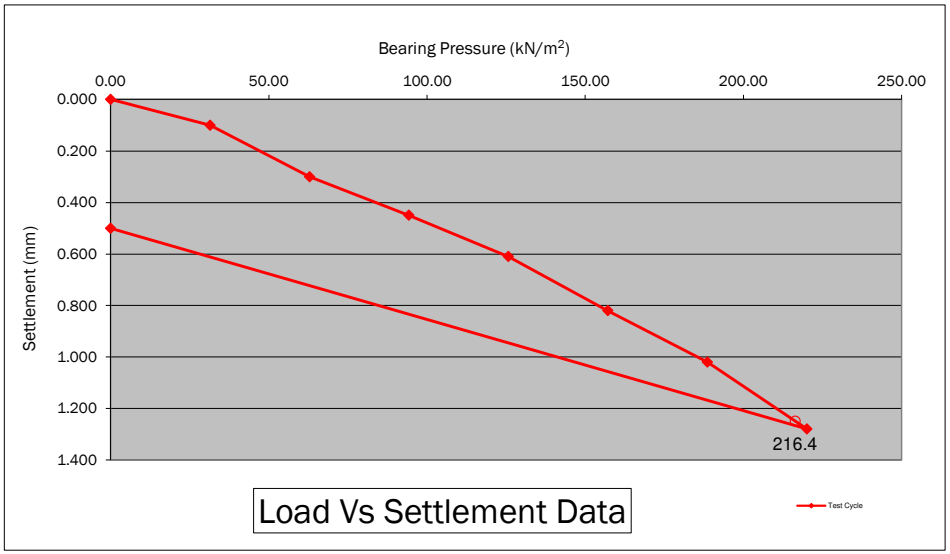
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1H	**REPORT NO:**	**ETS/1613H**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1H**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**D5 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.10
62.88	0.30
94.31	0.45
125.75	0.61
157.19	0.82
188.63	1.02
220.07	1.28
0.00	0.50
Recovery %	61



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	220.1	kN/m²	**32.2**	
Maximum Settlement	1.28	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	216.4	kN/m²		
Modulus of Subgrade Reaction K762	107.9	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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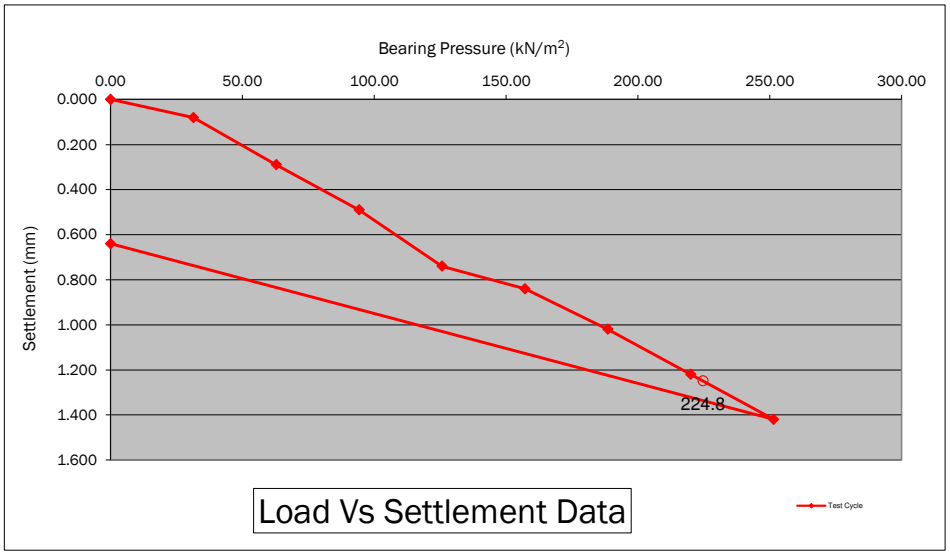
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1I	**REPORT NO:**	**ETS/1613I**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1I**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**D4 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.08
62.88	0.29
94.31	0.49
125.75	0.74
157.19	0.84
188.63	1.02
220.07	1.22
251.50	1.42
0.00	0.64
Recovery %	55



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²	**34.4**	
Maximum Settlement	1.42	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	224.8	kN/m²		
Modulus of Subgrade Reaction K762	112.0	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

Results relate only to the sample(s) as tested.

This report may not be reproduced other than in full without the prior written approval of the issuing laboratory.

The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer.

Testing carried out at client's site location.

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Wingates - Bolton

UKAS TESTING
27572

ETL EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Dunscroft
Doncaster
DN7 4JJ

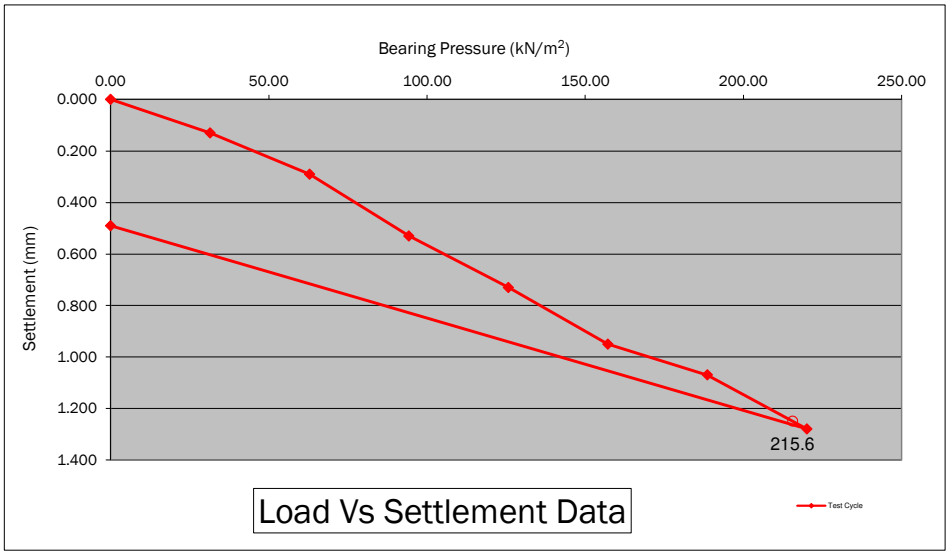
Tel: 07310 161694
E-mail ops@earthworkstesting.co.uk

Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1J	**REPORT NO:**	**ETS/1613J**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1J**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**C4 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.13
62.88	0.29
94.31	0.53
125.75	0.73
157.19	0.95
188.63	1.07
220.07	1.28
0.00	0.49
Recovery %	62



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	220.1	kN/m²	**32.0**	
Maximum Settlement	1.28	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	215.6	kN/m²		
Modulus of Subgrade Reaction K762	107.5	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

Results relate only to the sample(s) as tested.

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Testing carried out at client's site location.

** End of report **

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

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Unit 6 Eco Park, Eco Way
Dunscroft
Doncaster
DN7 4JJ

Tel: 07310 161694
E-mail ops@earthworkstesting.co.uk

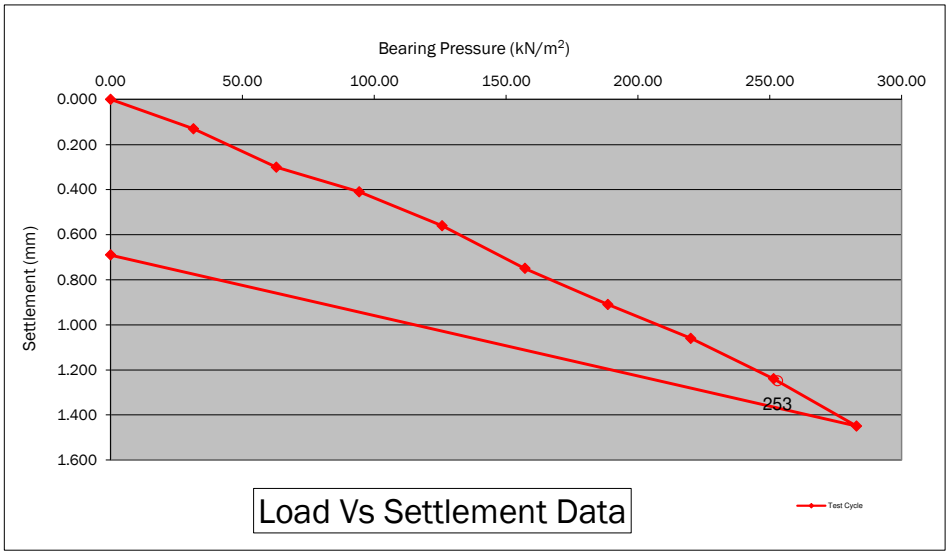
Wingates - Bolton

Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1K	**REPORT NO:**	**ETS/1613K**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1K**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**B4 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.13
62.88	0.30
94.31	0.41
125.75	0.56
157.19	0.75
188.63	0.91
220.07	1.06
251.50	1.24
282.94	1.45
0.00	0.69
Recovery %	52



Load Vs Settlement Data

Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	282.9	kN/m²	**42.2**	
Maximum Settlement	1.45	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	253.0	kN/m²		
Modulus of Subgrade Reaction K762	126.1	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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Testing carried out at client's site location.

** End of report **

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Wingates - Bolton

UKAS TESTING
27572

ETL EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Dunscroft
Doncaster
DN7 4JJ

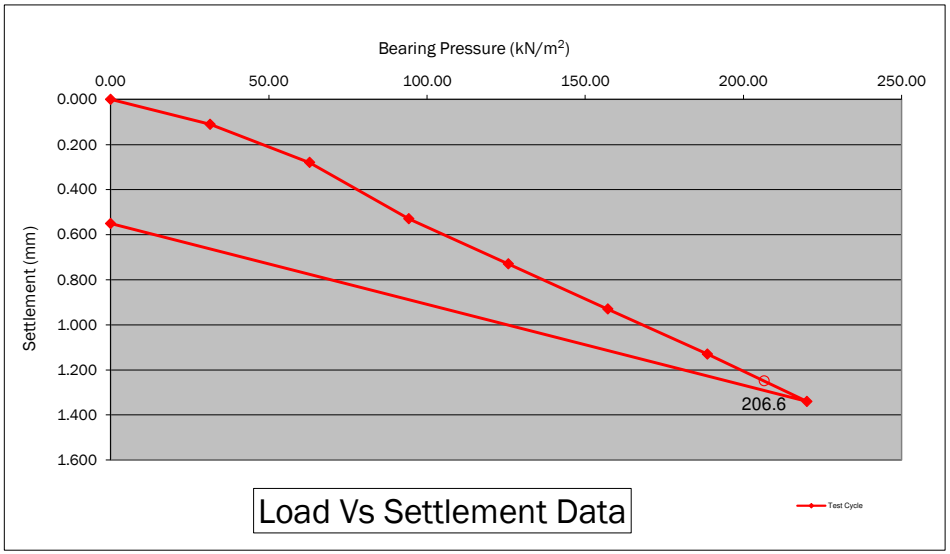
Tel: 07310 161694
E-mail ops@earthworkstesting.co.uk

Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/1L	**REPORT NO:**	**ETS/1613L**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/1L**	Report Date:	18/10/2023

TEST REPORT

Material Description:	Cemented Brown Clay	Date Tested:	**17/10/2023**
Test Location:	**A4 Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.11
62.88	0.28
94.31	0.53
125.75	0.73
157.19	0.93
188.63	1.13
220.07	1.34
0.00	0.55
Recovery %	59



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	220.1	kN/m²	**29.7**	
Maximum Settlement	1.34	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	206.6	kN/m²		
Modulus of Subgrade Reaction K762	103.0	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

Results relate only to the sample(s) as tested.

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Testing carried out at client's site location.

** End of report **

Laboratory Report	ETS/1683	Contract Sample No	C1082/3
Report Date	27/10/2023	Clients Reference	C1082/3
		Material Description	Brown Stoney Clay + 2% OPC
Collins Earthworks Ltd			
Whiteley Road		Date Sampled	19/10/2023
Ripley		Source	Ex-Site
Derbyshire		Supplier	Ex-Site
DE5 3QL		Sampled By	ETL
		Sampling Environment	Dry
		Sample Type	Bulk
		Location in sample	Quartered
Wingates - Bolton		Sample Location	B3 Cement
		Sampling Plan	ETL Procedure
		Sampling Method	Sampling from site fill locations.

UKAS TESTING
27572

ETL EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ
Tel: 07310 161694
Email: ops@earthworkstesting.co.uk

Date Received	19/10/2023
Date Tests Completed	27/10/2023

TEST REPORT

Determination of Particle Density

Tested in Accordance with BS 1377: Part 2: 1990. Clause 8.2 (Gas Jar Method)

Average Particle Density 2.60 Mg/m³

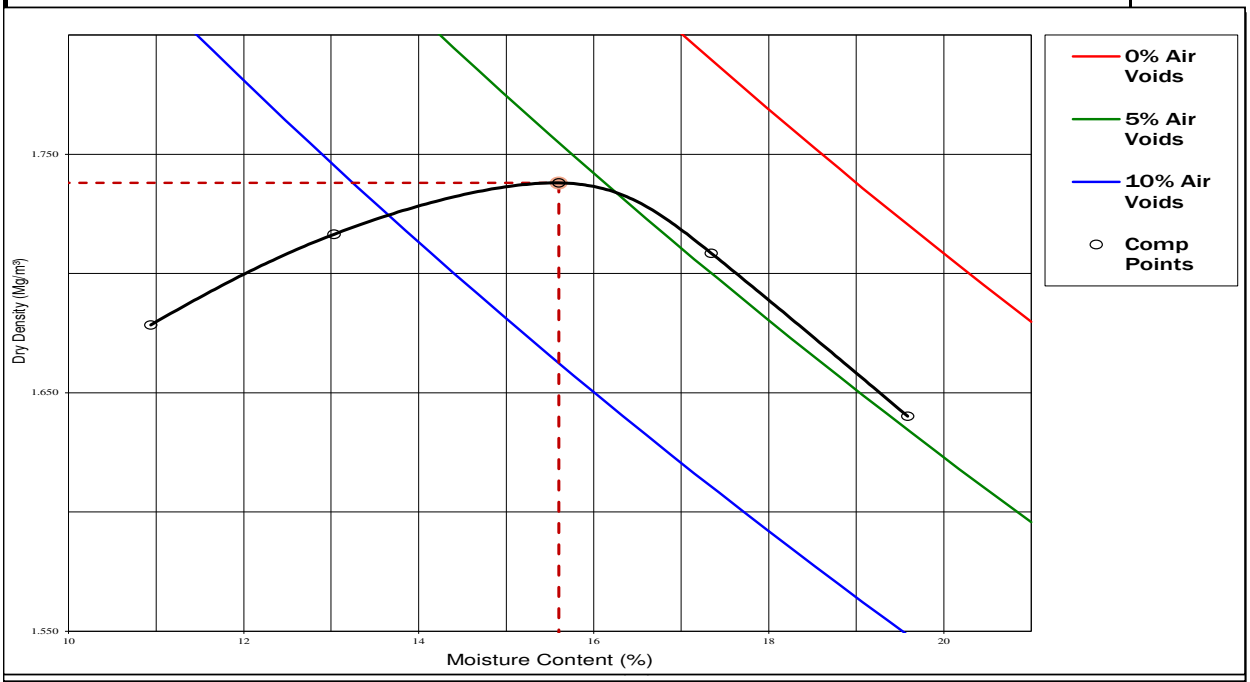
Sample prepared in Accordance with BS 1377-1:2016, clause 8.4

Determination of Dry Density / Moisture Content Relationship

Tested in Accordance with BS 1377: Part 4: 1990 Clause 3.4.4.2 (2.5kg Rammer, CBR mould)

The test was carried out using separate samples, each prepared in Accordance with BS1377: Part 1: 2016 Clause 8.3.4(b)

Sample particle size adjustment:



Optimum Moisture Content (%)	16 %
Maximum Dry Density	1.74 Mg/m³
Material Retained on 37.5mm test sieve	0 %
Material Retained on 20.0mm test sieve	0 %
Particle Density (Measured) Determined by BS1377:Part 2:1990 Clause 8.2	2.60 Mg/m³

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation.
Results relate only to the sample(s) as received.
This report may not be reproduced other than in full without the prior written approval of the issuing laboratory.
The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer.

Authorised Signatory

T. McDonald

** END OF REPORT **

John Lamb
Earthworks Testing Ltd☐
69 High Street
Dodworth
Barnsley
South Yorkshire
S75 3RQ

e: ops@earthworkstesting.co.uk

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

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

Analytical Report Number : 23-63870

Project / Site name:	Wingates - Bolton	**Samples received on:**	20/10/2023
Your job number:	C1082	**Samples instructed on/ Analysis started on:**	20/10/2023
Your order number:	SC058	**Analysis completed by:**	03/11/2023
Report Issue Number:	1	**Report issued on:**	03/11/2023
Samples Analysed:	1 soil sample		

Signed:

Dominika Liana
Junior Reporting Specialist
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.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-63870
Project / Site name: Wingates - Bolton
Your Order No: SC058

Lab Sample Number				2852255
Sample Reference				C1082
Sample Number				/3
Depth (m)				None Supplied
Date Sampled				19/10/2023
Time Taken				1600
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	13
Total mass of sample received	kg	0.001	NONE	0.5

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	11.8
Total Sulphate as SO4	%	0.005	MCERTS	0.317
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.103
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	21
Total Sulphur	%	0.005	MCERTS	0.133
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	< 5.0
Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5

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

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 23-63870
Project / Site name: Wingates - Bolton

* 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 *
2852255	C1082	/3	None Supplied	Brown clay and sand with gravel.

Analytical Report Number : 23-63870
Project / Site name: Wingates - Bolton

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
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
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.	L019-UK/PL	D	NONE
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 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.

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

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

4041

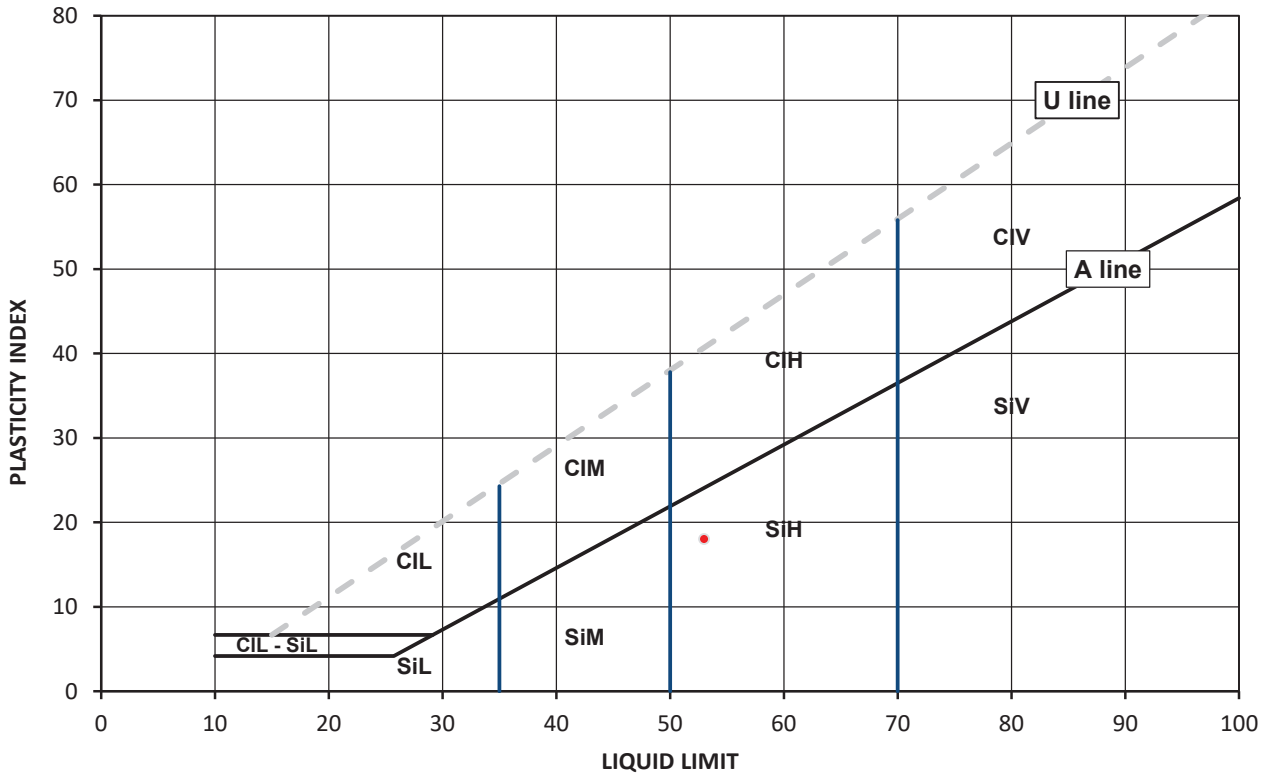
Client:	Earthworks Testing Ltd	Client Reference:	C1082
Client Address:	Unit 6, Eco Way Dunscroft Doncaster DN7 4JJ	Job Number:	23-63867-1
		Date Sampled:	19/10/2023
		Date Received:	20/10/2023
Contact:	John Lamb	Date Tested:	28/10/2023
Site Address:	Wingates - Bolton	Sampled By:	Client - ETL

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

Test Results:

Laboratory Reference:	2852253	Depth Top [m]:	Not Given
Hole No.:	C1082	Depth Base [m]:	Not Given
Sample Reference:	/3	Sample Type:	B
Sample Description:	Brownish grey sandy silty GRAVEL with fragments of brick, crushed concrete		
Sample Preparation:	Tested after washing to remove >425 µm		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
15	53	35	18	26



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 1377-2: 1990: Clause 3.2

Remarks:

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Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 10/11/2023

GF 232.13

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

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

4041

Client: Earthworks Testing Ltd

Client Address: Unit 6, Eco Way
Dunscroft Doncaster
DN7 4JJ

Contact: John Lamb

Site Address: Wingates - Bolton

Client Reference: C1082
Job Number: 23-63867-1
Date Sampled: 19/10/2023
Date Received: 20/10/2023
Date Tested: 28/10/2023
Sampled By: Client - ETL

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2852253	C1082	/3	Not Given	Not Given	B	Brownish grey sandy silty GRAVEL with fragments of brick, crushed concrete		15	Sample was quartered, oven dried at 108.4 °C			

Comments:

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Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 10/11/2023

GF 099.17

4041

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION

Tested in Accordance with: BS 1377-2:1990: Clause 9.2

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

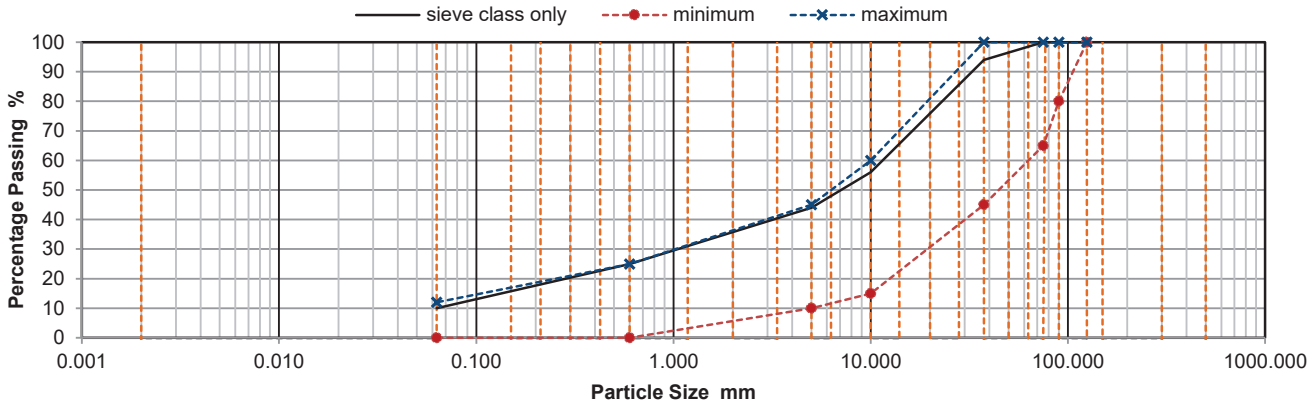
Environmental Science

Client:	Earthworks Testing Ltd	Client Reference:	C1082
Client Address:	Unit 6, Eco Way Dunscroft Doncaster DN7 4JJ	Job Number:	23-63867-1
		Date Sampled:	19/10/2023
		Date Received:	20/10/2023
Contact:	John Lamb	Date Tested:	28/10/2023
Site Address:	Wingates - Bolton	Sampled By:	Client - ETL

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

Test Results:

Laboratory Reference:	2852253	Depth Top [m]:	Not Given
Hole No.:	C1082	Depth Base [m]:	Not Given
Sample Reference:	/3	Sample Type:	B
Sample Description:	Brownish grey sandy silty GRAVEL with fragments of brick, crushed concrete		
Sample Preparation:	Sample was quartered, oven dried at 108.4 °C and broken down by hand.		



Sieving		Material Type 6F2 Selected granular material			
Particle Size mm	Passing %	Material Specification			Pass or Fail
500	100				
300	100				
150	100				
125	100	100	-	100	PASS
90	100	80	-	100	PASS
75	100	65	-	100	PASS
63	100				
50	100				
37.5	94	45	-	100	PASS
28	80				
20	71				
14	62				
10	56	15	-	60	PASS
6.3	49				
5	44	10	-	45	PASS
3.35	39				
2	34				
1.18	30				
0.6	25	0	-	25	PASS
0.425	22				
0.3	19				
0.212	16				
0.15	13				
0.063	10	0	-	12	PASS

Uniformity Coefficient [Cu]		190
D60	mm	12.7
D10	mm	0.066

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

Earthworks

Specification for Highway Works, Volume 1, Series 600, TABLE 6/2

Remarks:

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Signed: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 10/11/2023

GF 471.3

4041

TEST CERTIFICATE

DETERMINATION OF THE UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

Tested in Accordance with: BS 1377-7: 1990: Clause 8

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

Client:	Earthworks Testing Ltd	Client Reference:	C1082
Client Address:	Unit 6, Eco Way Dunscroft Doncaster DN7 4JJ	Job Number:	23-63867-1
		Date Sampled:	19/10/2023
		Date Received:	20/10/2023
Contact:	John Lamb	Date Tested:	07/11/2023
Site Address:	Wingates - Bolton	Sampled By:	Client - ETL

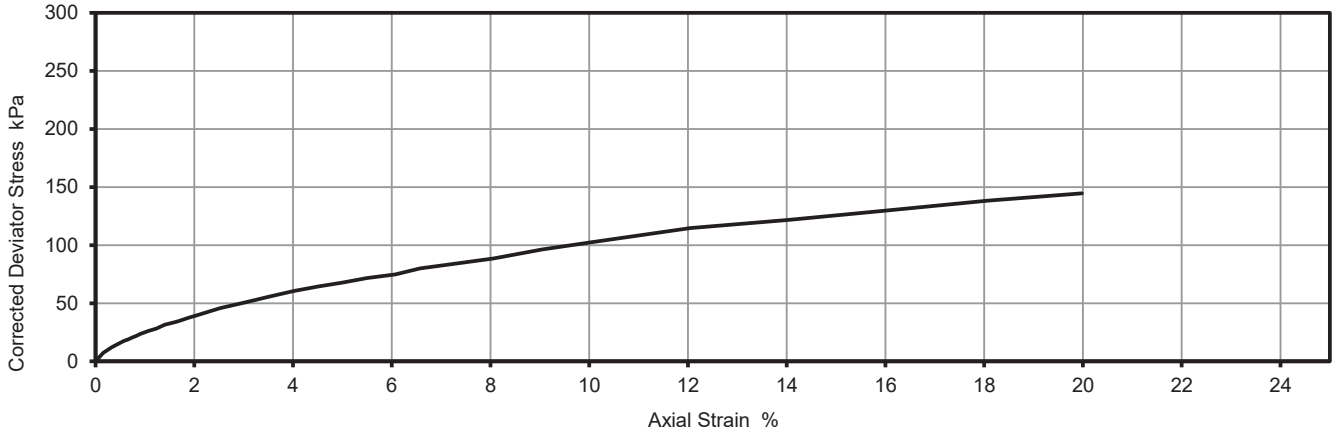
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

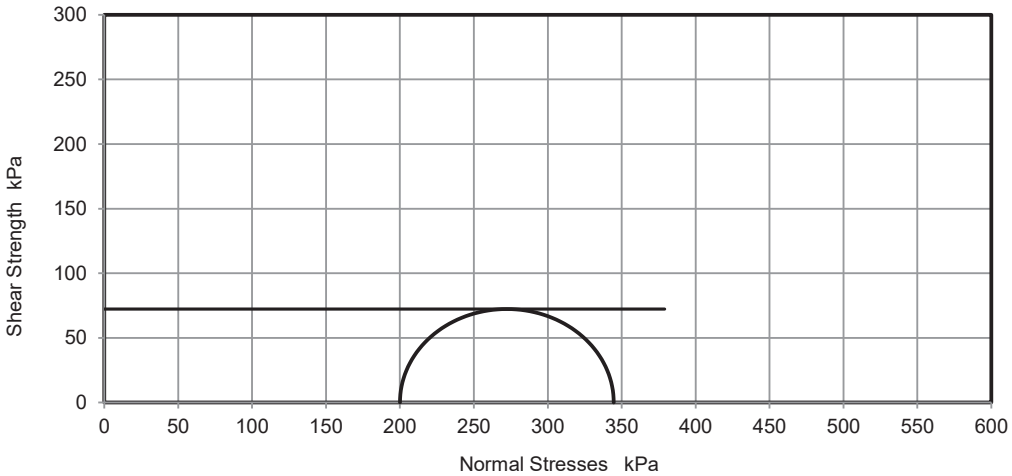
Laboratory Reference:	2852253	Depth Top [m]:	Not Given
Hole No.:	C1082	Depth Base [m]:	Not Given
Sample Reference:	/3	Sample Type:	B
Sample Description:	Brownish grey sandy silty GRAVEL with fragments of brick, crushed concrete		
Sample Preparation:	Recompacted at NMC using 2.5kg rammer in accordance with Table 6 of BS1377-1:2016.		

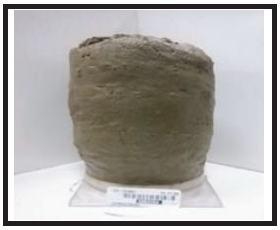
Test Number	1		Rate of Strain	1.00	%/min
Length	201.22	mm	Cell Pressure	200	kPa
Diameter	102.14	mm	Axial Strain at failure	20.0	%
Bulk Density	2.03	Mg/m3	Deviator Stress, (σ1 - σ3)f	145	kPa
Moisture Content	21	%	Undrained Shear Strength, cu	72	kPa ½(σ1 - σ3)f
Dry Density	1.68	Mg/m3	Mode of Failure	Compound	
Membrane Correction	1.02	kPa	Latex membrane thickness	0.27	mm

Deviator Stress v Axial Strain

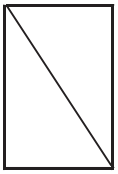


Mohr Circles





Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks:

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: Katarzyna Koziel

Katarzyna Koziel
Senior Reporting Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 10/11/2023

GF 184.14

John Lamb
Earthworks Testing Ltd☐
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i2 Analytical Ltd.
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WD18 8YS

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e: reception@i2analytical.com

Analytical Report Number : 23-64057

Project / Site name:	Wingates - Bolton	**Samples received on:**	20/10/2023
Your job number:	C1082	**Samples instructed on/ Analysis started on:**	20/10/2023
Your order number:	SC058	**Analysis completed by:**	31/10/2023
Report Issue Number:	1	**Report issued on:**	31/10/2023
Samples Analysed:	2 soil samples		

Signed:

Dominika Liana
Junior Reporting Specialist
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

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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.

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Analytical Report Number: 23-64057
Project / Site name: Wingates - Bolton
Your Order No: SC058

Lab Sample Number				2853157	2853158
Sample Reference				C1082/3	C1082/7
Sample Number				None Supplied	None Supplied
Depth (m)				None Supplied	None Supplied
Date Sampled				19/10/2023	19/10/2023
Time Taken				1600	1600
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	-	39
Moisture Content	%	0.01	NONE	-	16
Total mass of sample received	kg	0.001	NONE	-	0.3
Asbestos in Soil	Type	N/A	ISO 17025	Not-detected	-
Asbestos Analyst ID	N/A	N/A	N/A	DSO	N/A

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	-	10.6
Total Sulphate as SO4	mg/kg	50	MCERTS	-	3600
Total Sulphate as SO4	%	0.005	MCERTS	-	0.358
Acid Soluble Sulphur	%	0.003	NONE	-	0.12
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	-	660
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	-	0.33
Water Soluble Sulphur	%	0.0001	NONE	-	0.022
Total Potential Sulphate	mg/kg	30	NONE	-	4600
Total Potential Sulphate	%	0.003	NONE	-	0.464
Oxidisable Sulphide (as SO4)	%	0.002	NONE	-	0.106
Oxidisable Sulphide (as SO4)	mg/kg	20	NONE	-	1100
Total Sulphur	mg/kg	50	MCERTS	-	1500
Total Sulphur	%	0.005	MCERTS	-	0.155
Organic Matter (automated)	%	0.1	MCERTS	-	1.4

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

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Analytical Report Number : 23-64057
Project / Site name: Wingates - Bolton

* 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 *
2853158	C1082/7	None Supplied	None Supplied	Brown clay and sand with gravel.

Analytical Report Number : 23-64057
Project / Site name: Wingates - Bolton

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
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Oxidisable Sulphide in soil	Determination of oxidisable sulphide in soil by calculation from total sulphur and total sulphate.	In-house method based on TRL 447		D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
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.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total potential sulphate in soil	Determination of total potential sulphate in soil by calculation from total sulphur.	By calculation - In-house method based on TRL 447 report.	L038-PL	D	NONE
Acid Soluble Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	NONE
Water Soluble Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE

Analytical Report Number : 23-64057
Project / Site name: Wingates - Bolton

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
Total potential sulphate in soil (Percentage)	Determination of total potential sulphate in soil by calculation from total sulphur - expressed as a percentage.	By calculation - In-house method based on TRL 447 report.	L038-PL	D	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.

Laboratory Report	ETS/1683-1687	Contract Sample No	C1082/3-7
Report Date	14 November 2023	ETS Contract No	C1082/3-7

Collins Earthworks Ltd Whiteley Road Ripley Derbyshire DE5 3QL	Material Description	See Below
	Source	Ex-Site
	Supplier	Ex-Site
	Date Sampled	19/10/2023
	Date Received	19/10/2023
Wingates - Bolton	Date Completed	10/11/2023
	Sample Location	See Below
	Client Reference	C1082/3-7

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Doncaster
DN7 4JJ
Tel: 07310 161694
Email-ops@earthworkstesting.co.uk

Testing Lab: I2 Analytical LTD **Report Number:** 23-64057 & 23-63867-1

ETS Number	Sample Number	Location	Matieral	Testing
1683	3	B3 Cement	Brown Stoney Clay + 2% OPC	BRE SD 1 / Asbestos, MC,PSD,PI,QUSS
1687	7	B3	Brown Stoney Clay	TRL 447

Authorised Signatory

T. McDonald

Laboratory Report	ETS/1684	Contract Sample No	C1082/4
Report Date	20 October 2023	ETS Contract No	C1082/4

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27572

Tel: 07310 161694

Email-ops@earthworkstesting.co.uk

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Date Sampled	19/10/2023
Date Received	19/10/2023
Date Completed	20/10/2023
Sample Location	See Below
Client Reference	C1082/4

Insitu Density & Moisture Content - Core Cutter Tests BS 1377: 1990: Part 9

Operator JH

Maximum Dry Density (MDD)	1.74	Mg.m³
Optimum Moisture Content	16	%
Particle Density	2.60	Mg/m³
Source sample reference	C1082/3	

Test Location	Reference	Bulk Density Mg/m³	Moisture Content %	Dry Density Mg/m³	% MDD	Air Voids %
B3 Cement	C1082/4	2.054	16.5	1.763	101.3	3.1
C3 Cement	C1082/4	2.082	14.9	1.812	104.1	3.3
D3 Cement	C1082/4	2.062	15.9	1.779	102.2	3.3

Authorised Signatory

T. McDonald

Results provided for interpretation by others.

Results relate only to the item(s) tested.

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The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer.

**** End of report ****

Laboratory Report	ETS/1684	Contract Sample No	C1082/4
Report Date	20/10/2023	ETS Contract No	C1082/4

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Tel: 07310 161694

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Date Sampled	19/10/2023
Sample Location	See Below
Client Reference	C1082/4
Source	Ex-Site
Supplier	Ex-Site
Sampling Environment	Overcast
Material Description	Brown Stoney Clay + 2% OPC
Date Received	19/10/2023
Date Tested	19/10/2023

TEST REPORT

Determination of Equivalent Shear Strength

Tested in accordance with In-House Test Procedure Based on BS1377, Part 9: 1990 & BS 5930: 1999

Calibration Constant:	1.000000	Equipment Ref.: HSV 095	Operator JH

Test Reference	Test Location	Shear Vane Readings (Divisions)				Average Vane Reading	Equivalent Shear Strength (kPa)
		Test 1	Test 2	Test 3	Test 4		
C1082/4	B3 Cement	>150	>150	>150	>150	>150	**>150**
C1082/4	C3 Cement	>150	>150	>150	>150	>150	**>150**
C1082/4	D3 Cement	>150	>150	>150	>150	>150	**>150**

Notes:

Authorised Signatory

Laboratory Report	ETS/1684	Contract Sample No	C1082/4
Report Date	20/10/2023	ETS Contract No	C1082/4

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Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Date Sampled	19/10/2023
Sample Location	See Below
Client Reference	C1082/4
Source	Ex-Site
Supplier	Ex-Site
Sampling Environment	Overcast
Material Description	Brown Stoney Clay + 2% OPC
Date Received	19/10/2023
Date Tested	19/10/2023

TEST REPORT

Determination of Equivalent Shear Strength

Tested in accordance with In-House Test Procedure Based on BS1377, Part 9: 1990 & BS 5930: 1999

Calibration Constant:	1.000000	Equipment Ref.:	HSV 095	Operator	JH

Laboratory Report	ETS/1685	Contract Sample No	C1082/5
Report Date	20/10/2023	ETS Contract No	C1082/5

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Dunscroft
Doncaster
DN7 4JJ

UKAS TESTING
27572

Tel: **07310 161694**
Email: ops@earthworkstesting.co.uk

Collins Earthworks Ltd	Source	Ex-Site
Whiteley Road	Supplier	Ex-Site
Ripley	Date Sampled	19/10/2023
Derbyshire	Stabiliser/s Used	OPC
DE5 3QL	% Stabiliser Used	2%
	Carried out at	Site
	Weather	Overcast
Project: Wingates - Bolton	Operator	JH

TEST REPORT

Determination of Moisture Condition Value & Degree of Pulverization of Unbound and Hydraulically Bound Mixtures*

BS EN13286, Part 46: 2003 & BS EN 13286-48: 2005

Material Description	Location	% Retained on 20mm Sieve	Method of interpretation	Moisture Content %	Moisture Condition Value	Pulverisation* %
Brown Stoney Clay + 2% OPC	B3 Cement	4.77	Steepest Straight Line	12.5	**12.0**	**65**

Tempelate Version 1.0

** Degree of Pulverisation is **NOT** covered by current scope of UKAS accreditation*

Authorised Signatory

Opinions and interpretations not covered by the current scope of UKAS accreditation of this laboratory.
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Results relate only to the samples(s) as tested.
The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer

Laboratory Report	ETS/1685	Contract Sample No	C1082/5
Report Date	20/10/2023	ETS Contract No	C1082/5

EARTHWORKS TESTING LTD

Unit 6, Eco Way
Dunscroft
Doncaster
DN7 4JJ

UKAS TESTING
27572

Tel: **07310 161694**
Email: ops@earthworkstesting.co.uk

Collins Earthworks Ltd	Source	Ex-Site
Whiteley Road	Supplier	Ex-Site
Ripley	Date Sampled	19/10/2023
Derbyshire	Stabiliser/s Used	OPC
DE5 3QL	% Stabiliser Used	2%
	Carried out at	Site
	Weather	Overcast
Project: Wingates - Bolton	Operator	JH

TEST REPORT

Determination of Moisture Condition Value & Degree of Pulverization of Unbound and Hydraulically Bound Mixtures*

BS EN13286, Part 46: 2003 & BS EN 13286-48: 2005

** END OF REPORT **

Laboratory Report	ETS/1685	Contract Sample No	C1082/5
Report Date	20/10/2023	ETS Contract No	C1082/5

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email:ops@earthworkstesting.co.uk
Tel: 07310 161694

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Stabiliser(s)	OPC
% Stabiliser	2%
Sample Plan	Client Specification
Date Sampled	19/10/2023
Date Tested	19/10/2023
Weather Conditions	Overcast
Operator	JH

TEST REPORT

Degree of Pulverization of Unbound and Hydraulically Bound Mixtures - BS EN 13286-48: 2005

Reference	Test Location	Pulverization %	Reference	Test Location	Pulverization %
C1082/5	C3 Cement	70			
C1082/5	D3 Cement	60			

Deviations:

Template Version: 1.0

Authorised Signatory

Laboratory Report	ETS/1685	Contract Sample No	C1082/5
Report Date	20/10/2023	ETS Contract No	C1082/5

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Tel: 07310 161694

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Stabiliser(s)	OPC
% Stabiliser	2%
Sample Plan	Client Specification
Date Sampled	19/10/2023
Date Tested	19/10/2023
Weather Conditions	Overcast
Operator	JH

TEST REPORT

Degree of Pulverization of Unbound and Hydraulically Bound Mixtures - BS EN 13286-48: 2005

** END OF REPORT **

Laboratory Report	ETS/1686	Contract Sample No	C1082/6
Report Date	23/11/2023	Clients Reference	C1082/6
		Material Description	Brown Stoney Clay + 2% OPC
Collins Earthworls Ltd			
Whiteley Road		Date Sampled	19/10/2023
Ripley		Source	Ex-Site
Derbyshire		Supplier	Ex-Site
DE5 3QL		Sampled By	ETL
		Sampling Environment	Overcast
		Sample Type	Bulk
		Location in sample	N/A
Wingates - Bolton		Sample Location	B3 Cement
		Sampling Plan	ETL Procedure
		Sampling Method	Sampling from heaps / stockpiles.

UKAS TESTING
27572

ETL EARTHWORKS TESTING LTD
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Tel: 07310 161694
Email: ops@earthworkstesting.co.uk

Date Received	19/10/2023
Date Tests Completed	23/11/2023

TEST REPORT

California Bearing Ratio (CBR)

Tested in Accordance with BS EN 13286-47:2021 in a soaked condition

Curing Method: Evaporation Prevention followed by full soaking - BS EN 13286-47:2021: Clause 8.4

Time to Maximum Swell	168	Hrs
Total swell	0.03	%
Weight of Surcharge used during soak period	5	Kg

Sample Preparation

Compacted with specified effort using 2.5kg rammer in accordance with BS EN 13286-2: 2010: Annex A

Pre-test data

Bulk density	2.29	Mg/m³
Water Content	21 (20.6)*	%
Dry density	1.90	Mg/m³
Weight of Surcharge used during test period	5	Kg

Post test data

Water Content	21 (20.6)*	%

CBR Result

CBR (top)	95	%
CBR (bottom) - Definitive Value	165	%

Swell Data

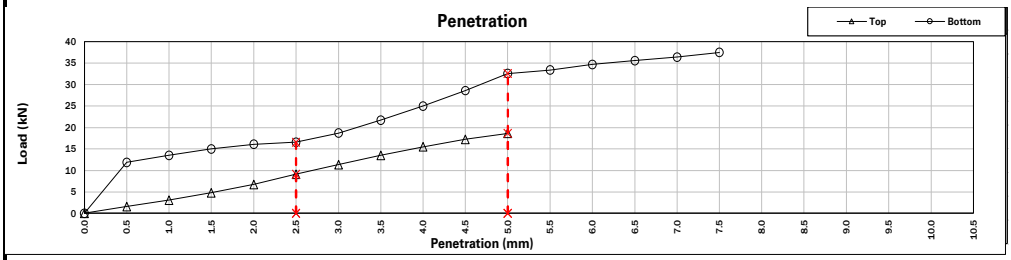
Curing Period: 22 Days

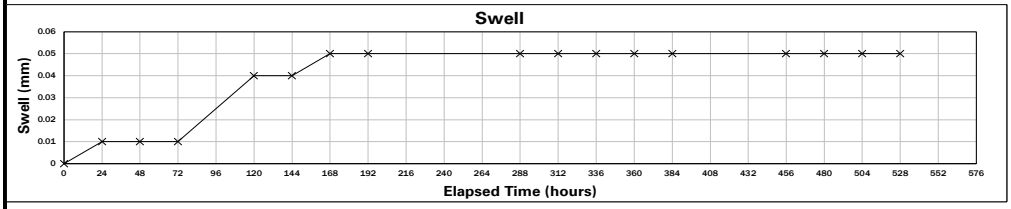
Curing Temperatures: 18-22°C

*Moisture content result also presented rounded to 0.1% at client's request. Not covered by scope of UKAS accreditation

Top - Tested at 7 days

Bottom - Tested at 28 days





Penetration Curve Type

Top: Convex Upwards

Bottom: Convex Upwards

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Authorised Signatory

T. McDonald

** END OF REPORT **

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Analytical Report Number : 23-64903

Project / Site name:	Wingates - Bolton	**Samples received on:**	25/10/2023
Your job number:	C1082	**Samples instructed on/ Analysis started on:**	25/10/2023
Your order number:	SC061	**Analysis completed by:**	02/11/2023
Report Issue Number:	1	**Report issued on:**	02/11/2023
Samples Analysed:	2 soil samples		

Izabela Wójcik
Signed:

Izabela Wójcik
Reporting Specialist
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

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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.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-64903
Project / Site name: Wingates - Bolton
Your Order No: SC061

Lab Sample Number				2857853	2857854
Sample Reference				C1082	C1082
Sample Number				/8	/9
Depth (m)				None Supplied	None Supplied
Date Sampled				24/10/2023	24/10/2023
Time Taken				1600	1600
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**		
Stone Content	%	0.1	NONE	36	-
Moisture Content	%	0.01	NONE	21	-
Total mass of sample received	kg	0.001	NONE	0.3	-

Asbestos in Soil	Type	N/A	ISO 17025	-	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	N/A	WEM

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.4	-
Total Sulphate as SO4	mg/kg	50	MCERTS	980	-
Total Sulphate as SO4	%	0.005	MCERTS	0.098	-
Acid Soluble Sulphur	%	0.003	NONE	0.033	-
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	630	-
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.314	-
Water Soluble Sulphur	%	0.0001	NONE	0.0209	-
Total Potential Sulphate	mg/kg	30	NONE	1700	-
Total Potential Sulphate	%	0.003	NONE	0.174	-
Oxidisable Sulphide (as SO4)	%	0.002	NONE	0.076	-
Oxidisable Sulphide (as SO4)	mg/kg	20	NONE	760	-
Total Sulphur	mg/kg	50	MCERTS	580	-
Total Sulphur	%	0.005	MCERTS	0.058	-
Organic Matter (automated)	%	0.1	MCERTS	0.8	-

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 relate only to the sample(s) submitted for testing.

Analytical Report Number : 23-64903
Project / Site name: Wingates - Bolton

* 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 *
2857853	C1082	/8	None Supplied	Brown clay and sand with gravel.

Analytical Report Number : 23-64903
Project / Site name: Wingates - Bolton

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
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Oxidisable Sulphide in soil	Determination of oxidisable sulphide in soil by calculation from total sulphur and total sulphate.	In-house method based on TRL 447		D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
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.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total potential sulphate in soil	Determination of total potential sulphate in soil by calculation from total sulphur.	By calculation - In-house method based on TRL 447 report.	L038-PL	D	NONE
Acid Soluble Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	NONE
Water Soluble Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Total potential sulphate in soil (Percentage)	Determination of total potential sulphate in soil by calculation from total sulphur - expressed as a percentage.	By calculation - In-house method based on TRL 447 report.	L038-PL	D	NONE

Analytical Report Number : 23-64903
Project / Site name: Wingates - Bolton

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

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.

Laboratory Report	ETS/1746-1747	Contract Sample No	C1082/8-9
Report Date	16 November 2023	ETS Contract No	C1082/8-9

Collins Earthworks Ltd Whiteley Road Ripley Derbyshire DE5 3QL	Material Description	See Below
	Source	Ex-Site
	Supplier	Ex-Site
	Date Sampled	24/10/2023
	Date Received	24/10/2023
Wingates - Bolton	Date Completed	02/11/2023
	Sample Location	See Below
	Client Reference	C1082/8-9

EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ
Tel: 07310 161694
Email-ops@earthworkstesting.co.uk

Testing Lab: I2 Analytical LTD

Report Number: 23-64903 & 23-64633 & 23-64632

ETS Number	Sample Number	Location	Matieral	Testing
1746	8	B6 Layer 1	Brown Stoney Clay	TRL 447, OM
1747	9	B6 Layer 1	Brown Stoney Clay + 2% OPC	BRE SD1 / Asbestos, MC,SA,PI,QUSS

Authorised Signatory

T. McDonald

Laboratory Report	ETS/1747	Contract Sample No	C1082/9
Report Date	27/10/2023	Clients Reference	C1082/9
		Material Description	Brown Stoney Clay + 2% OPC
Collins Earthworks Ltd			
Whiteley Road		Date Sampled	24/10/2023
Ripley		Source	Ex-Site
Derbyshire		Supplier	Ex-Site
DE5 3QL		Sampled By	ETL
		Sampling Environment	Dry
		Sample Type	Bulk
		Location in sample	Quartered
Wingates - Bolton		Sample Location	B6 Layer 1
		Sampling Plan	ETL Procedure
		Sampling Method	Sampling from site fill locations.

UKAS TESTING
27572

ETL
EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ

Tel: 07310 161694
Email: ops@earthworkstesting.co.uk

Date Received	24/10/2023
Date Tests Completed	27/10/2023

TEST REPORT

Determination of Particle Density

Tested in Accordance with BS 1377: Part 2: 1990. Clause 8.2 (Gas Jar Method)

Sample prepared in Accordance with BS 1377-1:2016, clause 8.4

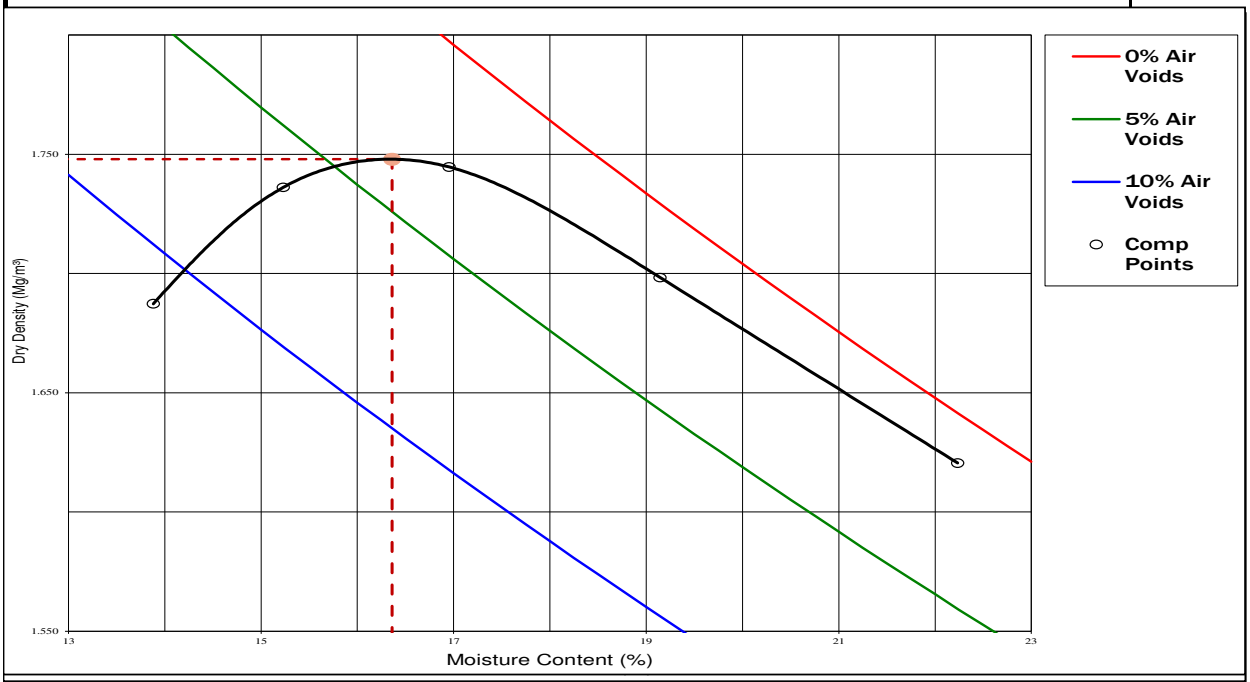
Average Particle Density	2.59 Mg/m³

Determination of Dry Density / Moisture Content Relationship

Tested in Accordance with BS 1377: Part 4: 1990 Clause 3.4.4.2 (2.5kg Rammer, CBR mould)

The test was carried out using separate samples, each prepared in Accordance with BS1377: Part 1: 2016 Clause 8.3.4(b)

Sample particle size adjustment:



Optimum Moisture Content (%)	16 %
Maximum Dry Density	1.75 Mg/m³
Material Retained on 37.5mm test sieve	0 %
Material Retained on 20.0mm test sieve	0 %
Particle Density (Measured) Determined by BS1377:Part 2:1990 Clause 8.2	2.59 Mg/m³

Opinions and interpretations expressed herein are outside of the scope of the UKAS Accreditation.
Results relate only to the sample(s) as received.
This report may not be reproduced other than in full without the prior written approval of the issuing laboratory.
The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer.

Authorised Signatory

T. McDonald

** END OF REPORT **

John Lamb
Earthworks Testing Ltd
Unit 6, Eco Way
Dunscroft
Doncaster
DN7 4JJ

e: ops@earthworkstesting.co.uk

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

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

Analytical Report Number : 23-64633

Project / Site name:	Wingates - Bolton	**Samples received on:**	25/10/2023
Your job number:	C1082	**Samples instructed on/ Analysis started on:**	25/10/2023
Your order number:	SC061	**Analysis completed by:**	03/11/2023
Report Issue Number:	1	**Report issued on:**	03/11/2023
Samples Analysed:	1 soil sample		

Izabela Wójcik
Signed:

Izabela Wójcik
Reporting Specialist
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.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-64633
Project / Site name: Wingates - Bolton
Your Order No: SC061

Lab Sample Number				2856214
Sample Reference				C1082/9
Sample Number				None Supplied
Depth (m)				None Supplied
Date Sampled				24/10/2023
Time Taken				None Supplied
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	< 0.1
Moisture Content	%	0.01	NONE	11
Total mass of sample received	kg	0.001	NONE	0.4

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	11.6
Total Sulphate as SO4	%	0.005	MCERTS	0.231
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0525
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	52.5
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	12
Total Sulphur	%	0.005	MCERTS	0.094
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	1.1
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	0.11
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	< 5.0
Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5

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

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 23-64633
Project / Site name: Wingates - Bolton

* 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 *
2856214	C1082/9	None Supplied	None Supplied	Brown sandy clay.

Analytical Report Number : 23-64633
Project / Site name: Wingates - Bolton

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
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
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.	L019-UK/PL	D	NONE
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 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.

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

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

4041

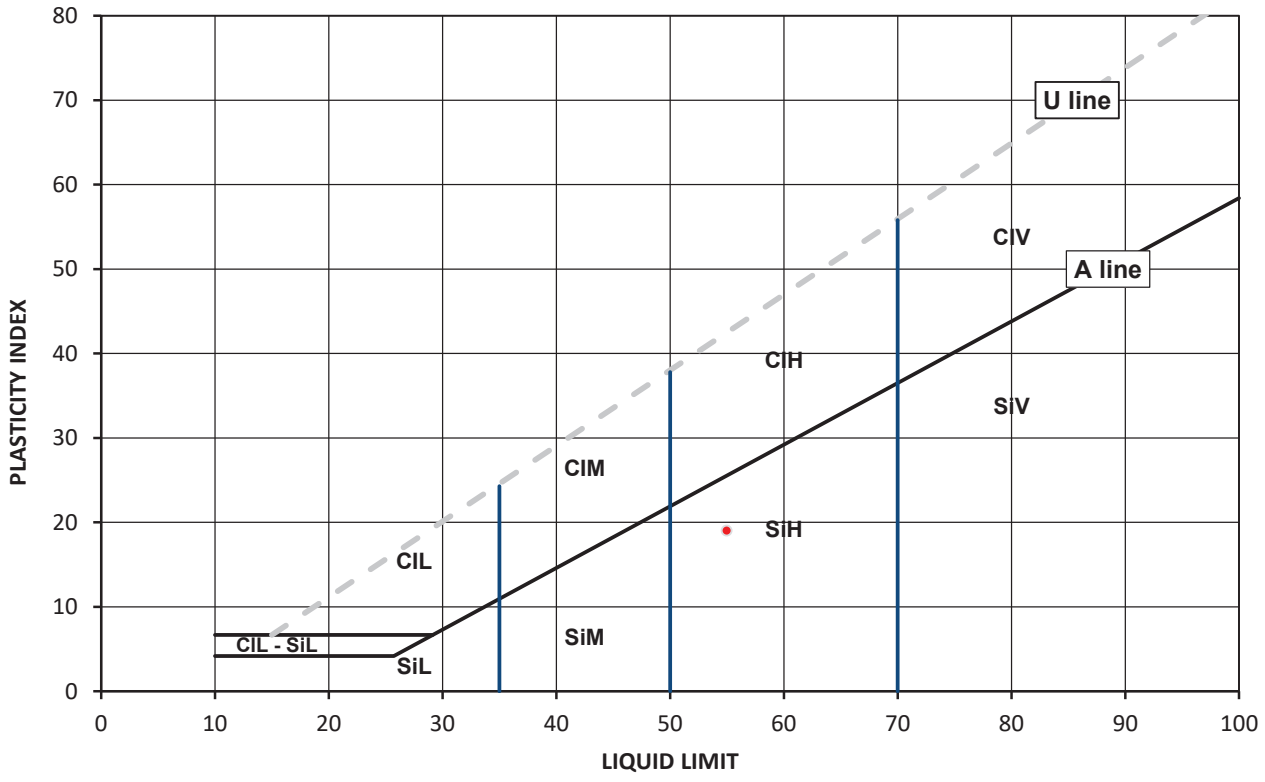
Client:	Earthworks Testing Ltd	Client Reference:	C1082
Client Address:	Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ	Job Number:	23-64632-1
		Date Sampled:	24/10/2023
		Date Received:	25/10/2023
Contact:	John Lamb	Date Tested:	10/11/2023
Site Address:	Wingates - Bolton	Sampled By:	Client - ETL

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

Test Results:

Laboratory Reference:	2856213	Depth Top [m]:	Not Given
Hole No.:	C1082/9	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey sandy clayey GRAVEL with fragments of crushed concrete		
Sample Preparation:	Tested after washing to remove >425 µm		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
18	55	36	19	40



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 1377-2: 1990: Clause 3.2

Remarks:

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 Janoszek
PL Environmental & Geotechnical Lab Production Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 15/11/2023

GF 232.13

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

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

4041

Client: Earthworks Testing Ltd

Client Address: Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ

Contact: John Lamb

Site Address: Wingates - Bolton

Client Reference: C1082
Job Number: 23-64632-1
Date Sampled: 24/10/2023
Date Received: 25/10/2023
Date Tested: 10/11/2023
Sampled By: Client - ETL

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2856213	C1082/9	Not Given	Not Given	Not Given	B	Brownish grey sandy clayey GRAVEL with fragments of crushed concrete		18	Sample was quartered, oven dried at 107.3 °C			

Comments:

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Signed:

Monika Janoszek
PL Environmental & Geotechnical Lab Production Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 15/11/2023

GF 099.17

4041

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION
Tested in Accordance with: BS 1377-2:1990: Clause 9.2

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

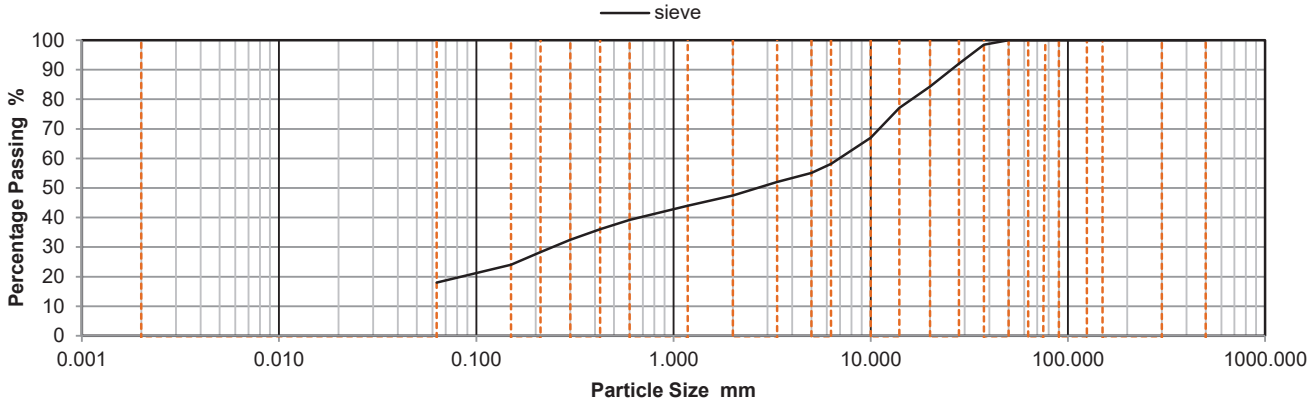
Environmental Science

Client:	Earthworks Testing Ltd	Client Reference:	C1082
Client Address:	Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ	Job Number:	23-64632-1
		Date Sampled:	24/10/2023
		Date Received:	25/10/2023
Contact:	John Lamb	Date Tested:	10/11/2023
Site Address:	Wingates - Bolton	Sampled By:	Client - ETL

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

Test Results:

Laboratory Reference:	2856213	Depth Top [m]:	Not Given
Hole No.:	C1082/9	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey sandy clayey GRAVEL with fragments of crushed concrete		
Sample Preparation:	Sample was quartered, oven dried at 107.3 °C and broken down by hand.		



Sieving		Material Type 2C Stony Cohesive Material			
Particle Size mm	Passing %	Material Specification			Pass or Fail
500	100				
300	100				
150	100				
125	100	100	-	100	PASS
90	100				
75	100				
63	100				
50	100				
37.5	99				
28	92				
20	84				
14	77				
10	67				
6.3	58				
5	55				
3.35	52				
2	48	15	-	80	PASS
1.18	44				
0.6	39				
0.425	36				
0.3	33				
0.212	28				
0.15	24				
0.063	18	15	-	80	PASS

Uniformity Coefficient [Cu]		> 110
D60	mm	6.96
D10	mm	

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

Earthworks

Specification for Highway Works, Volume 1, Series 600, TABLE 6/2

Remarks:

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. This report includes a statement of conformity to an industry standard specification, as such risks associated with uncertainty in relation to the decision rules applied do not need to be considered.

Signed:

Monika Janoszek
PL Environmental & Geotechnical Lab Production Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 15/11/2023

GF 472.3

4041

TEST CERTIFICATE

DETERMINATION OF THE UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

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

Tested in Accordance with: BS 1377-7: 1990: Clause 8

Client:	Earthworks Testing Ltd	Client Reference:	C1082
Client Address:	Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ	Job Number:	23-64632
		Date Sampled:	24/10/2023
		Date Received:	25/10/2023
Contact:	John Lamb	Date Tested:	14/11/2023
Site Address:	Wingates - Bolton	Sampled By:	Client - ETL

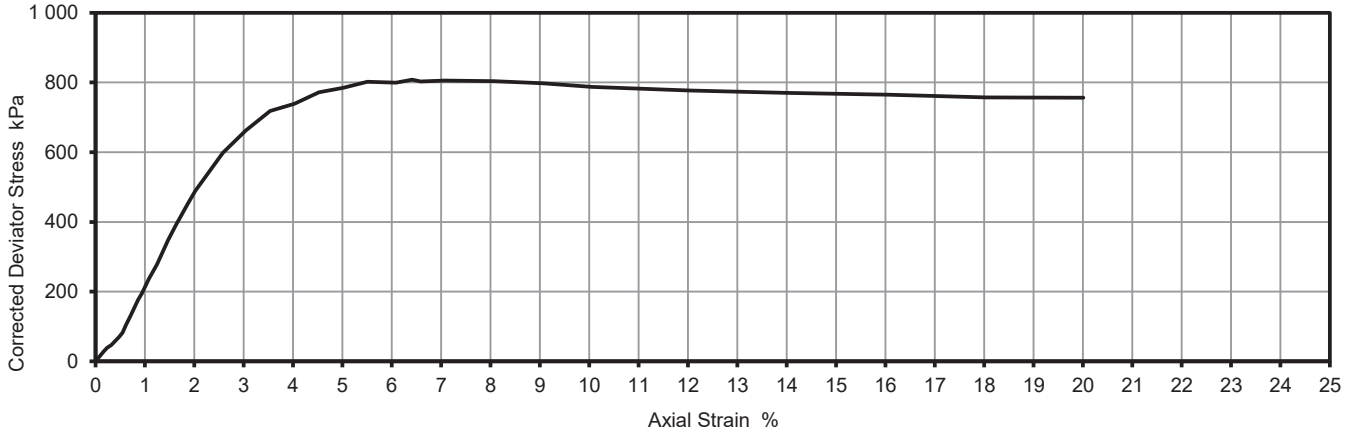
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

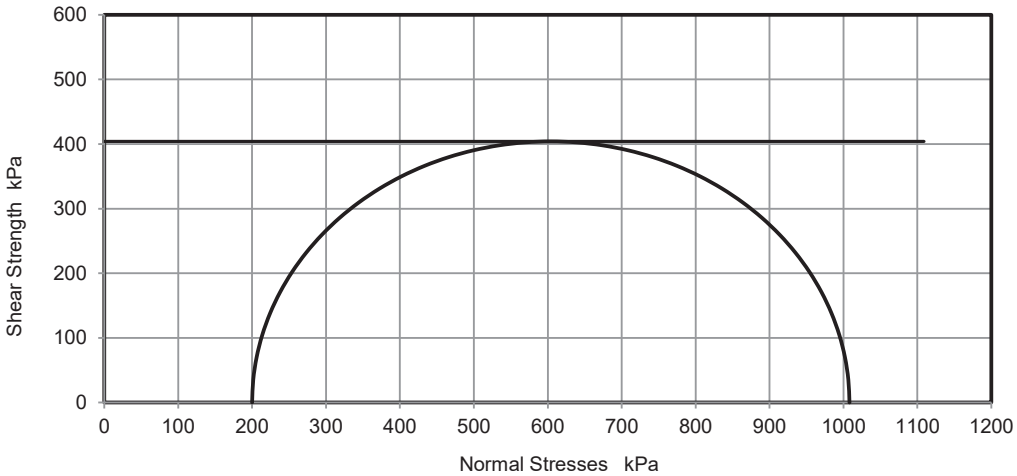
Laboratory Reference:	2856213	Depth Top [m]:	Not Given
Hole No.:	C1082/9	Depth Base [m]:	Not Given
Sample Reference:	Not Given	Sample Type:	B
Sample Description:	Brownish grey sandy clayey GRAVEL with fragments of crushed concrete		
Sample Preparation:	Recompacted at NMC using 2.5kg rammer in accordance with Table 6 of BS1377-1:2016.		

Test Number	1		Rate of Strain	1.00	%/min	
Length	199.73	mm	Cell Pressure	200	kPa	
Diameter	100.59	mm	Axial Strain at failure	6.4	%	
Bulk Density	1.99	Mg/m3	Deviator Stress, (σ1 - σ3)f	808	kPa	
Moisture Content	19	%	Undrained Shear Strength, cu	404	kPa	½(σ1 - σ3)f
Dry Density	1.66	Mg/m3	Mode of Failure	Compound		
Membrane Correction	0.43	kPa	Latex membrane thickness	0.26	mm	

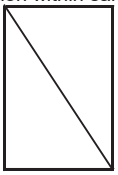
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks:

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Signed:

Monika Janoszek
PL Environmental & Geotechnical Lab Production Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 15/11/2023

GF 184.14

Laboratory Report	ETS/1748	Contract Sample No	C1082/10
Report Date	25 October 2023	ETS Contract No	C1082/10

EARTHWORKS TESTING LTD

Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ

UKAS TESTING
27572

Tel: 07310 161694
Email-ops@earthworkstesting.co.uk

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Date Sampled	24/10/2023
Date Received	24/10/2023
Date Completed	25/10/2023
Sample Location	See Below
Client Reference	C1082/10

Insitu Density & Moisture Content - Core Cutter Tests BS 1377: 1990: Part 9

Operator JH

Maximum Dry Density (MDD)	1.75	Mg.m³
Optimum Moisture Content	16	%
Particle Density	2.59	Mg/m³
Source sample reference	C1082/9	

Test Location	Reference	Bulk Density Mg/m³	Moisture Content %	Dry Density Mg/m³	% MDD	Air Voids %
B6 Layer 1	C1082/10	2.072	14.9	1.803	103.0	3.5
B5 Layer 1	C1082/10	2.114	16.4	1.816	103.8	0.1
C5 Layer 1	C1082/10	2.063	15.6	1.785	102.0	3.3
C6 Layer 1	C1082/10	2.091	16.2	1.799	102.8	1.4
D6 Layer 1	C1082/10	2.070	18.2	1.751	100.1	0.5
D5 Layer 1	C1082/10	2.096	16.0	1.807	103.3	1.3
D4 Layer 1	C1082/10	2.086	15.6	1.804	103.1	2.2
C4 Layer 1	C1082/10	2.064	17.5	1.757	100.4	1.4
B4 Layer 1	C1082/10	2.084	15.9	1.798	102.7	2.0

Authorised Signatory

T. McDonald

Results provided for interpretation by others.

Results relate only to the item(s) tested.

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The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer.

Earthworks Testing Ltd - Company No. 14251352

**** End of report ****

Laboratory Report	ETS/1748	Contract Sample No	C1082/10
Report Date	25/10/2023	ETS Contract No	C1082/10

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Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Date Sampled	24/10/2023
Sample Location	See Below
Client Reference	C1082/10
Source	Ex-Site
Supplier	Ex-Site
Sampling Environment	Overcast
Material Description	Brown Stoney Clay + 2% OPC
Date Received	24/10/2023
Date Tested	24/10/2023

TEST REPORT

Determination of Equivalent Shear Strength

Tested in accordance with In-House Test Procedure Based on BS1377, Part 9: 1990 & BS 5930: 1999

Calibration Constant:	1.000000	Equipment Ref.: HSV 095	Operator	JH

Test Reference	Test Location	Shear Vane Readings (Divisions)				Average Vane Reading	Equivalent Shear Strength (kPa)
		Test 1	Test 2	Test 3	Test 4		
C1082/10	B6 Layer 1	96	102	100	150	112	**112**
C1082/10	B5 Layer 1	150	122	98	116	122	**122**
C1082/10	C5 Layer 1	150	150	150	134	146	**146**
C1082/10	C6 Layer 1	150	146	150	150	149	**149**
C1082/10	D6 Layer 1	104	110	136	124	119	**119**
C1082/10	D5 Layer 1	122	130	150	114	129	**129**
C1082/10	D4 Layer 1	108	132	150	134	131	**131**
C1082/10	C4 Layer 1	124	150	150	118	136	**136**
C1082/10	B4 Layer 1	136	144	120	132	133	**133**

Notes:

Authorised Signatory

Laboratory Report	ETS/1748	Contract Sample No	C1082/10
Report Date	25/10/2023	ETS Contract No	C1082/10

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Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Date Sampled	24/10/2023
Sample Location	See Below
Client Reference	C1082/10
Source	Ex-Site
Supplier	Ex-Site
Sampling Environment	Overcast
Material Description	Brown Stoney Clay + 2% OPC
Date Received	24/10/2023
Date Tested	24/10/2023

TEST REPORT

Determination of Equivalent Shear Strength

Tested in accordance with In-House Test Procedure Based on BS1377, Part 9: 1990 & BS 5930: 1999

Calibration Constant:	1.000000	Equipment Ref.: HSV 095	Operator JH

Laboratory Report	ETS/1749	Contract Sample No	C1082/11
Report Date	25/10/2023	ETS Contract No	C1082/11

EARTHWORKS TESTING LTD

Unit 6, Eco Way
Dunscroft
Doncaster
DN7 4JJ

UKAS TESTING
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Tel: **07310 161694**
Email: ops@earthworkstesting.co.uk

Collins Earthworks Ltd	Source	Ex-Site
Whiteley Road	Supplier	Ex-Site
Ripley	Date Sampled	24/10/2023
Derbyshire	Stabiliser/s Used	OPC
DE5 3QL	% Stabiliser Used	2%
	Carried out at	Site
	Weather	Overcast
Project: Wingates - Bolton	Operator	JH

TEST REPORT

Determination of Moisture Condition Value & Degree of Pulverization of Unbound and Hydraulically Bound Mixtures*

BS EN13286, Part 46: 2003 & BS EN 13286-48: 2005

Material Description	Location	% Retained on 20mm Sieve	Method of interpretation	Moisture Content %	Moisture Condition Value	Pulverisation* %
Brown Stoney Clay + 2% OPC	B6 Layer 1	6.41	Steepest Straight Line	14.3	**11.0**	**70**

Tempelate Version 1.0

** Degree of Pulverisation is **NOT** covered by current scope of UKAS accreditation*

Authorised Signatory

Opinions and interpretations not covered by the current scope of UKAS accreditation of this laboratory.

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Results relate only to the samples(s) as tested.

The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer

Laboratory Report	ETS/1749	Contract Sample No	C1082/11
Report Date	25/10/2023	ETS Contract No	C1082/11

EARTHWORKS TESTING LTD

Unit 6, Eco Way
Dunscroft
Doncaster
DN7 4JJ

UKAS TESTING
27572

Tel: **07310 161694**
Email: ops@earthworkstesting.co.uk

Collins Earthworks Ltd	Source	Ex-Site
Whiteley Road	Supplier	Ex-Site
Ripley	Date Sampled	24/10/2023
Derbyshire	Stabiliser/s Used	OPC
DE5 3QL	% Stabiliser Used	2%
	Carried out at	Site
	Weather	Overcast
Project: Wingates - Bolton	Operator	JH

TEST REPORT

Determination of Moisture Condition Value & Degree of Pulverization of Unbound and Hydraulically Bound Mixtures*

BS EN13286, Part 46: 2003 & BS EN 13286-48: 2005

** END OF REPORT **

Laboratory Report	ETS/1749	Contract Sample No	C1082/11
Report Date	25/10/2023	ETS Contract No	C1082/11

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Stabiliser(s)	OPC
% Stabiliser	2%
Sample Plan	Client Specification
Date Sampled	24/10/2023
Date Tested	24/10/2023
Weather Conditions	Overcast
Operator	JH

EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
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Dunscroft
Doncaster
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email:ops@earthworkstesting.co.uk
Tel: 07310 161694

TEST REPORT

Degree of Pulverization of Unbound and Hydraulically Bound Mixtures - BS EN 13286-48: 2005

Reference	Test Location	Pulverization %	Reference	Test Location	Pulverization %
C1082/11	B4 Layer 1	65			
C1082/11	C5 Layer 1	75			
C1082/11	D6 Layer 1	60			
C1082/11	D4 Layer 1	60			

Deviations:

Template Version: 1.0

Authorised Signatory

Laboratory Report	ETS/1749	Contract Sample No	C1082/11
Report Date	25/10/2023	ETS Contract No	C1082/11

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email:ops@earthworkstesting.co.uk
Tel: 07310 161694

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Stabiliser(s)	OPC
% Stabiliser	2%
Sample Plan	Client Specification
Date Sampled	24/10/2023
Date Tested	24/10/2023
Weather Conditions	Overcast
Operator	JH

TEST REPORT

Degree of Pulverization of Unbound and Hydraulically Bound Mixtures - BS EN 13286-48: 2005

** END OF REPORT **

Laboratory Report	ETS/1750	Contract Sample No	C1082/12
Report Date	23/11/2023	Clients Reference	C1082/12
		Material Description	Brown Stoney Clay + 2% OPC
Collins Earthworls Ltd			
Whiteley Road		Date Sampled	24/10/2023
Ripley		Source	Ex-Site
Derbyshire		Supplier	Ex-Site
DE5 3QL		Sampled By	ETL
		Sampling Environment	Overcast
		Sample Type	Bulk
		Location in sample	N/A
Wingates - Bolton		Sample Location	B6 Layer 1
		Sampling Plan	ETL Procedure
		Sampling Method	Sampling from heaps / stockpiles.

UKAS TESTING
27572

ETL
EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
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Doncaster
DN7 4JJ
Tel: 07310 161694
Email: ops@earthworkstesting.co.uk

Date Received	24/10/2023
Date Tests Completed	23/11/2023

TEST REPORT

California Bearing Ratio (CBR)

Tested in Accordance with BS EN 13286-47:2021 in a soaked condition

Curing Method: Evaporation Prevention followed by full soaking - BS EN 13286-47:2021: Clause 8.4

Time to Maximum Swell	0	Hrs
Total swell	0.00	%
Weight of Surcharge used during soak period	5	Kg

Sample Preparation

Compacted with specified effort using 2.5kg rammer in accordance with BS EN 13286-2: 2010: Annex A

Pre-test data

Bulk density	2.49	Mg/m³
Water Content	16 (16.3)*	%
Dry density	2.14	Mg/m³
Weight of Surcharge used during test period	5	Kg

Post test data

Water Content	16 (16.3)*	%

CBR Result

CBR (top)	220	%
CBR (bottom) - Definitive Value	310	%

Swell Data

Curing Period: 21 Days

Curing Temperatures: 18-22°C

*Moisture content result also presented rounded to 0.1% at client's request. Not covered by scope of UKAS accreditation

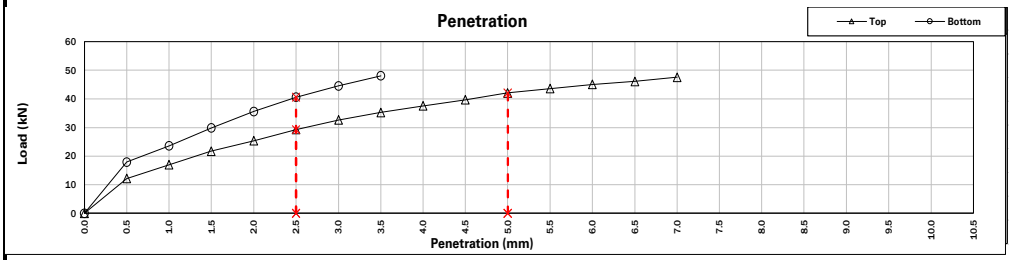
Top - Tested at 7 days

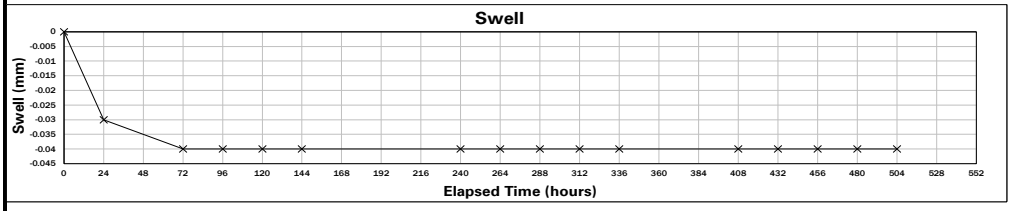
Bottom - Tested at 28 days

Penetration Curve Type

Top: Convex Upwards

Bottom: Convex Upwards





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Authorised Signatory

T. McDonald

** END OF REPORT **

John Lamb
Earthworks Testing Ltd☐
Unit 6, Eco Way
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DN7 4JJ

e: ops@earthworkstesting.co.uk

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

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

Analytical Report Number : 23-65179

Project / Site name:	Wingates Bolton	**Samples received on:**	26/10/2023
Your job number:	C1082	**Samples instructed on/ Analysis started on:**	26/10/2023
Your order number:	SC063	**Analysis completed by:**	06/11/2023
Report Issue Number:	1	**Report issued on:**	06/11/2023
Samples Analysed:	1 soil sample		

Signed:

Anna Goc
PL Head of Reporting Team
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.

This certificate should not be reproduced, except in full, without the express permission of the laboratory.
The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-65179
Project / Site name: Wingates Bolton
Your Order No: SC063

Lab Sample Number				2859294
Sample Reference				C1082
Sample Number				/13
Depth (m)				None Supplied
Date Sampled				25/10/2023
Time Taken				1700
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	58
Moisture Content	%	0.01	NONE	13
Total mass of sample received	kg	0.001	NONE	1

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	JBH

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	12.1
Total Sulphate as SO4	mg/kg	50	MCERTS	2500
Total Sulphate as SO4	%	0.005	MCERTS	0.254
Acid Soluble Sulphur	%	0.003	NONE	0.085
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	100
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.0499
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	49.9
Water Soluble Sulphur	%	0.0001	NONE	0.0033
Total Potential Sulphate	mg/kg	30	NONE	6200
Total Potential Sulphate	%	0.003	NONE	0.619
Oxidisable Sulphide (as SO4)	%	0.002	NONE	0.364
Oxidisable Sulphide (as SO4)	mg/kg	20	NONE	3600
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	9.1
Total Sulphur	mg/kg	50	MCERTS	2100
Total Sulphur	%	0.005	MCERTS	0.206
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	2.2
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	0.22
Organic Matter (automated)	%	0.1	MCERTS	0.9
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	< 5.0
Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5

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

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number : 23-65179
Project / Site name: Wingates Bolton

* 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 *
2859294	C1082	/13	None Supplied	Brown clay and sand with gravel and vegetation.

Analytical Report Number : 23-65179
Project / Site name: Wingates Bolton

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
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Oxidisable Sulphide in soil	Determination of oxidisable sulphide in soil by calculation from total sulphur and total sulphate.	In-house method based on TRL 447		D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
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.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total potential sulphate in soil	Determination of total potential sulphate in soil by calculation from total sulphur.	By calculation - In-house method based on TRL 447 report.	L038-PL	D	NONE
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Acid Soluble Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	NONE
Water Soluble Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS

Analytical Report Number : 23-65179
Project / Site name: Wingates Bolton

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
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Total potential sulphate in soil (Percentage)	Determination of total potential sulphate in soil by calculation from total sulphur - expressed as a percentage.	By calculation - In-house method based on TRL 447 report.	L038-PL	D	NONE
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 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.

Laboratory Report	ETS/1789	Contract Sample No	C1082/13
Report Date	08 November 2023	ETS Contract No	C1082/13

Collins Earthworks Ltd Whiteley Road Ripley Derbyshire DE5 3QL	Material Description	See Below
	Source	Ex-Site
	Supplier	Ex-Site
	Date Sampled	25/10/2023
	Date Received	25/10/2023
Wingates - Bolton	Date Completed	06/11/2023
	Sample Location	See Below
	Client Reference	C1082/13

EARTHWORKS TESTING LTD
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DN7 4JJ

Tel: 07310 161694
Email-ops@earthworkstesting.co.uk

Testing Lab: I2 Analytical LTD **Report Number:** 23-65179

ETS Number	Sample Number	Location	Matieral	Testing
1789	13	A6 Layer 1	Brown Stoney Clay	TRL 447, OM, BRE SD1, Asbestos ID

Authorised Signatory

T. McDonald

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

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

4041

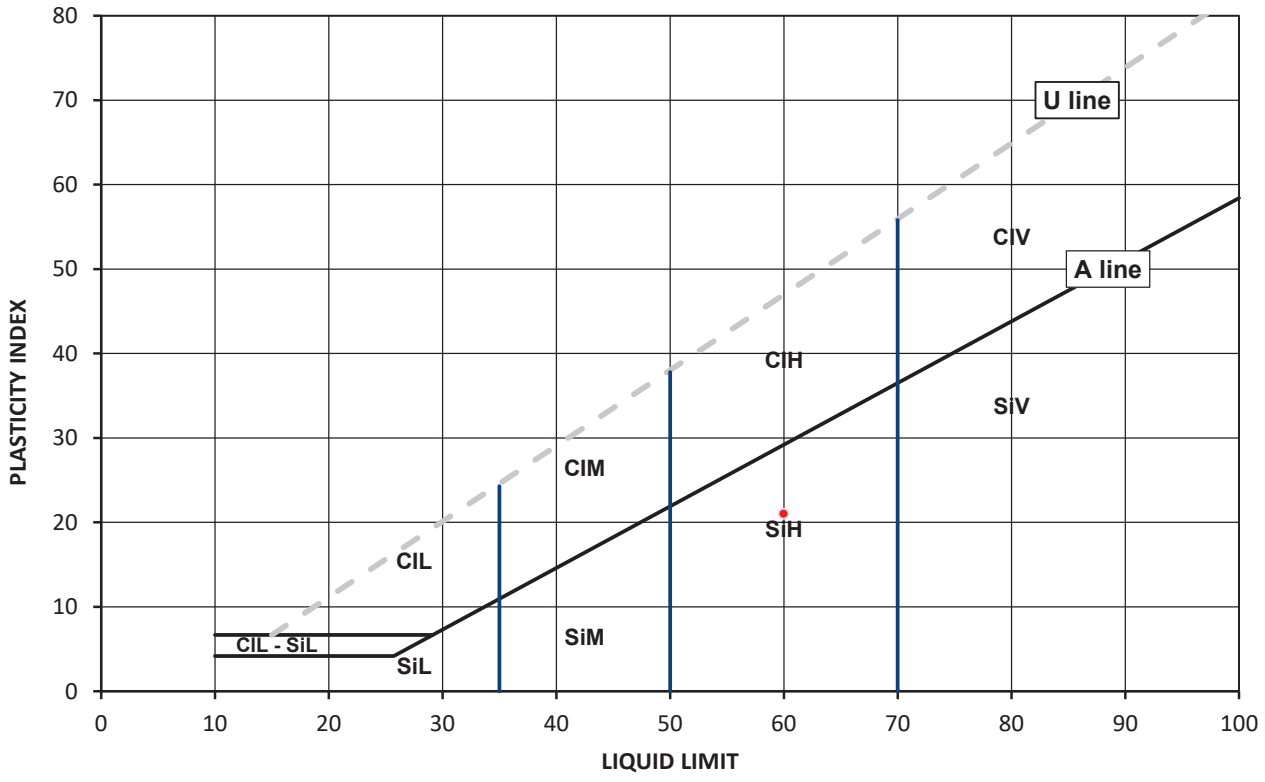
Client:	Earthworks Testing Ltd	Client Reference:	SC063
Client Address:	Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ	Job Number:	23-69376-1
		Date Sampled:	Not Given
		Date Received:	26/10/2023
Contact:	John Lamb	Date Tested:	17/11/2023
Site Address:	Wingates - Bolton	Sampled By:	Client - ETL

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

Test Results:

Laboratory Reference:	2881356	Depth Top [m]:	Not Given
Hole No.:	C1082	Depth Base [m]:	Not Given
Sample Reference:	/14	Sample Type:	B
Sample Description:	Brown gravelly clayey SILT with fragments of crushed concrete		
Sample Preparation:	Tested after washing to remove >425 µm		

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
14	60	39	21	43



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 1377-2: 1990: Clause 3.2

Remarks:

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Signed:

Monika Janoszek
PL Environmental & Geotechnical Lab Production Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/11/2023

GF 232.13

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

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

4041

Client: Earthworks Testing Ltd

Client Address: Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ

Contact: John Lamb

Site Address: Wingates - Bolton

Client Reference: SC063
Job Number: 23-69376-1
Date Sampled: Not Given
Date Received: 26/10/2023
Date Tested: 17/11/2023
Sampled By: Client - ETL

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2881356	C1082	/14	Not Given	Not Given	B	Brown gravelly clayey SILT with fragments of crushed concrete		14	Sample was quartered, oven dried at 108.6 °C			

Comments:

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Signed:

Monika Janoszek
PL Environmental & Geotechnical Lab Production Specialist
for and on behalf of i2 Analytical Ltd

Date Reported: 21/11/2023

GF 099.17

Laboratory Report	ETS/1790	Contract Sample No	C1082/14
Report Date	08 November 2023	ETS Contract No	C1082/14

Collins Earthworks Ltd Whiteley Road Ripley Derbyshire DE5 3QL	Material Description	See Below
	Source	Ex-Site
	Supplier	Ex-Site
	Date Sampled	25/10/2023
	Date Received	25/10/2023
Wingates - Bolton	Date Completed	16/11/2023
	Sample Location	See Below
	Client Reference	C1082/14

EARTHWORKS TESTING LTD
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Bootham Lane
Dunscroft
Doncaster
DN7 4JJ
Tel: 07310 161694
Email-ops@earthworkstesting.co.uk

Testing Lab: I2 Analytical LTD **Report Number:** 23-64858-1

ETS Number	Sample Number	Location	Matieral	Testing
1790	14	A6 Layer 1	Brown Stoney Clay	MC,SA,PI,QUSS

Authorised Signatory

T. McDonald

Laboratory Report	ETS/1791	Contract Sample No	C1082/15
Report Date	27 October 2023	ETS Contract No	C1082/15

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Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Date Sampled	25/10/2023
Date Received	25/10/2023
Date Completed	27/10/2023
Sample Location	See Below
Client Reference	C1082/15

Insitu Density & Moisture Content - Core Cutter Tests BS 1377: 1990: Part 9

Operator JH

Maximum Dry Density (MDD)	1.75	Mg.m³
Optimum Moisture Content	16	%
Particle Density	2.59	Mg/m³
Source sample reference	C1082/9	

Test Location	Reference	Bulk Density Mg/m³	Moisture Content %	Dry Density Mg/m³	% MDD	Air Voids %
A6 Layer 1	C1082/15	2.059	17.3	1.755	100.3	1.9
A5 Layer 1	C1082/15	2.090	14.8	1.821	104.0	2.8
A4 Layer 1	C1082/15	2.095	16.5	1.798	102.8	0.9
A3 Layer 1	C1082/15	2.127	14.8	1.853	105.9	1.0

Authorised Signatory

T. McDonald

Results provided for interpretation by others.

Results relate only to the item(s) tested.

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Earthworks Testing Ltd - Company No. 14251352

**** End of report ****

Laboratory Report	ETS/1791	Contract Sample No	C1082/15
Report Date	26/10/2023	ETS Contract No	C1082/15

EARTHWORKS TESTING LTD
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Tel: 07310 161694

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Date Sampled	25/10/2023
Sample Location	See Below
Client Reference	C1082/15
Source	Ex-Site
Supplier	Ex-Site
Sampling Environment	Overcast
Material Description	Brown Stoney Clay + 2% OPC
Date Received	25/10/2023
Date Tested	25/10/2023

TEST REPORT

Determination of Equivalent Shear Strength

Tested in accordance with In-House Test Procedure Based on BS1377, Part 9: 1990 & BS 5930: 1999

Calibration Constant:	1.000000	Equipment Ref.: HSV 095	Operator JH

Test Reference	Test Location	Shear Vane Readings (Divisions)				Average Vane Reading	Equivalent Shear Strength (kPa)
		Test 1	Test 2	Test 3	Test 4		
C1082/15	A6 Layer 1	150	150	114	150	141	**141**
C1082/15	A5 Layer 1	142	134	106	150	133	**133**
C1082/15	A4 Layer 1	106	128	110	146	123	**123**
C1082/15	A3 Layer 1	126	108	124	130	122	**122**

Notes:

Authorised Signatory

Laboratory Report	ETS/1791	Contract Sample No	C1082/15
Report Date	26/10/2023	ETS Contract No	C1082/15

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Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Date Sampled	25/10/2023
Sample Location	See Below
Client Reference	C1082/15
Source	Ex-Site
Supplier	Ex-Site
Sampling Environment	Overcast
Material Description	Brown Stoney Clay + 2% OPC
Date Received	25/10/2023
Date Tested	25/10/2023

TEST REPORT

Determination of Equivalent Shear Strength

Tested in accordance with In-House Test Procedure Based on BS1377, Part 9: 1990 & BS 5930: 1999

Calibration Constant:	1.000000	Equipment Ref.: HSV 095	Operator JH

Laboratory Report	ETS/1792	Contract Sample No	C1082/16
Report Date	27/10/2023	ETS Contract No	C1082/16

EARTHWORKS TESTING LTD

Unit 6, Eco Way
Dunscroft
Doncaster
DN7 4JJ

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27572

Tel: **07310 161694**
Email: ops@earthworkstesting.co.uk

Collins Earthworks Ltd	Source	Ex-Site
Whiteley Road	Supplier	Ex-Site
Ripley	Date Sampled	25/10/2023
Derbyshire	Stabiliser/s Used	OPC
DE5 3QL	% Stabiliser Used	2%
	Carried out at	Site
	Weather	Overcast
Project: Wingates - Bolton	Operator	JH

TEST REPORT

Determination of Moisture Condition Value & Degree of Pulverization of Unbound and Hydraulically Bound Mixtures*

BS EN13286, Part 46: 2003 & BS EN 13286-48: 2005

Material Description	Location	% Retained on 20mm Sieve	Method of interpretation	Moisture Content %	Moisture Condition Value	Pulverisation* %
Brown Stoney Clay + 2% OPC	A6 Layer 1	2.96	Steepest Straight Line	17.9	**11.0**	**65**

Tempelate Version 1.0

** Degree of Pulverisation is **NOT** covered by current scope of UKAS accreditation*

Authorised Signatory

Opinions and interpretations not covered by the current scope of UKAS accreditation of this laboratory.

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Results relate only to the samples(s) as tested.

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Laboratory Report	ETS/1792	Contract Sample No	C1082/16
Report Date	27/10/2023	ETS Contract No	C1082/16

EARTHWORKS TESTING LTD

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Dunscroft
Doncaster
DN7 4JJ

UKAS TESTING
27572

Tel: **07310 161694**
Email: ops@earthworkstesting.co.uk

Collins Earthworks Ltd	Source	Ex-Site
Whiteley Road	Supplier	Ex-Site
Ripley	Date Sampled	25/10/2023
Derbyshire	Stabiliser/s Used	OPC
DE5 3QL	% Stabiliser Used	2%
	Carried out at	Site
	Weather	Overcast
Project: Wingates - Bolton	Operator	JH

TEST REPORT

Determination of Moisture Condition Value & Degree of Pulverization of Unbound and Hydraulically Bound Mixtures*

BS EN13286, Part 46: 2003 & BS EN 13286-48: 2005

** END OF REPORT **

Laboratory Report	ETS/1792	Contract Sample No	C1082/16
Report Date	26/10/2023	ETS Contract No	C1082/16

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email:ops@earthworkstesting.co.uk
Tel: 07310 161694

Collins Earthworks Ltd
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Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Stabiliser(s)	OPC
% Stabiliser	2%
Sample Plan	Client Specification
Date Sampled	25/10/2023
Date Tested	25/10/2023
Weather Conditions	Overcast
Operator	JH

TEST REPORT

Degree of Pulverization of Unbound and Hydraulically Bound Mixtures - BS EN 13286-48: 2005

Reference	Test Location	Pulverization %	Reference	Test Location	Pulverization %
C1082/16	A4 Layer 1	65			

Deviations:

Template Version: 1.0

Authorised Signatory

Laboratory Report	ETS/1792	Contract Sample No	C1082/16
Report Date	26/10/2023	ETS Contract No	C1082/16

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Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Stabiliser(s)	OPC
% Stabiliser	2%
Sample Plan	Client Specification
Date Sampled	25/10/2023
Date Tested	25/10/2023
Weather Conditions	Overcast
Operator	JH

TEST REPORT

Degree of Pulverization of Unbound and Hydraulically Bound Mixtures - BS EN 13286-48: 2005

** END OF REPORT **

Laboratory Report	ETS/1793	Contract Sample No	C1082/17
Report Date	23/11/2023	Clients Reference	C1082/17
		Material Description	Brown Stoney Clay + 2% OPC
Collins Earthworls Ltd			
Whiteley Road		Date Sampled	25/10/2023
Ripley		Source	Ex-Site
Derbyshire		Supplier	Ex-Site
DE5 3QL		Sampled By	ETL
		Sampling Environment	Overcast
		Sample Type	Bulk
		Location in sample	N/A
Wingates - Bolton		Sample Location	A6 Layer 1
		Sampling Plan	ETL Procedure
		Sampling Method	Sampling from heaps / stockpiles.

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Email: ops@earthworkstesting.co.uk

Date Received	25/10/2023
Date Tests Completed	23/11/2023

TEST REPORT

California Bearing Ratio (CBR)

Tested in Accordance with BS EN 13286-47:2021 in a soaked condition

Curing Method: Evaporation Prevention followed by full soaking - BS EN 13286-47:2021: Clause 8.4

Time to Maximum Swell	408	Hrs
Total swell	0.03	%
Weight of Surcharge used during soak period	5	Kg

Sample Preparation

Compacted with specified effort using 2.5kg rammer in accordance with BS EN 13286-2: 2010: Annex A

Pre-test data

Bulk density	2.54	Mg/m³
Water Content	15 (15.4)*	%
Dry density	2.20	Mg/m³
Weight of Surcharge used during test period	5	Kg

Post test data

Water Content	15 (15.4)*	%

CBR Result

CBR (top)	215	%
CBR (bottom) - Definitive Value	345	%

Swell Data

Curing Period: 24 Days

Curing Temperatures: 18-22°C

*Moisture content result also presented rounded to 0.1% at client's request. Not covered by scope of UKAS accreditation

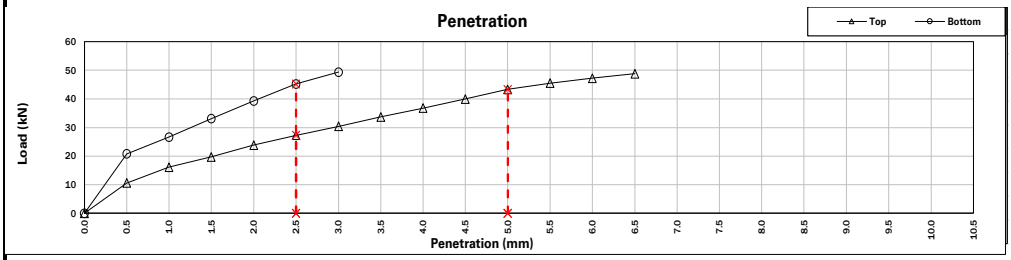
Top - Tested at 7 days

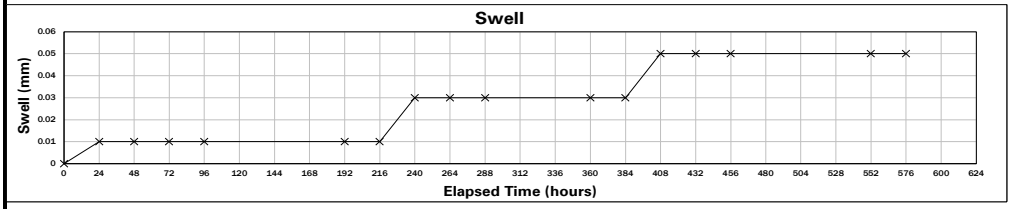
Bottom - Tested at 28 days

Penetration Curve Type

Top: Convex Upwards

Bottom: Convex Upwards





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Authorised Signatory

T. McDonald

** END OF REPORT **

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Wingates - Bolton

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ETL EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Dunscroft
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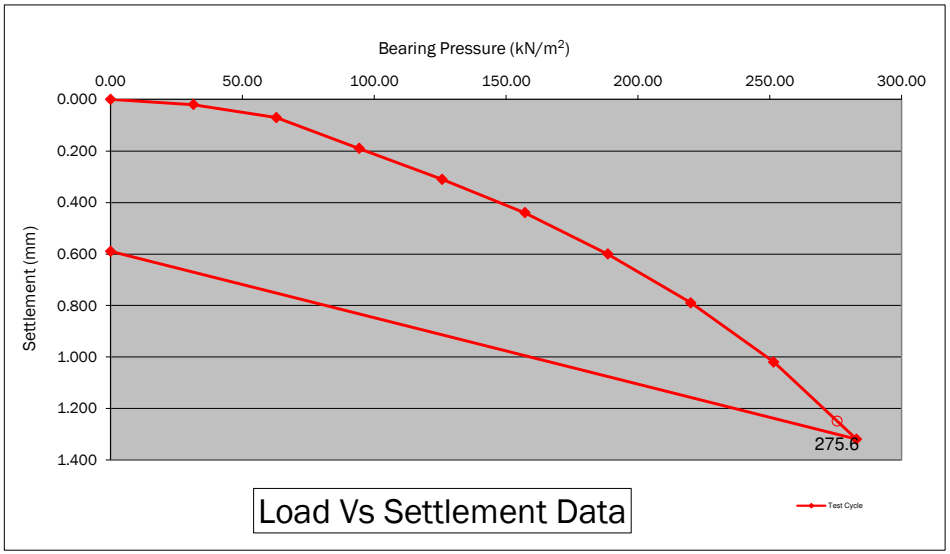
Tel: 07310 161694
E-mail ops@earthworkstesting.co.uk

Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/18A	**REPORT NO:**	**ETS/1794A**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/18A**	Report Date:	26/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**25/10/2023**
Test Location:	**D6**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.02
62.88	0.07
94.31	0.19
125.75	0.31
157.19	0.44
188.63	0.60
220.07	0.79
251.50	1.02
282.94	1.32
0.00	0.59
Recovery %	55



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	282.9	kN/m²	**48.9**	
Maximum Settlement	1.32	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	275.6	kN/m²		
Modulus of Subgrade Reaction K762	137.4	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

Results relate only to the sample(s) as tested.

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Testing carried out at client's site location.

** End of report **

Collins Earthworks Ltd
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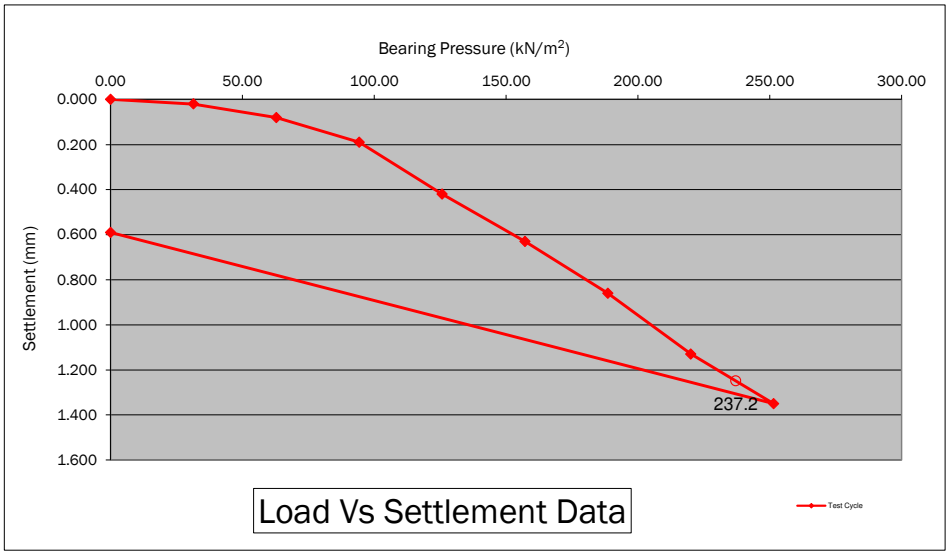
Wingates - Bolton

Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/18B	**REPORT NO:**	**ETS/1794B**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/18B**	Report Date:	26/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**25/10/2023**
Test Location:	**C6**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.02
62.88	0.08
94.31	0.19
125.75	0.42
157.19	0.63
188.63	0.86
220.07	1.13
251.50	1.35
0.00	0.59
Recovery %	56



Depth of Test	**Surface**		Plate Diameter	**450mm**
Distance from edge of plate to wall of excavation	**N/A**	mm	Moisture Content*	**Not Taken**
Reaction Load	**20T Roller**		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	**0.62**		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	**251.5**	kN/m²	**37.7**	
Maximum Settlement	**1.35**	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	**237.2**	kN/m²		
Modulus of Subgrade Reaction K762	**118.2**	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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Testing carried out at client's site location.

** End of report **

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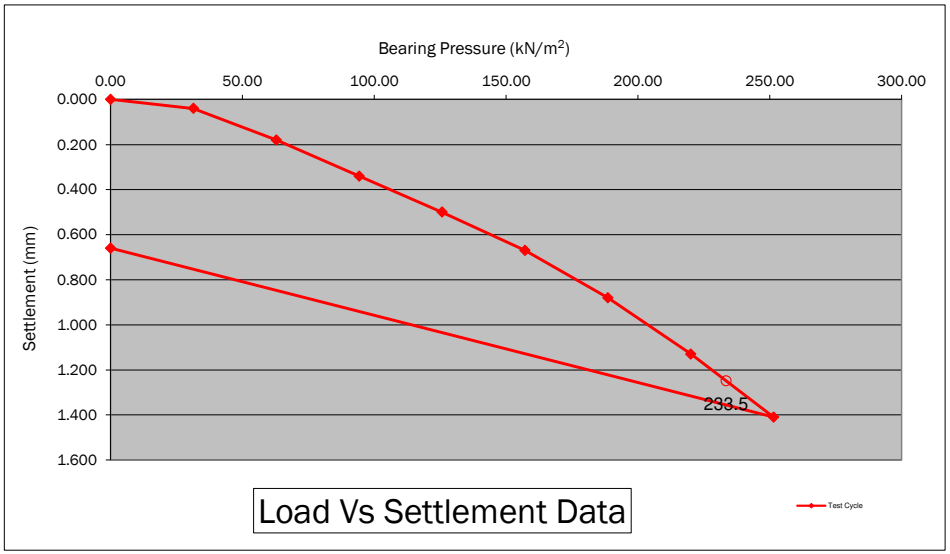
Wingates - Bolton

Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/18C	**REPORT NO:**	**ETS/1794C**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/18C**	Report Date:	26/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**25/10/2023**
Test Location:	**B6**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.04
62.88	0.18
94.31	0.34
125.75	0.50
157.19	0.67
188.63	0.88
220.07	1.13
251.50	1.41
0.00	0.66
Recovery %	53



Depth of Test	**Surface**		Plate Diameter	**450mm**
Distance from edge of plate to wall of excavation	**N/A**	mm	Moisture Content*	**Not Taken**
Reaction Load	**20T Roller**		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	**0.62**		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	**251.5**	kN/m²	**36.7**	
Maximum Settlement	**1.41**	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	**233.5**	kN/m²		
Modulus of Subgrade Reaction K762	**116.4**	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

Results relate only to the sample(s) as tested.

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Testing carried out at client's site location.

** End of report **

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DN7 4JJ

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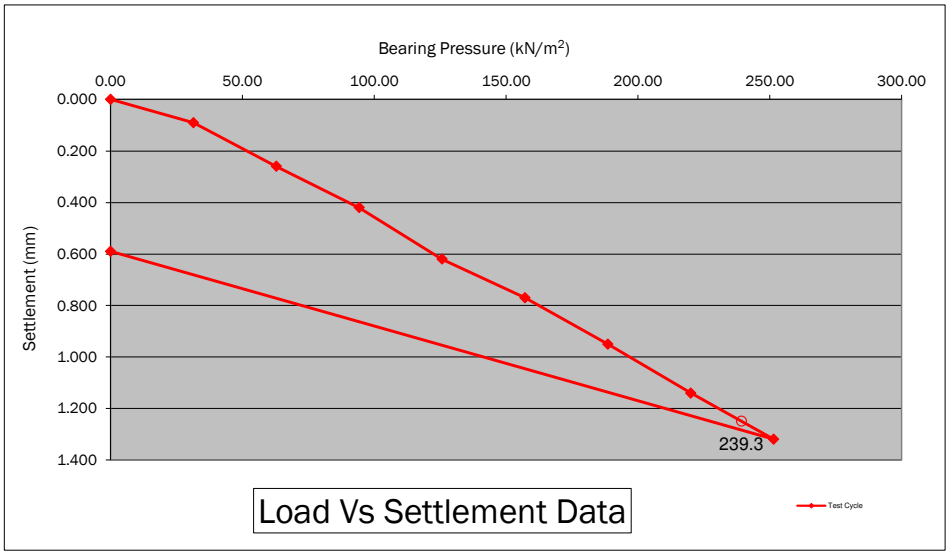
Wingates - Bolton

Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/18D	**REPORT NO:**	**ETS/1794D**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/18D**	Report Date:	26/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**25/10/2023**
Test Location:	**A6**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.09
62.88	0.26
94.31	0.42
125.75	0.62
157.19	0.77
188.63	0.95
220.07	1.14
251.50	1.32
0.00	0.59
Recovery %	55



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²		
Maximum Settlement	1.32	mm	**38.3**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	239.3	kN/m²		
Modulus of Subgrade Reaction K762	119.3	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

Results relate only to the sample(s) as tested.

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Testing carried out at client's site location.

Collins Earthworks Ltd
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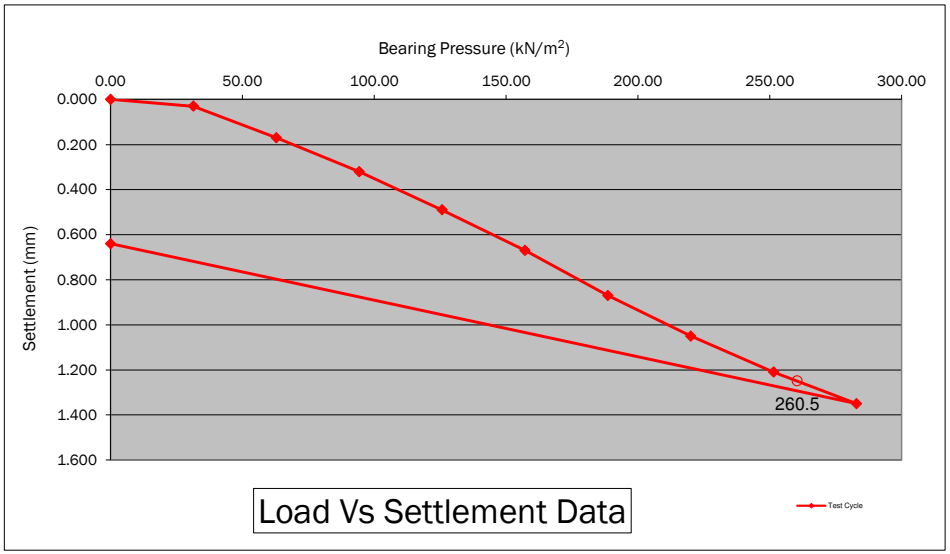
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/18E	**REPORT NO:**	**ETS/1794E**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/18E**	Report Date:	26/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**25/10/2023**
Test Location:	**A5**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.03
62.88	0.17
94.31	0.32
125.75	0.49
157.19	0.67
188.63	0.87
220.07	1.05
251.50	1.21
282.94	1.35
0.00	0.64
Recovery %	53



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	282.9	kN/m²		
Maximum Settlement	1.35	mm	**44.3**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	260.5	kN/m²		
Modulus of Subgrade Reaction K762	129.8	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

Results relate only to the sample(s) as tested.

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Testing carried out at client's site location.

** End of report **

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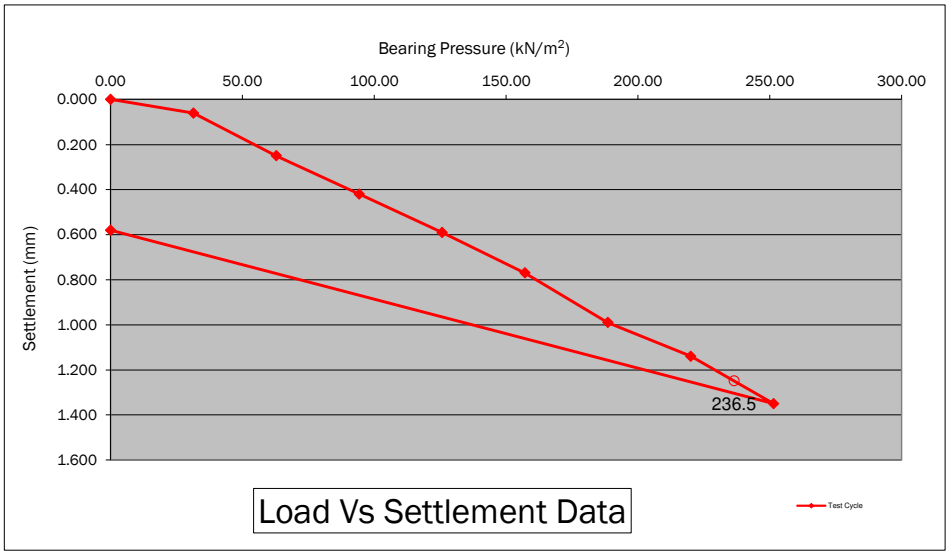
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/18F	**REPORT NO:**	**ETS/1794F**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/18F**	Report Date:	26/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**25/10/2023**
Test Location:	**B5**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.06
62.88	0.25
94.31	0.42
125.75	0.59
157.19	0.77
188.63	0.99
220.07	1.14
251.50	1.35
0.00	0.58
Recovery %	57



Depth of Test	Surface		Plate Diameter	**450mm**
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	**Not Taken**
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²	**37.5**	
Maximum Settlement	1.35	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	236.5	kN/m²		
Modulus of Subgrade Reaction K762	117.9	kN/m²/mm		

Authorised Signatory

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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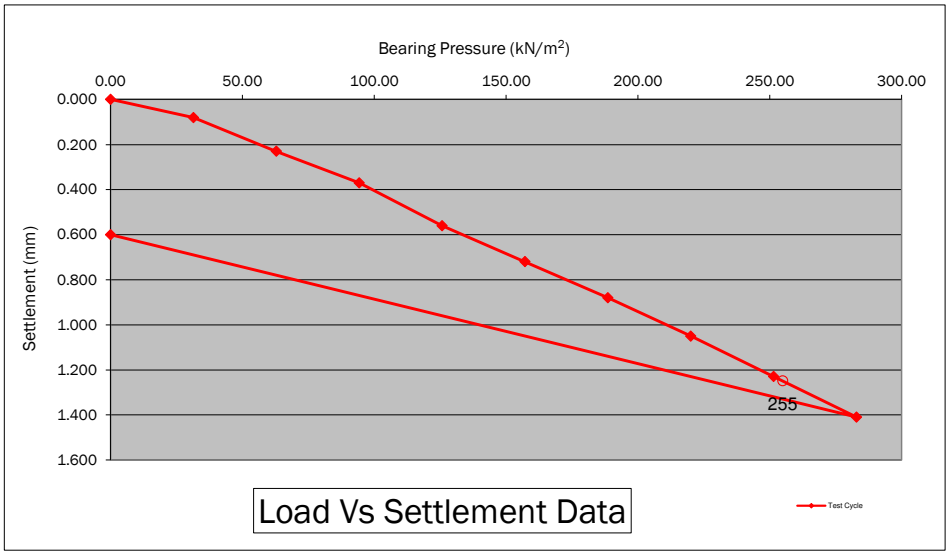
Wingates - Bolton

Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/18G	**REPORT NO:**	**ETS/1794G**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/18G**	Report Date:	26/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**25/10/2023**
Test Location:	**C5**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.08
62.88	0.23
94.31	0.37
125.75	0.56
157.19	0.72
188.63	0.88
220.07	1.05
251.50	1.23
282.94	1.41
0.00	0.60
Recovery %	57



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	282.9	kN/m²		
Maximum Settlement	1.41	mm	**42.7**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	255.0	kN/m²		
Modulus of Subgrade Reaction K762	127.1	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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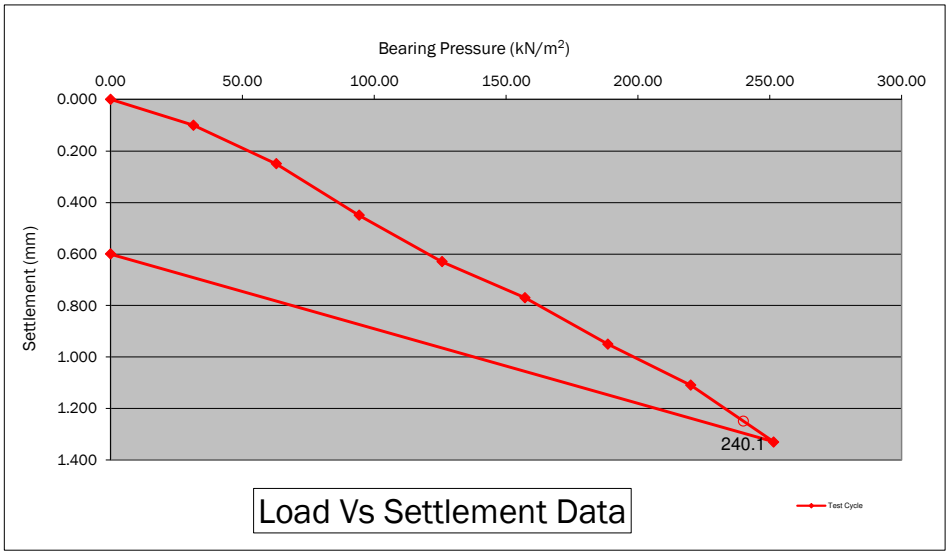
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/18H	**REPORT NO:**	**ETS/1794H**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/18H**	Report Date:	26/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**25/10/2023**
Test Location:	**D5**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.10
62.88	0.25
94.31	0.45
125.75	0.63
157.19	0.77
188.63	0.95
220.07	1.11
251.50	1.33
0.00	0.60
Recovery %	55



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²	**38.5**	
Maximum Settlement	1.33	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	240.1	kN/m²		
Modulus of Subgrade Reaction K762	119.7	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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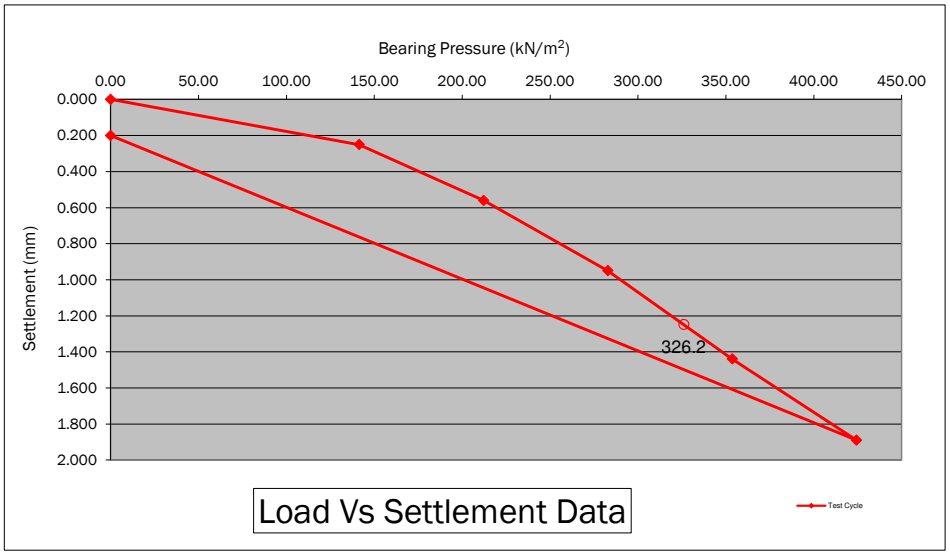
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19A	**REPORT NO:**	**ETS/1796A**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19A**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**A6 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
141.47	0.25
212.21	0.56
282.94	0.95
353.68	1.44
424.41	1.89
0.00	0.20
Recovery %	89



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	424.4	kN/m²	**36.1**	
Maximum Settlement	1.89	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	326.2	kN/m²		
Modulus of Subgrade Reaction K762	115.3	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

Results relate only to the sample(s) as tested.

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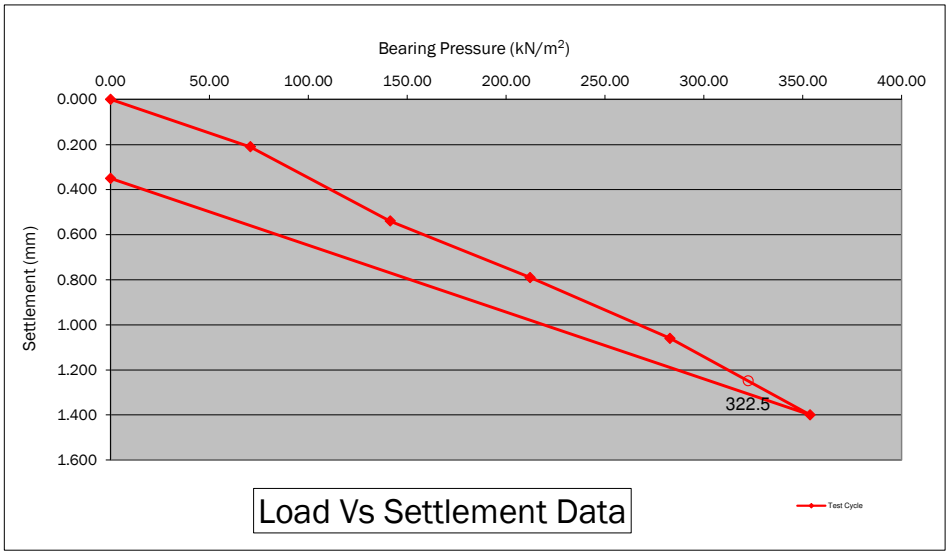
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19B	**REPORT NO:**	**ETS/1796B**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19B**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**B6 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.21
141.47	0.54
212.21	0.79
282.94	1.06
353.68	1.40
0.00	0.35
Recovery %	75



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	353.7	kN/m²	**35.4**	
Maximum Settlement	1.4	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	322.5	kN/m²		
Modulus of Subgrade Reaction K762	114.0	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

Results relate only to the sample(s) as tested.

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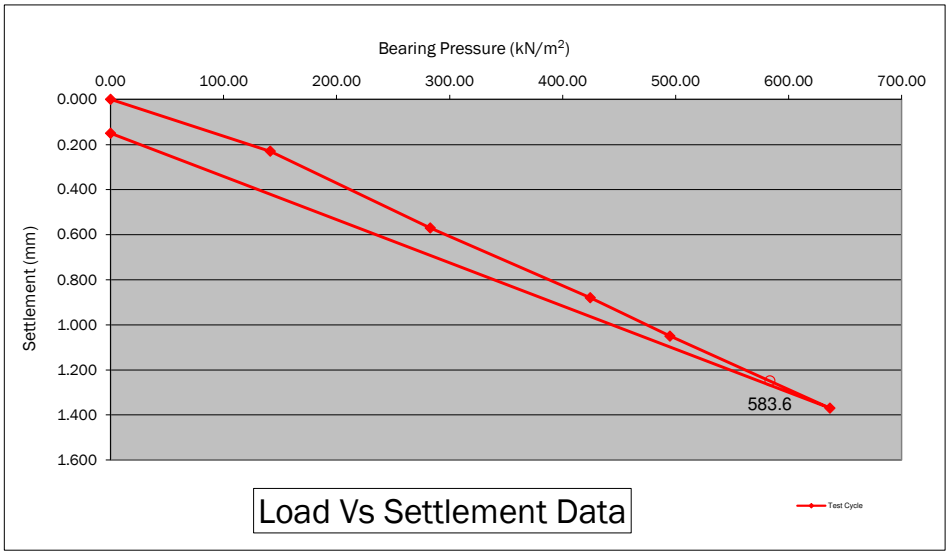
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19C	**REPORT NO:**	**ETS/1796C**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19C**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**C6 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
141.47	0.23
282.94	0.57
424.41	0.88
495.15	1.05
636.62	1.37
0.00	0.15
Recovery %	89



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	636.6	kN/m²	**98.9**	
Maximum Settlement	1.37	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	583.6	kN/m²		
Modulus of Subgrade Reaction K762	206.2	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

Results relate only to the sample(s) as tested.

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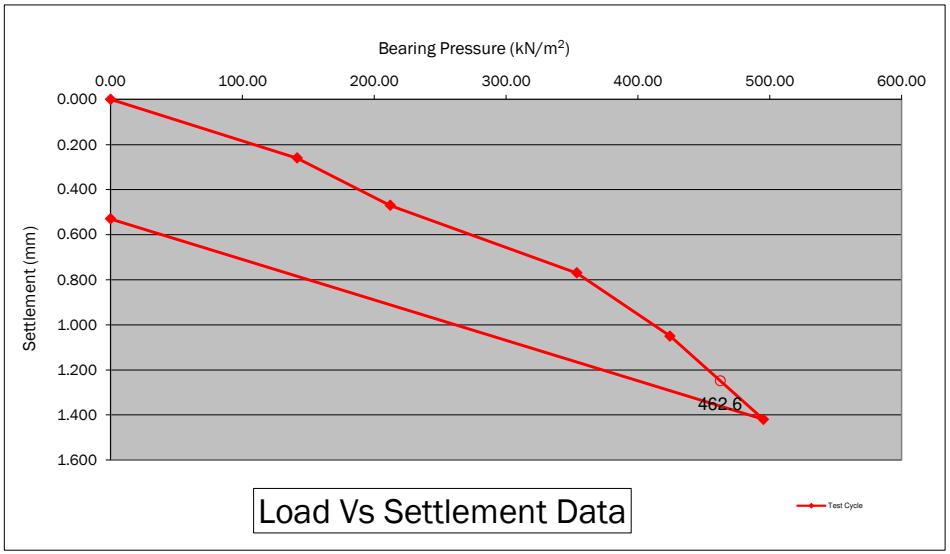
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19D	**REPORT NO:**	**ETS/1796D**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19D**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**D6 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
141.47	0.26
212.21	0.47
353.68	0.77
424.41	1.05
495.15	1.42
0.00	0.53
Recovery %	63



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	495.1	kN/m²	**66.1**	
Maximum Settlement	1.42	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	462.6	kN/m²		
Modulus of Subgrade Reaction K762	163.5	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

Results relate only to the sample(s) as tested.

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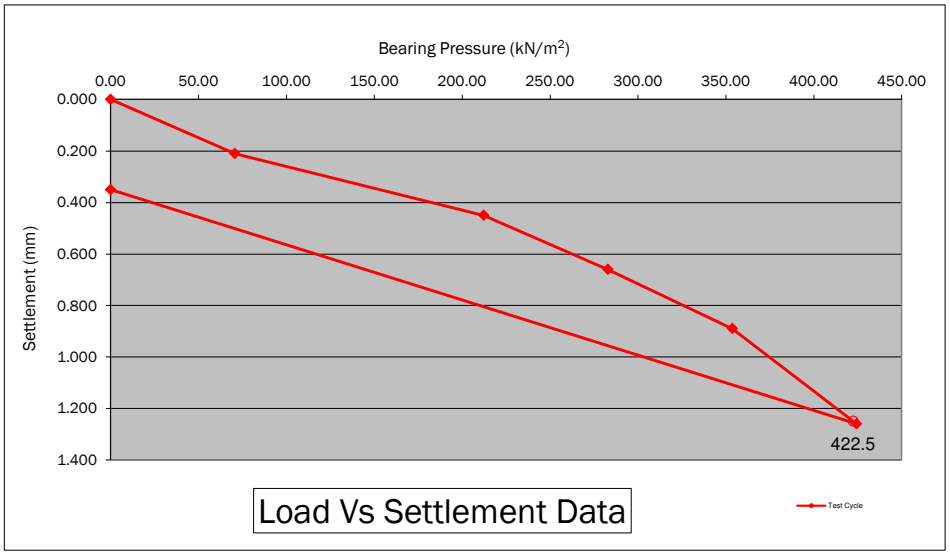
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19E	**REPORT NO:**	**ETS/1796E**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19E**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**D5 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.21
212.21	0.45
282.94	0.66
353.68	0.89
424.41	1.26
0.00	0.35
Recovery %	72



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	424.4	kN/m²		
Maximum Settlement	1.26	mm	**56.5**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	422.5	kN/m²		
Modulus of Subgrade Reaction K762	149.3	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

Results relate only to the sample(s) as tested.

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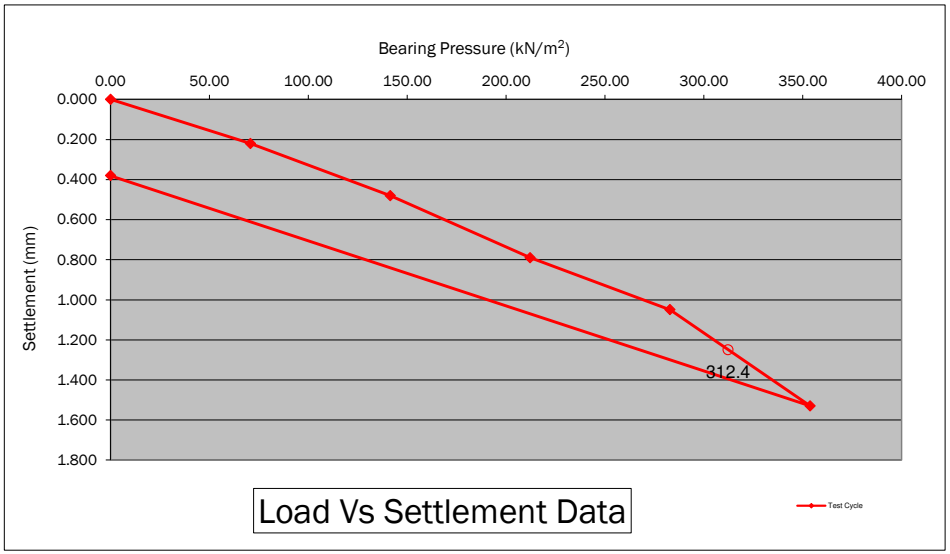
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19F**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**C5 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.22
141.47	0.48
212.21	0.79
282.94	1.05
353.68	1.53
0.00	0.38
Recovery %	75



Depth of Test	**Surface**		Plate Diameter	**300mm**
Distance from edge of plate to wall of excavation	**N/A**	mm	Moisture Content*	**Not Taken**
Reaction Load	**20T Roller**		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	**0.44**		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	**353.7**	kN/m²	**33.5**	
Maximum Settlement	**1.53**	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	**312.4**	kN/m²		
Modulus of Subgrade Reaction K762	**110.4**	kN/m²/mm		

Authorised Signatory

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

Results relate only to the sample(s) as tested.

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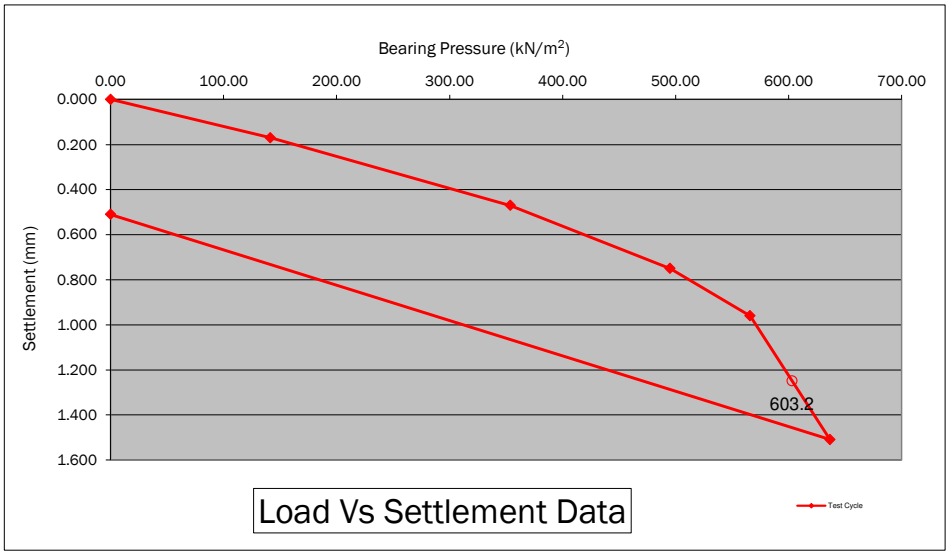
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19G	**REPORT NO:**	**ETS/1796G**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19G**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**B5 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
141.47	0.17
353.68	0.47
495.15	0.75
565.88	0.96
636.62	1.51
0.00	0.51
Recovery %	66



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	636.6	kN/m²		
Maximum Settlement	1.51	mm	**104.7**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	603.2	kN/m²		
Modulus of Subgrade Reaction K762	213.1	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

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Testing carried out at client's site location.

** End of report **

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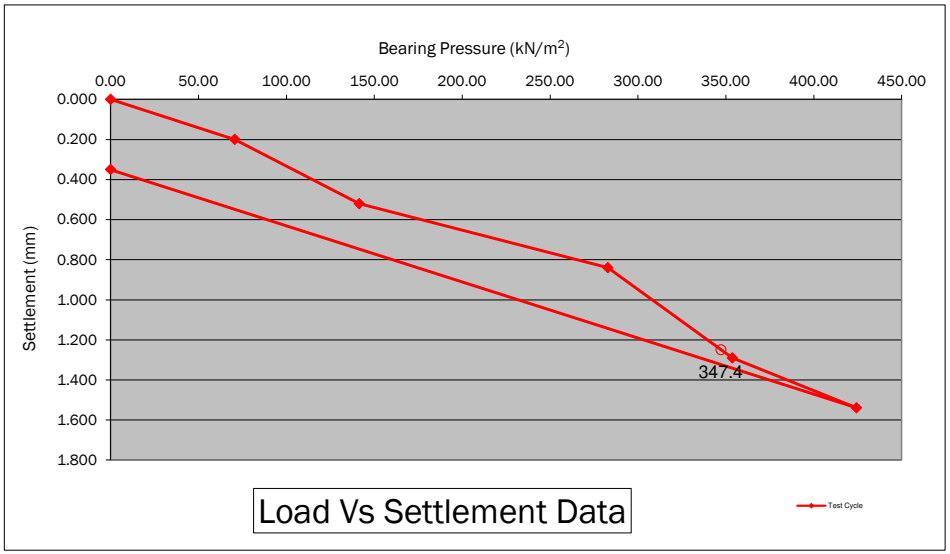
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19H	**REPORT NO:**	**ETS/1796H**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19H**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**A5 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.20
141.47	0.52
282.94	0.84
353.68	1.29
424.41	1.54
0.00	0.35
Recovery %	77



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	424.4	kN/m²	**40.2**	
Maximum Settlement	1.54	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	347.4	kN/m²		
Modulus of Subgrade Reaction K762	122.8	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

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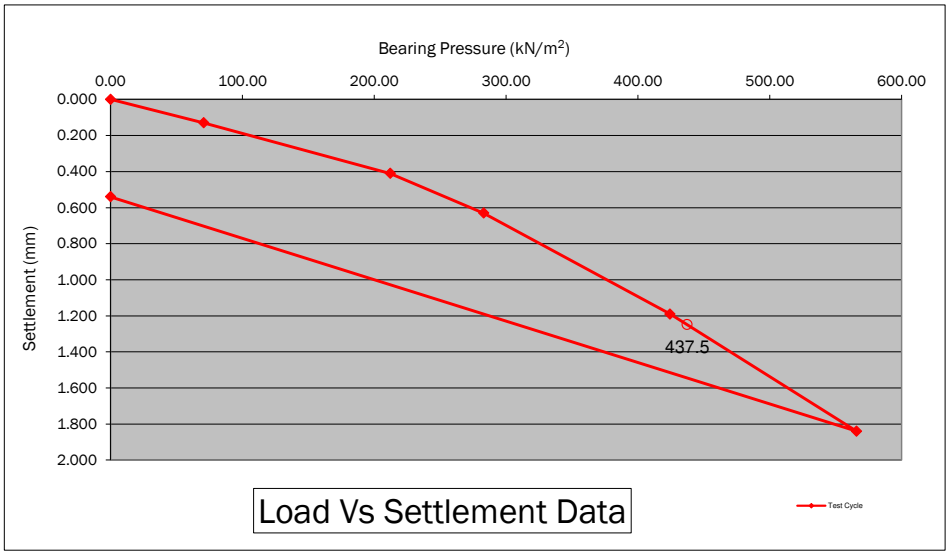
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19I	**REPORT NO:**	**ETS/1796I**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19I**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**A4 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.13
212.21	0.41
282.94	0.63
424.41	1.19
565.88	1.84
0.00	0.54
Recovery %	71



Depth of Test	**Surface**		Plate Diameter	**300mm**
Distance from edge of plate to wall of excavation	**N/A**	mm	Moisture Content*	**Not Taken**
Reaction Load	**20T Roller**		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	**0.44**		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	**565.9**	kN/m²	**60.0**	
Maximum Settlement	**1.84**	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	**437.5**	kN/m²		
Modulus of Subgrade Reaction K762	**154.6**	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

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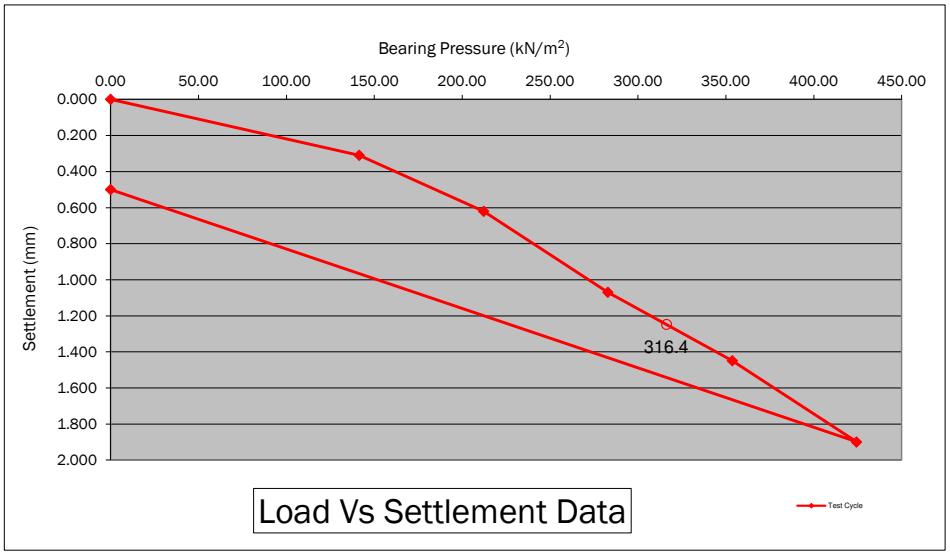
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19J	**REPORT NO:**	**ETS/1796J**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19J**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**C4 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
141.47	0.31
212.21	0.62
282.94	1.07
353.68	1.45
424.41	1.90
0.00	0.50
Recovery %	74



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	424.4	kN/m²	**34.2**	
Maximum Settlement	1.9	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	316.4	kN/m²		
Modulus of Subgrade Reaction K762	111.8	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

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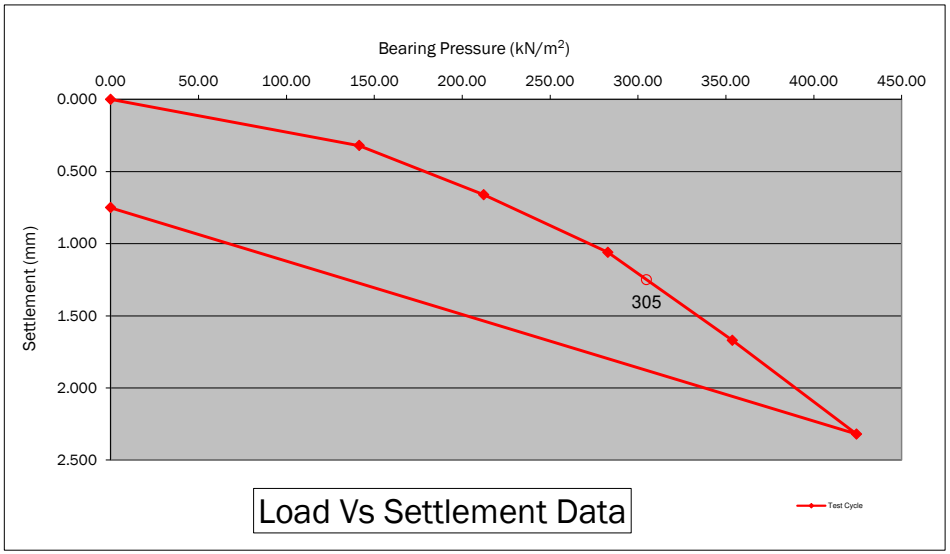
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19K	**REPORT NO:**	**ETS/1796K**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19K**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**B4 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
141.47	0.32
212.21	0.66
282.94	1.06
353.68	1.67
424.41	2.32
0.00	0.75
Recovery %	68



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	424.4	kN/m²		
Maximum Settlement	2.32	mm	**32.1**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	305.0	kN/m²		
Modulus of Subgrade Reaction K762	107.8	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

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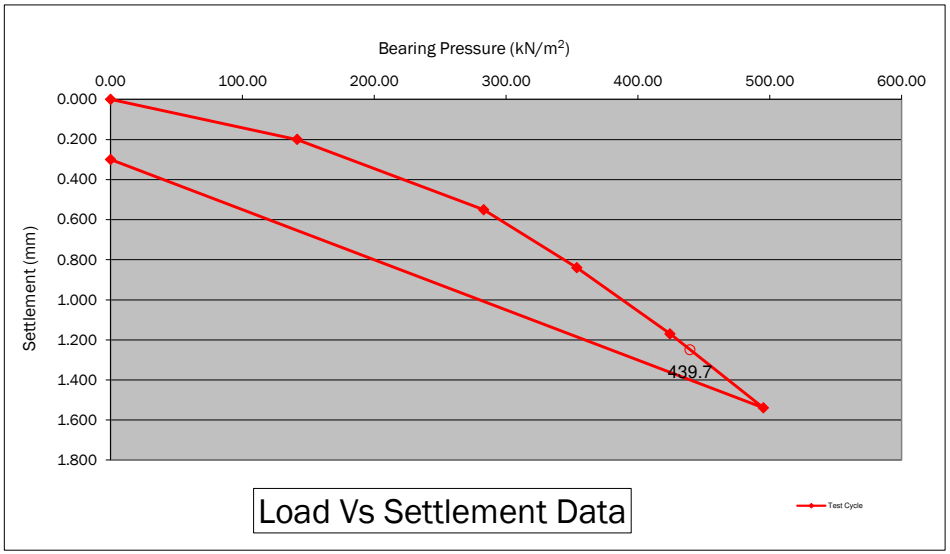
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/19L	**REPORT NO:**	**ETS/1796L**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/19L**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Brown Clay & OPC	Date Tested:	**26/10/2023**
Test Location:	**D4 Cemented Layer**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
141.47	0.20
282.94	0.55
353.68	0.84
424.41	1.17
495.15	1.54
0.00	0.30
Recovery %	81



Depth of Test	**Surface**		Plate Diameter	**300mm**
Distance from edge of plate to wall of excavation	**N/A**	mm	Moisture Content*	**Not Taken**
Reaction Load	**20T Roller**		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	**0.44**		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	**495.1**	kN/m²	**60.5**	
Maximum Settlement	**1.54**	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	**439.7**	kN/m²		
Modulus of Subgrade Reaction K762	**155.4**	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

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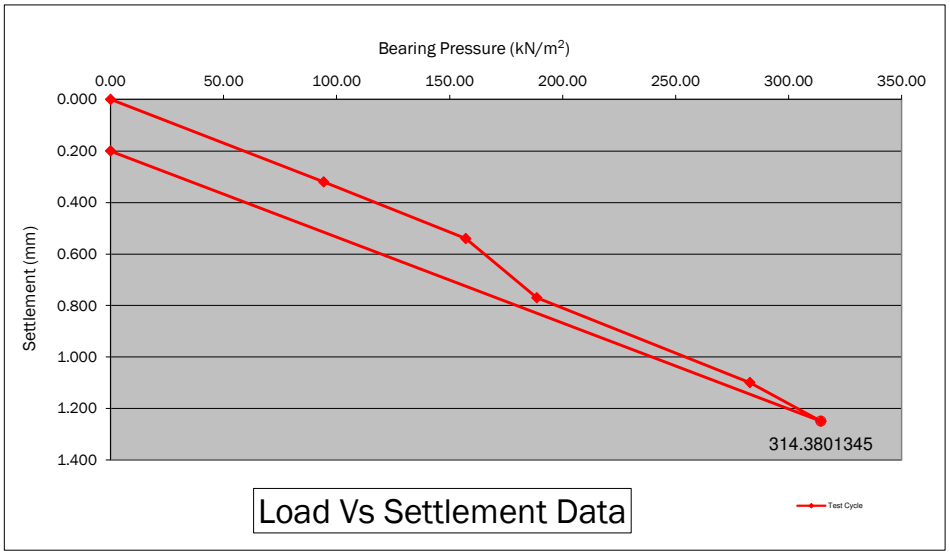
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/20A	**REPORT NO:**	**ETS/1797A**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/20A**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Type 1 Sub Base	Date Tested:	**26/10/2023**
Test Location:	**A4**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
94.31	0.32
157.19	0.54
188.63	0.77
282.94	1.10
314.38	1.25
0.00	0.20
Recovery %	84



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	314.4	kN/m²	**61.4**	
Maximum Settlement	1.25	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	314.4	kN/m²		
Modulus of Subgrade Reaction K762	156.7	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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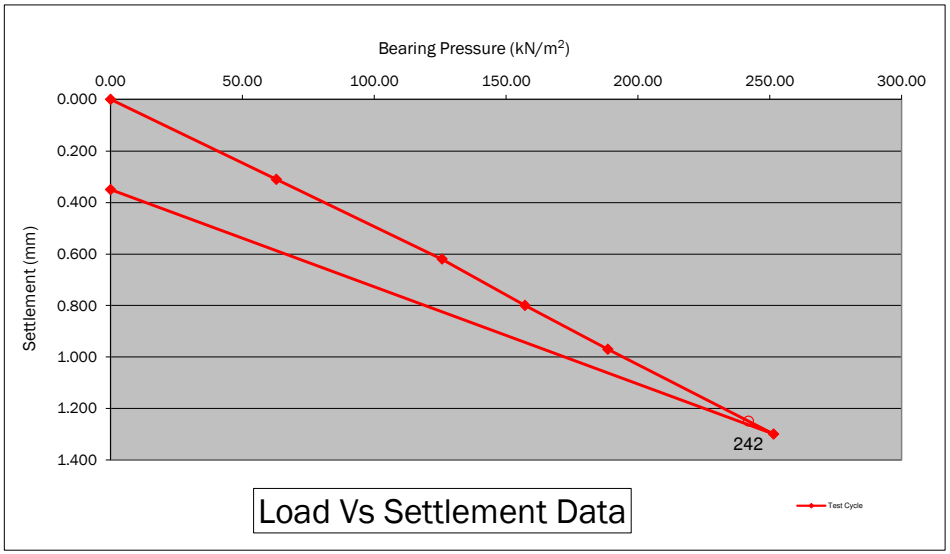
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/20B	**REPORT NO:**	**ETS/1797B**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/20B**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Type 1 Sub Base	Date Tested:	**26/10/2023**
Test Location:	**B4**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
62.88	0.31
125.75	0.62
157.19	0.80
188.63	0.97
251.50	1.30
0.00	0.35
Recovery %	73



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²		
Maximum Settlement	1.3	mm	**39.0**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	242.0	kN/m²		
Modulus of Subgrade Reaction K762	120.6	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

Results relate only to the sample(s) as tested.

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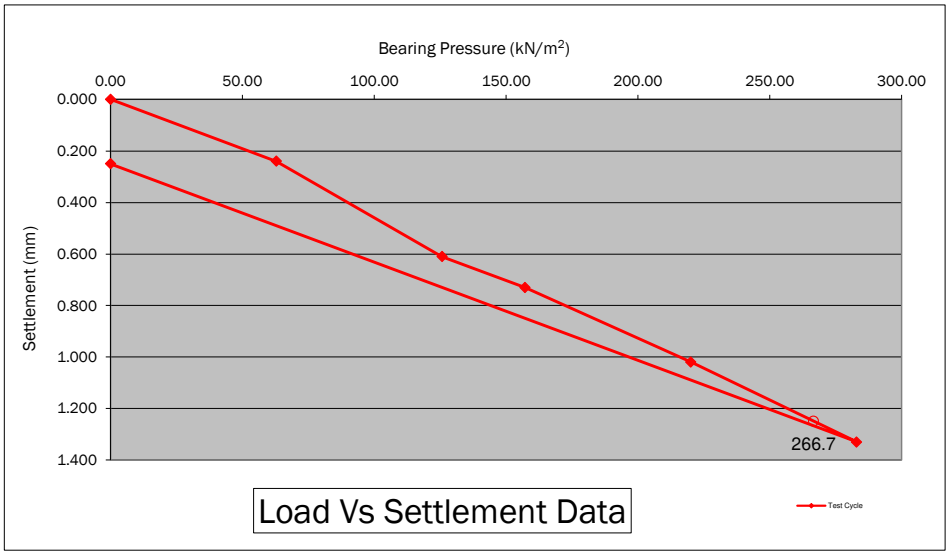
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/20C	**REPORT NO:**	**ETS/1797C**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/20C**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Type 1 Sub Base	Date Tested:	**26/10/2023**
Test Location:	**C4**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
62.88	0.24
125.75	0.61
157.19	0.73
220.07	1.02
282.94	1.33
0.00	0.25
Recovery %	81



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	282.9	kN/m²	**46.2**	
Maximum Settlement	1.33	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	266.7	kN/m²		
Modulus of Subgrade Reaction K762	132.9	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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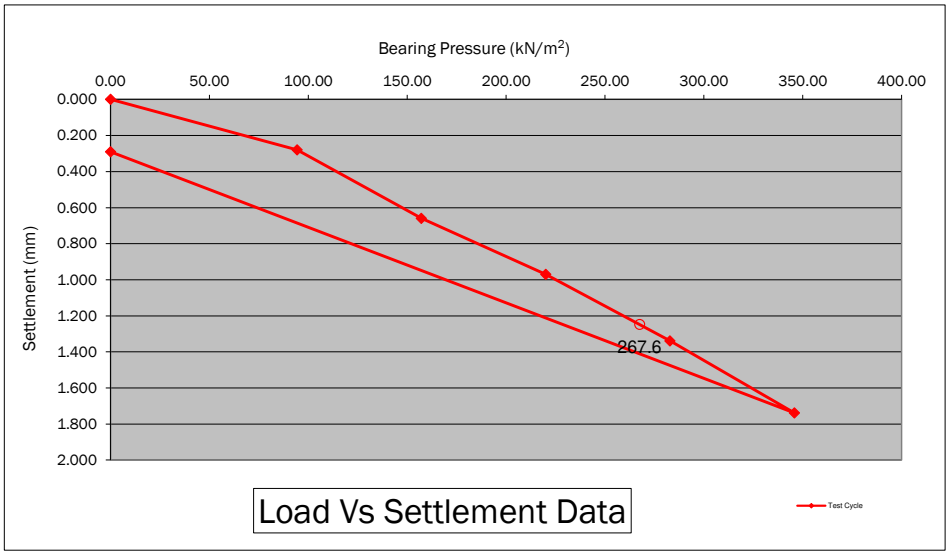
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/20D	**REPORT NO:**	**ETS/1797D**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/20D**	Report Date:	27/10/2023

TEST REPORT

Material Description:	Type 1 Sub Base	Date Tested:	**26/10/2023**
Test Location:	**D4**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
94.31	0.28
157.19	0.66
220.07	0.97
282.94	1.34
345.82	1.74
0.00	0.29
Recovery %	83



Depth of Test	**Surface**		Plate Diameter	**450mm**
Distance from edge of plate to wall of excavation	**N/A**	mm	Moisture Content*	**Not Taken**
Reaction Load	**20T Roller**		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	**0.62**		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	**345.8**	kN/m²	**46.5**	
Maximum Settlement	**1.74**	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	**267.6**	kN/m²		
Modulus of Subgrade Reaction K762	**133.4**	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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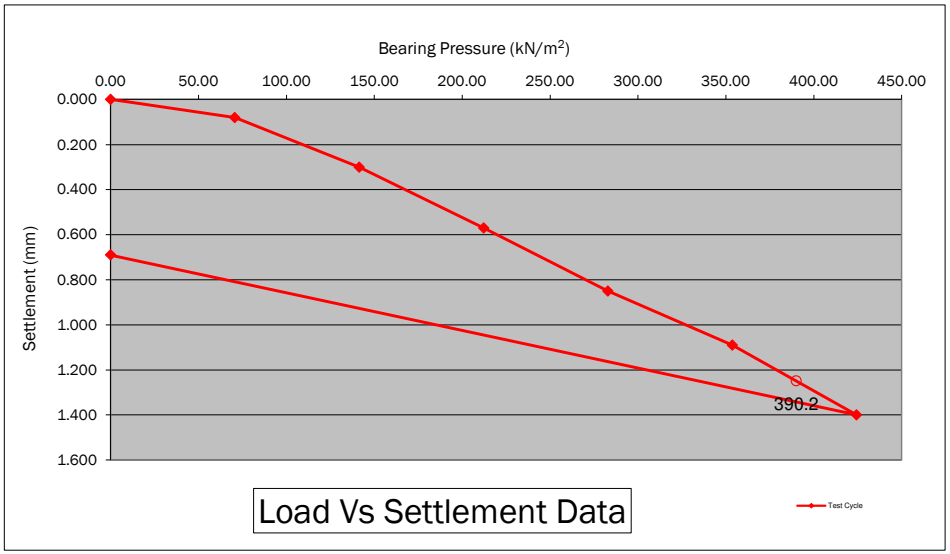
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/21A	**REPORT NO:**	**ETS/1820A**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/21A**	Report Date:	30/10/2023

TEST REPORT

Material Description:	Brown Clay & 2% OPC	Date Tested:	**27/10/2023**
Test Location:	**A3 Final Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.08
141.47	0.30
212.21	0.57
282.94	0.85
353.68	1.09
424.41	1.40
0.00	0.69
Recovery %	51



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	424.4	kN/m²	**49.2**	
Maximum Settlement	1.4	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	390.2	kN/m²		
Modulus of Subgrade Reaction K762	137.9	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

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Testing carried out at client's site location.

** End of report **

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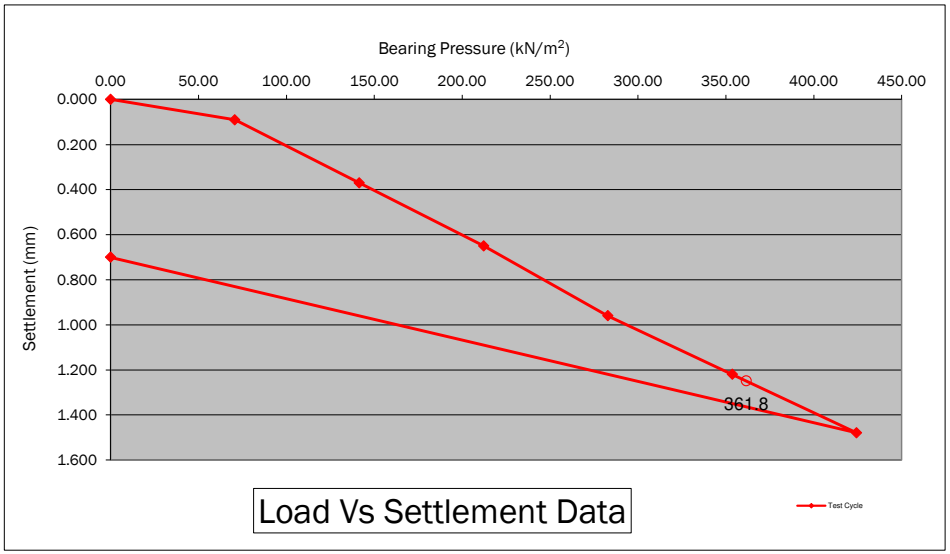
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/21B	**REPORT NO:**	**ETS/1820B**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/21B**	Report Date:	30/10/2023

TEST REPORT

Material Description:	Brown Clay & 2% OPC	Date Tested:	**27/10/2023**
Test Location:	**B3 Final Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.09
141.47	0.37
212.21	0.65
282.94	0.96
353.68	1.22
424.41	1.48
0.00	0.70
Recovery %	53



Depth of Test	**Surface**		Plate Diameter	**300mm**
Distance from edge of plate to wall of excavation	**N/A**	mm	Moisture Content*	**Not Taken**
Reaction Load	**20T Roller**		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	**0.44**		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	**424.4**	kN/m²	**43.2**	
Maximum Settlement	**1.48**	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	**361.8**	kN/m²		
Modulus of Subgrade Reaction K762	**127.8**	kN/m²/mm		

Authorised Signatory

T. McDonald

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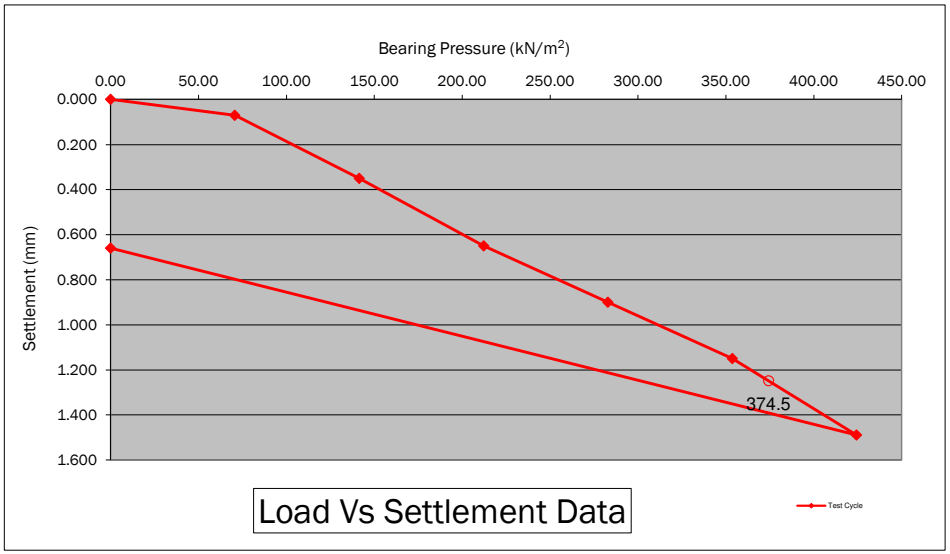
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/21C	**REPORT NO:**	**ETS/1820C**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/21C**	Report Date:	30/10/2023

TEST REPORT

Material Description:	Brown Clay & 2% OPC	Date Tested:	**27/10/2023**
Test Location:	**C3 Final Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.07
141.47	0.35
212.21	0.65
282.94	0.90
353.68	1.15
424.41	1.49
0.00	0.66
Recovery %	56



Depth of Test	**Surface**		
Distance from edge of plate to wall of excavation	**N/A**	mm	
Reaction Load	**20T Roller**		
Plate Correction Factor	**0.44**		
Maximum Applied Pressure	**424.4**	kN/m²	
Maximum Settlement	**1.49**	mm	
Test Cycle Values			
Bearing Pressure @ 1.25mm Settlement	**374.5**	kN/m²	
Modulus of Subgrade Reaction K762	**132.3**	kN/m²/mm	

Plate Diameter	**300mm**
Moisture Content*	**Not Taken**

*Carried out in accordance with BS1377: Part 2: 1990.

Equivalent CBR Value (%)

45.8

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

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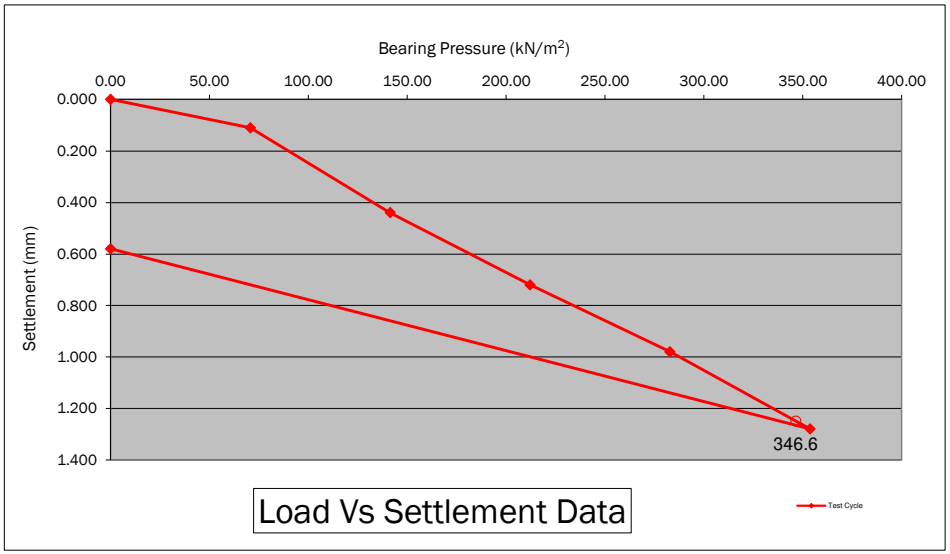
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/21D	**REPORT NO:**	**ETS/1820D**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/21D**	Report Date:	30/10/2023

TEST REPORT

Material Description:	Brown Clay & 2% OPC	Date Tested:	**27/10/2023**
Test Location:	**D3 Final Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.11
141.47	0.44
212.21	0.72
282.94	0.98
353.68	1.28
0.00	0.58
Recovery %	55



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	353.7	kN/m²	**40.1**	
Maximum Settlement	1.28	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	346.6	kN/m²		
Modulus of Subgrade Reaction K762	122.5	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

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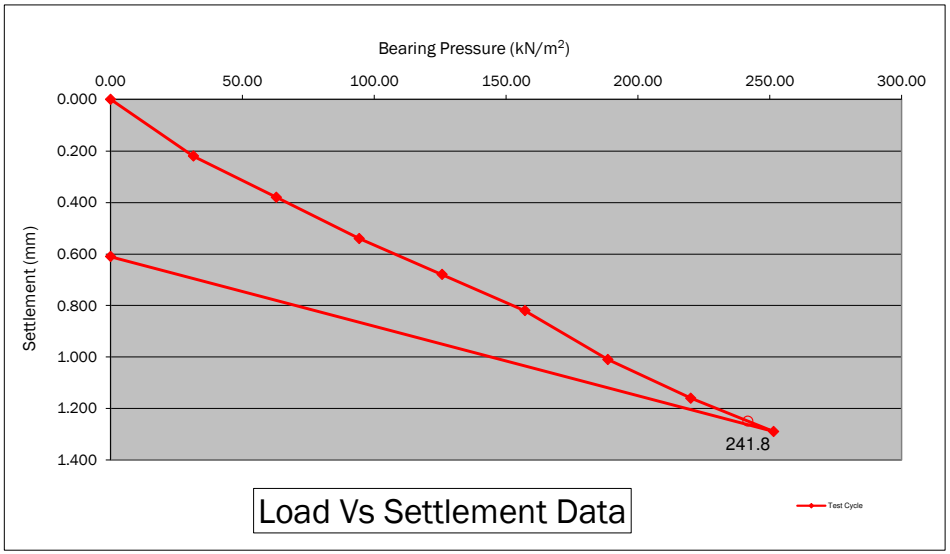
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/22A	**REPORT NO:**	**ETS/1821A**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/22A**	Report Date:	30/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**27/10/2023**
Test Location:	**A3**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.22
62.88	0.38
94.31	0.54
125.75	0.68
157.19	0.82
188.63	1.01
220.07	1.16
251.50	1.29
0.00	0.61
Recovery %	53



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²		
Maximum Settlement	1.29	mm	**39.0**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	241.8	kN/m²		
Modulus of Subgrade Reaction K762	120.5	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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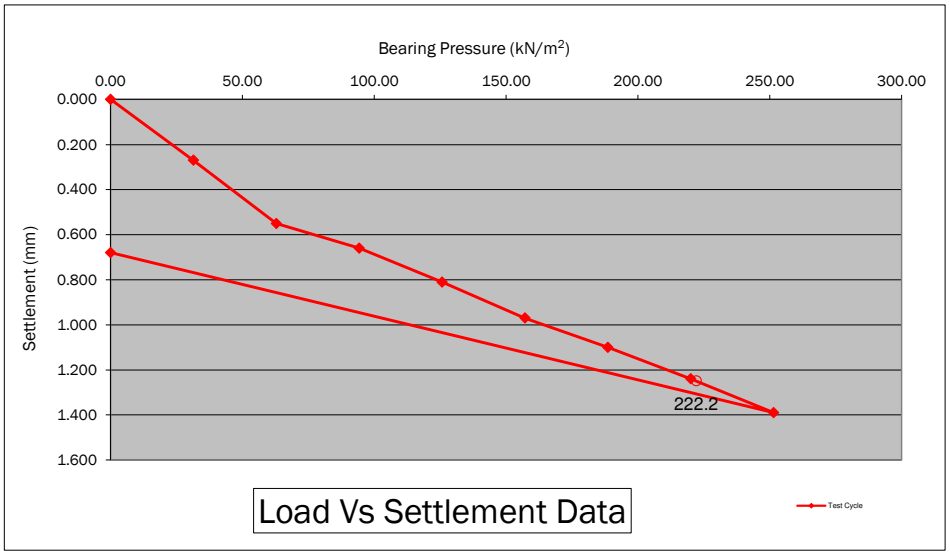
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/22B	**REPORT NO:**	**ETS/1821B**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/22B**	Report Date:	30/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**27/10/2023**
Test Location:	**B3**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.27
62.88	0.55
94.31	0.66
125.75	0.81
157.19	0.97
188.63	1.10
220.07	1.24
251.50	1.39
0.00	0.68
Recovery %	51



Depth of Test	Surface		
Distance from edge of plate to wall of excavation	N/A	mm	
Reaction Load	20T Roller		
Plate Correction Factor	0.62		
Maximum Applied Pressure	251.5	kN/m²	
Maximum Settlement	1.39	mm	
Test Cycle Values			
Bearing Pressure @ 1.25mm Settlement	222.2	kN/m²	
Modulus of Subgrade Reaction K762	110.8	kN/m²/mm	

Plate Diameter	450mm
Moisture Content*	Not Taken

*Carried out in accordance with BS1377: Part 2: 1990.

Equivalent CBR Value (%)

33.7

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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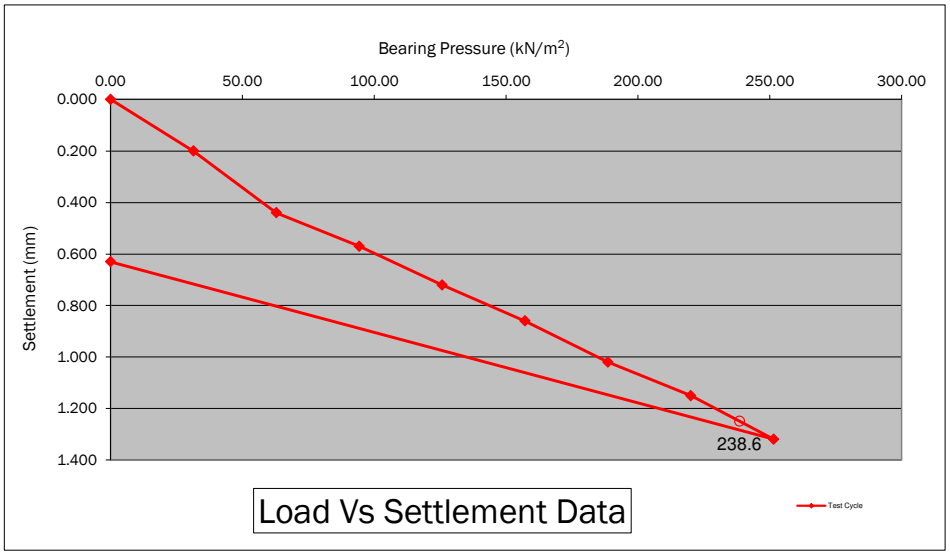
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/22C	**REPORT NO:**	**ETS/1821C**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/22C**	Report Date:	30/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**27/10/2023**
Test Location:	**C3**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.20
62.88	0.44
94.31	0.57
125.75	0.72
157.19	0.86
188.63	1.02
220.07	1.15
251.50	1.32
0.00	0.63
Recovery %	52



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²		
Maximum Settlement	1.32	mm	**38.1**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	238.6	kN/m²		
Modulus of Subgrade Reaction K762	118.9	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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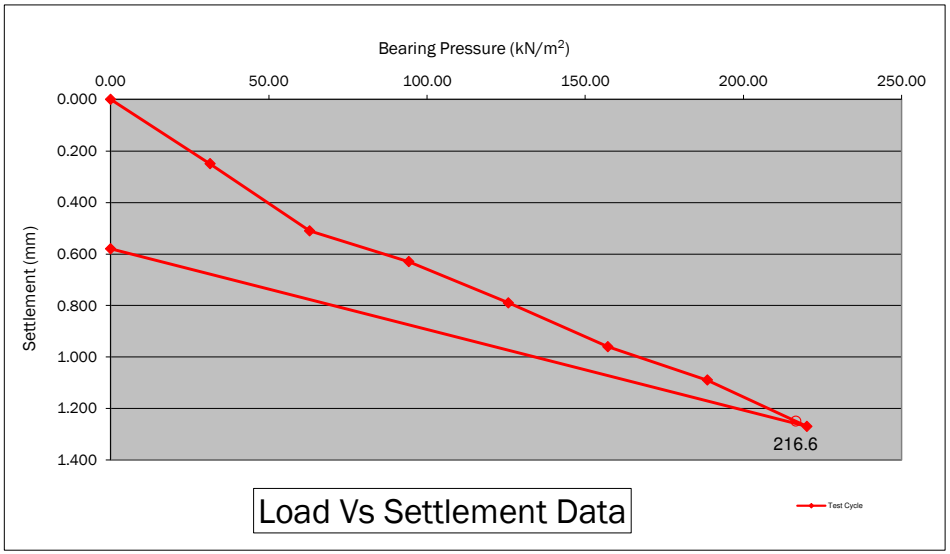
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/22D	**REPORT NO:**	**ETS/1821D**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/22D**	Report Date:	30/10/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**27/10/2023**
Test Location:	**D3**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.25
62.88	0.51
94.31	0.63
125.75	0.79
157.19	0.96
188.63	1.09
220.07	1.27
0.00	0.58
Recovery %	54



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	220.1	kN/m²	**32.2**	
Maximum Settlement	1.27	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	216.6	kN/m²		
Modulus of Subgrade Reaction K762	108.0	kN/m²/mm		

Authorised Signatory

T. McDonald

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e: reception@i2analytical.com

Analytical Report Number : 23-68107

Project / Site name:	Wingates - Bolton	**Samples received on:**	09/11/2023
Your job number:	C1082	**Samples instructed on/ Analysis started on:**	09/11/2023
Your order number:	SC069	**Analysis completed by:**	20/11/2023
Report Issue Number:	1	**Report issued on:**	20/11/2023
Samples Analysed:	1 soil sample		

Izabela Wójcik
Signed:

Izabela Wójcik
Senior Reporting Specialist
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

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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.

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The results included within the report relate only to the sample(s) submitted for testing.

Analytical Report Number: 23-68107
Project / Site name: Wingates - Bolton
Your Order No: SC069

Lab Sample Number				2874456
Sample Reference				C1082
Sample Number				23
Depth (m)				None Supplied
Date Sampled				07/11/2023
Time Taken				1700
Analytical Parameter (Soil Analysis)	**Units**	**Limit of detection**	**Accreditation Status**	
Stone Content	%	0.1	NONE	22
Moisture Content	%	0.01	NONE	17
Total mass of sample received	kg	0.001	NONE	0.9

Asbestos in Soil	Type	N/A	ISO 17025	Not-detected
Asbestos Analyst ID	N/A	N/A	N/A	KSZ

General Inorganics

pH - Automated	pH Units	N/A	MCERTS	9.7
Total Sulphate as SO4	mg/kg	50	MCERTS	700
Total Sulphate as SO4	%	0.005	MCERTS	0.07
Acid Soluble Sulphur	%	0.003	NONE	0.023
Water Soluble Sulphate as SO4 16hr extraction (2:1)	mg/kg	2.5	MCERTS	410
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	g/l	0.00125	MCERTS	0.206
Water Soluble SO4 16hr extraction (2:1 Leachate Equivalent)	mg/l	1.25	MCERTS	206
Water Soluble Sulphur	%	0.0001	NONE	0.0137
Total Potential Sulphate	mg/kg	30	NONE	1600
Total Potential Sulphate	%	0.003	NONE	0.164
Oxidisable Sulphide (as SO4)	%	0.002	NONE	0.094
Oxidisable Sulphide (as SO4)	mg/kg	20	NONE	940
Water Soluble Chloride (2:1) (leachate equivalent)	mg/l	0.5	MCERTS	3.7
Total Sulphur	mg/kg	50	MCERTS	550
Total Sulphur	%	0.005	MCERTS	0.055
Ammoniacal Nitrogen as NH4	mg/kg	0.5	MCERTS	7.3
Ammonium as NH4 (10:1 leachate equivalent)	mg/l	0.05	MCERTS	0.73
Organic Matter (automated)	%	0.1	MCERTS	2.1
Water Soluble Nitrate (2:1) as N (leachate equivalent)	mg/l	2	NONE	< 2.0

Heavy Metals / Metalloids

Magnesium (water soluble)	mg/kg	5	NONE	< 5.0
Magnesium (leachate equivalent)	mg/l	2.5	NONE	< 2.5

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

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Analytical Report Number : 23-68107
Project / Site name: Wingates - Bolton

* 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 *
2874456	C1082	23	None Supplied	Brown clay and sand with gravel.

Analytical Report Number : 23-68107
Project / Site name: Wingates - Bolton

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
Sulphate, water soluble, in soil (16hr extraction)	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS
Asbestos identification in soil	Asbestos Identification with the use of polarised light microscopy in conjunction with dispersion staining techniques.	In house method based on HSG 248	A001-PL	D	ISO 17025
Magnesium, water soluble, in soil	Determination of water soluble magnesium by extraction with water followed by ICP-OES.	In-house method based on TRL 447	L038-PL	D	NONE
Moisture Content	Moisture content, determined gravimetrically. (30 oC)	In house method.	L019-UK/PL	W	NONE
Oxidisable Sulphide in soil	Determination of oxidisable sulphide in soil by calculation from total sulphur and total sulphate.	In-house method based on TRL 447		D	NONE
pH in soil (automated)	Determination of pH in soil by addition of water followed by automated electrometric measurement.	In house method.	L099-PL	D	MCERTS
Total sulphate (as SO4 in soil)	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
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.	L019-UK/PL	D	NONE
Total Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total potential sulphate in soil	Determination of total potential sulphate in soil by calculation from total sulphur.	By calculation - In-house method based on TRL 447 report.	L038-PL	D	NONE
Ammonium as NH4 in soil	Determination of Ammonium/Ammonia/ Ammoniacal Nitrogen by the colorimetric salicylate/nitroprusside method, 10:1 water extraction.	In-house method based on Examination of Water and Wastewater 20th Edition: Clesceri, Greenberg & Eaton	L082-PL	W	MCERTS
Acid Soluble Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	NONE
Water Soluble Sulphur in soil	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	NONE
Organic matter (Automated) in soil	Determination of organic matter in soil by oxidising with potassium dichromate followed by titration with iron (II) sulphate.	In house method.	L009-PL	D	MCERTS
Total Sulphate in soil as %	Determination of total sulphate in soil by extraction with 10% HCl followed by ICP-OES.	In house method.	L038-PL	D	MCERTS
Total Sulphur in soil as %	Determination of total sulphur in soil by extraction with aqua-regia, potassium bromide/bromate followed by ICP-OES.	In house method.	L038-PL	D	MCERTS

Analytical Report Number : 23-68107
Project / Site name: Wingates - Bolton

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
D.O. for Gravimetric Quant if Screen/ID positive	Dependent option for Gravimetric Quant if Screen/ID positive scheduled.	In house asbestos methods A001 & A006.	A006-PL	D	NONE
Total potential sulphate in soil (Percentage)	Determination of total potential sulphate in soil by calculation from total sulphur - expressed as a percentage.	By calculation - In-house method based on TRL 447 report.	L038-PL	D	NONE
Water Soluble Nitrate (2:1) as N in soil	Determination of nitrate by reaction with sodium salicylate and colorimetry.	In-house method based on Examination of Water and Wastewatern & Polish Standard Method PN-82/C-04579.08, 2:1 extraction.	L078-PL	W	NONE
Chloride, water soluble, in soil	Determination of Chloride colorimetrically by discrete analyser.	In house method.	L082-PL	D	MCERTS
Sulphate, water soluble, in soil	Determination of water soluble sulphate by ICP-OES. Results reported directly (leachate equivalent) and corrected for extraction ratio (soil equivalent).	In house method.	L038-PL	D	MCERTS

For method numbers ending in 'UK or A' analysis have been carried out in our laboratory in the United Kingdom (WATFORD).
For method numbers ending in 'F' analysis have been carried out in our laboratory in the United Kingdom (East Kilbride).
For method numbers ending in 'PL or B' analysis have been carried out in our laboratory in Poland.
Soil analytical results are expressed on a dry weight basis. Where analysis is carried out on as-received the results obtained are multiplied by a moisture correction factor that is determined gravimetrically using the moisture content which is carried out at a maximum of 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.

Laboratory Report	ETS/1932	Contract Sample No	C1082/23
Report Date	21 November 2023	ETS Contract No	C1082/23

Collins Earthworks Ltd Whiteley Road Ripley Derbyshire DE5 3QL	Material Description	See Below
	Source	Ex-Site
	Supplier	Ex-Site
	Date Sampled	07/11/2023
	Date Received	07/11/2023
Wingates - Bolton	Date Completed	20/11/2023
	Sample Location	See Below
	Client Reference	C1082/23

EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ

Tel: 07310 161694
Email-ops@earthworkstesting.co.uk

Testing Lab: I2 Analytical LTD **Report Number:** 23-68107

ETS Number	Sample Number	Location	Matieral	Testing
1932	23	B2 Layer 1	Brown Stoney Clay	TRL 447, OM, BRE SD 1, Asbestos

Authorised Signatory

T. McDonald

TEST CERTIFICATE

DETERMINATION OF LIQUID AND PLASTIC LIMITS
Tested in Accordance with:BS 1377-2:1990:Clause 4.4 and 5

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

4041

Client:	Earthworks Testing Ltd	Client Reference:	C1082
Client Address:	Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ	Job Number:	23-67888-1
		Date Sampled:	Not Given
		Date Received:	09/11/2023
Contact:	John Lamb	Date Tested:	17/11/2023
Site Address:	Wingates Bolton	Sampled By:	Client - ETL

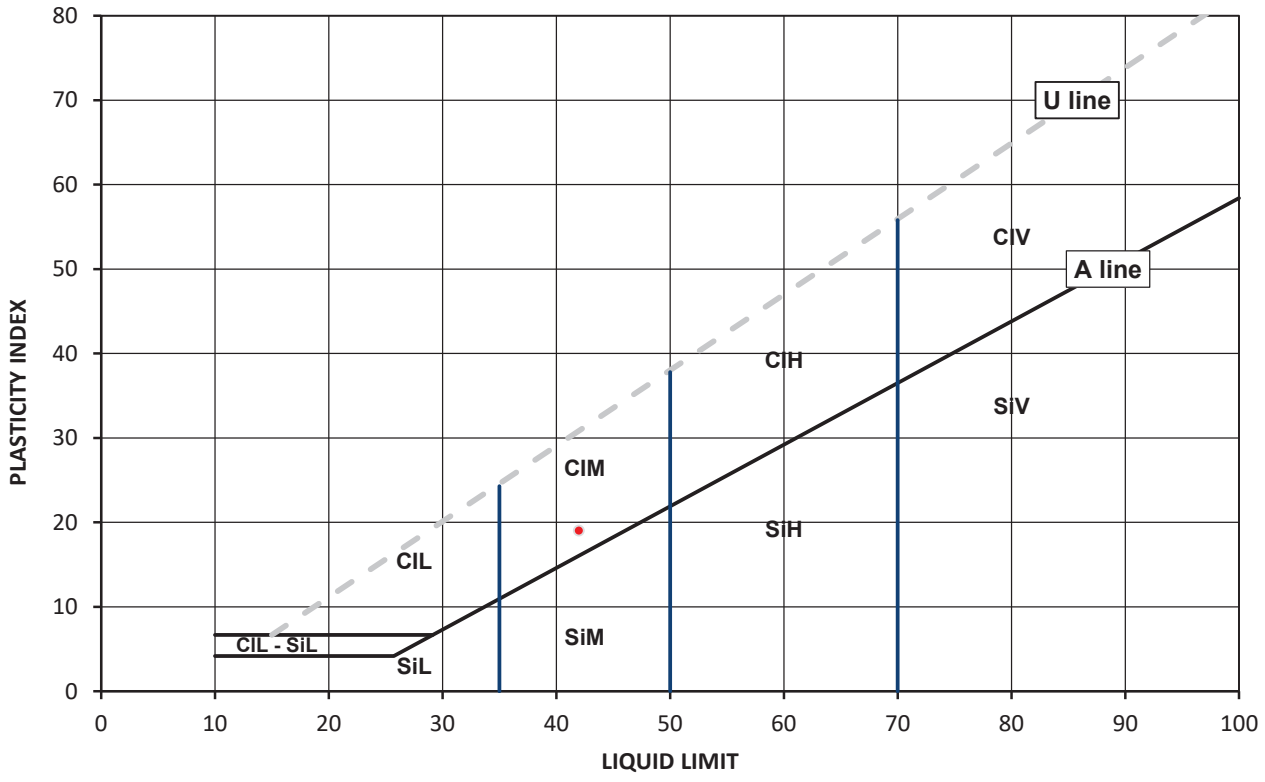
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

Laboratory Reference:	2873319	Depth Top [m]:	Not Given
Hole No.:	C1082	Depth Base [m]:	Not Given
Sample Reference:	24	Sample Type:	B
Sample Description:	Grey gravelly sandy CLAY		

Sample Preparation: Tested after washing to remove >425 µm

As Received Water Content [W] %	Liquid Limit [WL] %	Plastic Limit [Wp] %	Plasticity Index [Ip] %	% Passing 425µm BS Test Sieve
20	42	23	19	63



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 1377-2: 1990: Clause 3.2

Remarks:

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:

Szczepan Bielatowicz, PhD
Project Manager
for and on behalf of i2 Analytical Ltd

Date Reported: 30/11/2023

GF 232.13

SUMMARY REPORT

DETERMINATION OF WATER CONTENT

Tested in Accordance with: BS 1377-2: 1990: Clause 3.2

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

4041

Client: Earthworks Testing Ltd

Client Address: Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ

Contact: John Lamb

Site Address: Wingates Bolton

Client Reference: C1082
Job Number: 23-67888-1
Date Sampled: Not Given
Date Received: 09/11/2023
Date Tested: 17/11/2023
Sampled By: Client - ETL

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

Test results

Laboratory Reference	Hole No.	Sample				Description	Remarks	WC	Sample preparation / Oven temperature at the time of testing			
		Reference	Depth Top m	Depth Base m	Type			%				
2873319	C1082	24	Not Given	Not Given	B	Grey gravelly sandy CLAY		20	Sample was quartered, oven dried at 106.7 °C			

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:

Szczepan Bielatowicz, PhD
Project Manager
for and on behalf of i2 Analytical Ltd

Date Reported: 30/11/2023

GF 099.17

4041

TEST CERTIFICATE

DETERMINATION OF PARTICLE SIZE DISTRIBUTION
Tested in Accordance with: BS 1377-2:1990: Clause 9.2

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

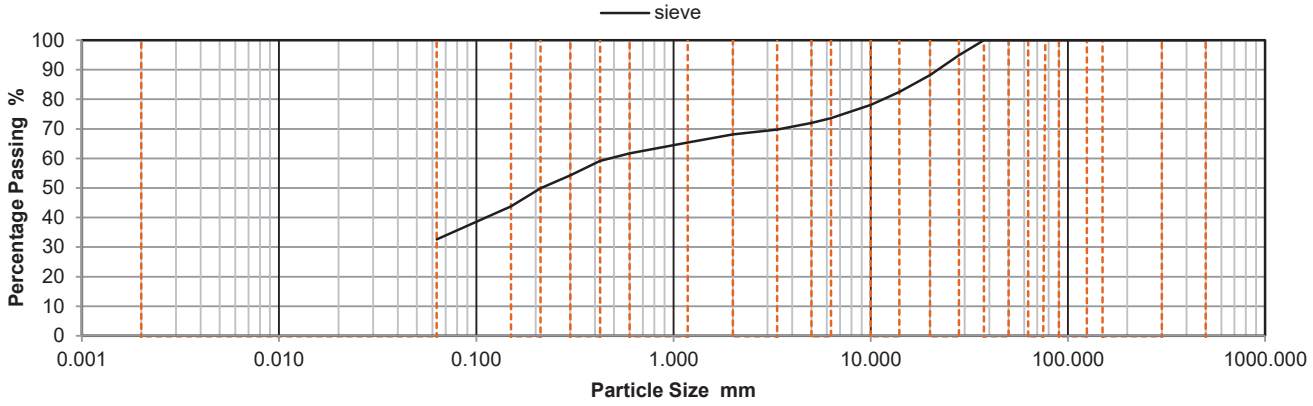
Environmental Science

Client:	Earthworks Testing Ltd	Client Reference:	C1082
Client Address:	Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ	Job Number:	23-67888-1
		Date Sampled:	Not Given
		Date Received:	09/11/2023
Contact:	John Lamb	Date Tested:	17/11/2023
Site Address:	Wingates Bolton	Sampled By:	Client - ETL

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

Test Results:

Laboratory Reference:	2873319	Depth Top [m]:	Not Given
Hole No.:	C1082	Depth Base [m]:	Not Given
Sample Reference:	24	Sample Type:	B
Sample Description:	Grey gravelly sandy CLAY		
Sample Preparation:	Sample was quartered, oven dried at 106.7 °C and broken down by hand.		



Sieving		Material Type 2C Stony Cohesive Material			
Particle Size mm	Passing %	Material Specification			Pass or Fail
500	100				
300	100				
150	100				
125	100	100	-	100	PASS
90	100				
75	100				
63	100				
50	100				
37.5	100				
28	95				
20	88				
14	83				
10	78				
6.3	74				
5	72				
3.35	70				
2	68	15	-	80	PASS
1.18	65				
0.6	62				
0.425	59				
0.3	54				
0.212	50				
0.15	44				
0.063	33	15	-	80	PASS

Uniformity Coefficient [Cu]		> 7.5
D60	mm	0.472
D10	mm	

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

Earthworks

Specification for Highway Works, Volume 1, Series 600, TABLE 6/2

Remarks:

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. This report includes a statement of conformity to an industry standard specification, as such risks associated with uncertainty in relation to the decision rules applied do not need to be considered.

Signed:

Szczepan Bielatowicz, PhD
Project Manager
for and on behalf of i2 Analytical Ltd

Date Reported: 30/11/2023

GF 472.3

TEST CERTIFICATE

DETERMINATION OF THE UNDRAINED SHEAR STRENGTH IN TRIAXIAL COMPRESSION WITHOUT MEASUREMENT OF PORE PRESSURE

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

4041

Tested in Accordance with: BS 1377-7: 1990: Clause 8

Client:	Earthworks Testing Ltd	Client Reference:	C1082
Client Address:	Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ	Job Number:	23-67888-1
		Date Sampled:	Not Given
		Date Received:	09/11/2023
Contact:	John Lamb	Date Tested:	28/11/2023
Site Address:	Wingates Bolton	Sampled By:	Client - ETL

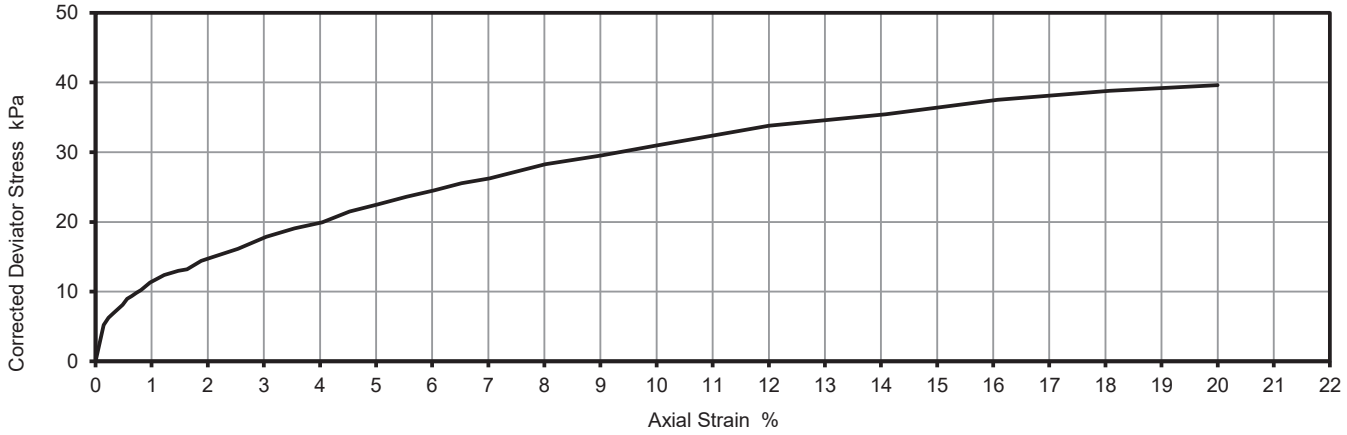
Testing carried out at i2 Analytical Limited, ul. Pionierow, 41-711 Ruda Slaska, Poland

Test Results:

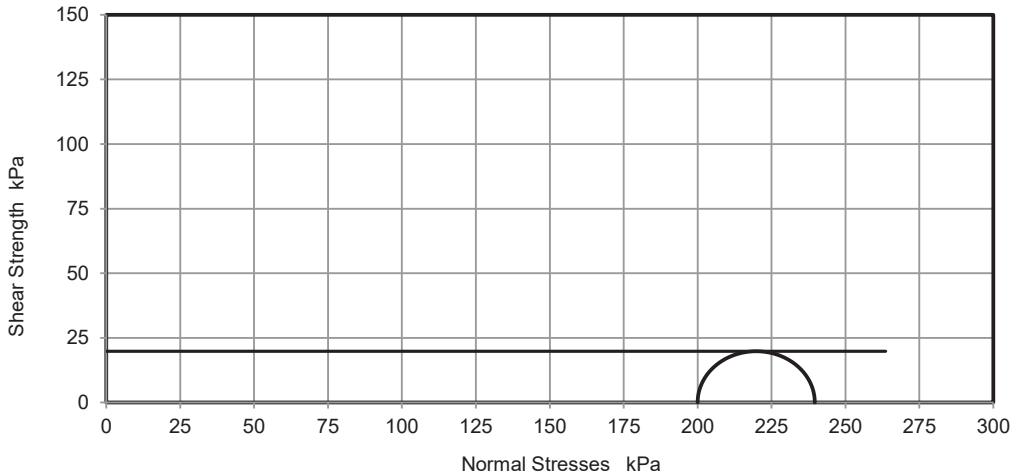
Laboratory Reference:	2873319	Depth Top [m]:	Not Given
Hole No.:	C1082	Depth Base [m]:	Not Given
Sample Reference:	24	Sample Type:	B
Sample Description:	Grey gravelly sandy CLAY		
Sample Preparation:	Recompacted at NMC using 2.5kg rammer in accordance with Table 6 of BS1377-1:2016.		

Test Number	1		Rate of Strain	1.00	%/min
Length	200.01	mm	Cell Pressure	200	kPa
Diameter	99.85	mm	Axial Strain at failure	20.0	%
Bulk Density	2.06	Mg/m3	Deviator Stress, (σ1 - σ3)f	40	kPa
Moisture Content	20	%	Undrained Shear Strength, cu	20	kPa ½(σ1 - σ3)f
Dry Density	1.72	Mg/m3	Mode of Failure	Compound	
Membrane Correction	1.04	kPa	Latex membrane thickness	0.27	mm

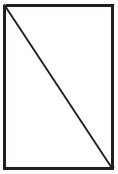
Deviator Stress v Axial Strain



Mohr Circles



Position within sample



Note: Deviator stress corrected for area change and membrane effects. Mohr circles and their interpretation is not covered by BS1377. This is provided for information only.

Remarks:

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:

Szczepan Bielatowicz, PhD
Project Manager
for and on behalf of i2 Analytical Ltd

Date Reported: 30/11/2023

GF 184.14

Laboratory Report	ETS/1933	Contract Sample No	C1082/24
Report Date	01 December 2023	ETS Contract No	C1082/24

Collins Earthworks Ltd Whiteley Road Ripley Derbyshire DE5 3QL	Material Description	See Below
	Source	Ex-Site
	Supplier	Ex-Site
	Date Sampled	07/11/2023
	Date Received	07/11/2023
Wingates - Bolton	Date Completed	30/11/2023
	Sample Location	See Below
	Client Reference	C1082/24

EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ
Tel: 07310 161694
Email-ops@earthworkstesting.co.uk

Testing Lab: I2 Analytical LTD **Report Number:** 23-67888-1

ETS Number	Sample Number	Location	Matieral	Testing
1933	24	B2 Layer 1	Brown Stoney Clay + 2% OPC	MC,PSD,PI,QUSS

Authorised Signatory

T. McDonald

Laboratory Report	ETS/1934	Contract Sample No	C1082/25
Report Date	20 December 2023	ETS Contract No	C1082/25

Collins Earthworks Ltd Whiteley Road Ripley Derbyshire DE5 3QL	Material Description	See Below
	Source	Ex-Site
	Supplier	Ex-Site
	Date Sampled	07/11/2023
	Date Received	07/11/2023
Wingates - Bolton	Date Completed	20/12/2023
	Sample Location	See Below
	Client Reference	C1082/25

EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ
Tel: 07310 161694
Email-ops@earthworkstesting.co.uk

Testing Lab: I2 Analytical LTD **Report Number:** 23-69522-1

ETS Number	Sample Number	Location	Matieral	Testing
1934	25	B2 Layer 1	Brown Clay & 2% OPC	FROST

Authorised Signatory

T. McDonald

TEST CERTIFICATE

DETERMINATION OF FROST HEAVE OF AGGREGATES

Tested in Accordance with: BS 812-124: 2009

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

Client:	Earthworks Testing Ltd	Client Reference:	C1082
Client Address:	Unit 6, Eco Way, Dunscroft, Doncaster, DN7 4JJ	Job Number:	23-69522-1
		Date Sampled:	07/11/2023
		Date Received:	17/11/2023
Contact:	John Lamb	Date Tested:	06/12/2023
Site Address:	Wingates-Bolton	Sampled By:	Client - ETL

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

Test Results:

Laboratory Reference:	2882219	Depth Top [m]:	Not Given
Client ID:	C1082/25	Depth Base [m]:	Not Given
Sample Reference:	1	Sample Type:	B
Sample Description:	Brown CLAY with 2% OPC addition		

Is a copy of the sampling certificate available? NO

Frost Heave test result:

Comparator specimen - maximum heave observed in 96 hours (mm)

Comparator specimen 1	14.5	*(nearest 0.5 mm)*	
Comparator specimen 2	13.5	*(nearest 0.5 mm)*	
Comparator specimen 3	9.5	*(nearest 0.5 mm)*	
Mean	**12.5**	*(nearest 0.1 mm)*	*acceptable range: 9.6 - 17.6 mm*

Test specimen - maximum heave observed in 96 hours (mm)

Test specimen 1	12.0	*(nearest 0.5 mm)*	
Test specimen 2	8.0	*(nearest 0.5 mm)*	
Test specimen 3	10.0	*(nearest 0.5 mm)*	
Range of test specimen heave	4.0		*acceptable range: 0 - 6 mm*
Mean Frost Heave	**10.0**	*(nearest 0.1 mm)*	

The sample is classified as being **non-frost susceptible**

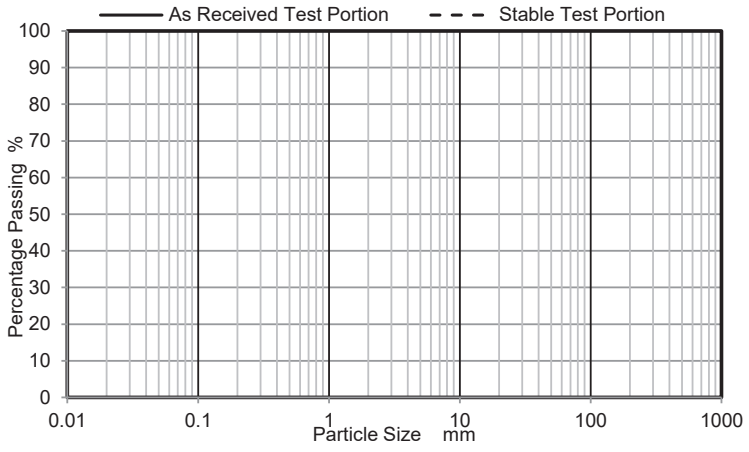
SHW Series 800: clause 801.15 (11/21) Material shall be classified as non-frost-susceptible if the mean heave is 15 mm or less, when tested in accordance with BS 812-124. Comparator specimens in accordance with Annex B of BS 812-124 shall be used.

Laboratory Dry Density & Water Content Test Result

As received sample:			Stable specimen:		
Maximum dry density	N/A	Mg/m3	Actual dry density	N/A	Mg/m3
Optimum water content	N/A	%	Actual water content	N/A	%

Particle Size Distribution Test Result

BS Test Sieve Nominal Apperature	As Received Test Portion % Passing	Stable Test Portion % Passing
63	N/A	N/A
40	N/A	N/A
31.5	N/A	N/A
16	N/A	N/A
8	N/A	N/A
4	N/A	N/A
2	N/A	N/A
1	N/A	N/A
0.063	N/A	N/A



Remarks: specimens pre-compacted in MCV mould with OPC addition

Signed: Katarzyna Koziel

Katarzyna Koziel
Senior 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.

Date Reported: 20/12/2023

GF 424.2

Laboratory Report	ETS/1935	Contract Sample No	C1082/26
Report Date	09/11/2023	ETS Contract No	C1082/26

EARTHWORKS TESTING LTD

Unit 6, Eco Way
Dunscroft
Doncaster
DN7 4JJ

UKAS TESTING
27572

Tel: **07310 161694**
Email: ops@earthworkstesting.co.uk

Collins Earthworks Ltd	Source	Ex-Site
Whiteley Road	Supplier	Ex-Site
Ripley	Date Sampled	07/11/2023
Derbyshire	Stabiliser/s Used	OPC
DE5 3QL	% Stabiliser Used	2%
	Carried out at	Site
	Weather	Overcast
Project: Wingates - Bolton	Operator	JH

TEST REPORT

Determination of Moisture Condition Value & Degree of Pulverization of Unbound and Hydraulically Bound Mixtures*

BS EN13286, Part 46: 2003 & BS EN 13286-48: 2005

Material Description	Location	% Retained on 20mm Sieve	Method of interpretation	Moisture Content %	Moisture Condition Value	Pulverisation* %
Brown Stoney Clay + 2% OPC	B2 Layer 1	4.6	Steepest Straight Line	13.8	**10.5**	**60**

Tempelate Version 1.0

** Degree of Pulverisation is **NOT** covered by current scope of UKAS accreditation*

Authorised Signatory

Opinions and interpretations not covered by the current scope of UKAS accreditation of this laboratory.
This report may not be reproduced other than in full without the prior written approval of the issuing laboratory
Results relate only to the samples(s) as tested.
The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer

Laboratory Report	ETS/1935	Contract Sample No	C1082/26
Report Date	09/11/2023	ETS Contract No	C1082/26

EARTHWORKS TESTING LTD

Unit 6, Eco Way
Dunscroft
Doncaster
DN7 4JJ

UKAS TESTING
27572

Tel: **07310 161694**
Email: ops@earthworkstesting.co.uk

Collins Earthworks Ltd	Source	Ex-Site
Whiteley Road	Supplier	Ex-Site
Ripley	Date Sampled	07/11/2023
Derbyshire	Stabiliser/s Used	OPC
DE5 3QL	% Stabiliser Used	2%
	Carried out at	Site
	Weather	Overcast
Project: Wingates - Bolton	Operator	JH

TEST REPORT

Determination of Moisture Condition Value & Degree of Pulverization of Unbound and Hydraulically Bound Mixtures*

BS EN13286, Part 46: 2003 & BS EN 13286-48: 2005

** END OF REPORT **

Laboratory Report	ETS/1935	Contract Sample No	C1082/26
Report Date	09/11/2023	ETS Contract No	C1082/26

EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ

email:ops@earthworkstesting.co.uk
Tel: 07310 161694

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Stabiliser(s)	OPC
% Stabiliser	2%
Sample Plan	Client Specification
Date Sampled	07/11/2023
Date Tested	07/11/2023
Weather Conditions	Overcast
Operator	JH

TEST REPORT

Degree of Pulverization of Unbound and Hydraulically Bound Mixtures - BS EN 13286-48: 2005

Reference	Test Location	Pulverization %	Reference	Test Location	Pulverization %
C1082/26	D2 Layer 1	70			
C1082/26	C2 Layer 2	65			

Deviations:

Template Version: 1.0

Authorised Signatory

Laboratory Report	ETS/1935	Contract Sample No	C1082/26
Report Date	09/11/2023	ETS Contract No	C1082/26

EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ

email:ops@earthworkstesting.co.uk
Tel: 07310 161694

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Project:
Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Stabiliser(s)	OPC
% Stabiliser	2%
Sample Plan	Client Specification
Date Sampled	07/11/2023
Date Tested	07/11/2023
Weather Conditions	Overcast
Operator	JH

TEST REPORT

Degree of Pulverization of Unbound and Hydraulically Bound Mixtures - BS EN 13286-48: 2005

** END OF REPORT **

Laboratory Report	ETS/1936	Contract Sample No	C1082/27
Report Date	09 November 2023	ETS Contract No	C1082/27

EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ

UKAS TESTING
27572

Tel: 07310 161694
Email-ops@earthworkstesting.co.uk

Collins Earthworks Ltd
Whiteley Road
Ripley
Derbyshire
DE5 3QL

Wingates - Bolton

Material Description	Brown Stoney Clay + 2% OPC
Source	Ex-Site
Supplier	Ex-Site
Date Sampled	07/11/2023
Date Received	07/11/2023
Date Completed	08/11/2023
Sample Location	See Below
Client Reference	C1082/27

Insitu Density & Moisture Content - Core Cutter Tests BS 1377: 1990: Part 9

Operator JH

Maximum Dry Density (MDD)	1.75	Mg.m³
Optimum Moisture Content	16	%
Particle Density	2.59	Mg/m³
Source sample reference	C1082/9	

Test Location	Reference	Bulk Density Mg/m³	Moisture Content %	Dry Density Mg/m³	% MDD	Air Voids %
B2 Layer 1	C1082/27	2.098	14.8	1.828	104.4	2.4
C2 Layer 1	C1082/27	2.062	17.3	1.758	100.5	1.7
D2 Layer 1	C1082/27	2.048	16.1	1.764	100.8	3.5
B2 Layer 2	C1082/27	2.082	15.6	1.801	102.9	2.4
C2 Layer 2	C1082/27	2.070	15.5	1.792	102.4	3.0
D2 Layer 2	C1082/27	2.058	14.6	1.796	102.6	4.4

Authorised Signatory

T. McDonald

Results provided for interpretation by others.

Results relate only to the item(s) tested.

This report may not be reproduced other than in full without the prior written approval of the issuing laboratory.

The laboratory does not apply a conformity statement to test reports as standard, unless specifically requested by the customer.

**** End of report ****

Laboratory Report	ETS/1936	Contract Sample No	C1082/27
Report Date	09/11/2023	ETS Contract No	C1082/27

EARTHWORKS TESTING LTD
Unit 6 Eco Park, Eco Way
Bootham Lane
Dunscroft
Doncaster
DN7 4JJ

Email: ops@earthworkstesting.co.uk
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Project:
Wingates - Bolton

Date Sampled	07/11/2023
Sample Location	See Below
Client Reference	C1082/27
Source	Ex-Site
Supplier	Ex-Site
Sampling Environment	Overcast
Material Description	Brown Stoney Clay + 2% OPC
Date Received	07/11/2023
Date Tested	07/11/2023

TEST REPORT

Determination of Equivalent Shear Strength

Tested in accordance with In-House Test Procedure Based on BS1377, Part 9: 1990 & BS 5930: 1999

Calibration Constant:	1.000000	Equipment Ref.: HSV 095	Operator JH

Test Reference	Test Location	Shear Vane Readings (Divisions)				Average Vane Reading	Equivalent Shear Strength (kPa)
		Test 1	Test 2	Test 3	Test 4		
C1082/27	B2 Layer 1	124	132	130	116	126	**126**
C1082/27	C2 Layer 1	100	118	112	138	117	**117**
C1082/27	D2 Layer 1	108	128	124	104	116	**116**
C1082/27	B2 Layer 2	136	104	124	122	122	**122**
C1082/27	C2 Layer 2	116	126	128	122	123	**123**
C1082/27	D2 Layer 2	118	128	114	100	115	**115**

Notes:

Authorised Signatory

Laboratory Report	ETS/1936	Contract Sample No	C1082/27
Report Date	09/11/2023	ETS Contract No	C1082/27

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Date Sampled	07/11/2023
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Sampling Environment	Overcast
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Tested in accordance with In-House Test Procedure Based on BS1377, Part 9: 1990 & BS 5930: 1999

Calibration Constant:	1.000000	Equipment Ref.:	HSV 095	Operator	JH

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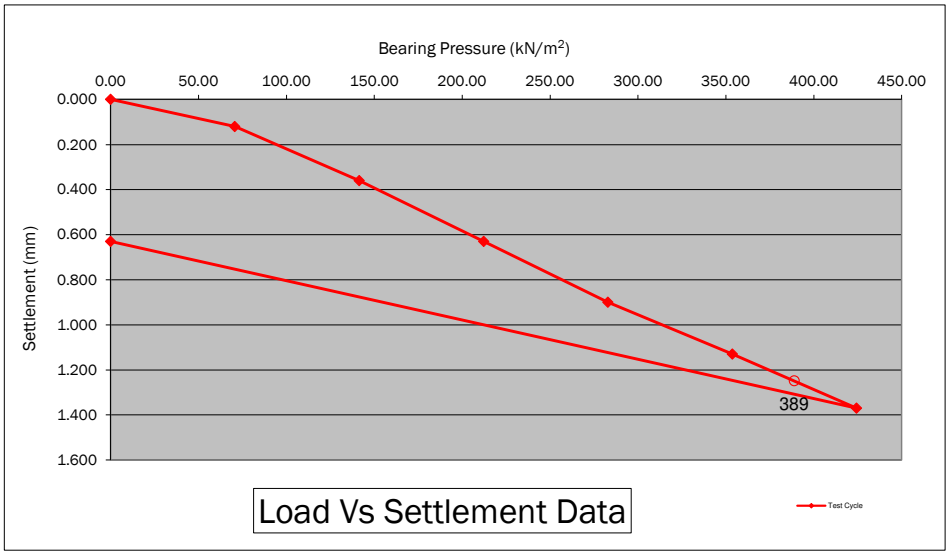
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/29A	**REPORT NO:**	**ETS/2006A**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/29A**	Report Date:	13/11/2023

TEST REPORT

Material Description:	Brown Stoney Clay & 2% OPC	Date Tested:	**10/11/2023**
Test Location:	**B2 Final Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.12
141.47	0.36
212.21	0.63
282.94	0.90
353.68	1.13
424.41	1.37
0.00	0.63
Recovery %	54



Depth of Test	**Surface**		Plate Diameter	**300mm**
Distance from edge of plate to wall of excavation	**N/A**	mm	Moisture Content*	**Not Taken**
Reaction Load	**20T Roller**		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	**0.44**		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	**424.4**	kN/m²	**49.0**	
Maximum Settlement	**1.37**	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	**389.0**	kN/m²		
Modulus of Subgrade Reaction K762	**137.5**	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

Results relate only to the sample(s) as tested.

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Testing carried out at client's site location.

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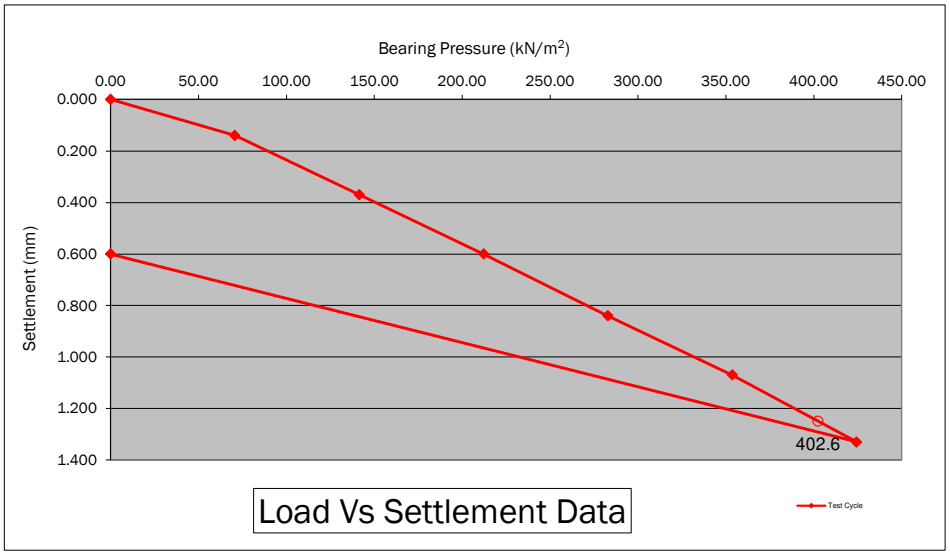
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/29B	**REPORT NO:**	**ETS/2006B**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/29B**	Report Date:	13/11/2023

TEST REPORT

Material Description:	Brown Stoney Clay & 2% OPC	Date Tested:	**10/11/2023**
Test Location:	**C2 Final Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.14
141.47	0.37
212.21	0.60
282.94	0.84
353.68	1.07
424.41	1.33
0.00	0.60
Recovery %	55



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	424.4	kN/m²	**52.0**	
Maximum Settlement	1.33	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	402.6	kN/m²		
Modulus of Subgrade Reaction K762	142.3	kN/m²/mm		

Authorised Signatory

T. McDonald

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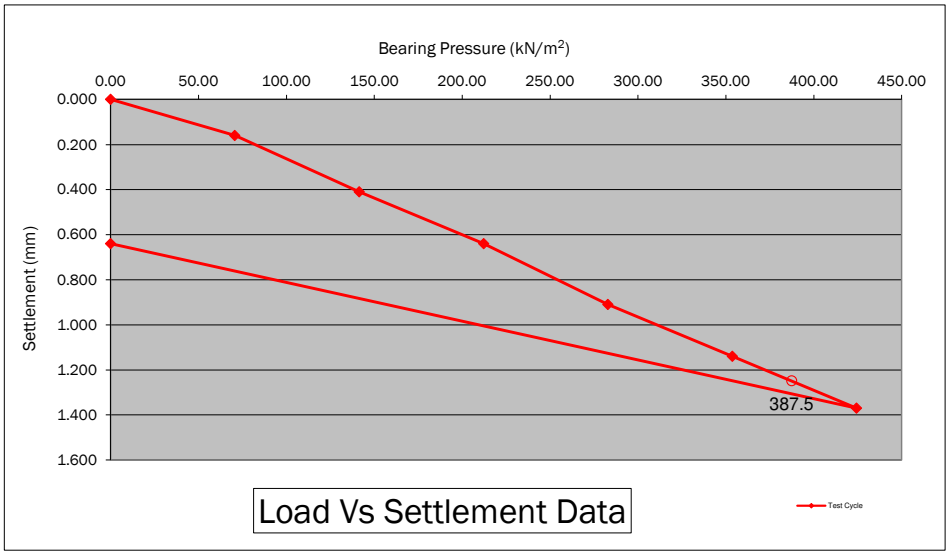
Wingates - Bolton

Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/29C	**REPORT NO:**	**ETS/2006C**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/29C**	Report Date:	13/11/2023

TEST REPORT

Material Description:	Brown Stoney Clay & 2% OPC	Date Tested:	**10/11/2023**
Test Location:	**D2 Final Formation**	Supplier/Source:	Ex-Site
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
70.74	0.16
141.47	0.41
212.21	0.64
282.94	0.91
353.68	1.14
424.41	1.37
0.00	0.64
Recovery %	53



Depth of Test	Surface		Plate Diameter	300mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.44		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	424.4	kN/m²	**48.6**	
Maximum Settlement	1.37	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	387.5	kN/m²		
Modulus of Subgrade Reaction K762	136.9	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.3 kN

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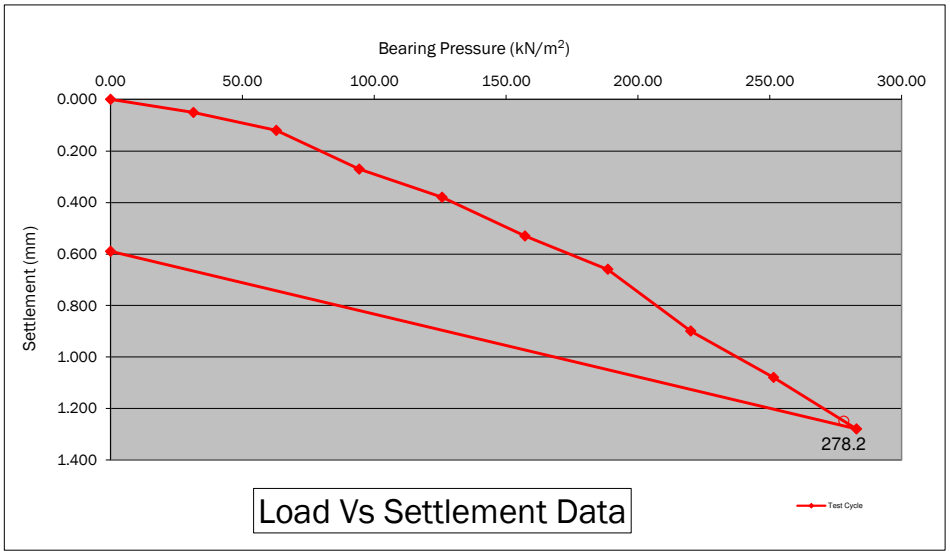
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/30A	**REPORT NO:**	**ETS/2007A**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/30A**	Report Date:	13/11/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**10/11/2023**
Test Location:	**B2**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.05
62.88	0.12
94.31	0.27
125.75	0.38
157.19	0.53
188.63	0.66
220.07	0.90
251.50	1.08
282.94	1.28
0.00	0.59
Recovery %	54



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	282.9	kN/m²		
Maximum Settlement	1.28	mm	**49.7**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	278.2	kN/m²		
Modulus of Subgrade Reaction K762	138.7	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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** End of report **

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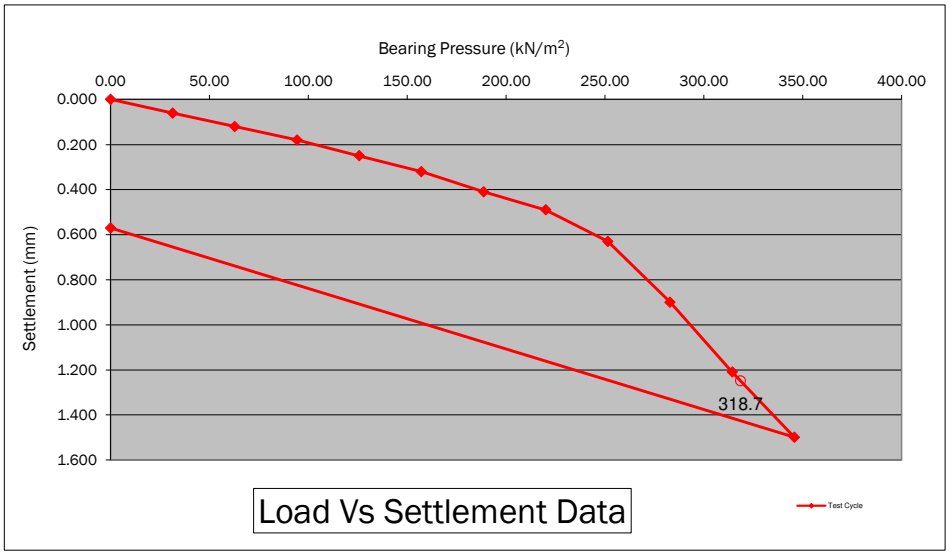
Wingates - Bolton

Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/30B	**REPORT NO:**	**ETS/2007B**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/30B**	Report Date:	13/11/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**10/11/2023**
Test Location:	**C2**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.06
62.88	0.12
94.31	0.18
125.75	0.25
157.19	0.32
188.63	0.41
220.07	0.49
251.50	0.63
282.94	0.90
314.38	1.21
345.82	1.50
0.00	0.57
Recovery %	62



Depth of Test	Surface		Plate Diameter	**450mm**
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	**Not Taken**
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	345.8	kN/m²	**62.9**	
Maximum Settlement	1.5	mm		
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	318.7	kN/m²		
Modulus of Subgrade Reaction K762	158.9	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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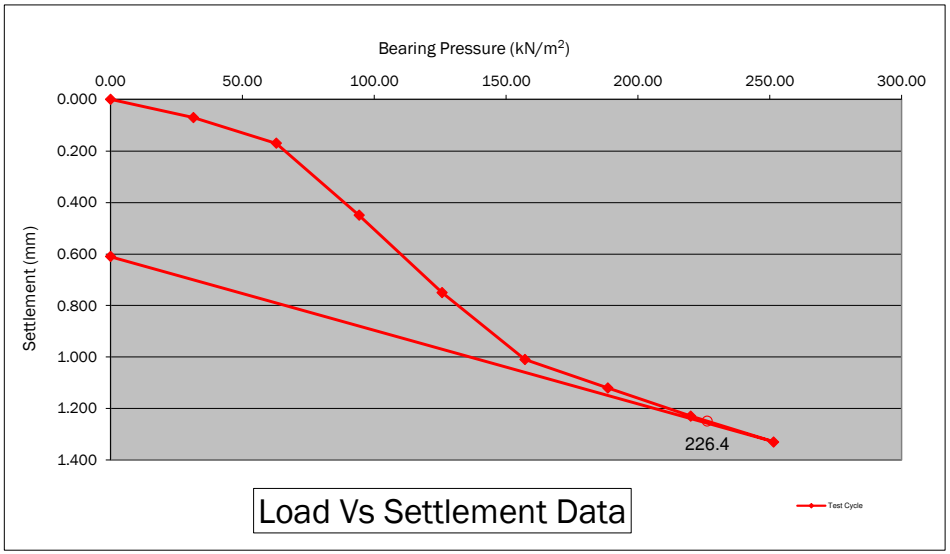
Plate Loading Test to determine equivalent CBR Value	Contract Test Reference:	C1082/30C	**REPORT NO:**	**ETS/2007C**
In accordance with ETL's In-house procedure based on HD 25/94 (replaced by IAN 73/06 Revision 1 :2009)	Clients Reference:	**C1082/30C**	Report Date:	13/11/2023

TEST REPORT

Material Description:	Type 1	Date Tested:	**10/11/2023**
Test Location:	**D2**	Supplier/Source:	Not Stated
Weather	Overcast		

Test Cycle	
Bearing Pressure (See Notes below)	*Settlement*
kN/m²	*mm*
31.44	0.07
62.88	0.17
94.31	0.45
125.75	0.75
157.19	1.01
188.63	1.12
220.07	1.23
251.50	1.33
0.00	0.61
Recovery %	54



Depth of Test	Surface		Plate Diameter	450mm
Distance from edge of plate to wall of excavation	N/A	mm	Moisture Content*	Not Taken
Reaction Load	20T Roller		*Carried out in accordance with BS1377: Part 2: 1990.	
Plate Correction Factor	0.62		**Equivalent CBR Value (%)**	
Maximum Applied Pressure	251.5	kN/m²		
Maximum Settlement	1.33	mm	**34.8**	
Test Cycle Values				
Bearing Pressure @ 1.25mm Settlement	226.4	kN/m²		
Modulus of Subgrade Reaction K762	112.8	kN/m²/mm		

Authorised Signatory

T. McDonald

Notes: Initial load applied by test equipment calculated to be less than 0.5 kN

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Cleaning and Maintenance Regimes

N/A

winvic
winvic.co.uk

Data Sheets

winvic

winvic.co.uk

A CAF GROUP COMPANY

ENVIRONMENT

Barings Core Fund Bolton S.Ã.R.L
Wingates (Unit 3)
Bolton
Earthworks Specification
WIN-BWB-ZZ-XX-RP-CE-0001_EWS

www.bwbconsulting.com

ENVIRONMENT

Barings Core Fund Bolton S.Ã.R.L
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Nottingham
5th Floor, Waterfront House, Station Street
Nottingham, NG2 3DQ
T: 0115 924 1100

September 2023

DOCUMENT ISSUE RECORD

Document Number:	**WIN-BWB-ZZ-XX-RP-CE-0001_EWS**
BWB Reference:	NTS2796

Revision	Date of Issue	Status	Author:	Checked:	Approved:
C01	May 2023	S4	Simon Steel BSc	Alex Booer BSc (Hons) MSc CGeol FGS	Ashley Lowe BSc BSc Hons PGeol
C02	June 2023	S4	Simon Steel BSc	Alex Booer BSc (Hons) MSc CGeol FGS	Ashley Lowe BSc BSc Hons PGeol
C03	September 2023	S4	Simon Steel BSc	Alex Booer BSc (Hons) MSc CGeol FGS	Ashley Lowe BSc BSc Hons PGeol

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FIGURES

Figure 2:1 Site Location Plan

TABLES

Table 1.1: Roles and Responsibilities

APPENDICES

APPENDIX 1: Masterplan & Earthwork Drawings
APPENDIX 2: SHW Table 1/5
APPENDIX 3: SHW Table 6/1 (Acceptable Earthworks Materials: Classification & Compaction Requirements)
APPENDIX 4: Results Format in Microsoft Excel Required from Earthworks Contractor

1. INTRODUCTION

Instruction

1.1 BWB Consulting Ltd (BWB) was appointed by Barings Core Fund Bolton S.Ã.R.L to produce an Earthworks Specification for the development of an Industrial Unit at Wingates (Unit 3).

General Information

1.2 The project is anticipated to comprise the development of an industrial unit with associated access, service yards, car parking, landscaping and drainage infrastructure. A proposed development plan is included as **Appendix 1**.

1.3 This document comprises an 'End Product' Earthworks Specification and is applicable to the proposed earthworks anticipated to be required at the site.

1.4 In this Specification the following definitions in **Table 1.1** shall apply:

Table 1.1: Roles and Responsibilities

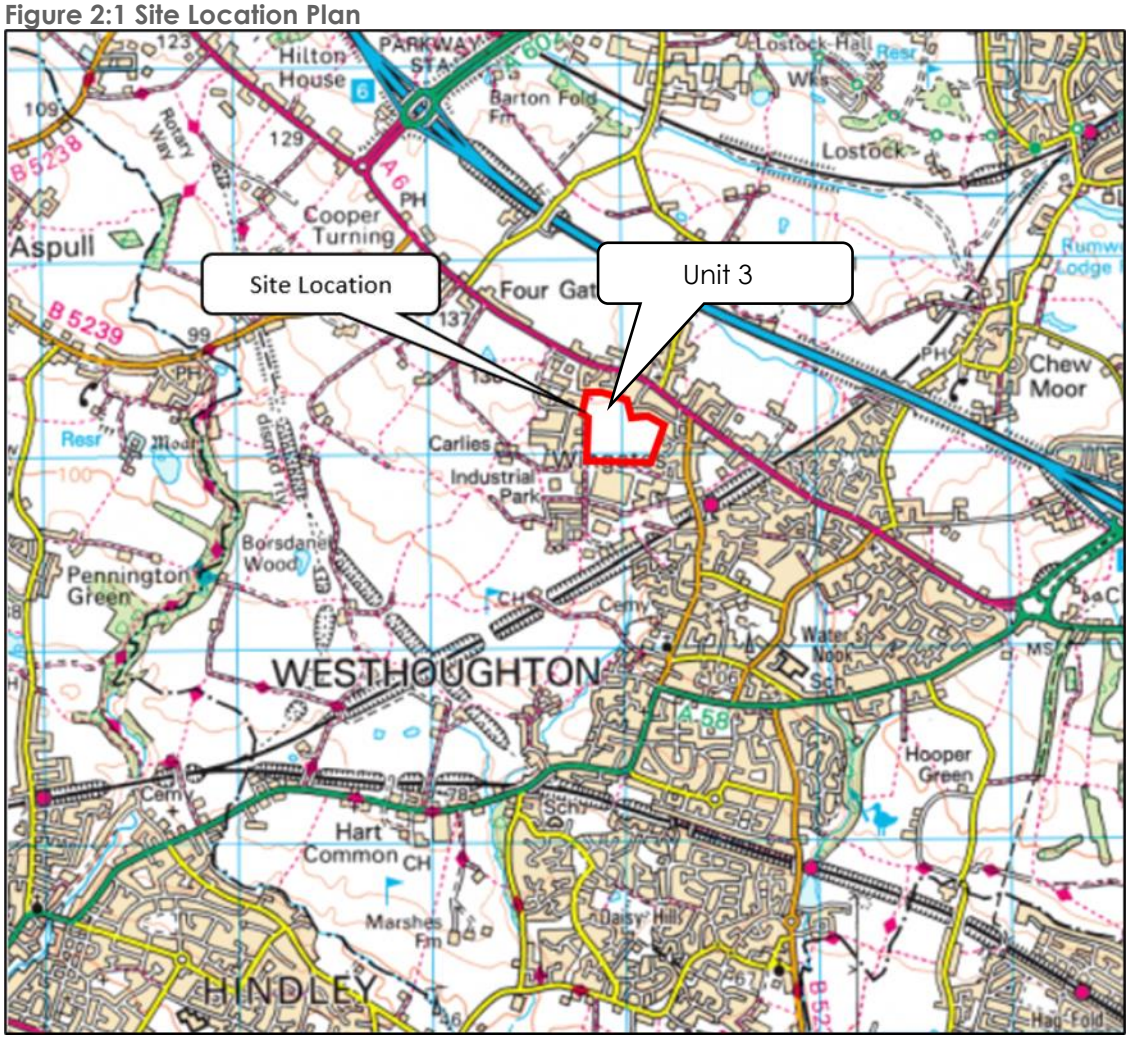
Reference	Company Name	Contact	Telephone Number
Client / Main Contractor	Winvic	Neil Gooding	07793 240909
Engineer	BWB Consulting Ltd.	Karen Sinclair	07793 223943
Developer	Panattoni Barings Core Fund Bolton S.Ã.R.L	Owen Follett	07399 186080

2. THE SITE

Site Location

2.1 The site is in the northern part of the Wingates Industrial Estate (in the suburb of Westhoughton) approximately 700 m to the south of the M61 Motorway (between Junctions 5 and 6), and to the south-west of Bolton. It is centred at approximate National Grid Reference 364962, 407078. The location of the site is shown in **Figure 2:1**

Figure 2:1 Site Location Plan



Ground Conditions

2.2 Ground conditions at the site have been explored in recent ground investigations which are referenced below:

- Delta Simons for Strathclyde Pension Fund Phase II Geo-Environmental Assessment, Former Kitchen Manufacturing Facility, Wingates Industrial Estate, Bolton, Delta Simons Project No. 10-1097.02 dated July 2011.
- Delta Simons for Panattoni, Geo-Environmental Assessment, Wingates Industrial Estate, Bolton, Presented to Panattoni, Project No. 18-2023.01, 2019.
- BWB WIN-BWB-ZZ-XX-RP-CE-0003_Supplementary SI in November 2020.

2.3 The ground investigations (GI's) encountered the following ground conditions.

2.4 Approximately 90% of site surface was covered by Tarmac or reinforced concrete associated with former development of the site which is typically, 0.1m and 0.2m in thickness.

2.5 Made ground, comprising reworked/disturbed soft to firm gravelly Clays (made ground) containing coal, brick, plastic, and sandstone cobbles was recorded on logs between 0.3m and 1.2m thickness. Depths of made ground extend to 4.5m over the wider site outside Unit 3.

2.6 Made ground is underlain by firm to stiff gravelly (stony) clays with local sand bands inferred as Glacial in origin up to 13.1m depth in the area of Unit 3. In situ standard penetration (SPT) tests indicate there is generally a weaker and more compressible layer above 5m depth from existing ground level, over a more stiff horizon below 5m.

2.7 Glacial soils are underlain by bedrock comprising very weak/weak mudstone and weak to moderately weak sandstone, which was proved to 17.2m in this area.

2.8 A full description of the underlying ground conditions is provided in the GI reports.

2.9 Elevated concentrations of methane and carbon dioxide have been identified at the site which would be typical of a Characteristic Situation 2 i.e. Low Risk, whereby ground gas protection measures are required in the design and construction of new structures at the Site.

2.10 No visual or olfactory evidence of potential gross contamination was observed during the various investigations.

2.11 Asbestos was, however, recorded in one sample of Made Ground and could be present at other locations across the site including existing and future stockpiles of soil for re-use within the earthworks.

2.12 A Remediation Strategy has been prepared for the site on the basis of the historical reporting and the BWB ground investigation, report reference WIN-BWB-ZZ-XX-RP-YES-0002_RS. **The Remediation strategy and any subsequent updates should be read with this Report**.

3. STRATEGY

Proposed Earthworks

3.1 It is understood that the enabling works will include a 'cut and fill' exercise to remove all obstructions that might impact upon the development and create a level platform for the proposed construction. The finished floor level (FFL) of the proposed structure is anticipated to be of the order of 115.4m AOD. A cut and fill exercise will be required to achieve the proposed site levels. Analysis carried out by BWB is given in drawing (Ref. WIN-BWB-HGT-U3-DR-D-0630) presented in **Appendix 1**.

3.2 This analysis estimates, a cut volume of 1,061m^3 and fill volume of 1,409m^3 form existing levels minus a surficial strip with a deficit of 348m^3 required to achieve formation levels. A surplus of circa 890.9m^3 is anticipated from works generating foundation and drainage arisings. 542m^3 of subsoil may need off site export. For details of the cut and fill estimates, reference should be made to the cut and fill drawing appended in **Appendix 1**.

Material Source

3.3 Based on the previous investigations, the source material required for the filling operations will comprise site-won materials from the cut areas/construction generated arisings. This material is considered likely to comprise Made Ground and Glacial clay soils. The materials should be subject to compliance testing prior to acceptance for re-use in the permeant works. It is considered that the soils will generally classify as Class 2 soils in accordance with the Specification for Highway Works (SHW).

3.4 Materials acceptance testing shall be undertaken by the Earthworks Contractor in accordance with criteria detailed in Sections 4.56 to 4.61 of this Specification and be reviewed by the validating Engineer for all earthworks materials to be utilised for earthworks purposes across the site. Based on test results together with the work that has already been undertaken the site won materials are deemed to be suitable for use as earthworks.

Excavation

3.5 Excavations are expected to be achievable utilising conventional backhoe excavating techniques, The Earthworks Contractor should make his own assessment of appropriate excavation plant/equipment.

Stockpiles

3.6 If during the earthworks material cannot be placed immediately after excavation then it will be stockpiled. Careful consideration should be given as to stability and the likely effect precipitation will have on the cohesive material with respect to altering its Natural Moisture Content (NMC) and the effect this will have on the workability of the material when it is laid down in areas of fill. All stockpiles of material that are to be used for filling or disposal offsite should be adequately sealed or covered to prevent deterioration occurring due to excessive moisture contents.

Filing

3.7 Prior to commencement of works, trials should be undertaken by the contractor to ensure the proposed plant for compacting the range of fill classifications is suitable to achieve adequate compaction.

3.8 The bulk fill materials may require modifying in the form of natural drying or through conditioning with binder such as Ordinary Portland Cement (OPC) / Ground Granulated Blast-furnace Slag (GGBS) or similar, to ensure acceptability for use. Consequently, it is recommended that if the option of conditioning is to be adopted, the appointed Earthworks Contractor should undertake the required testing to confirm the suitability of the soils for modification and the required type and percentage of additive needed to modify the materials prior to commencement of the earthworks. It should be noted that high sulphate concentrations in the Made Ground deposits have been indicated and therefore should be accounted for when additives are selected.

3.9 No filling works are to progress until the base of earthworks surface (i.e., the sub-formation) has been validated and inspected by the Engineer to ensure its suitability as a starter horizon.

Groundwater

3.10 Groundwater has been recorded at the Unit 3 site during excavation and/or drilling of exploratory holes at depths between 1.2m and 1.8m in Made ground (water was also encountered within Glacial soils in sand bands, i.e. at 8.1m in BH101). Monitored water levels in the area of Unit 3 ranged between 0.2m and 1.2m depth. Water is anticipated in excavations below around 1.2m depth but may vary seasonally.

3.11 Strong seepages of perched groundwater within the shallow granular Made Ground (including the surficial demolition rubble) were also recorded across the wider site within more granular soils in the Glacial soils at depth.

3.12 Where excavations encounter perched groundwater, dewatering and stabilisation of excavations may be required. Based on observations, groundwater is likely to be manageable using the "sump and pump" technique. Implementation of suitable groundwater management option(s) during the earthworks is the responsibility of the Earthworks Contractor.

4. SPECIFICATION

4.1 For purpose of this scheme, an 'End Product' specification has been considered for the compaction of suitable fill. It is understood that the current proposed foundation solution comprises ground improvement by the installation of vibro-stone columns beneath the footprints of the warehouse unit and floor slab.

4.2 All materials and workmanship shall be in accordance with the Earthworks Specification below, and the 'Specification for Highway Works' (February 2016), Volume 1 of the Manual of Contract Documents for Highway Works published by HMSO.

4.3 The Earthworks Contractor will be deemed to be fully conversant with the latter document and to possess their own copy.

4.4 All work shall follow the guidelines and recommendations contained within BS6031: 2009, Code of Practice for Earthworks.

Extent of Works

4.5 This specification relates to the proposed earthworks required to form a level development platform created by using engineered fill to provide a suitable bearing medium for shallow foundations and ground bearing floor slabs for the proposed development (on ground subject to improvement by vibro-treatment beneath the proposed buildings).

4.6 The Earthworks Contractor shall allow for carrying out any investigation or testing that they consider necessary to ensure the suitability and acceptance compliance of the material to be used within the works.

Earthworks Contractor's Programme

4.7 The Earthworks Contractor's programme shall take full account of the conditions of the Contract for the proposed phasing of the overall site work, and other activities taking place on the site. This programme shall be agreed prior to the commencement of the works.

The Control of Noise, Vibration and Mud/Dust Nuisance

4.8 The Earthworks Contractor shall comply with the recommendations for practical measures to reduce noise set out in BS5228: Parts 1, 2 and 4 and with any specific Contract requirements.

4.9 The Earthworks Contractor shall take all reasonable measures to prevent any dirt or foreign matter being deposited upon or falling upon any public or private highway or access. Where any such material is on any such highway or access the Earthworks Contractor shall, forthwith, remove the offending material at his own expense, and clean the surface of the highway or access to the satisfaction of the Client/or Engineer and/or the Highway Authority/Law Enforcement.

4.10 The Earthworks Contractor shall take all reasonable measures to prevent dust nuisance from being generated by construction traffic, etc.

Traffic Safety and Management

4.11 The Earthworks Contractor shall comply in all respects with Chapter 8 of the Traffic Signs Manual for works on or affecting the public highway and/or any private roads forming the highway access to/from the site. The Earthworks Contractor should obtain all necessary consents from the Local Highway Authority for works on the public highway.

4.12 On-site accesses and haul routes should be provided and maintained by the Earthworks Contractor in such a manner so as not to endanger either the user, those working in the vicinity of such accesses/haul routes, and/or the works.

Private and Public Owned Services

4.13 Prior to commencing works, the Earthworks Contractor shall obtain copies of all available services' records and excavate trial pits as necessary.

4.14 During the progress of the works, the Earthworks Contractor shall:

- take all measures reasonably required by any Public or Statutory Authority for the full protection of its sewers, drains, pipes, mains, cables or any other apparatus, and shall afford proper facilities to accredited representatives of such authorities for access as may be necessary for inspection, repair, renewal or removal of any such apparatus;
- temporarily support any sewers, drains, pipes, mains, cables or other services affected by the works;
- take responsibility for ensuring that all hydrant covers, stop tap boxes, manhole covers and the like are raised or lowered to suit the finished levels of the road and footway, margin or verge;
- comply with the requirements of utilities providers on all matters relating to services; and
- indemnify the Client and the Engineer against any claims arising in consequence of the operations.

4.15 During the progress of the works the Earthworks Contractor shall provide an alternative service in full working order to the satisfaction of the owner of the service, and Engineer, before any privately-owned service for water, electricity, and the like passing through the site are affected by the works is cut or disconnected.

4.16 Trial pits shall be excavated by hand as necessary in order to verify the position of known existing services to be retained.

Damage to Property

4.17 The Earthworks Contractor shall ensure that all precautions are taken in order to avoid any damage to existing property arising from the works and shall be responsible in the event that any damage should arise from his failure to exercise due care. Any adjacent structures, services and the like shall be inspected prior to commencement of the works for evidence of existing defects and, if necessary, a dilapidation survey shall be carried

out by the Earthworks Contractor, prior to works commencing on site. A re-inspection shall take place on completion of the Contract to verify that no damage or deterioration of the said structure, service or apparatus has occurred as a result of the works. A schedule of the findings of this re-inspection shall be circulated to all parties concerned for their records.

4.18 The Earthworks Contractor shall execute the works with care so as to avoid damage to existing structures and drains or other services to be retained.

4.19 All fences, trees, paths, shrubs, grassed areas and other surfaces required to be retained shall be protected from spillages and damage caused by site operations and upon completion of the works they shall be handed over in an undamaged and proper state to the satisfaction of the Client. The Earthworks Contractor shall not raise or lower the ground level beneath the spread of the branches of any tree to be retained without the approval of the Client.

Site Clearance

4.20 Before starting the site clearance works, the Earthworks Contractor shall verify with the Client which existing fences, gates, walls, roads, paved areas, trees, shrubs, etc. are to be removed. Existing water features that are to be redundant and are to be filled must be cleared of all vegetation and soft/ organic deposits before filling. Any existing watercourses which have previously been filled should be re-excavated and treated likewise.

4.21 All materials removed as part of the site clearance shall be removed to off-site licensed tips unless as otherwise described below. On-site burning of materials shall not be permitted.

4.22 The Earthworks Contractor shall demolish, break up and remove any redundant concrete slabs, structures, drains and other superficial obstructions within the works area or otherwise obstructing the construction of the works as instructed. All old foundations, treatment beds, basements, filling, tanks, service pipes, manholes, drains, monitoring points etc. identified on site shall be required to be removed by the Contractor.

4.23 At the Earthworks Contractor's discretion, any cleared materials (e.g. buried foundations, existing brick structures) may be retained on site for use as filling material provided that they are proven to be acceptable or are treated so as to become acceptable materials to comply in all respects with this specification for such use and approved by the Engineer.

4.24 The use of explosives shall not be permitted.

4.25 All fossils, coins, bottles, articles of value or antiquity and structures or other remains or things of geological or archaeological interest discovered on the site shall be immediately reported to the Client and shall be deemed to be the absolute property of the Client and not further disturbed without approval of the Client.

Setting Out

4.26 The Earthworks Contractor shall be responsible for the true and proper setting-out of the works and for the correctness of the position, levels, dimensions and alignment of all parts of the works and for the provision of all necessary instruments, appliances and labour in connection therewith. The Earthworks Contractor shall carefully protect and preserve all benchmarks, sight rails, pegs and other things used in setting out the works.

4.27 Should the Earthworks Contractor find any discrepancies on the drawings he is to refer the matter to the Client and the Engineer for verification before proceeding with the works.

General Earthworks requirements

4.28 The Specification for Highway Works (SHW) Series 600, published by HMSO, shall form the base specification for all earthworks.

4.29 Acceptable general fill materials shall meet the requirements of the contract specific Appendix 6/1 and Table 6/2 of the SHW, the updated Appendix 6/1 is enclosed as **Appendix 2**.

4.30 Unacceptable material is classified as the following:

- peat, materials from swamps, marshes and bogs;
- logs, stumps and perishable material;
- materials in a frozen condition;
- clay having a liquid limit determined in accordance with BS1377: Part 2, exceeding 90% or plasticity index determined in accordance with BS1377: Part 2, exceeding 65%;
- materials susceptible to spontaneous combustion;
- materials containing invasive plant species or roots and rhizomes of such; and
- materials having hazardous chemical or physical properties requiring special measures for its excavation, handling, storage, transportation, deposition and disposal.

4.31 Prior to works commencing, a site strip maybe required to remove shallow organics that may be present over the site surface. Any invasive plant species must be removed/treated prior to commencing site strip and associated earthworks.

4.32 If an authorised formation or material deposited as fill subsequently deteriorates due to inclement weather (or for any other reason) such that it would be reclassified as unacceptable and cannot be compacted in accordance with the Contract, the Earthworks Contractor shall, at his own expense, either:

- cease work on the material until its condition is such that it can again be classified as acceptable; or
- make good by removing and disposing of the unacceptable material and replacing it with acceptable material.

4.33 The Earthworks Contractor shall provide for such measures as may be necessary to ensure that water, whether groundwater, water from precipitation or any other source does not accumulate in excavations or on subgrade formations.

4.34 The Earthworks Contractor shall arrange for the rapid dispersal of water shed on to the surface of earthworks or completed formation during construction or which enters the earthworks above the water table from any source.

4.35 The Earthworks Contractor shall provide where necessary temporary watercourses, ditches, drains, pumping or other means of maintaining the earthworks free from water. Such provision shall include carrying out the work of forming the earthworks in such a manner that their surfaces have at all times a sufficient minimum crossfall and, where practicable, a sufficient longitudinal gradient to enable them to shed water and prevent ponding.

4.36 The Earthworks Contractor shall submit proposals for disposal of water to the relevant authority. Where pumping is authorised, precautions shall be taken to prevent disturbance of material in and around excavations and discharge point(s). Adequate means of trapping silt shall be provided on temporary systems discharging into permanent drainage systems.

4.37 The Earthworks Contractor shall allow for such seasonal and other variations to the groundwater levels as might reasonably be anticipated.

4.38 Where, in the opinion of the Engineer, earthworks have been adversely affected by the ingress of water during the earthworks contract so as to render the material unacceptable, these works shall be removed and made good at the Earthworks Contractor's expense.

4.39 The Earthworks Contractor is required to remove all unsuitable material including any soft spots to a sufficient depth, prior to filling with acceptable material.

4.40 Surfaces of excavations with a gradient greater than 1v:5h which are to receive filling must have horizontal benches cut to match the depths of compacted layers of filling.

4.41 Where, during the progress of the work, the difference in level between adjacent areas of filling exceeds 600mm, the Earthworks Contractor shall cut into the edge of higher filling to form benches having a minimum width of 600mm and a height equivalent to the depth of a layer of compacted filling. The Earthworks Contractor shall spread and compact new filling to ensure maximum continuity with the previous fill.

4.42 The accuracy of and permissible deviation from required formation levels (underside of sub-base/capping) shall be as follows:

- Beneath roads and other paved areas: +/- 30mm; and
- Other areas: +/- 50mm.

Bulk Excavation

4.43 The bulk excavation shall be carried out in accordance with the earthworks' drawings and as necessary to remove all unsuitable soils obstructions (former, structures redundant drainage etc.) and extraneous items not previously identified.

4.44 Excavations will be carried out to remove all structures/obstructions that will impact upon the further development of the site such as the construction and installation of services and of vibro-stone columns which will support foundations and floor slabs.

4.45 The exposed sub-formation shall be tested and inspected by the Engineer prior to any upfilling, to ensure obstructions to the works have been removed and a suitable starter layer has been achieved.

4.46 A topographic survey shall be undertaken to record the base level of excavations and test locations, and all areas of earthworks shall be surveyed with x, y and z co-ordinates.

4.47 The Earthworks Contactor is responsible for maintaining the stability of all temporary excavations during the works.

4.48 Should the Earthworks Contractor intend to use any special methods to assist in excavation work, such as 'soil freezing', 'chemical stabilisation', etc. then details shall be submitted to the Engineer for comment at least three weeks in advance of the work and no work shall be commenced on the portion of the excavation concerned until consent has been given.

4.49 Any large obstructions or unexpected findings discovered during excavation shall be reported immediately to the Client and the Engineer.

4.50 Following completion of any excavation, particular care must be taken to avoid deterioration of the excavated surface. The Earthworks Contractor shall be responsible for protecting the excavations against damage from weather and/or construction traffic.

4.51 Where areas of ground considered unsuitable by the Engineer are found at the bottom of excavations or at the sub-formation level, the Earthworks Contractor shall, under the direction of the Engineer, excavate to such further depth as may be required. Such extra depth shall be filled with acceptable general fill materials or selected sub-base/capping materials as required by the Engineer.

4.52 Excavations shall be carried out by the Earthworks Contractor in such a way as to avoid disturbance and/or damage to the surrounding ground, existing roads, pavements, buildings and services, etc. on and/or adjoining the site.

4.53 The Earthworks Contractor shall be solely responsible for the safety of all excavations and for the sufficiency of all temporary supports thereto.

4.54 The Earthworks Contractor shall be responsible for disposing of all unacceptable or surplus materials arising from the works to licensed tips off-site and keeping/making available records of such disposal.

4.55 Should material be encountered that gives rise to the opinion that it may be contaminated, either by olfactory or visual evidence, the attention of this material is to be drawn to the Engineer who will advise as to the appropriate course of action.

Material Classification

4.56 It is anticipated that in its current state the site source material (Made Ground and Glacial soils) will be predominantly SHW Class 2 with possibly subordinate Class 1 soils.

4.57 All material sources to be utilised within the filling works should be authorised by the Engineer prior to commencement of filling. Furthermore, it is a requirement that any proposed imported fill, that may be required, shall also be authorised for use by the Engineer prior to importation to site dependent upon laboratory test results/data demonstrating its suitability and compliance with this Specification.

4.58 Compliance testing of all materials selected as earthworks fill material required to achieve the development platform shall be carried out by the Earthworks Contractor at a UKAS accredited testing laboratory. Compliance testing requirements and frequency shall be completed by the Earthworks Contractor in conjunction with the table presented as **Appendix 3**, which constitutes the requirements of Table 1/5 from the SHW.

4.59 The results of the tests shall be made available to the Client and the Engineer within two (2) days of receiving them from the laboratory.

4.60 Failure on the part of the Earthworks Contractor to provide test results to the Engineer within the above stated period may result in **non-compliance** of the earthworks specification with the contactor effectively proceeding at their own risk.

4.61 Any stabilised (subgrade-replacement) material is outside the scope of this specification but as guidance the Engineer would expect to see the following additional testing to confirm the suitability of the methodology and it is recommended a trial pad is completed to confirm the achievable on-site compaction and required number of passes.

- Aggressivity testing (BRE pyritic suite, comprising pH, water soluble sulphate, total sulphur and acid soluble sulphate) – to determine the suitability of the soils;
- Organic matter testing;
- Consumption testing – in order to confirm the amount of cement/ GGBS or any other additives to be added;
- Frost susceptibility testing – in order to ensure the cemented materials can adequately provide part of the required thickness of non-frost susceptible build up; and
- Remoulded soaked CBR test (28 days) - to ensure the required CBR can be achieved, and that swell does not occur which could cause long term problems.

Filing – End Product Specification

4.62 The general filling work shall be undertaken in accordance with Clause 612 of the SHW to the 'End Product' compaction and in conjunction with Table 6/1 of this report, presented as **Appendix 2**. In addition it is recommended that up to 3 Plate Loading tests

are undertaken, to provide information for the design of the Tracked Plant/ VSC platform.

4.63 If, in the opinion of the Engineer, the material alters in classification or becomes unacceptable for whatever reason during the course of the filling operations, the Earthworks Contractor will be required to repeat the compliance testing as required by the Engineer. Equally, if the Earthworks Contractor considers that the classification of the material(s) has changed he should inform the Client and the Engineer immediately.

- Based on the geotechnical laboratory testing currently available, the filling operations should achieve the CBR value that has been specified by the Vibro Stone Column Contractor which is usually between 3%-5%. for a 300-500mm layer which would need to be confirmed by the ground improvement contractor.

4.64 Prior to up-filling, the sub-formation should be proof rolled and inspected for soft spots. Any soft, loose and otherwise deleterious materials is to be removed and replaced with granular fill prior to rolling.

4.65 Where cohesive deposits are present at the base of excavation/sub-formation level in external areas prior to up-filling, a minimum undrained shear strength of 60kPa should be confirmed using hand shear vane (HSV) tests on a 25m grid. Hand shear vane (HSV) testing should be undertaken as specified in BS1377-9 clause 4.4.

4.66 Where non-cohesive deposits are present at the base of excavation/sub-formation level, It is recommended that the base of excavation be proof rolled, and any soft spots being dealt with accordingly.

4.67 Validation Criteria for cohesive fill layers:

- Fill to be compacted to a minimum of 95% Maximum Dry Density (granular fill). This shall be demonstrated by Nuclear Density Gauge or other agreed alternatives (based on 2.5kg rammer compaction tests) to the methods described in BS1377- Part 9. Testing to be undertaken on a 25m grid on each placed layer of cohesive fill.
- In addition to the above, for cohesive fill: minimum shear strength of 75kPa as determined by the Hand Shear Vane is to be tested on a 25m grid on the base of excavation layer and each layer within the areas of the proposed fillings for cohesive fill.

4.68 For all tests, the Grid Square within which the tests were undertaken should be recorded and marked up on suitable drawings.

4.69 The Earthworks Contractor must provide an **Inspection Testing Plan (ITP)** based on above minimum requirements, which must be submitted **no less than 10 working days** before commencing and be approved by the Engineer prior to the commencement of any earthworks.

4.70 The testing above should be undertaken on the base of excavation/sub-formation layer and each subsequent layer with layers not exceeding 300mm in thickness. The above testing regime is the minimum that is required to ensure the material has been placed to achieve the required compaction and to ensure the necessary bearing capacity and associated settlements are within tolerable limits, and would need to be confirmed by the ground improvement contractor.

4.71 The foregoing criteria should be applicable to all the re-engineered materials utilised in the earthworks to provide a suitable founding stratum for the proposed development.

4.72 Earthworks trials (which may be undertaken as the initial layers are placed), should be undertaken by the Earthworks Contractor prior to commencement of the main works in order to ensure that the methods of working proposed by the contractor are achieving the validation criteria and in particular required densities as stipulated by the optimum moisture content / dry density compliance testing results.

4.73 Test panels for trial compaction should not be smaller than 20m in length and 10m in width and should be built up in layers of no greater than 300mm un-compacted thickness; these panels should not be formed over areas of hardstanding or potential hard spots.

4.74 The Contractor will be responsible for recording the type of plant and number of passes per layer undertaken during the compaction trials, and for providing the information to the Engineer.

4.75 The Earthworks Contractor shall be responsible for removing from site any unacceptable material to licensed tips and keeping records of such.

4.76 Should the material prove to be too wet or unsuitable for use in order to achieve the adequate compaction then the material will be removed, and consideration given to the addition of lime/cement or similar to make the material suitable for placement, with due considerations to sulphate test results. Where any such substance is utilised in the works, detailed records are to be kept including the location, and layer thicknesses.

4.77 The number of passes will be confirmed based on the trial embankment and any additives will be recorded and noted on test records for each layer or grid square.

Specific Requirements

4.78 A topographic survey should be undertaken to record the 'As-Dug' and 'As-Built' formation levels, and to provide a plan showing all testing locations within the affected areas.

Health and Safety

4.79 The Earthworks Contractor shall not commence construction works until the project health and safety plan has been prepared to the Main (Principal) Contractor's satisfaction. The Earthworks Contractor shall be responsible for complying with the plan and shall be required to:

Ensure co-operation between other Contractors so that they all may comply with the relevant statutory provisions as are relevant to the project themselves;

- Ensure that everyone on site complies with the health and safety plan;
- Take reasonable steps to ensure that only authorised persons are allowed on site (or part thereof as the case may be);

- Display, where they can be easily read, any notification that has been sent to the Health and Safety Executive;
- Prepare method statements for construction operations as required by the CDM Principal Designer; and
- Provide the CDM Principal Designer with any other relevant information.

4.80 The Earthworks Contractor shall pay particular attention to the following in the context of this Specification:

- Potentially hazardous or contaminated materials used or encountered on site;
- Working in the vicinity of underground or overhead services;
- Working in confined spaces;
- Working in or adjacent to watercourses /water features; and
- Working on or in the vicinity of highways.

4.81 The Earthworks Contractor shall take all necessary safety precautions throughout the ground treatment operations and shall comply with the Health and Safety at Work Act 1974 or any subsequent re-enactment thereof.

4.82 The Earthworks Contractor shall take note of the Pre-tender Health & Safety Plan and comply with the CDM Regulations 2015.

4.83 The Earthworks Contractor shall submit for approval all necessary method statements to the Main Contractor prior to commencing the works.

Working Hours

4.84 The Earthworks Contractor must liaise with the relevant Environmental Health Department of the Local Authority to determine the permitted working hours, which must be strictly observed throughout the duration of the operations. The tender sum and contract programme presented at tender submission must take into account such restrictions on working hours.

Supervision

4.85 It should be noted that the earthworks should be suitably supervised and validated to ensure that all works have been completed in accordance with this specification.

4.86 Supervision should include the on-site supervision as the works progress and review of testing results provided by the Testing Contractor as and when they become available to ensure the works are being carried out in accordance with this specification.

4.87 BWB the Engineer for the Client and, as per the appointment documentation, will undertake periodic site visits during the works in order to inspect the quality of the work and to monitor progress. Additionally, the Engineer will assist the Contractor to see that the structural elements of the works are executed in accordance with our design and/or specification for the same and in accordance with good engineering practice.

4.88 The Earthworks contractor will need to make separate arrangements (either direct with BWB or an agreed third party) for adequate supervision to ensure the earthworks are

completed in accordance with this end product specification. These arrangements will need to be agreed between the Client and the selected Earthworks Contractor.

Contractor's Weekly Reporting

4.89 The Earthworks Contractor shall on a weekly basis or as applicable provide the Engineer with the following information to inform the validation process:

- 'As-Dug' base of excavation topographical survey;
- Acceptance and verification test results and the location/source of sampling;
- Site compaction records of layer thicknesses and compactive effort;
- Details of compaction plant used;
- Material placement records (e.g. what materials were placed where);
- Photographs of the work;
- 'As-Built' topographical survey;

4.90 The information above may be issued by email to the Engineer's designated representative names in **Table 1.1** of this Specification.

4.91 The Earthworks Contractor shall, at times and intervals detailed, provide the Engineer with the following information:

- Material Acceptance' test results are to be issued as pdf copies within 10 working days after sampling on site. It is appreciated that currently delays are being experienced by the testing laboratories, but effort should be made to expedite the receipt of the test results, and a summary table of results in Microsoft Excel format as presented in **Appendix 4** provided on a weekly basis and as one document within 3 weeks of completion of earthworks; and
- 'Verification' test results are to be issued as pdf copies within 48 hours of testing on site, and a summary table of results in Microsoft Excel format as presented in **Appendix 4** provided on a weekly basis and as one document within 3 weeks of completion of earthworks.

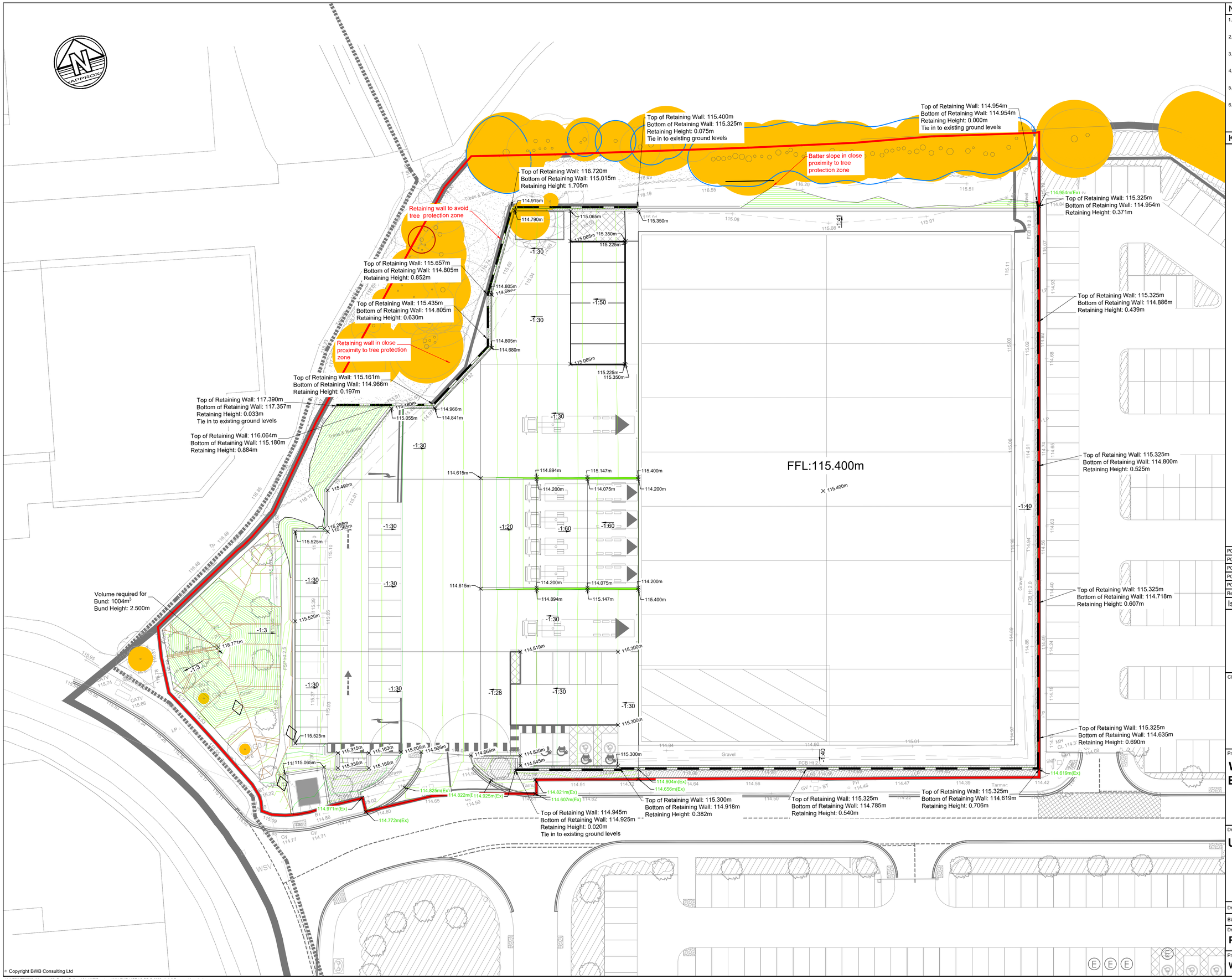
Validation

4.92 The validation report should appraise the geotechnical aspects of the earthworks and present relevant site records, testing results undertaken by the Earthworks Contractor and remain as certification that the works have been carried out in accordance with this earthworks specification.

4.93 The report should also include all appropriate plans as provided by the Earthworks Contractor such as base of excavation, testing location and final formation 'as-built' drawings. It will also provide an assessment of the earthworks as carried out in relation to the likely performance of the ground treatment in the context of the proposed development and will detail any agreed alterations to this specification that were undertaken. The report shall be presented within five (5) weeks of completion of earthworks.

APPENDICES

APPENDIX 1: Masterplan & Earthwork Drawings



Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. Architects layout taken from AEW's drawing ' 12737-AEW-03-ZZ-DR-A-0503_P8_Proposed Site Plan' dated 12/12/22.
6. Topographical layout taken from BWB drawing 'WIN-SOL-VTO-XX-M3-D-0002_Unit 3 Updated Topographical Survey' dated 17/05/22.

Key

- Major Contours (0.500m intervals)
- Minor Contours (0.100m intervals)
- Retaining Wall
- Site Boundary

PROPOSALS ARE SUBJECT TO APPROVAL

PROPOSALS ARE SUBJECT TO CHANGE DURING DETAILED DESIGN AND PROJECT TEAM REVIEW

SITE LEVELS SHOWN INDICATIVELY - SUBJECT TO CONTRACTORS METHOD OF WORKS. COULD BE RAISED OR LOWERED BY +/- 0.5m

Rev	Date	Details of issue / revision	Drw	Rev
P05	19.12.22	Revised following updated site layout	MH	JR
P04	14.11.22	Revised following updated site layout	MM	JR
P03	11.11.22	Planning Issue	GL	JR
P02	28.10.22	Levels amended to suit latest site layout	IB	JR
P01	21.10.22	Preliminary Issue	MH	IB

Issues & Revisions

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Client

PANATTONI

Project Title

Wingates Industrial Park Bolton

Drawing Title

Unit 3 Proposed Levels

Drawn:	M. Hussain		Reviewed:	I. Baciulyte
BWB Ref:	NTS2796	Date:	Oct' 22	Scale@A1: 1:250

Drawing Status

Planning

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
WIN-BWB-HGT-U3-DR-D-0603	**S2**	**P05**

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EARTHWORKS ASSUMPTIONS

1. Earthworks analysis results represent the cut and fill volumes between the existing ground less top soil strip and the proposed formation levels.
2. Existing ground levels as topographical survey undertaken by BWB.
3. Plot boundaries and building and external works footprints shown on this drawing are indicative only, based on the latest AEW architecture drawing.
4. BWB proposed earthworks analysis is indicative only. It is based on third party information and general assumptions and should be read in conjunction with the BWB earthworks specification document.
5. BWB do not accept responsibility for variations in the actual depth of site strip or any other on site earthworks which may effect the resulting volumes. The Contractor shall undertake an independent analysis of proposed earthworks to satisfy himself as to the validity of the information provided.
6. Approximate earthwork volumes have been determined based on the following assumptions/caveats;
7. An average of 0.3m site strip is required for site strip removal.

Formation depth are as follows:
- 0.450m for the unit
- 0.450m for the substation
- 0.425m for the plot access road
- 0.415m for the concrete service yard
- 0.395m for the car park aisle
- 0.325m for car parking bays
- 0.375m for the cycle shelter base
- 0.210m for the concrete block paved footway
- 0.175m for the bituminous paved footway
- 0.150m for the fire track

8. No bulking factors have been considered.
9. It is assumed that 95% of materials exposed during excavation will be suitable for reuse. Not including topsoil / soft organic material.
10. A volume of 890.9m³ has been taken for arisings.
11. Indicative retaining structures have been used to the proposed levels into existing topographical level. These are subject to change as design progresses

INDICATIVE EARTHWORKS CALCULATION SUMMARY

SITE STRIP
A site wide 0.3m site strip for a 8,909m² area has been used. This is calculated as 2,672.7m³.

Any site strip material not required for reuse, to be taken offsite and disposed of.

BULK CUT/FILL EARTHWORKS
Following the site strip, the bulk earthworks required to reach formation levels is anticipated to generate;

Total Net: Cut: 1061m³ Fill: 1,409m³ Net: 348m³ (Required)

ARISINGS
Construction arisings generated from drainage, foundations and services for Wingates Unit 3 have been estimated at 890.9m³. This arisings figure has been based on 10% of site area.

LANDSCAPING BUND
An area of 401m² and height of 2.5m was used to generate the Bund volume of 1,004m³.

The Bund indicated on the drawing requires a volume of 1,004m³ of material. This material is included in the Bulk Cut/Fill earthworks calculations above.

SUMMARY

Bulk Earthworks: 348m³ (Required)
Arisings: 890.9m³ (Surplus)
Total Subsoil: 542.9m³ (Surplus)

Notes

1. Do not scale this drawing. All dimensions must be checked/ verified on site. If in doubt ask.
2. This drawing is to be read in conjunction with all relevant architects, engineers and specialists drawings and specifications.
3. All dimensions in millimetres unless noted otherwise. All levels in metres unless noted otherwise.
4. Any discrepancies noted on site are to be reported to the engineer immediately.
5. Architects layout taken from AEW's drawing ' 12737-AEW-03-ZZ-DR-A-0503_P8_Proposed Site Plan' dated 16/12/22.
6. Topographical layout taken from BWB drawing 'WIN-SOL-VTO-XX-M3-D-0002_Unit 3 Updated Topographical Survey' dated 17/05/22.

Key Plan

- Earthworks Fill
- Neutral Earthworks (No cut or fill required)
- Earthworks Cut
- Site Boundary

PROPOSALS ARE SUBJECT TO APPROVAL

PROPOSALS ARE SUBJECT TO CHANGE DURING DETAILED DESIGN AND PROJECT TEAM REVIEW

SITE LEVELS SHOWN INDICATIVELY - SUBJECT TO CONTRACTORS METHOD OF WORKS. COULD BE RAISED OR LOWERED BY +/- 0.5m

Rev	Date	Details of issue / revision	Drw	Rev
P03	19.12.22	Revised following updated site layout	MH	JR
P02	14.11.22	Revised following updated site layout	MM	JR
P01	11.11.22	For Planning	MH	JR

Issues & Revisions

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Client: PANATTONI

Project Title: **Wingates Industrial Park Bolton**

Drawing Title: **Unit 3 Earthworks Analysis**

Drawn:	M. Hussain	Reviewed:	J. Roberts
BWB Ref:	NTS 2796	Date:	09.11.22
Scale@A1:	1:250		

Drawing Status: **Planning**

Project - Originator - Zone - Level - Type - Role - Number	Status	Rev
WIN-BWB-HGT-U3-DR-D-0630	S2	P03

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APPENDIX 2: SHW Table 1/5 (Material Compliance Testing Frequencies)

Summary of Material Compliance Testing to be Carried Out by the Contractor – Series 600

Clause	Acceptable Material		Test	Frequency of Testing	Test Certificate	Comments
	Class	General Description				
601, 631 to 637, 640	1	Selected granular material (Fine and coarse grading)	Grading	1 no. test per 1000m^3 or 5 no. tests in total, whichever is the greater.	Required	Compaction required to 95% of the MDD on placed materials with 5% or less air voids for cohesive class 2 soils
			Particle density			
			Moisture Content			
			Compaction (vibrating Hammer)			
			Organic Matter Content			
			Asbestos Screening			
			BRE Suite – pH, water soluble sulfate, acid soluble sulfate and total sulfur (results may dictate additional testing for additional magnesium, chloride and nitrate)			
	2	General cohesive fill	Grading			
			Particle density			
			Moisture Content			
			Atterberg Limits			
			Compaction (2.5kg heavy)			
			Organic Matter Content			
			Asbestos Screening			
			BRE Suite – pH, water soluble sulfate, acid soluble sulfate and total sulfur (results may dictate additional testing for additional magnesium, chloride and nitrate)			

Notes:

1. Tests comparable to those specified in this Appendix will be necessary for any equivalent works, goods or materials proposed by the Contractor.
2. UKAS or equivalent accredited laboratory must proceed with sampling and test reporting or certificates as required.
3. Any departures for testing regime or type of test must be agreed with the Engineer.
4. NDGT – Nuclear Density Gauge Testing
5. SRT – Sand Replacement Test

APPENDIX 3: SHW Table 6/1 (Acceptable Earthworks Materials: Classification & Compaction Requirements)

Table 6/1: Schedule of Acceptable Earthworks Materials: Classification and Compaction Requirements (see Footnotes)

Class	General Material Description	Typical Use	Permitted Constituents (All subject to requirements of Clause 601 (SHW) and Appendix 6/1)	Material Properties Required for Acceptability (in addition to requirements on use of fill materials in Clause 601 and testing in Clause 631 of the SHW)				Compaction Requirements in Clause 612 (SHW)
				Property (see exception in previous column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
1A	Well graded granular material	General Fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. (Properties (i), (ii) and (iv) in next column, shall not apply to chalk). Recycled aggregate. Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9, and 10: P (natural aggregates); A (construction and demolition recycling industries); B1 (municipal incinerator bottom ash (MIBA)); D2 (air cooled blast furnace slag) D3 (basic oxygen furnace slag) D4 (electric arc furnace slag (EAF C)) E (non-ferrous steel industry – except E2 molybdenum slag) G (mining and quarry industry)	(i) grading	BS 1377: Part 2 or BS EN 13242	Tab 6/2	Tab 6/2	To achieve 95% of the maximum dry density based on vibrating hammer compaction results. (End Product Specification)
				(ii) uniformity coefficient	See Note 5	10	-	
				(iii) moisture content (mc)	BS 1377: Part 2 See Note 4	OMC -2%	OMC +2%	

Table 6/1: (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All subject to requirements of Clause 601 (SHW) and Appendix 6/1)	Material Properties Required for Acceptability (in addition to requirements on use of fill materials in Clause 601 and testing in Clause 631 of the SHW)				Compaction Requirements in Clause 612 (SHW)
				Property (see exception in previous column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
1B	Uniformly graded granular material	General Fill	Any material, or combination of materials, other than material designated as Class 3 in the Contract. (Properties (i), (ii) and (iv) in next column, shall not apply to chalk). Recycled aggregate. Where material is imported onto site which is not 'as dug' it shall be aggregate conforming to BS EN 13242 from one or more of the following source codes, see Notes 8, 9, and 10: P (natural aggregates); A (construction and demolition recycling industries); B1 (municipal incinerator bottom ash (MIBA)); D2 (air cooled blast furnace slag) D3 (basic oxygen furnace slag) D4 (electric arc furnace slag (EAF C)) E (non-ferrous steel industry – except E2 molybdenum slag) G (mining and quarry industry)	(i) grading	BS 1377: Part 2 or BS EN 13242	Tab 6/2	Tab 6/2	To achieve 95% of the maximum dry density based on vibrating hammer compaction results. (End Product Specification)
				(ii) uniformity coefficient	See Note 5	-	10	
				(iii) moisture content (mc)	BS 1377: Part 2 See Note 4	OMC -2%	OMC +2%	

Table 6/1: (continued)

Class	General Material Description	Typical Use	Permitted Constituents (All subject to requirements of Clause 601 (SHW) and Appendix 6/1)	Material Properties Required for Acceptability (in addition to requirements on use of fill materials in Clause 601 and testing in Clause 631 of the SHW)				Compaction Requirements in Clause 612 (SHW)
				Property (see exception in previous column)	Defined and Tested in Accordance with:	Acceptable Limits Within:		
						Lower	Upper	
2A	Wet cohesive material	General Fill	Any material or combination of materials, other than chalk.	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	To achieve 95% of the maximum dry density based on 2.5kg compaction results with 5 % or less air voids. (End Product Specification)
				(ii) plastic limit (PL)	BS 1377: Part 2	-	-	
				(iii) moisture content (mc)	BS EN ISO 17892-1:2014	PL -4%	OMC +2%	
				(v) Undrained shear strength of remoulded material using HSV	Clause 633	75 kPa	-	
2B	Dry cohesive material	General Fill	Any material or combination of materials, other than chalk.	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	To achieve 95% of the maximum dry density based on 2.5kg compaction results with 5 % or less air voids. . (End Product Specification)
				(ii) plastic limit (PL)	BS 1377: Part 2	-	-	
				(iii) moisture content (mc)	BS EN ISO 17892-1:2014	OMC -2%	PL-4%	
				(v) undrained shear strength of remoulded material using HSV	Clause 633	75 kPa	-	
2C	Stony cohesive material	General Fill	Any material or combination of materials, other than chalk.	(i) grading	BS 1377: Part 2	Tab 6/2	Tab 6/2	To achieve 95% of the maximum dry density based on 4.5kg compaction results with 5 % or less air voids. (End Product Specification)
				(ii) plastic limit (PL)	BS 1377: Part 2	-	-	
				(iii) moisture content (mc)	BS EN ISO 17892-1:2014	OMC -2%	OMC+2%	
				(v) undrained shear strength of remoulded material using HSV	Clause 633	75 kPa	-	

Footnotes to Table 6/1

1 Tab = Table
2 Where in the Acceptable Limits column is made to App 6/1, only those properties having limits ascribed to them in Appendix 6/1 shall apply. Where Appendix 6/1 gives limits for other properties not listed in this table such limits shall also apply.
3 Where BS EN ISO 17892-1:2014 is specified should the laboratory of choice not be accredited to this, the test should be in accordance with BS 1377: Part 2 for moisture content, this shall mean BS1377: Part 2 or BS EN 1097 – 5 as appropriate.
4 Defines no upper or lower limit
5 * OMC of granular materials to be confirmed following compliance testing, and if required Table 6/1 to be updated.

Testing frequencies as described in Appendix 1 and Paragraphs 4.69 to 4.71 of the Earthworks Specification.

APPENDIX 4: Results Format in Microsoft Excel Required from Earthworks Contractor

Source Approval Testing

Sample Table for Compliance Testing

Test Certificate No.	Laboratory Reference No.	Sample Date	Test Date	Source	Location		Co-ordinates			Brief Material Description	Grading Test		PD (Mg/m³)	Atterberg's Limits			MC (%)	Compaction		Comments
					Grid Ref.	Layer No.	X	Y	Z		Material Class	Uniformity Coefficient		LL (%)	PL (%)	PI (%)		MDD (Mg/m³)	OMC (%)	

Note
PD – Particle Density, LL – Liquid Limit, PL – Plastic Limit, PI – Plasticity Index, MC – Moisture Content, MDD – Maximum Dry Density and OMC – Optimum Dry Density

Validation Testing

Sample Table for Nuclear Density Gauge / Sand Replacement Test / Core Cutter Test

Test Certificate No.	Laboratory Reference No.	Sample Date	Test Date	Location		Co-ordinates			Brief Material Description	Test Method	MC (%)	ρ_{bulk} (Mg/m³)	ρ_{dry} (Mg/m³)	% MDD (%)	% AV (%)	Comments
				Grid Ref.	Layer No.	X	Y	Z								

Note
MC – Moisture Content, ρ_{bulk} – Bulk Density, ρ_{dry} – Dry Density, % MDD – Percentage Maximum Dry Density and % AV – Percentage Air Voids

Sample Table for California Bearing Ratio (CBR)

Test Certificate No.	Laboratory Reference No.	Sample Date	Test Date	Location		Co-ordinates			Brief Material Description	Plate Diameter (mm)	Modulus of Subgrade Reaction (kN/m³/mm)	CBR (%)	Comments
				Grid Ref.	Layer No.	X	Y	Z					

Sample Table for Incremental Load Test

Test Certificate No.	Laboratory Reference No.	Sample Date	Test Date	Location		Co-ordinates			Brief Material Description	Plate Diameter (mm)	Applied Load (kN/m²)	Settlement at Applied Load (mm)	Time at Settlement (minutes)	Comments
				Grid Ref.	Layer No.	X	Y	Z						

Sample Table for Hand Shear Vane Test

Test Certificate No.	Laboratory Reference No.	Sample Date	Test Date	Location		Co-ordinates			Brief Material Description	Equivalent Undrained Shear Strength (kN/m²)	Comments
				Grid Ref.	Layer No.	X	Y	Z			

Note
Equivalent Undrained Shear Strength – Refers to the average of the 'set of 3' undrained shear strength results

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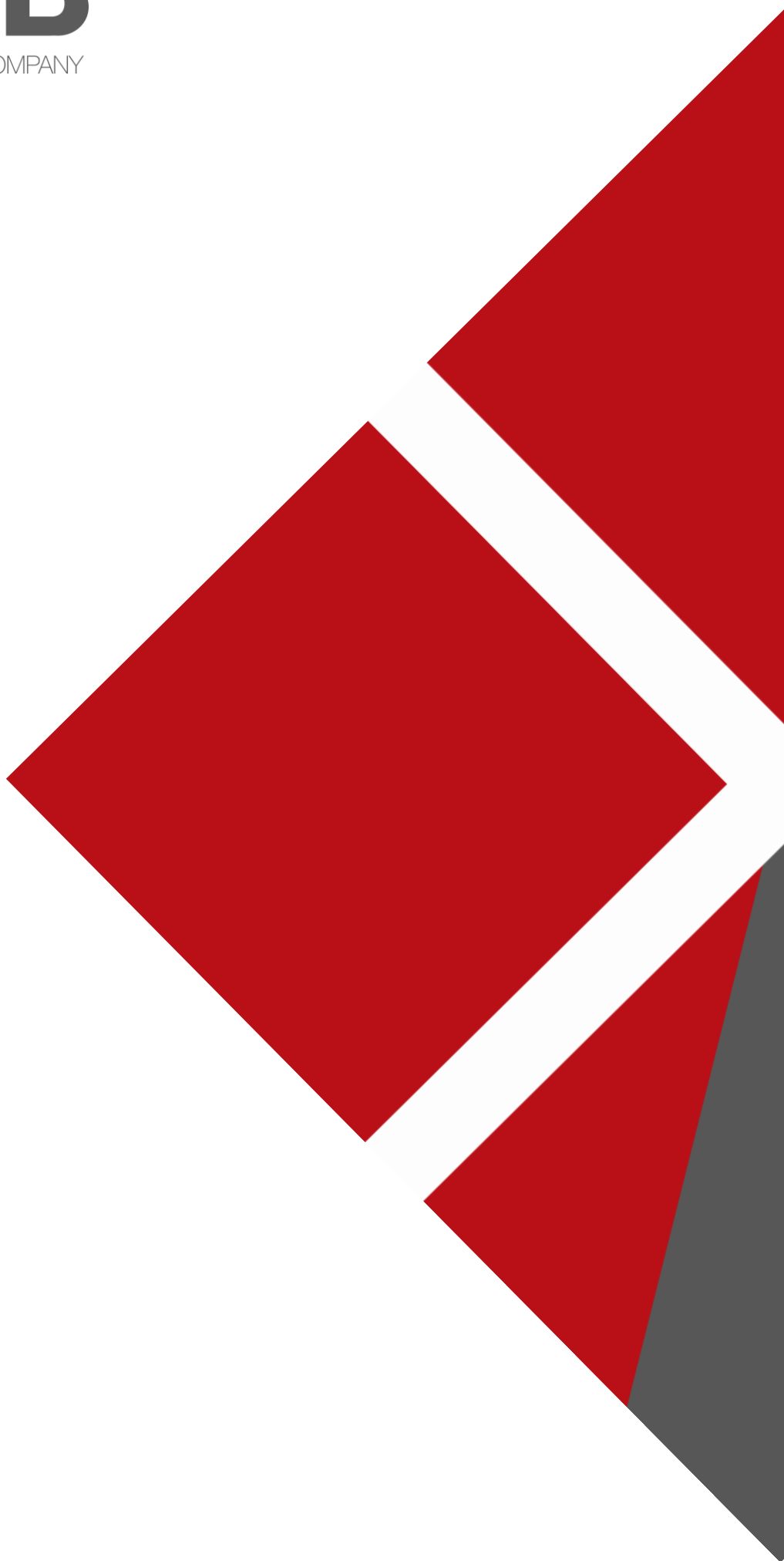

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PRODUCT SPECIFICATIONS FOR CS78B

WEIGHTS

Operating Weight - With Cab	18700.0 kg
Weight - Drum with Cab	13440.0 kg

OPERATING SPECIFICATIONS

Compaction Width	2134.0 mm
Travel Speed - Maximum	11.4 km/h
Turning Radius - Inside Drum Edge	3.68 m
Ground Clearance	437.0 mm
Static Linear Load - With Cab	63.0 kg/cm

ENGINE

Gross Power	129.5 kW
Engine Model	Cat C4.4 with ACERT

DIMENSIONS

Overall Length	6.13 m
Wheel Base	2.9 m
Height - With ROPS/FOPS or Cab	3.11 m
Drum Width	2134.0 mm
Drum Diameter	1534.0 mm
Overall Width	2.36 m

VIBRATORY SYSTEM

Variable Frequency Option Range	23.3 - 28 Hz (1400-1680 vpm)
Centrifugal Force - Maximum	332.0 kN
Centrifugal Force - Minimum	166.0 kN
Nominal Amplitude - Low	0.98 mm
Vibratory Frequency - Standard	28 Hz (1680 vpm)
Nominal Amplitude - High	2.1 mm

TIRES

Tires	23.1 x 26

SERVICE REFILL CAPACITIES

Fuel Tank Capacity	332.0 l

Results Summary

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	D6 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	C6 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	B6 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	A6 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	A5 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	B5 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	C5 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	D5 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	D4 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	B4 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	A4 Formation																								>150																			
ETS/1612	C1082/1	17/10/2023	Cemented Brown Clay	D6 Formation																								>150																			
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	D6 Formation																				450	32.3	108.1																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	C6 Formation																				450	30.1	103.7																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	B6 Formation																				450	34.1	111.7																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	A6 Formation																				450	30.7	105.0																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	A5 Formation																				450	38.2	119.1																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	B5 Formation																				450	38.3	119.3																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	C5 Formation																				450	38.8	120.1																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	D5 Formation																				450	32.2	107.9																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	D4 Formation																				450	34.4	112.0																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	B4 Formation																				450	32.0	107.5																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	A4 Formation																				450	42.2	126.1																					
ETS/1613	C1082/2	17/10/2023	Cemented Brown Clay	D6 Formation																				450	29.7	103.0																					

Results Summary

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ETL EARTHWORKS TESTING LTD

Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		
ETS/1683	C1082/3	19/10/2023	Brown Stoney Clay + 2% OPC	B3 Cement	15.0	100	100	94	71	44	34	10	35	53	18	72			16	1.74			2.60																							BRE SD1 / Asbestos
ETS/1684	C1082/4	19/10/2023	Brown Stoney Clay + 2% OPC	B3 Cement																								>150	2.054	16.5	1.763	***101.3***	**3.1**																
ETS/1684	C1082/4	19/10/2023	Brown Stoney Clay + 2% OPC	C3 Cement																								>150	2.082	14.9	1.812	***104.1***	**3.3**																
ETS/1684	C1082/4	19/10/2023	Brown Stoney Clay + 2% OPC	D3 Cement																								>150	2.062	15.9	1.779	***102.2***	**3.3**																
ETS/1685	C1082/5	19/10/2023	Brown Stoney Clay + 2% OPC	B3 Cement	12.5												12.0	65																												
ETS/1685	C1082/5	19/10/2023	Brown Stoney Clay + 2% OPC	C3 Cement														70																												
ETS/1685	C1082/5	19/10/2023	Brown Stoney Clay + 2% OPC	D3 Cement														60																												
ETS/1686	C1082/6	19/10/2023	Brown Stoney Clay + 2% OPC	B3 Cement																							95.0	0.05																		
ETS/1687	C1082/7	19/10/2023	Brown Stoney Clay	B3	Please see Chemical Certificate TRL 447, OM																																									

Results Summary

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		
ETS/1746	C1082/8	24/10/2023	Brown Stoney Clay	B6 Layer 1	Please see Chemical Certificate TRL 447, OM																																										TRL 447, OM
ETS/1747	C1082/9	24/10/2023	Brown Stoney Clay + 2% OPC	B6 Layer 1	18.0	100	100	99	84	55	48	18	36	55	19	404			16	1.75			2.59																								BRE SD1 / Asbestos
ETS/1748	C1082/10	24/10/2023	Brown Stoney Clay + 2% OPC	B6 Layer 1																								112	2.072	14.9	1.803	***103.0***	**3.5**															
ETS/1748	C1082/10	24/10/2023	Brown Stoney Clay + 2% OPC	B5 Layer 1																								122	2.114	16.4	1.816	***103.8***	**0.1**															
ETS/1748	C1082/10	24/10/2023	Brown Stoney Clay + 2% OPC	C5 Layer 1																								146	2.063	15.6	1.785	***102.0***	**3.3**															
ETS/1748	C1082/10	24/10/2023	Brown Stoney Clay + 2% OPC	C6 Layer 1																								149	2.091	16.2	1.799	***102.8***	**1.4**															
ETS/1748	C1082/10	24/10/2023	Brown Stoney Clay + 2% OPC	D6 Layer 1																								119	2.070	18.2	1.751	***100.1***	**0.5**															
ETS/1748	C1082/10	24/10/2023	Brown Stoney Clay + 2% OPC	D5 Layer 1																								129	2.096	16.0	1.807	***103.3***	**1.3**															
ETS/1748	C1082/10	24/10/2023	Brown Stoney Clay + 2% OPC	D4 Layer 1																								131	2.086	15.6	1.804	***103.1***	**2.2**															
ETS/1748	C1082/10	24/10/2023	Brown Stoney Clay + 2% OPC	C4 Layer 1																								136	2.064	17.5	1.757	***100.4***	**1.4**															
ETS/1748	C1082/10	24/10/2023	Brown Stoney Clay + 2% OPC	B4 Layer 1																								133	2.084	15.9	1.798	***102.7***	**2.0**															
ETS/1749	C1082/11	24/10/2023	Brown Stoney Clay + 2% OPC	B6 Layer 1	14.3												11.0	70																													
ETS/1749	C1082/11	24/10/2023	Brown Stoney Clay + 2% OPC	B4 Layer 1														65																													
ETS/1749	C1082/11	24/10/2023	Brown Stoney Clay + 2% OPC	C5 Layer 1														75																													
ETS/1749	C1082/11	24/10/2023	Brown Stoney Clay + 2% OPC	D6 Layer 1														60																													
ETS/1749	C1082/11	24/10/2023	Brown Stoney Clay + 2% OPC	D4 Layer 1														60																													
ETS/1750	C1082/12	24/10/2023	Brown Stoney Clay + 2% OPC	B6 Layer 1																							220.0	0.00																			

Results Summary

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		
ETS/1789	C1082/13	25/10/2023	Brown Stoney Clay	A6 Layer 1	Please See Chemical Certificate TRL 447, OM, BRE SD1, Asbestos ID & Quant																																										
ETS/1790	C1082/14	25/10/2023	Brown Stoney Clay + 2% OPC	A6 Layer 1	11.0	100	100	96	78	56	45	11	39	60	21	414			x	x			x																									
ETS/1791	C1082/15	25/10/2023	Brown Stoney Clay + 2% OPC	A6 Layer 1																									141	2.059	17.3	1.755	***100.3***	**1.9**															
ETS/1791	C1082/15	25/10/2023	Brown Stoney Clay + 2% OPC	A5 Layer 1																									133	2.090	14.8	1.821	***104.0***	**2.8**															
ETS/1791	C1082/15	25/10/2023	Brown Stoney Clay + 2% OPC	A4 Layer 1																									123	2.095	16.5	1.798	***102.8***	**0.9**															
ETS/1791	C1082/15	25/10/2023	Brown Stoney Clay + 2% OPC	A3 Layer 1																									122	2.127	14.8	1.853	***105.9***	**1.0**															
ETS/1792	C1082/16	25/10/2023	Brown Stoney Clay + 2% OPC	A6 Layer 1	17.9												11.0	65																													
ETS/1792	C1082/16	25/10/2023	Brown Stoney Clay + 2% OPC	A4 Layer 1														65																													
ETS/1793	C1082/17	25/10/2023	Brown Stoney Clay + 2% OPC	A6 Layer 1																							215.0	0.05																			
ETS/1794	C1082/18	25/10/2023	Type 1	D6																				450	48.9	137.4																			
ETS/1794	C1082/18	25/10/2023	Type 1	C6																				450	37.7	118.2																			
ETS/1794	C1082/18	25/10/2023	Type 1	B6																				450	36.7	116.4																			
ETS/1794	C1082/18	25/10/2023	Type 1	A6																				450	38.3	119.3																			
ETS/1794	C1082/18	25/10/2023	Type 1	A5																				450	44.3	129.8																			
ETS/1794	C1082/18	25/10/2023	Type 1	B5																				450	37.5	117.9																			
ETS/1794	C1082/18	25/10/2023	Type 1	C5																				450	42.7	127.1																			
ETS/1794	C1082/18	25/10/2023	Type 1	D5																				450	38.5	119.7																			

Results Summary

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	A6 Cemented Layer																				300	36.1	115.3																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	B6 Cemented Layer																				300	35.4	114.0																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	C6 Cemented Layer																				300	98.9	206.2																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	D6 Cemented Layer																				300	66.1	163.5																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	D5 Cemented Layer																				300	56.5	149.3																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	C5 Cemented Layer																				300	33.5	110.4																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	B5 Cemented Layer																				300	104.7	213.1																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	A5 Cemented Layer																				300	40.2	122.8																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	A4 Cemented Layer																				300	60.0	154.6																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	C4 Cemented Layer																				300	34.2	111.8																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	B4 Cemented Layer																				300	32.1	107.8																							
ETS/1796	C1082/19	26/10/2023	Brown Clay & OPC	D4 Cemented Layer																				300	60.5	155.4																							
ETS/1797	C1082/20	26/10/2023	Type 1 Sub Base	A4																				450	61.4	156.7																							
ETS/1797	C1082/20	26/10/2023	Type 1 Sub Base	B4																				450	39.0	120.6																							
ETS/1797	C1082/20	26/10/2023	Type 1 Sub Base	C4																				450	46.2	132.9																							
ETS/1797	C1082/20	26/10/2023	Type 1 Sub Base	D4																				450	46.5	133.4																							

Results Summary

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		
ETS/1820	C1082/21	27/10/2023	Brown Clay & 2% OPC	A3 Final Formation																				300	49.2	137.9																							
ETS/1820	C1082/21	27/10/2023	Brown Clay & 2% OPC	B3 Final Formation																				300	43.2	127.8																							
ETS/1820	C1082/21	27/10/2023	Brown Clay & 2% OPC	C3 Final Formation																				300	45.8	132.3																							
ETS/1820	C1082/21	27/10/2023	Brown Clay & 2% OPC	D3 Final Formation																				300	40.1	122.5																							
ETS/1821	C1082/22	27/10/2023	Type 1	A3																				450	39.0	120.5																							
ETS/1821	C1082/22	27/10/2023	Type 1	B3																				450	33.7	110.8																							
ETS/1821	C1082/22	27/10/2023	Type 1	C3																				450	38.1	118.9																							
ETS/1821	C1082/22	27/10/2023	Type 1	D3																				450	32.2	108.0																							

Results Summary

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		
ETS/1932	C1082/23	07/11/2023	Brown Stoney Clay	B2 Layer 1	Please See Chemical Certificate (TRL 447, OM, BRE SD1, Asbestos)																																										
ETS/1933	C1082/24	07/11/2023	Brown Stoney Clay & 2% OPC	B2 Layer 1	20.0	100	100	100	88	72	68	33	23	42	19	20			x	x			x																									
ETS/1934	C1082/25	07/11/2023	Brown Stoney Clay & 2% OPC	B2 Layer 1	Please See Chemical Certificate FROST																																										
ETS/1935	C1082/26	07/11/2023	Brown Stoney Clay & 2% OPC	B2 Layer 1	13.8												10.5	60																													
ETS/1935	C1082/26	07/11/2023	Brown Stoney Clay & 2% OPC	D2 Layer 1														70																													
ETS/1935	C1082/26	07/11/2023	Brown Stoney Clay & 2% OPC	C2 Layer 2														65																													
ETS/1936	C1082/27	07/11/2023	Brown Stoney Clay & 2% OPC	B2 Layer 1																									126	2.098	14.8	1.828	***104.4***	**2.4**														
ETS/1936	C1082/27	07/11/2023	Brown Stoney Clay & 2% OPC	C2 Layer 1																									117	2.062	17.3	1.758	***100.5***	**1.7**														
ETS/1936	C1082/27	07/11/2023	Brown Stoney Clay & 2% OPC	D2 Layer 1																									116	2.048	16.1	1.764	***100.8***	**3.5**														
ETS/1936	C1082/27	07/11/2023	Brown Stoney Clay & 2% OPC	B2 Layer 2																									122	2.082	15.6	1.801	***102.9***	**2.4**														
ETS/1936	C1082/27	07/11/2023	Brown Stoney Clay & 2% OPC	C2 Layer 2																									123	2.070	15.5	1.792	***102.4***	**3.0**														
ETS/1936	C1082/27	07/11/2023	Brown Stoney Clay & 2% OPC	D2 Layer 2																									115	2.058	14.6	1.796	***102.6***	**4.4**														
ETS/1937	C1082/28	07/11/2023	Brown Stoney Clay & 2% OPC	B2 Layer 1																							x	x																			

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		
ETS/2006	C1082/29	10/11/2023	Brown Stoney Clay & 2% OPC	B2 Final Formation																				300	49.0	137.5																							
ETS/2006	C1082/29	10/11/2023	Brown Stoney Clay & 2% OPC	C2 Final Formation																				300	52.0	142.3																							
ETS/2006	C1082/29	10/11/2023	Brown Stoney Clay & 2% OPC	D2 Final Formation																				300	48.6	136.9																							
ETS/2007	C1082/30	10/11/2023	Type 1	B2																				450	49.7	138.7																							
ETS/2007	C1082/30	10/11/2023	Type 1	C2																				450	62.9	158.9																							
ETS/2007	C1082/30	10/11/2023	Type 1	D2																				450	34.8	112.8																							

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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Collins Earthworks Ltd
Wingates - Bolton

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

Results Summary

Collins Earthworks Ltd
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						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		

Results Summary

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

Results Summary

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			Bulk Density	Moisture Content	Dry Density			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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| Laboratory Reference No | Contract Sample No | Date Sampled | Material Description | Location - Grid Ref | Moisture Content | Particle Size Distribution (percent passing BS Sieve (mm)) 125 | 50 | 37.5 | 20 | 5 | 2 | 0.063 | Plastic Limit W_P % | Liquid Limit W_L % | Plasticity Index I_P % | QUSS kPa | MCV @ Nat MC | Pulverisation | OMC 2.5 | MDD 2.5 | OMC 4.5 | MDD 4.5 | Particle Density | Plate Size | Plate Test CBR | MSGR K762 | Soaked CBR (7 Days) | Swell @ 7 Days | HSV | As Found CORE Values Bulk Density | Moisture Content | Dry Density | % of MDD | % Air Voids | As Found SRD Values Bulk Density | Moisture Content | Dry Density | % of MDD | % Air Voids | As Found NDG Values Bulk Density | Moisture Content | Dry Density | % of MDD | % Air Voids | REFERNCE DATA OMC | MDD | Particle Density | Ref | Comments |
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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

Results Summary

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

Results Summary

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
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						125	50	37.5	20	5	2	0.063																			Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

Results Summary

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

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						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

Results Summary

Collins Earthworks Ltd
Wingates - Bolton

C1082

DRAFT

ETL EARTHWORKS TESTING LTD

Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

Results Summary

Collins Earthworks Ltd
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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
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Results Summary

Collins Earthworks Ltd
Wingates - Bolton

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ETL EARTHWORKS TESTING LTD

Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
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Results Summary

Collins Earthworks Ltd
Wingates - Bolton

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
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Results Summary

Collins Earthworks Ltd
Wingates - Bolton

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ETL EARTHWORKS TESTING LTD

Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
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Results Summary

Collins Earthworks Ltd
Wingates - Bolton

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ETL EARTHWORKS TESTING LTD

Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																		Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

Results Summary

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ETL EARTHWORKS TESTING LTD

Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR	MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
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Results Summary

Collins Earthworks Ltd
Wingates - Bolton

C1082

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Laboratory Reference No	Contract Sample No	Date Sampled	Material Description	Location - Grid Ref	Moisture Content	Particle Size Distribution (percent passing BS Sieve (mm))							Plastic Limit W_P %	Liquid Limit W_L %	Plasticity Index I_P %	QUSS kPa	MCV @ Nat MC	Pulverisation	OMC 2.5	MDD 2.5	OMC 4.5	MDD 4.5	Particle Density	Plate Size	Plate Test CBR MSGR K762	Soaked CBR (7 Days)	Swell @ 7 Days	HSV	As Found CORE Values			% of MDD	% Air Voids	As Found SRD Values			% of MDD	% Air Voids	As Found NDG Values			% of MDD	% Air Voids	REFERNCE DATA			Ref	Comments
						125	50	37.5	20	5	2	0.063																	Bulk Density	Moisture Content	Dry Density			*Bulk Density*	*Moisture Content*	*Dry Density*			*Bulk Density*	*Moisture Content*	*Dry Density*			OMC	MDD	Particle Density		

DO NOT SCALE, IF IN DOUBT PLEASE ASK.

1cm | A4

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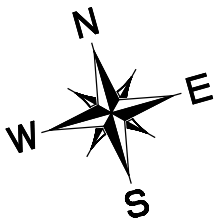

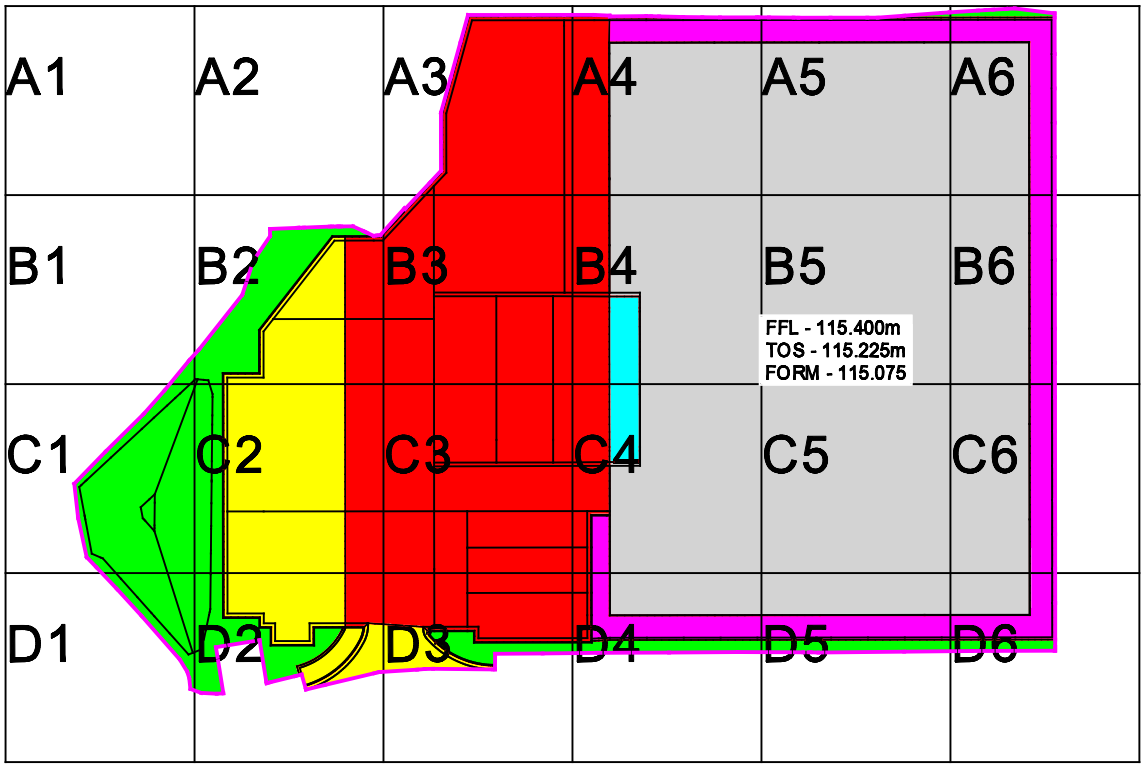

CDP

STAB BUILDING SLAB
175mm Concrete
150mm Quarried Type 1
MODEL FORMATION
Cemented Layer 30% CBR

STAB CAR PARK AND ENTRANCE
190mm Asphalt
100mm Quarried Type 1
MODEL FORMATION
Cemented Layer 30% CBR

STAB DOCK SLAB
240mm Concrete
100mm Quarried Type 1
MODEL FORMATION
Cemented Layer 30% CBR

STAB SERVICE YARD
190mm Concrete
100mm Quarried Type 1
MODEL FORMATION
Cemented Layer 30% CBR

STAB WHSE PERIMETER PATH
150mm Concrete
100mm Quarried Type 1
MODEL FORMATION
Cemented Layer 30% CBR

TRAD LANDSCAPING
300mm Topsoil
MODEL FORMATION

Notes:

Make-ups derived from the following: Collins asuptions

Landscaping layout based on:
12933-2 Plot 3 Great Bank Road Bolton FFL 115_400m 31082023 3d

Rev	Date	Revision Detail	By	
P02	01.09.2023	New Linework and OGL	THS	
P01	05.05.2023	First Revision.	THS	-

Client: winvic

Project: WINGATES BOLTON

Title: CONSTRUCTION DETAIL PLAN

Status: | Suitability:

Drawing No: CDP#770 PAGE 1 OF 1 | Internal Ref No: T23-097

Revision: P01 | Issue Date: 01.09.2023 | Scale: Indicated @ A4

Processed By: THS | Drafted By: THS | Checked By: -

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Ripley, Derbyshire
DE5 3QL
01623 750002
www.collinsearthworks.co.uk

1cm | A4

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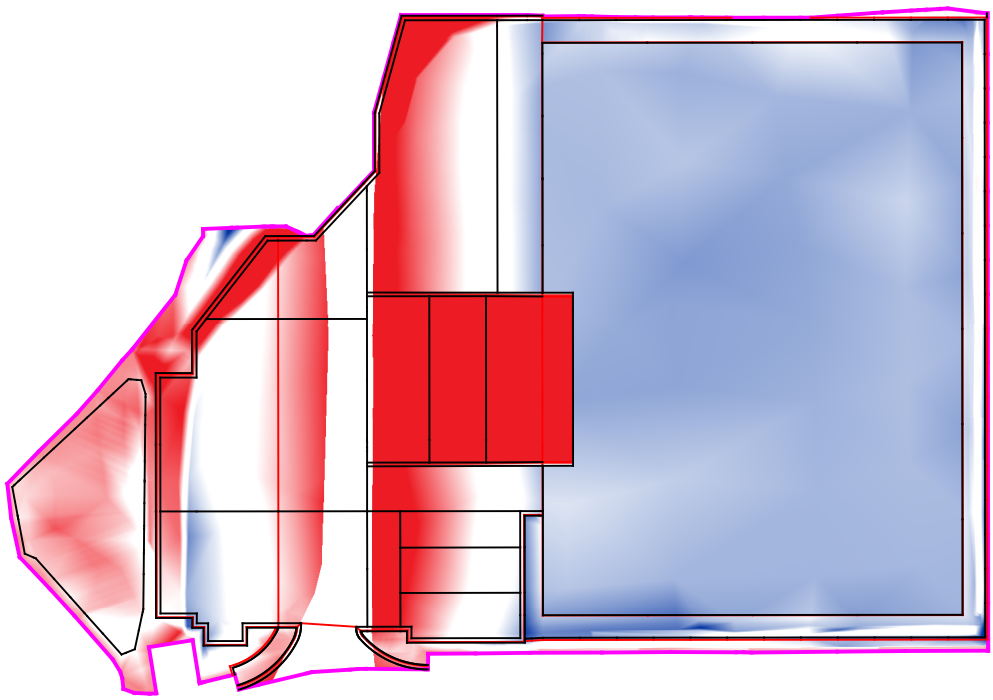

Cut and Fill Map (05.09.2023) Depth Shading

Minimum Elevation	Maximum Elevation	Area	Colour
-2.250	-0.400	932.9	
-0.400	-0.100	1692.9	
-0.100	0.100	1003.4	
0.100	0.400	4991.6	
0.400	2.250	6.3	

Areas of CUT

Areas of FILL

Rev	Date	Revision detail	By	-
P02	26.09.2023	2m Hv Exclusion Zone	-	-
P01	05.09.2023	Original Issue	-	-

Client: winvic

Project: WINGATES BOLTON

Title: CUT & FILL AREAS

Status:

Suitability:

Drawing no: CF#475 PAGE 1 OF 3

Internal Ref: T23-097

Revision: P01 | Issue Date: 05.09.2023 | Scale: Indicated @ A4

Processed By: THS | Drafted By: THS | Checked By: -

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Derbyshire
DE5 3QL
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A4 | 1cm

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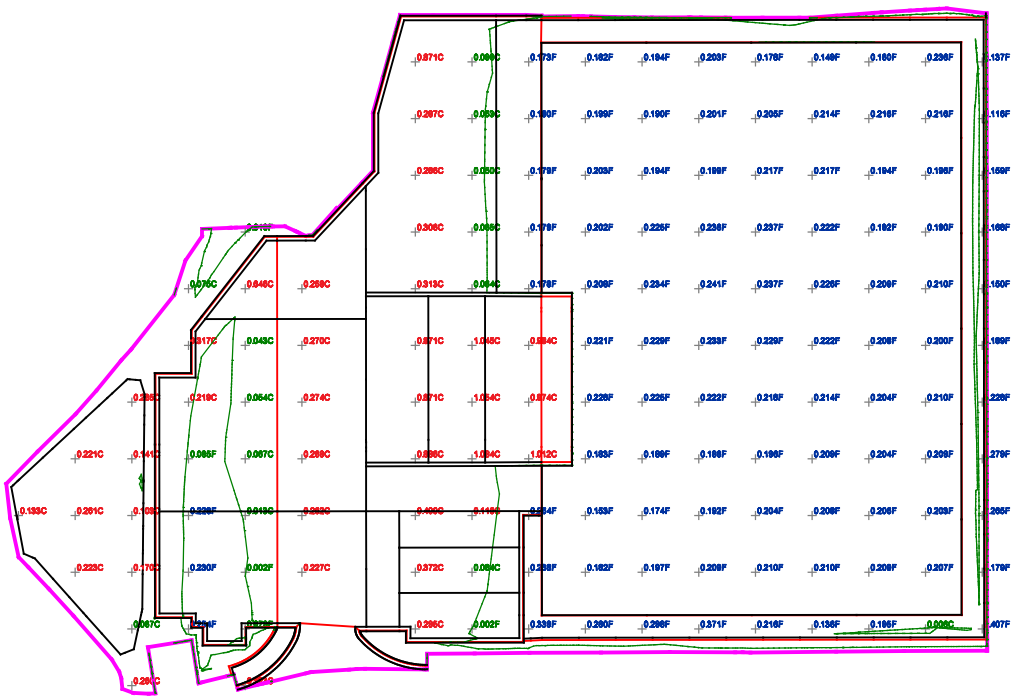
SCALE=1:1000



Notes:

Depths of CUT

Depths of CUT / FILL <100mm

Depths of FILL

Rev	Date	Revision detail	By	
P02	26.09.2023	2m Hv Exclusion Zone	-	-
P01	05.09.2023	Original issue	-	-

Client: winvic

Project: WINGATES BOLTON

Title: CUT & FILL PLAN

Status: | Suitability:

Drawing no: CF#475 PAGE 2 OF 3 | Internal Ref: T23-097

Revision: P01 | Issue Date: 05.09.2023 | Scale: Indicated @ A4

Processed By: THS | Drafted By: THS | Checked By: -

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Derbyshire
DE5 3QL
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A4 | 1cm

N E S W

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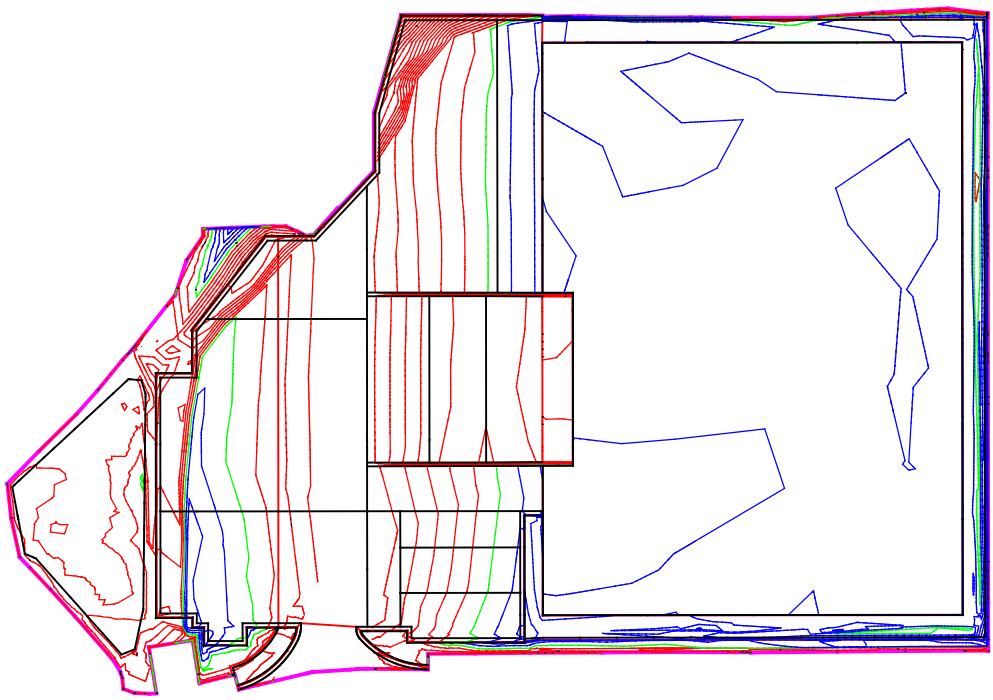
SCALE=1:1000



Notes:

CUT ISOPACHS every 100mm Vertical Difference

CUT / FILL LINE

FILL ISOPACHS every 100mm Vertical Difference

Yellow Line showing HV Cable

Rev	Date	Revision detail	By	
P02	26.09.2023	2m Hv Exclusion Zone	-	-
P01	05.09.2023	Original Issue	-	-

Client: winvic

Project: WINGATES BOLTON

Title: CUT & FILL ISOPACH

Status: | Suitability:

Drawing no: CF#475 PAGE 3 OF 3 | Internal Ref: T23-097

Revision: P01 | Issue Date: 05.09.2023 | Scale: Indicated @ A4

Processed By: THS | Drafted By: THS | Checked By: -

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DO NOT SCALE, IF IN DOUBT PLEASE ASK.

1cm									A4

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20 0 20 40 60 80 100 m
SCALE=1:1000

FFL - 115.400m
TOS - 115.225m
FORM - 115.075

Notes:

All Finished levels to be taken from the 3D line work or triangulation is model space. The triangulated surface is on the layer "Finished design" currently turned off for clarity.

The formation/subsoil levels can be derived by deducting the construction depths detailed in CDP???

Minor contours every 0.1m
Major contours every 1.0m

The 3D model was generated using the following files:

WORKING ROOM ALLOWANCE:

500mm along kerb lines
300mm along path edgings
2.0m along dock wing walls
4.0m from face of dock walls

All cut and fill batters tying back to existing levels have been generated at 1:3 U.N.O

All kerb faces have been assumed to be 125mm

Rev	Date	Revision Detail	By	-
C01	20.09.2023	First Revision.	THS	-

Client: winvic

Project: WINGATES BOLTON

Title: PROPOSED FINISHED LEVELS

Status: | Suitability:

Drawing No: FL#340 PAGE 1 OF 1 | Internal Ref No: T23-097

Revision: P01 | Issue Date: 20.09.2023 | Scale: Indicated @ A4

Processed By: THS | Drafted By: THS | Checked By: -

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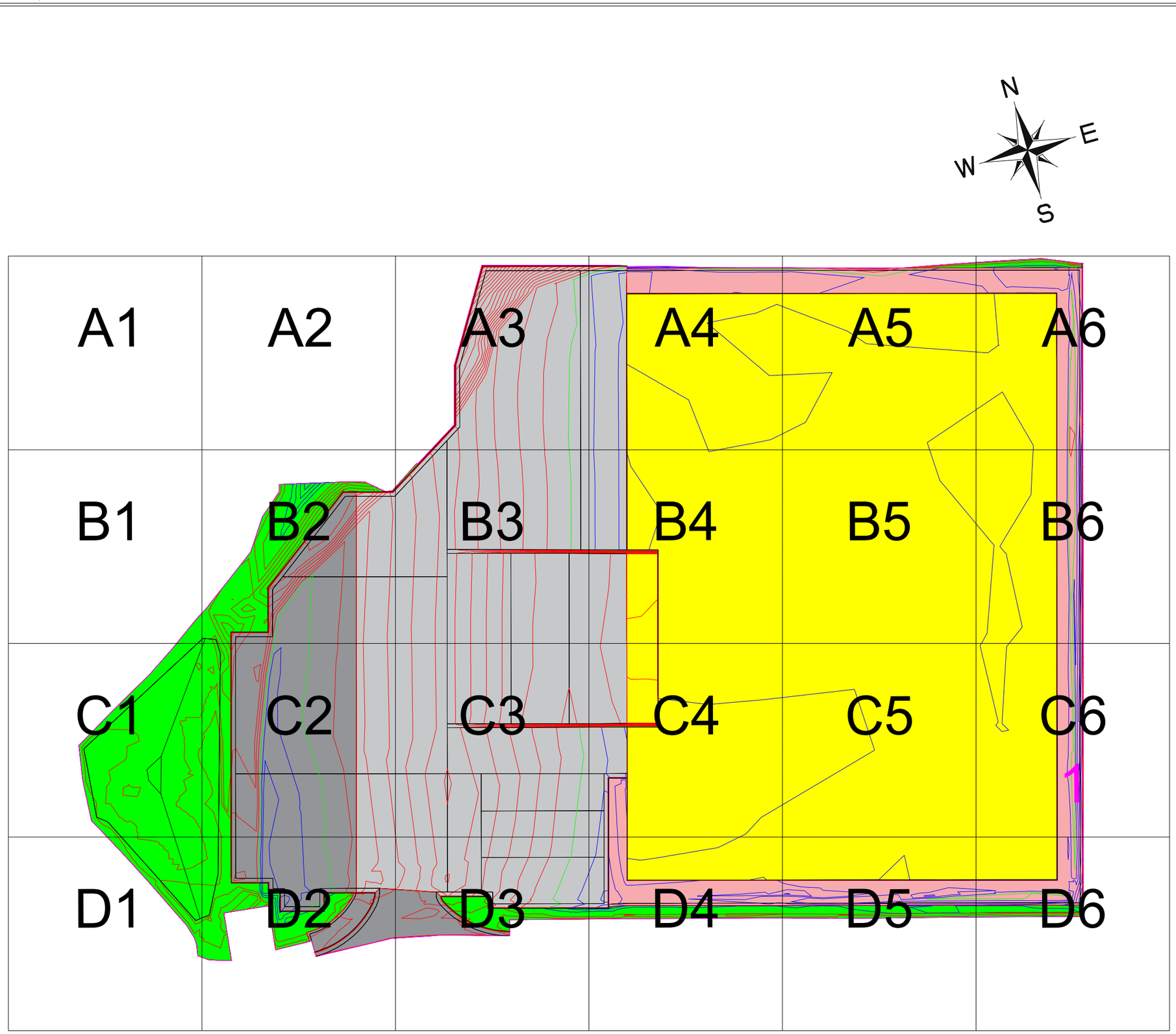

A3

1cm

Notes:

Testing Requirements

Prior to any fill, the existing formation is to be proof rolled with the vibratory roller and visually inspected, with any soft or loose material removed and replaced with a well compacted engineered fill. The definition of a soft spot area will correspond to a CBR of less than 3% and less than 60kPa

Compliance Testing

The following compliance testing suit shall be undertaken on Class 1 & Class 2 material every 1,000m^3 or 5 tests in total.

- Grading
- Uniformity Coefficient (Class 1 only)
- PL (Class 2 only)
- Undrained Sheer Strength (Class 2 only)
- Particle density
- Compaction (vib hammer Class 1) (2.5kg rammer Class 2)
- Organic matter
- MC/MCV (max 5 per day)
- OMC
- BRE suite
- Asbestos screening
- Atterberg limits (Class 2 only)

Validation Testing

Cohesive

- 1 no. NDG to be undertaken every 625m^2 per layer and final formation to achieve ≥95% Maximum Dry Density & ≤5% Air Voids (2.5kg rammer)
- 1 no. Hand Shear Vane to be undertaken every 625m^2 per layer and final formation to achieve >75kPa

Granular

- 1 no. NDG to be undertaken every 625m^2 per layer and final formation to achieve ≥95% Maximum Dry Density (2.5kg rammer)
- 1 no. 300mm plate test every 625m^2 per layer and final formation to achieve 5% CBR

Type 1

- 1 no. 450mm plate load test to be undertaken on top of Type 1 level every 625m^2 to achieve ≥30% CBR.

Lime/Cement Modified Material

- 1 no. MCV test to be undertaken per 1,000m^3 of modified material (max 5 per day).
- 1 no. Organic matter test to be undertaken per 1,000m^3 of modified material
- 1 no. Pulverisation test to be undertaken 1 per 1,000m^2 of modified material to achieve ≥30% on modified fill and ≥60% on sub-base replacement.
- 1 no. soak CBR to be undertaken on modified material at a frequency of 1 per 1,000m^3 (min 1 per day).
- 1 no. total sulphur and total sulphate tests at a frequency of 1 per 1,000m^3 on material to be lime / cement modified.
- 1 no. Frost susceptibility test to be undertaken per material to be modified with cement to achieve <15mm heave.

Compaction Requirements

Each class of material is to receive the following amount of passes with a 20 tonne vibratory roller (mass per meter >5000kg):

- General fill material; TBC following trials
- Cement stabilsed layer; TBC following trials
- Aggregate material; TBC following trials

The finished formation level shall be re-trimmed to have a surface level tolerance within +20mm and -20mm. Following re-trimming, the formation shall be rolled with 1 pass of a 20 tonne vibratory roller.

Key

- Black grid lines spaced at 25m x 25m. Use grid squares!! (not intersections)
- Pink numbers indicate the predicted layer numbers (225mm) to the top of general fill (this does not include the sub-base replacement layer)
- Building Footprints:

Rev	Date	Revision detail	By	Chk'd
P-01	12-09-23	Original Issue	JR	SH

Client: WINVIC CONSTRUCTION

Project: Wingates - Bolton

Title: Testing Grid & Regime

Status: APPROVAL	Suitability: S4	
Drawing no: BOLT-CEL-XX-DR-X-CTG611-XX		Internal Ref: CTG611 Rev P01
Rev: P01	Date: 12-09-2023	Scale: N/A
Drawn: JR	Checked: SH	Approved: SH

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