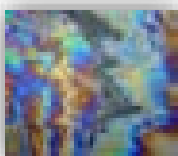
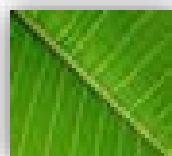




INVESTIGATE



REMEDiate



REGENERATE

TECHNICAL REPORT

**GROUND INVESTIGATION AND
SLOPE STABILITY ASSESSMENT
AT
NORTH ROAD,
KIRKBURTON,
WEST YORKSHIRE
FOR
BAYSWATER LIMITED**

**REPORT NO. NE3545A
JUNE 2017**



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CONTENTS

1. INTRODUCTION	1.1 Site Location and Description
	1.2 Proposed Development and Purpose of the Ground Investigation
2. INVESTIGATION	2.1 Investigation Details
	2.2 Sub Surface Detail
3. SAMPLING, TESTING AND MONITORING	3.1 Sampling
	3.2 Field Testing
	3.3 Installations and Monitoring
	3.4 Laboratory Testing
4. APPRAISAL AND RECOMMENDATIONS	4.1 Comments on the Profile
	4.2 Slope Stability
	4.3 General
APPENDICES	Slope Stability Analysis
	Insitu Test results
	Laboratory Test results
	Borehole Record sheets
	Mini Borehole Record sheets
	Hand Dug Trial Pit Records
	Figures

**GROUND INVESTIGATION AND SLOPE STABILITY ASSESSMENT AT
NORTH ROAD, KIRKBURTON, WEST YORKSHIRE****CLIENT: BAYSWATER LIMITED****ENGINEER: SIMBA CONSULTANTS LTD**

1. INTRODUCTION

This report has been prepared in accordance with an emailed instruction, dated 14th March 2017, from the Client.

The brief was set out in our estimate, ref. E5548A and dated 10th May 2017, with amendments as the investigation proceeded and includes:

- 3 No. cable percussive boreholes
- 5 No. mini boreholes
- 5 No. hand dug trial pits
- Geotechnical laboratory testing
- Installation of standpipes followed by groundwater monitoring
- Provision of an interpretative report including a slope stability assessment

1.1 Site Location and Description

The site is located to the south west of North Road in Kirkburton which is about 6 km to the south east of Huddersfield, West Yorkshire, as indicated on Figure 1. The approximate National Grid Reference of the centre of the site is SE.1867 1287.

As shown on Figure 2, the near triangular 0.13 hectare site is bounded to the north east by North Road with shops beyond, to the south by a track from North Road (which falls steeply down to the west) and to the north west by houses and gardens.

The site was formerly a fuel filling station and the relatively flat concrete and bituminous macadam surfaced forecourt, canopy and kiosk/ service building are still present, as shown on the site photographs taken on 1 November 2016. To the south east of the building, inspection covers to old fuel tanks and stop points to old fuel lines are also present.

The southern, south western and western margins of the site fall steeply down from the forecourt and at the time of the ground investigation were thickly wooded and potentially unstable.

1.2 Proposed Development and Purpose of the Ground Investigation

We understand that it is proposed to clear the site and construct a two storey building, with retail units at ground floor level and residential flats at first floor level, together with a car park, as shown on Figure 3.

The purpose of the investigation was to determine the ground conditions beneath the site in order that slope stability analysis could be undertaken for the existing and revised slope profiles.

1.3 Previous Reports

The following reports have been issued for the site which have been referenced during this investigation:

- Geo-environmental Phase I Desk Study report, ref. 15082 and dated June 2015, issued by Integral Design Solutions Limited.
- Phase II Ground Investigation report, ref. NE3545 and dated February 2017, issued by Sub Surface North East Ltd.

2. INVESTIGATION

2.1 Investigation Details

Five mini boreholes were put down to depths of between 2.50m and 5.45m at the positions determined and set out by Sub Surface North East Ltd, as shown on Figure 4. The boreholes were undertaken using a mini sampling rig fitted with windowless sample tubes of varying diameter, with the exception of M2, where a hand held mini sampler was used due to access restrictions. The samples were subsequently logged in accordance with BS EN ISO 14688-1: 2002 and BS EN ISO 14689-1: 2003 and the resulting Mini Borehole Records are appended.

Three 150mm diameter boreholes were put down by cable percussive boring techniques at the positions determined and set out by Sub Surface North East Ltd, as shown on Figure 4. The boreholes were put down to depths of between 10.15m and 11.25m, samples taken were logged in accordance with BS EN ISO 14688-1: 2002 and BS EN ISO 14689-1: 2003 and the resulting Borehole Records are appended.

Five hand dug trial pits were taken out at the positions determined and set out by Sub Surface North East Ltd, as shown on Figure 4. The hand dug trial pits were excavated to depths of between 0.65m and 0.85m. Samples were taken for logging, in accordance with BS EN ISO 14688-1: 2002 and BS EN ISO 14689-1: 2003, and testing. Dimensions of existing wall foundations where present were recorded and the resulting Hand Dug Trial Pit Records are appended.

On completion M1, M3 and HD1 to HD5 were backfilled with arisings as no installations were required.

Ground levels at the exploratory hole positions have been determined by a survey undertaken by Sub Surface North East Ltd. The reduced levels are related to Ordnance Datum.

2.2 Sub Surface Detail

Details of the strata encountered in the ground investigation are given on the appended exploratory hole records. The exploratory holes found made ground overlying . The depths of strata found were as follows:

TABLE 1 STRATA

Expl. Hole No.	Ground Level (mOD)	Depth of Granular MG (m)	Depth of Upper Soft Cohesive MG (m)	Depth of Lower Firm Cohesive MG (m)	Depth of Natural Cohesive (m)	Depth of Mudstone (m)	Depth of Hole (m)
BH4	124.22	1.50	6.15	8.70	-	10.15	10.15
BH5	123.77	1.30	5.00	9.80	10.40**	11.25	11.25
BH6	123.51	2.00	5.00	9.30	-	10.15	10.15
M1	123.58	0.75	5.00	5.45	-	-	5.45
M2	114.78	0.40	-	-	1.90*	2.50	2.50
M3	123.76	0.45	5.45	-	-	-	5.45
M4	123.10	-	2.62 [#]	-	-	-	2.62
M5	124.10	-	5.00	5.45	-	-	5.45
HD1	121.33	-	0.80	-	-	-	0.80
HD2	118.60	-	0.80	-	-	-	0.80
HD3	116.30	-	0.65	-	-	-	0.65
HD4	121.13	-	0.85	-	-	-	0.85
HD5	119.53	0.60	-	-	-	-	0.60

BH = Borehole, M = Mini Borehole, HD = Hand Dug Trial Pit.

*Alluvial clays and silts, **Residual silty clay, [#]Borehole terminated on concrete obstruction

A general summary of the strata found is as follows:

2.2.1 Made Ground

Boreholes BH4, BH5, BH6, M3, M4 and M5 found a concrete surfacing to depths of between 0.15m and 0.22m and M1 found a bituminous macadam surfacing to 0.10m depth. The remaining exploratory holes initially found an initial clayey topsoil surface.

Underlying the surface material BH4, BH5, BH5, M1, M2 and M3 initially encountered predominantly granular made ground to depths of 1.50m, 1.30m, 2.00m, 0.75m, 0.40m, 0.45m and 0.60m, respectively. The material generally comprised very loose to loose dark grey locally ashy locally clayey sandy gravel. Gravel sized fragments mainly consisted of fine to coarse brick, concrete, stone and clinker.

Underlying the granular material in the above and the surfacing in the remaining boreholes was encountered predominantly cohesive made ground. The material generally comprising soft greyish brown to dark grey locally gravelly slightly sandy silty clays with occasional clayey silts. Gravel sized fragments mainly consisted of stone, brick, concrete, clinker, coal and occasional wood. A low stone and concrete cobble content was recorded in M1 and M4, with the latter terminated on a concrete obstruction at 2.64m.

Underlying the clayey topsoil surface material, HD1 to HD4 generally encountered dark brown gravelly silty clay with occasional stone cobbles and tree roots. At 0.25m HD5 found compact dark grey silty ash and clinker and stone gravel with some cobbles.

The cohesive made ground was largely found to be very soft to soft, with low shear strengths, initially extremely low strength in M3, and generally becoming firm medium strength below 5.00m in BH5, BH6, M1 and M5, and below 6.15m in BH4.

Below 3.85m in M3, the cohesive made ground evidently comprised reworked natural material consisting of light greyish brown and light orangish brown slightly gravelly slightly sandy clay. The strata was found to be soft to firm low to medium strength, locally stiff high strength from 5.20m to the termination of the borehole at 5.45m.

2.2.2 Natural Cohesive Strata

Underlying the made ground at 9.80m, BH5 encountered residual clays derived from the complete weathering of the mudstone bedrock which evidently contained thin beds of sandstone. The strata was recovered as firm yellowish brown slightly sandy silty clay with many fine to coarse sandstone lithorelicts.

From 0.40m to 1.90m depth, M2 encountered soft to firm greyish brown slightly gravelly silty clay overlying soft greyish brown clayey silt, which are considered to be alluvial deposits associated with the adjacent stream to the south.

2.2.3 Bedrock

Underlying the made ground and/ or natural cohesive strata at 8.70m in BH4, 10.40m in BH5, 9.30m in BH6 and 1.90m in M2, was generally encountered extremely weak to very weak thinly laminated grey and greyish brown highly weathered mudstone bedrock.

2.2.4 Groundwater

Groundwater entries were recorded at 10.50m depth in BH5, rising to 10.40m in 20 minutes, and at 1.90m depth in M2. No groundwater was encountered in the remainder of the exploratory holes although it should be noted that groundwater levels and rates of inflow may be subject to seasonal and/ or climatic variations.

Monitoring of standpipes installed in BH4, BH5, BH6 and M2 between 04/04/2017 and 05/05/2017 found minimum depths to groundwater of 8.10m, 8.50m, 7.05m, and 1.10m respectively. The standpipes installed in M4 and M5 were found to be dry over the monitoring period.

3. SAMPLING, TESTING AND MONITORING

3.1 Sampling

Continuous core, small disturbed and bulk disturbed samples were obtained for the strata encountered and were subjected to careful examination and hand penetrometer and/ or hand shear vane tests, where appropriate.

The samples will be retained for a period of one month after the issue of this report, for reference purposes, and then disposed of unless otherwise instructed.

3.2 Field Testing

Fifty Standard Penetration Tests (SPTs) were performed in the boreholes, the results of which are recorded on the appended Standard Penetration Test Results Sheet with 'N' values and indicative relative density and shear strength, where appropriate, given on the appended Borehole Records.

3.3 Installations and Monitoring

On completion of BH4, BH5, BH6, M2, M4 and M5 slotted 50mm hdpe standpipes were installed to depths of 10.00m, 11.00m, 10.00m, 2.00m, 2.60m and 5.00m respectively. Details of the installations are given on the appended Borehole Records.

Monitoring of the standpipes for groundwater has been undertaken on two occasions using portable equipment. The results of the monitoring is given on the appended Groundwater Monitoring Results sheet.

3.4 Laboratory Testing

The following laboratory tests were carried out in accordance with BS.1377: 1990, where applicable, and the results are appended.

- Moisture content, plastic limit and liquid limit tests
- Consolidated drained peak and residual shear box tests

4. APPRAISAL AND RECOMMENDATIONS

4.1 Comments on the Profile

At the outset it should be appreciated that only a small proportion of the area to be developed has been investigated and consequently the recommendations made and opinions expressed in this report can only be applied to such conditions as were encountered in the exploratory holes.

The exploratory holes indicate a nature and degree of similarity to the extent that we consider them likely to be representative of the natural ground conditions. However, no guarantee can be given.

Due to the nature of made ground localised variations in thickness and composition should be anticipated and hence interpolation or extrapolation from the exploratory holes to adjoining areas should only be undertaken with caution.

Details of the findings of the investigation are given on the appended exploratory hole records and a summary of the ground conditions is given in Section 2.2.

4.2 Slope Stability

4.2.1 Model

To assess the stability of a slope it is necessary to determine the slope profile, the sequence of strata, the parameters of the strata and the groundwater levels.

To assess the stability of the slopes on this site, profiles along sections A-A' and B-B' have been determined from spot heights and contours shown on the topographical survey supplied by the Client which forms the base plan to Figure 4.

Ground levels relate to Ordnance Datum and together with determined chainages along profiles A-A' and B-B' have been used to draw the cross sections given as Figures 5 and 6.

This and a previous ground investigation (report ref. NE3545) have determined the sequence of strata at the exploratory hole positions and the legends of the exploratory hole records have been added to the cross section and subsequently interpreted. Approximate correlation lines have been added.

Monitoring of standpipes following the investigation (up to 05/05/2017) has provided the groundwater levels for the assessment and the shallowest levels have been added to the cross sections.

Parameters for the strata have been determined by insitu and laboratory test results where possible, however effective stress parameters for natural cohesive strata and mudstone, and parameters for hardstanding, concrete and granular fill material, have been based on our experience.

It should be noted that the effective stress parameters for cohesive made ground were derived by initially adopting the worst-case scenario with the lowest effective stress parameters from the laboratory testing. As slope analysis using these parameters indicated an unstable slope, to establish appropriate effective stress parameters, the slope analysis was reiterated with slightly improved parameters until a Factor of Safety close to 1.0m which is considered representative of ground conditions with a marginally stable slope.

The parameters determined for the strata in the existing slope were as follows:

TABLE 2 SLOPE STABILITY PARAMETERS (EXISTING SLOPE A-A')

No.	Strata	c_u (kN/m ²)	Φ_u (degrees)	Bulk Density (kN/m ³)	c' (kN/m ²)	Φ' (degrees)	r_u
1	Hardstanding	300	0	20.0	300	0	-
2	MG: Granular	0	28	17.8	10	22.5	0.25
3	MG: Upper Cohesive	20	0	19.7	4	30	0.35
4	MG: Lower Cohesive	40	0	19.7	4	30	0.40
5	Alluvial Silty CLAY	40	0	19.0	4	30	0.45
6	Residual Silty CLAY	52	0	20.1	10	25	0.5
7	MUDSTONE	380	0	20.5	10	30	0.5

NE3545A – NORTH RD, KIRKBURTON

TABLE 3 SLOPE STABILITY PARAMETERS (EXISTING SLOPE B-B')

No.	Strata	c_u (kN/m ²)	Φ_u (degrees)	Bulk Density (kN/m ³)	c' (kN/m ²)	Φ' (degrees)	r_u
1	Concrete	300	0	20.0	300	0	-
2	Granular Fill	0	28	18.0	0	30	-
3	MG: Granular	0	28	17.8	10	22.5	0.25
4	MG: Cohesive	20	0	19.7	4	30	0.35
7	MUDSTONE	380	0	20.5	10	30	0.5

MG = Made Ground

The parameters for the additional strata in the revised slope A-A' were as follows:

TABLE 4 SLOPE STABILITY PARAMETERS (REVISED SLOPE A-A')

No.	Strata	c_u (kN/m ²)	Φ_u (degrees)	Bulk Density (kN/m ³)	c' (kN/m ²)	Φ' (degrees)	r_u
1	Pile Wall	3000	0	23.0	3000	0	-
2	Granular Fill	0	30	18	0	30	-

4.2.2 Method and Assessment

The slope stability analysis has been undertaken using the SLOPE programme, version 12.04 dated 2014. Analysis has been undertaken using Bishops method for circular failure planes.

Stability has initially been assessed for the existing profiles in the long term using consolidated drained effective stress profiles.

Slope stability analysis was undertaken on section A-A' for a revised lower gradient slope using short term (total stress) and long term (effective stress) parameters.

Slope stability analysis was then undertaken initially using long term (effective stress) parameters followed by short term (total stress) parameters on section A-A' for a revised profile with a sheet pile retaining wall of variable height taken down 2m into mudstone bedrock and supporting granular backfill material at a 20° gradient.

There are no slip features in the slope and therefore initial analysis allowed for slip circles to daylight at any point along the profiles to ascertain the lowest factor of safety. Analysis was also undertaken with an identified critical point through which the slip circle must pass.

Assessment of the slope was looking for a factor of safety of in excess of 1.25, and ideally greater than 1.5, for no precautions or remedial measures to be required.

4.2.3 Results and Conclusions from the Slope Stability Analysis

The results of the slope stability analyses are summarised in the following tables:

TABLE 5 ANALYSIS OF SLOPE PROFILE A-A'

Run No.	Slope Profile	Minimum Factor Of Safety	Remarks
A1	Existing (Long Term)	0.99 (Marginally Stable)	Analysis of existing profile with effective stress parameters iterated until Factor of Safety approximately 1.0. No restrictions on slip circle.
A2	Revised 1 (Short Term)	1.59 (Stable)	Analysis of revised profile 1 (as shown on Figure 7) with total stress parameters. No restrictions on slip circle. Revised slope approximately 20°.
A3	Revised 1 (Long Term)	1.28 (Just Stable)	Analysis of revised profile with effective stress parameters. No restrictions on slip circle.
A4	Revised 2 (Long Term)	1.09 (Marginally Stable)	Analysis of revised profile incorporating sheet pile wall (5.0m) with retaining section of sheet pile wall 1.0m in height and granular backfill at approx. gradient of 20°. Effective stress parameters. No restrictions on slip circle.
A5	Revised 2 (Long Term)	1.39 (Just Stable)	As A4 with retaining section of sheet pile wall increased from 1.0m to 2.0m in height. Depth of granular backfill proportionately increased.
A6	Revised 2 (Long Term)	1.49 (Just Stable)	As A4 with slip surface passing through toe of slope (above pile wall) X= 7.34m, Y=116.78mOD.
A7	Revised 2 (Short Term)	1.12 (Marginally Stable)	As A5 with total stress parameters.
A8	Revised 2 (Short Term)	1.23 (Marginally Stable)	As A7 with retaining section of sheet pile wall increased 0.5m in height and depth of granular backfill proportionately increased to maintain approx. gradient of 20°.
A9	Revised 2 (Short Term)	1.38 (Just Stable)	As A5 with retaining section of sheet pile wall increased 1.0m in height to 3.0m and depth of granular backfill proportionately increased to maintain approx. gradient of 20°.
A10	Revised 2 (Long Term)	1.39 (Just Stable)	As A9 using effective stress parameters for long term analysis.
A11	Revised 2 (Long Term)	1.82 (Stable)	As A10 with slip surface passing through toe of slope (above pile wall) X= 7.34m, Y=117.78mOD.

The existing profile along A-A' was found to be marginally safe in the long term and therefore to improve stability to an acceptable factor of safety a revised slope at a lower gradient was required.

A revised profile with a gradient of approximately 20° was found to be safe in the short term analysis, however was found to be just safe in the long term.

Further analysis of a revised profile incorporating a sheet pile retaining wall and granular backfill was undertaken. The sheet pile wall was taken 2m into the underlying bedrock and backfilled above ground level with granular fill material forming a new profile at a gradient of 20° (in line with the previous assessment). The long term analysis found a 2m above ground level retaining wall was required to give a Factor of Safety of 1.39, however the short term analysis found the height needed to be increased to 3m to provide acceptable stability with a Factor of Safety of 1.38.

Based on our slope stability analysis and assessment we consider that slope stability of A-A' should be sufficiently improved by a 7m sheet pile wall taken down some 2m into mudstone bedrock with 3m above ground level. Additional loading of the toe of the slope provided by placing (ideally free draining) granular fill upslope of the retaining wall from approximately 114.50mOD to 122.50mSD, as indicated on the cross section.

It should be noted that we have not undertaken stability calculations for the sheet pile retaining wall. These calculations must be undertaken prior to designing and finalising the slope remedial measures to ensure that the sheet pile wall is stable, as ground anchors may be required.

TABLE 6 ANALYSIS OF SLOPE PROFILE B-B'

Run No.	Slope Profile	Minimum Factor Of Safety	Remarks
B1	Existing (Long Term)	1.62 (Safe)	Analysis of existing profile with effective stress parameters for long term assessment. No restrictions on slip circle.

The slope stability analysis indicated that the existing slope B-B' was stable in the long term.

4.2.4 General Comments on Slope Stability

The above slope stability analyses have not taken into account any surcharging due to the proposed development. Once detailed foundation details are available these additional slope stability analyses should be undertaken.

After the initial removal of hard surfaces and topsoil steps of say no more than 0.60m should be excavated into the existing slopes in order that preferential slip surfaces are not formed when the ground is raised over them.

The ground should be raised using graded granular fill material which can be placed in layers of say 0.15m and compacted over the existing slope, which has been assumed in the slope stability analysis.

It would be advisable to install drains in the slope face leading to a collector drain at the toe and the surface water should be led to a suitable discharge point away from the toe of the slope. With regard to the slope surfaces these should be grassed to bind the surface together.

4.3 General

We trust that this report fulfils your present requirements but if you have any queries or we can be of further assistance please contact Mr David Simpson at our Ossett office.

SUB SURFACE CONSULTANTS LIMITED
REPORT No. NE3545A
JUNE 2017

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Geoenvironmental Engineer
For and on behalf of
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For and on behalf of
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SLOPE STABILITY ANALYSIS

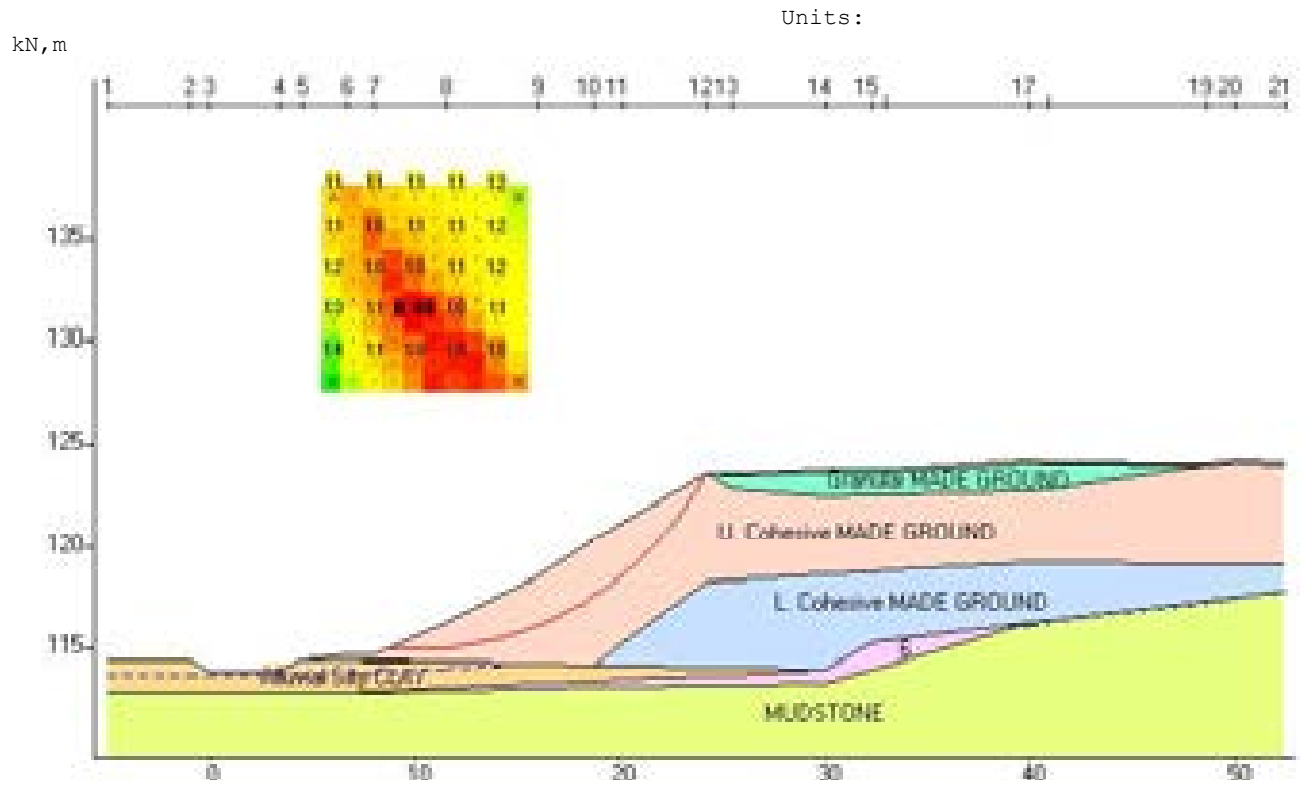
**SLOPE STABILITY ANALYSIS
FOR SECTION A-A'**

					Slope Stability		
Site: NORTH ROAD, KIRKBURTON, WEST YORKSHIRE							Job Number: NE3545A
Client: BAYSWATER LTD							Sheet: 1 / 1
Engineer: SIMBA CONSULTANTS LTD							
Chainage & Ground Levels for Slope Stability Analysis - Section A-A'							
No.	Chainage	Existing Levels	Chainage	Revised Levels	Chainage	Revised Levels	Remarks
	(m)	(mSD)	(m)	1 (mSD)	(m)	2 (mSD)	
1	-5.00	114.50	-5.00	114.50	-5.00	114.50	
2	0.00	113.90	0.00	113.90	0.00	113.90	Beck
3	4.50	114.50	4.50	114.50	4.50	114.50	
4	6.70	114.78	6.70	114.78	6.70	114.78	M2
					7.00	117.78	Pile Sheet Wall
					7.34	117.78	
5	8.00	114.80	8.00	114.80			
6	11.50	116.30	11.50	116.00			HD3
7	16.00	118.60	16.00	117.50			HD2
8	18.75	120.32	18.75	118.56	18.75	121.27	
9	20.20	121.23					HD1
					21.90	122.23	
10	24.20	123.58	24.20	120.65	24.20	123.58	
	25.50	123.58					M1
11	30.00	123.77	30.00	122.85	30.00	123.77	BH5
			32.20	123.77			
12	40.00	124.22	40.00	124.22	40.00	124.22	BH4
13	40.90	124.18	40.90	124.18	40.90	124.18	
14	48.60	124.10	48.60	124.10	48.60	124.10	M5
15	50.00	124.21	50.00	124.21	50.00	124.21	
16	52.50	124.15	52.50	124.15	52.50	124.15	
Remarks:							

EXISTING LONG TERM A-A'

SUB SURFACE CONSULTANTS LIMITED
Program: SLOPE Version 12.04 Revision A16.B13.R49
Licensed from GEOSOLVE
Run ID. A1 NE3545A Section A-A' Existing Long
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No. A1
| (FS: 0.99)
| Job No. NE3545A
| Made by : TP
| Date: 8-06-2017
| Checked :



SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
 Licensed from GEOSOLVE
 Run ID. A1 NE3545A Section A-A' Existing Long
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
 | Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	8.00	11.50

Stratum	Y-Coordinates							
1 (GL)	114.50	114.50	113.90	113.90	114.50	114.78	114.80	116.30
2	114.50	114.50	113.90	113.90	114.50	114.78	114.80	116.30
3	114.50	114.50	113.90	113.90	114.50	114.78	114.80	116.30
4	114.50	114.50	113.90	113.90	114.50	114.45	114.43	114.35
5	114.50	114.50	113.90	113.90	114.50	114.45	114.43	114.35
6	112.88	112.88	112.88	112.88	112.88	112.88	112.94	113.10
7	112.88	112.88	112.88	112.88	112.88	112.88	112.91	112.98

Grid line	9	10	11	12	13	14	15	16
X-Coord	16.00	18.75	20.20	24.20	25.50	30.00	32.30	33.00

Stratum	Y-Coordinates							
1 (GL)	118.60	120.32	121.23	123.58	123.58	123.77	123.77	123.77
2	118.60	120.32	121.23	123.58	123.48	123.62	123.62	123.62
3	118.60	120.32	121.23	123.58	122.83	122.47	122.53	122.57
4	114.26	114.20	115.29	118.28	118.36	118.65	118.78	118.82
5	114.26	114.20	114.17	114.09	114.06	113.97	115.37	115.45
6	113.32	113.44	113.51	113.70	113.76	113.97	115.37	115.45
7	113.08	113.13	113.16	113.25	113.28	113.37	113.97	114.18

Grid line	17	18	19	20	21
X-Coord	40.00	40.90	48.60	50.00	52.50

Stratum	Y-Coordinates				
1 (GL)	124.22	124.18	124.10	124.21	124.15
2	124.07	124.03	123.94	124.06	124.00
3	122.72	122.85	123.94	124.06	124.00
4	119.22	119.21	119.10	119.10	119.10
5	116.30	116.40	117.33	117.50	117.80
6	116.30	116.40	117.33	117.50	117.80
7	116.29	116.40	117.33	117.50	117.80

SOIL PROPERTIES

----- S t r a t u m -----		Bulk unit wt.		-----Strength parameters-----			
No.	Description	below GWL kN/m3	above GWL kN/m3	C kN/m2	Phi (deg)	dC/dY kN/m2/m	Datum for C
1	HARDSTANDING	20.00	20.00	300.00	0.00		
2	Granular MADE GROUND	17.80	17.80	10.00	22.50	Ru = 0.250	
3	U. Cohesive MADE GROUND	19.70	19.70	4.00	30.00	Ru = 0.350	
4	L. Cohesive MADE GROUND	19.60	19.60	4.00	30.00	Ru = 0.400	
5	Alluvial Silty CLAY	19.00	19.00	4.00	30.00	Ru = 0.450	
6	Residual Silty CLAY	20.10	20.10	10.00	25.00	Ru = 0.500	
7	MUDSTONE	20.50	20.50	10.00	30.00	Ru = 0.500	

GROUND WATER CONDITIONS

Unit wt. of water = 10.00 kN/m3

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	8.00	11.50

Ground water level								
	113.68	113.68	113.68	113.68	113.68	113.68	113.77	114.01

Grid line	9	10	11	12	13	14	15	16
X-Coord	16.00	18.75	20.20	24.20	25.50	30.00	32.30	33.00

Ground water level								
	114.31	114.50	114.60	114.87	114.96	115.27	115.47	115.53

Grid line	17	18	19	20	21
X-Coord	40.00	40.90	48.60	50.00	52.50

Ground water level					
	116.12	116.24	117.27	117.46	117.80

CIRCULAR SLIP SURFACE DATA

Grid of centres:	X	Y
Corner of grid	6.00	128.00
Grid increment	1.00	1.00
No. of grid lines	10	10

The grid of centres will be extended automatically
until a minimum factor of safety has been found.

Radii of circles:	Initial radius	1.00
	Increment of radius	0.50

ANALYSIS OPTIONS

Method of analysis: BISHOP - Simplified : Horizontal interslice forces

Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000
Partial factor of safety on soil weight	= 1.000
Partial factor of safety on surcharge loads	= 1.000

Minimum number of slices = 10

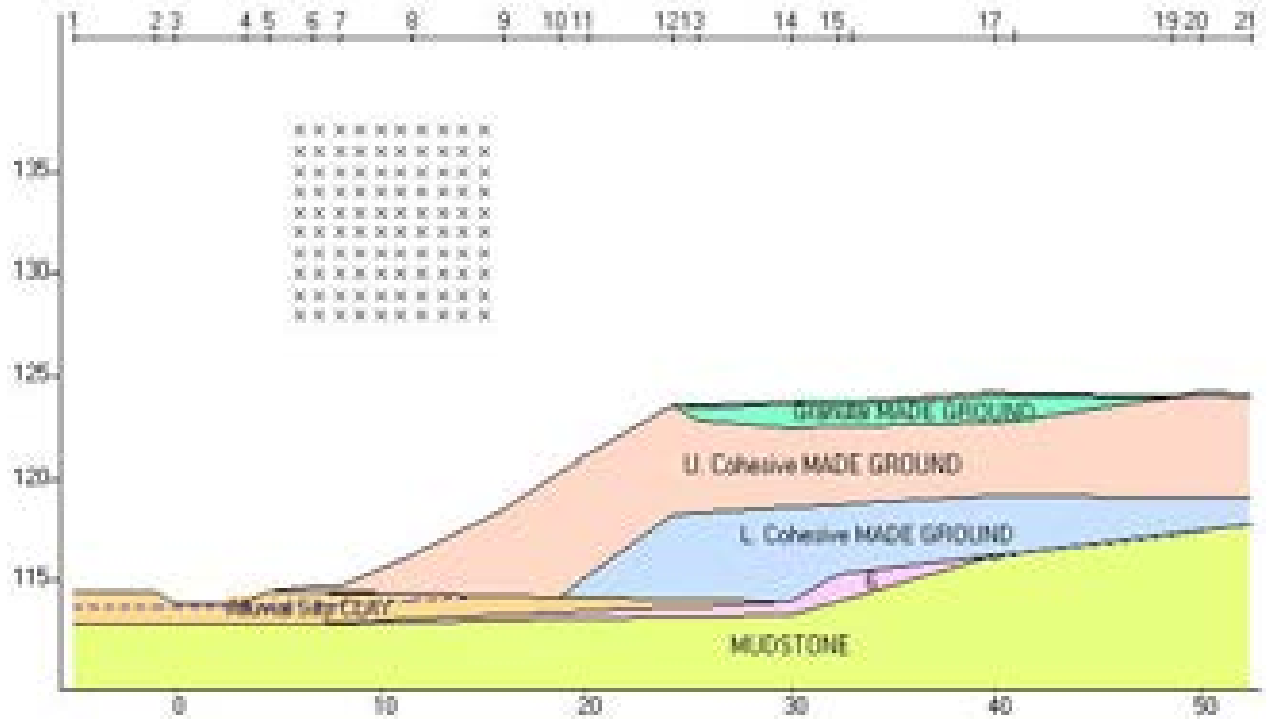
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 Run ID. A1 NE3545A Section A-A' Existing Long
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
Checked :

Units:

kN,m



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A1 NE3545A Section A-A' Existing Long	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Run ID. A1 NE3545A Section A-A' Existing Long
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No.
|
Date: 8-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates									
	6.00	8.00	10.00	12.00	14.00					
137.00	1.109	1.057	1.089	1.094	1.118	1.127	1.149	1.173	1.223	1.280
136.00	1.106	1.069	1.043	1.089	1.096	1.113	1.132	1.150	1.201	1.259
135.00	1.099	1.085	1.025	1.056	1.079	1.099	1.112	1.131	1.196	1.238
134.00	1.134	1.072	1.036	1.014	1.056	1.090	1.101	1.136	1.174	1.215
133.00	1.175	1.075	1.050	1.004	1.027	1.058	1.096	1.119	1.153	1.217
132.00	1.218	1.094	1.061	1.020	0.996	1.024	1.068	1.096	1.135	1.198
131.00	1.267	1.143	1.065	1.030	0.990	1.005	1.021	1.060	1.128	1.184
130.00	1.320	1.186	1.084	1.038	1.015	0.996	1.000	1.012	1.091	1.169
129.00	1.377	1.231	1.114	1.064	1.029	1.006	0.999	0.995	1.037	1.100
128.00	1.446	1.279	1.147	1.093	1.046	0.998	1.013	1.002	1.019	1.054

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A1 NE3545A Section A-A' Existing Long	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 0.990

Slipped mass = 547 kN/m Out of balance vertical force = 0 kN/m
 Out of balance horizontal force = 20 kN/m
 Centre of circle: X = 10.00 Y = 131.00 Radius = 16.00
 Overturning moment = 3891 kN.m/m Restoring moment = 3853 kN.m/m

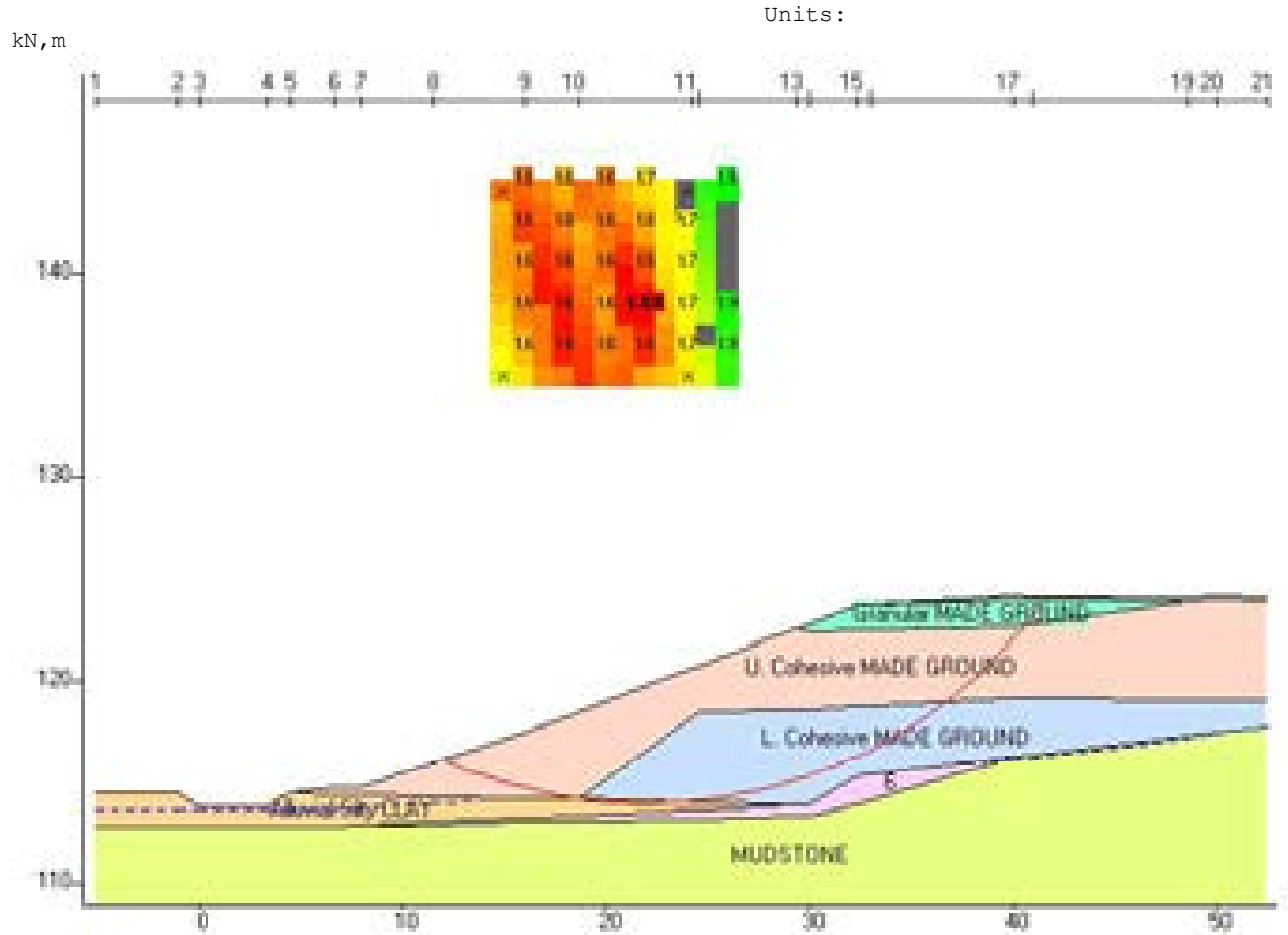
Slip surface coordinates			Piezometric	----- Interslice forces -----		
-----			elevation	----- horizontal ----- vertical		
No.	X	Y	Y(w)	E(total)	E'(effective)	Q
				kN/m	kN/m	kN/m
1	8.61	115.06	115.06	0	0	0
2	10.05	115.00	115.47	10	9	0
3	11.50	115.07	115.92	25	19	0
4	13.79	115.46	116.84	47	33	0
5	16.00	116.17	117.84	58	38	0
6	17.41	116.82	118.66	56	32	0
7	18.75	117.60	119.48	47	22	0
8	20.20	118.67	120.44	29	6	0
9	21.73	120.12	121.51	3	-11	0
10	23.06	121.76	122.55	-17	-22	0
11	24.16	123.56	123.56	-20	-20	0

Slice	Cohesion	Tan(phi)	Pore	Weight	Forces on base of slice		
No.	(avge)	(avge)	pressure	of slice	--- normal ---	---	shear
	kN/m2		(avge)	W	P	P'	S
			kN/m2	kN/m	kN/m	kN/m	kN/m
1	4.00	0.5774	2.34	10	10	7	10
2	4.00	0.5774	6.58	27	26	17	16
3	4.00	0.5774	11.19	73	68	42	34
4	4.00	0.5774	15.33	97	89	53	40
5	4.00	0.5774	17.57	71	65	38	28
6	4.00	0.5774	18.55	71	66	37	28
7	4.00	0.5774	18.18	75	72	39	30
8	4.00	0.5774	15.74	69	68	35	29
9	4.00	0.5774	10.89	41	42	19	19
10	4.00	0.5774	3.97	12	9	1	9

Revised 1 Short Term A-A'

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NORTH ROAD, KIRKBURTON
A-A'

| **Sheet No. A2**
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| Job No. NE3545A
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 Run ID. NE3545A Section A-A' Revised Short Term
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 6-06-2017
Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	8.00	11.50

Stratum	Y-Coordinates							
1 (GL)	114.50	114.50	113.90	113.90	114.50	114.78	114.80	116.00
2	114.50	114.50	113.90	113.90	114.50	114.78	114.80	116.00
3	114.50	114.50	113.90	113.90	114.50	114.78	114.80	116.00
4	114.50	114.50	113.90	113.90	114.50	114.45	114.42	114.35
5	114.50	114.50	113.90	113.90	114.50	114.45	114.42	114.35
6	112.88	112.88	112.88	112.88	112.88	112.88	112.94	113.10
7	112.88	112.88	112.88	112.88	112.88	112.88	112.91	112.98

Grid line	9	10	11	12	13	14	15	16
X-Coord	16.00	18.75	24.20	24.60	29.37	30.00	32.30	33.00

Stratum	Y-Coordinates							
1 (GL)	117.50	118.56	120.65	120.80	122.61	122.85	123.77	123.77
2	117.50	118.56	120.65	120.80	122.61	122.85	123.77	123.77
3	117.50	118.55	120.65	120.80	122.61	122.47	122.53	122.57
4	114.26	114.20	118.28	118.58	118.61	118.65	118.78	118.82
5	114.26	114.20	114.09	114.08	113.98	113.97	115.37	115.45
6	113.31	113.44	113.70	113.72	113.94	113.97	115.37	115.45
7	113.07	113.13	113.25	113.26	113.36	113.37	113.97	114.18

Grid line	17	18	19	20	21
X-Coord	40.00	40.90	48.60	50.00	52.50

Stratum	Y-Coordinates				
1 (GL)	124.22	124.18	124.10	124.21	124.15
2	124.07	124.03	123.94	124.06	124.00
3	122.72	122.85	123.94	124.06	124.00
4	119.22	119.21	119.10	119.10	119.10
5	116.30	116.40	117.33	117.50	117.80
6	116.30	116.40	117.33	117.50	117.80
7	116.29	116.40	117.33	117.50	117.80

SOIL PROPERTIES

----- S t r a t u m -----		Bulk unit wt.		-----Strength parameters-----			
No.	Description	below GWL kN/m3	above GWL kN/m3	C kN/m2	Phi (deg)	dC/dY kN/m2/m	Datum for C
1	HARDSTANDING	20.00	20.00	300.00	0.00		
2	Granular MADE GROUND	17.80	17.80	0.00	28.00		
3	U. Cohesive MADE GROUND	19.70	19.70	20.00	0.00		
4	L. Cohesive MADE GROUND	19.00	19.00	40.00	0.00		
5	Alluvial Silty CLAY	19.00	19.00	40.00	0.00		
6	Residual Silty CLAY	20.10	20.10	52.00	0.00		
7	MUDSTONE	20.50	20.50	380.00	0.00		

GROUND WATER CONDITIONS

Unit wt. of water = 10.00 kN/m3

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	8.00	11.50

Ground water level								
	113.68	113.68	113.68	113.68	113.68	113.68	113.77	114.01

Grid line	9	10	11	12	13	14	15	16
X-Coord	16.00	18.75	24.20	24.60	29.37	30.00	32.30	33.00

Ground water level								
	114.31	114.50	114.87	114.90	115.23	115.27	115.47	115.53

Grid line	17	18	19	20	21
X-Coord	40.00	40.90	48.60	50.00	52.50

Ground water level					
	116.12	116.24	117.27	117.46	117.80

CIRCULAR SLIP SURFACE DATA

Grid of centres:	X	Y
Corner of grid	15.00	135.00
Grid increment	1.00	1.00
No. of grid lines	10	10

The grid of centres will be extended automatically
until a minimum factor of safety has been found.

Radii of circles:	Initial radius	1.00
	Increment of radius	0.50

ANALYSIS OPTIONS

Method of analysis: BISHOP - Simplified : Horizontal interslice forces

Factors of safety calculated on Soil Strength

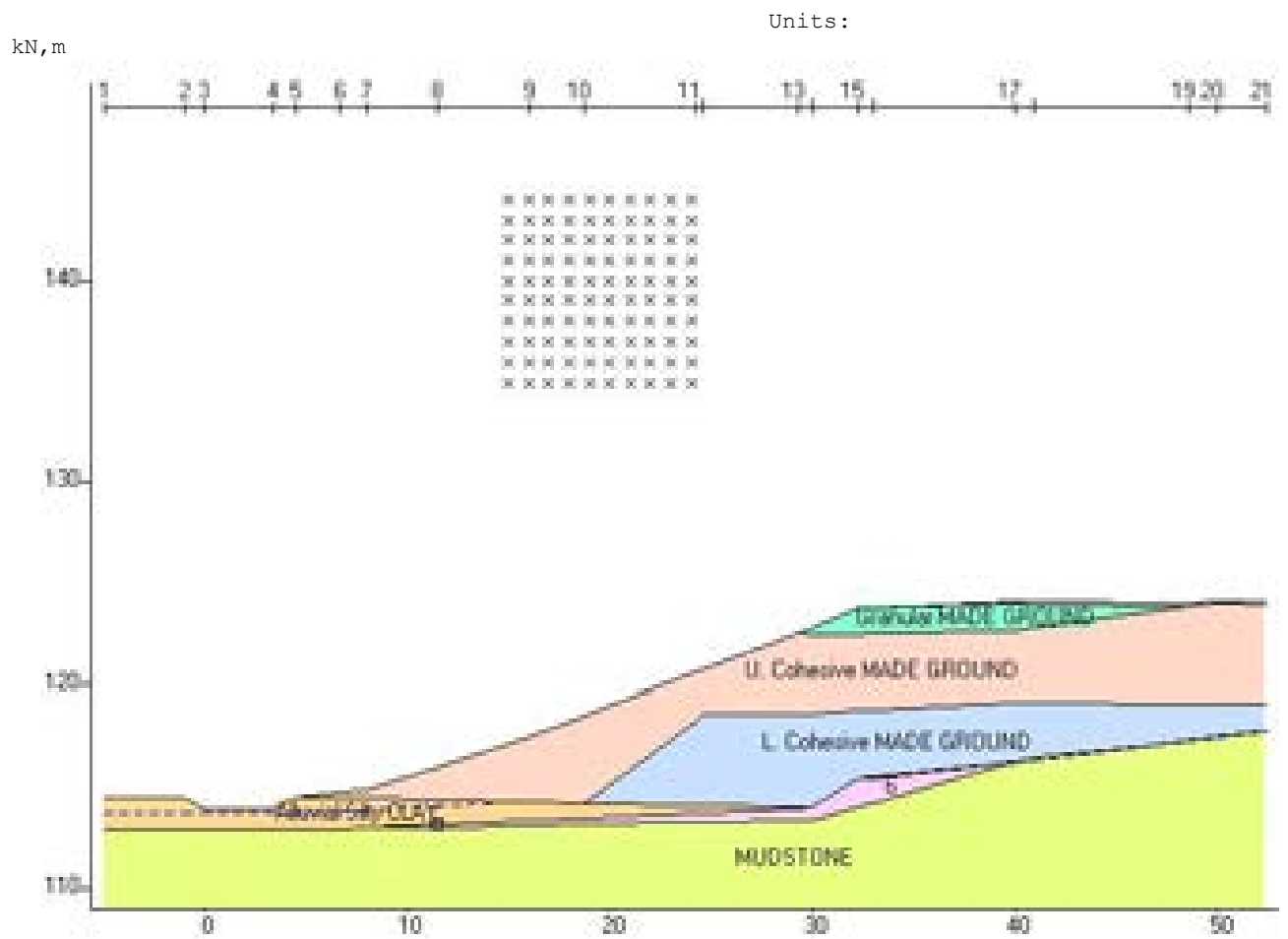
Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000
Partial factor of safety on soil weight	= 1.000
Partial factor of safety on surcharge loads	= 1.000

Minimum number of slices = 10

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Run ID. NE3545A Section A-A' Revised Short Term
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No.
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| Job No. NE3545A
| Made by : TP
| Date: 6-06-2017
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SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
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Run ID. NE3545A Section A-A' Revised Short Term	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 6-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Run ID. NE3545A Section A-A' Revised Short Term
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No.
|
Date: 6-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates											
	15.00	17.00	19.00	21.00	23.00	25.00						
144.00	1.616	1.612	1.621	1.636	1.613	1.620	1.638	1.659	1.687	.	1.853	1.878
143.00	1.637	1.606	1.612	1.627	1.617	1.616	1.625	1.646	1.675	.	1.840	.
142.00	1.632	1.603	1.605	1.619	1.637	1.617	1.611	1.632	1.684	1.733	1.827	.
141.00	1.630	1.627	1.599	1.611	1.629	1.621	1.599	1.618	1.672	1.717	1.813	.
140.00	1.632	1.623	1.595	1.604	1.621	1.616	1.590	1.607	1.660	1.721	1.800	.
139.00	1.639	1.620	1.594	1.598	1.615	1.629	1.592	1.596	1.648	1.709	1.787	.
138.00	1.653	1.621	1.617	1.594	1.608	1.629	1.592	1.590	1.636	1.697	1.774	1.869
137.00	1.672	1.628	1.616	1.593	1.604	1.624	1.614	1.595	1.626	1.686	.	1.860
136.00	1.710	1.644	1.618	1.595	1.600	1.619	1.615	1.599	1.621	1.675	1.765	1.850
135.00	1.750	1.667	1.626	1.618	1.600	1.615	1.610	1.632	1.645	1.665	1.747	1.849

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. NE3545A Section A-A' Revised Short Term	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 6-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.590

Slipped mass = 2794 kN/m Out of balance vertical force = 0 kN/m
Out of balance horizontal force = 48 kN/m

Centre of circle: X = 22.00 Y = 138.00 Radius = 24.00

Overturning moment = 15990 kN.m/m Restoring moment = 25425 kN.m/m

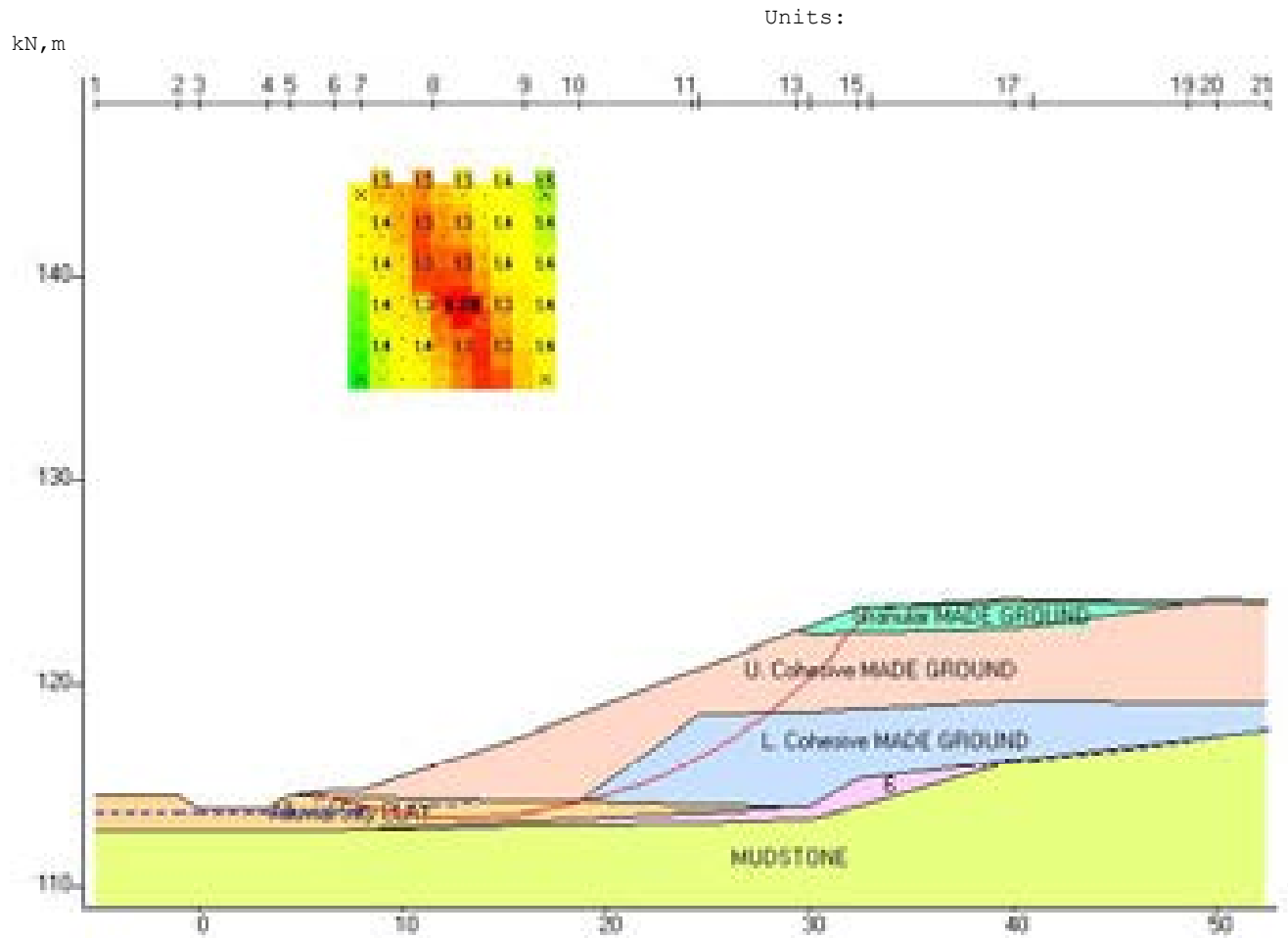
Slip surface coordinates			Piezometric elevation Y (w)	----- Interslice forces -----		
No.	X	Y		----- horizontal -----		vertical
				E (total) kN/m	E' (effective) kN/m	Q kN/m
1	12.02	116.17	114.04	0	0	0
2	13.98	115.38	114.18	40	40	0
3	16.00	114.76	114.31	93	93	0
4	18.75	114.22	114.50	167	166	0
5	21.47	114.01	114.69	256	254	0
6	24.20	114.10	114.87	314	311	0
7	24.60	114.14	114.90	319	316	0
8	27.01	114.53	115.07	329	328	0
9	29.37	115.16	115.23	304	304	0
10	30.00	115.37	115.27	291	291	0
11	32.30	116.32	115.47	222	222	0
12	33.00	116.67	115.53	196	196	0
13	36.75	119.07	115.84	50	50	0
14	40.00	122.13	116.12	-77	-77	0
15	40.90	123.21	116.24	-86	-86	0
16	41.62	124.17	116.34	-48	-48	0

Slice No.	Cohesion (avge) kN/m2	Tan(phi) (avge)	Pore pressure (avge) kN/m2	Weight of slice W kN/m	Forces on base of slice		
					--- normal --- P kN/m	--- P' kN/m	shear S kN/m
1	20.00	0.0000	0.00	28	41	41	27
2	20.00	0.0000	0.00	83	95	95	27
3	20.00	0.0000	0.54	192	202	201	35
4	39.84	0.0000	4.82	264	270	257	68
5	40.00	0.0000	7.28	320	318	298	69
6	40.00	0.0000	7.67	51	50	47	10
7	40.00	0.0000	6.49	322	316	300	61
8	40.00	0.0000	3.02	334	329	322	61
9	40.00	0.0000	0.13	91	90	90	17
10	40.00	0.0000	0.00	330	331	331	63
11	40.00	0.0000	0.00	98	99	99	20
12	39.67	0.0000	0.00	434	444	444	111
13	20.00	0.0000	0.00	217	245	245	56
14	12.45	0.2008	0.00	25	23	23	14
15	46.56	0.4492	0.00	6	-27	-27	28

REVISED 1 LONG TERM A-A'

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Run ID. A3 NE3545A Section A-A' Revised 1 Long
NORTH ROAD, KIRKBURTON
A-A'

| **Sheet No. A3**
| **(FS: 1.28)**
| Job No. NE3545A
| Made by : TP
| Date: 8-06-2017
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 Run ID. A3 NE3545A Section A-A' Revised 1 Long
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	8.00	11.50

Stratum	Y-Coordinates
1 (GL)	114.50 114.50 113.90 113.90 114.50 114.78 114.80 116.00
2	114.50 114.50 113.90 113.90 114.50 114.78 114.80 116.00
3	114.50 114.50 113.90 113.90 114.50 114.78 114.80 116.00
4	114.50 114.50 113.90 113.90 114.50 114.45 114.42 114.35
5	114.50 114.50 113.90 113.90 114.50 114.45 114.42 114.35
6	112.88 112.88 112.88 112.88 112.88 112.88 112.94 113.10
7	112.88 112.88 112.88 112.88 112.88 112.88 112.91 112.98

Grid line	9	10	11	12	13	14	15	16
X-Coord	16.00	18.75	24.20	24.60	29.37	30.00	32.30	33.00

Stratum	Y-Coordinates
1 (GL)	117.50 118.56 120.65 120.80 122.61 122.85 123.77 123.77
2	117.50 118.56 120.65 120.80 122.61 122.85 123.77 123.77
3	117.50 118.55 120.65 120.80 122.61 122.47 122.53 122.57
4	114.26 114.20 118.28 118.58 118.61 118.65 118.78 118.82
5	114.26 114.20 114.09 114.08 113.98 113.97 115.37 115.45
6	113.31 113.44 113.70 113.72 113.94 113.97 115.37 115.45
7	113.07 113.13 113.25 113.26 113.36 113.37 113.97 114.18

Grid line	17	18	19	20	21
X-Coord	40.00	40.90	48.60	50.00	52.50

Stratum	Y-Coordinates
1 (GL)	124.22 124.18 124.10 124.21 124.15
2	124.07 124.03 123.94 124.06 124.00
3	122.72 122.85 123.94 124.06 124.00
4	119.22 119.21 119.10 119.10 119.10
5	116.30 116.40 117.33 117.50 117.80
6	116.30 116.40 117.33 117.50 117.80
7	116.29 116.40 117.33 117.50 117.80

SOIL PROPERTIES

----- S t r a t u m -----		Bulk unit wt.		-----Strength parameters-----			
No.	Description	below GWL kN/m3	above GWL kN/m3	C kN/m2	Phi (deg)	dC/dY kN/m2/m	Datum for C
1	HARDSTANDING	20.00	20.00	300.00	0.00		
2	Granular MADE GROUND	17.80	17.80	10.00	22.50	Ru = 0.250	
3	U. Cohesive MADE GROUND	19.70	19.70	4.00	30.00	Ru = 0.350	
4	L. Cohesive MADE GROUND	19.70	19.70	4.00	30.00	Ru = 0.400	
5	Alluvial Silty CLAY	19.00	19.00	4.00	30.00	Ru = 0.450	
6	Residual Silty CLAY	20.10	20.10	10.00	25.00	Ru = 0.500	
7	MUDSTONE	20.50	20.50	10.00	30.00	Ru = 0.500	

GROUND WATER CONDITIONS

Unit wt. of water = 10.00 kN/m3

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	8.00	11.50

Ground water level								
	113.68	113.68	113.68	113.68	113.68	113.68	113.77	114.01

Grid line	9	10	11	12	13	14	15	16
X-Coord	16.00	18.75	24.20	24.60	29.37	30.00	32.30	33.00

Ground water level								
	114.31	114.50	114.87	114.90	115.23	115.27	115.47	115.53

Grid line	17	18	19	20	21
X-Coord	40.00	40.90	48.60	50.00	52.50

Ground water level					
	116.12	116.24	117.27	117.46	117.80

CIRCULAR SLIP SURFACE DATA

Grid of centres:	X	Y
Corner of grid	8.00	135.00
Grid increment	1.00	1.00
No. of grid lines	10	10

The grid of centres will be extended automatically
until a minimum factor of safety has been found.

Radii of circles:	Initial radius	1.00
	Increment of radius	0.50

ANALYSIS OPTIONS

Method of analysis: BISHOP - Simplified : Horizontal interslice forces

Factors of safety calculated on Soil Strength

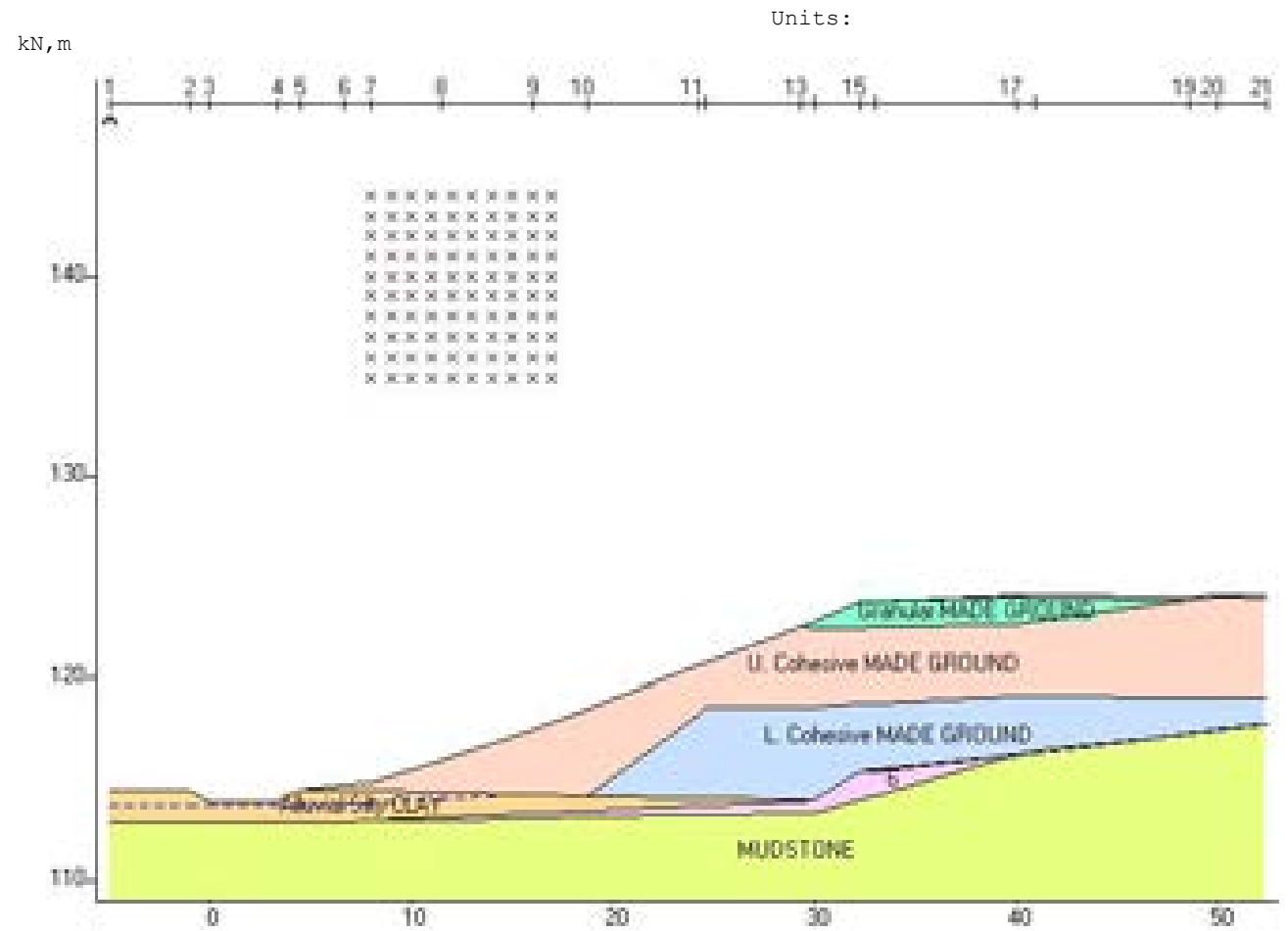
Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000
Partial factor of safety on soil weight	= 1.000
Partial factor of safety on surcharge loads	= 1.000

Minimum number of slices = 10

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 Run ID. A3 NE3545A Section A-A' Revised 1 Long
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
 | Checked :



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A3 NE3545A Section A-A' Revised 1 Long	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Run ID. A3 NE3545A Section A-A' Revised 1 Long
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No.
|
Date: 8-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates									
	8.00	10.00	12.00	14.00	16.00					
144.00	1.376	1.329	1.322	1.310	1.330	1.346	1.376	1.403	1.424	1.456
143.00	1.383	1.347	1.321	1.302	1.316	1.329	1.364	1.386	1.415	1.442
142.00	1.402	1.353	1.324	1.294	1.310	1.319	1.346	1.369	1.397	1.444
141.00	1.411	1.360	1.340	1.290	1.300	1.305	1.328	1.371	1.386	1.428
140.00	1.435	1.364	1.346	1.293	1.292	1.294	1.318	1.358	1.369	1.420
139.00	1.480	1.373	1.352	1.300	1.288	1.284	1.309	1.339	1.353	1.404
138.00	1.494	1.400	1.357	1.346	1.302	1.280	1.294	1.322	1.358	1.395
137.00	1.508	1.428	1.371	1.351	1.309	1.299	1.288	1.313	1.348	1.381
136.00	1.526	1.438	1.385	1.361	1.325	1.301	1.286	1.308	1.334	1.367
135.00	1.546	1.444	1.400	1.374	1.337	1.307	1.289	1.294	1.332	1.366

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A3 NE3545A Section A-A' Revised 1 Long	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.280

Slipped mass = 1610 kN/m Out of balance vertical force = 0 kN/m
Out of balance horizontal force = 37 kN/m

Centre of circle: X = 13.00 Y = 138.00 Radius = 24.50

Overturning moment = 12060 kN.m/m Restoring moment = 15431 kN.m/m

Slip surface coordinates			Piezometric	----- Interslice forces -----		
-----			elevation	----- horizontal -----		vertical
No.	X	Y	Y(w)	E(total)	E'(effective)	Q
				kN/m	kN/m	kN/m
1	5.61	114.64	114.64	0	0	0
2	6.70	114.32	114.72	7	7	0
3	8.00	114.02	114.70	20	18	0
4	11.50	113.55	115.70	77	62	0
5	13.75	113.51	116.36	117	97	0
6	16.00	113.68	117.05	149	131	0
7	18.75	114.18	118.06	170	169	0
8	21.54	115.03	118.65	164	125	0
9	24.20	116.21	119.71	132	76	0
10	24.60	116.42	119.87	125	69	0
11	27.09	117.95	120.94	68	51	0
12	29.37	119.77	121.73	8	-19	0
13	30.00	120.36	122.05	-7	-27	0
14	32.30	122.91	123.29	-43	-44	0
15	32.94	123.77	123.77	-37	-37	0

Slice No.	Cohesion	Tan(phi)	Pore pressure	Weight of slice	Forces on base of slice		
	(avge)	(avge)	(avge)	W	--- normal ---	--- shear ---	
	kN/m2		kN/m2	kN/m	P	P'	S
					kN/m	kN/m	kN/m
1	4.00	0.5774	2.00	5	7	4	6
2	4.00	0.5774	5.41	16	18	11	9
3	4.00	0.5774	14.16	110	117	67	41
4	4.00	0.5774	24.98	125	126	69	38
5	4.00	0.5774	31.06	155	152	82	44
6	4.00	0.5774	36.20	221	214	113	60
7	4.00	0.5774	37.47	246	237	128	67
8	4.00	0.5774	35.58	237	230	126	66
9	4.00	0.5774	34.76	35	34	18	10
10	4.00	0.5774	32.20	200	200	106	57
11	4.00	0.5774	24.72	149	154	82	46
12	4.00	0.5774	18.25	33	34	19	11
13	4.92	0.5524	10.38	73	76	40	30
14	10.00	0.4142	1.92	5	-1	-4	7

REVISED 2 LONG TERM A-A'

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Run ID. A4 NE3545A Section A-A' Revised 2 Long

NORTH ROAD, KIRKBURTON

A-A'

| **Sheet No. A4**

| **(FS: 1.09)**

| Job No. NE3545A

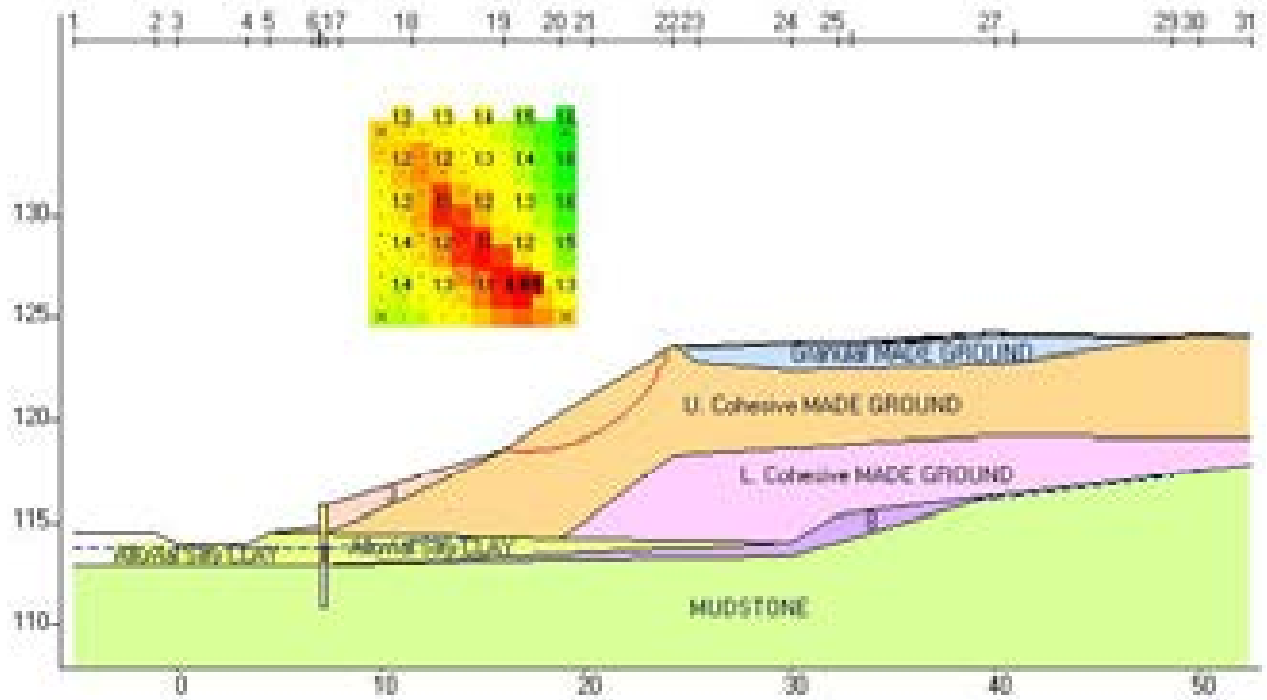
| Made by : TP

| Date: 8-06-2017

| Checked :

Units:

kN,m



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 Run ID. A4 NE3545A Section A-A' Revised 2 Long
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

Stratum	Y-Coordinates							
1 (GL)	114.50	114.50	113.90	113.90	114.50	114.78	114.78	115.78
2	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
3	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
4	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
5	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
6	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
7	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
8	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89
9	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89

Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

Stratum	Y-Coordinates							
1 (GL)	115.78	115.78	115.78	115.79	115.79	115.80	115.81	115.81
2	114.45	112.89	110.89	110.89	112.89	112.91	114.44	115.81
3	114.45	112.89	110.89	110.89	112.89	112.91	114.44	115.81
4	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
5	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
6	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.44
7	114.44	112.89	110.88	110.88	112.89	112.90	114.44	114.44
8	112.89	112.89	110.88	110.88	112.89	112.90	112.91	112.91
9	112.89	112.89	110.88	110.88	112.89	112.89	112.89	112.89

Grid line	17	18	19	20	21	22	23	24
X-Coord	8.00	11.50	16.00	18.75	20.20	24.20	25.50	30.00

Stratum	Y-Coordinates							
1 (GL)	116.02	117.15	118.60	120.32	121.23	123.58	123.58	123.77
2	116.02	117.15	118.60	120.32	121.23	123.58	123.58	123.77
3	116.02	117.15	118.60	120.32	121.23	123.58	123.48	123.62
4	114.80	116.30	118.60	120.32	121.23	123.58	123.48	123.62
5	114.80	116.30	118.60	120.32	121.23	123.58	122.83	122.47
6	114.43	114.35	114.26	114.20	115.29	118.28	118.36	118.65
7	114.43	114.35	114.26	114.20	114.17	114.09	114.06	113.97
8	112.94	113.10	113.32	113.44	113.51	113.70	113.76	113.97
9	112.91	112.98	113.08	113.13	113.16	113.25	113.28	113.37

Grid line	25	26	27	28	29	30	31
X-Coord	32.30	33.00	40.00	40.90	48.60	50.00	52.50

Stratum	Y-Coordinates						
1 (GL)	123.77	123.77	124.22	124.18	124.10	124.21	124.15
2	123.77	123.77	124.22	124.18	124.10	124.21	124.15
3	123.62	123.62	124.22	124.03	123.94	124.06	124.00
4	123.62	123.62	124.07	124.03	123.94	124.06	124.00
5	122.53	122.57	122.72	122.85	123.94	124.06	124.00
6	118.78	118.82	119.22	119.21	119.10	119.10	119.10
7	115.37	115.45	116.30	116.40	117.33	117.50	117.80
8	115.37	115.45	116.30	116.40	117.33	117.50	117.80
9	113.97	114.18	116.29	116.40	117.33	117.50	117.80

SOIL PROPERTIES

----- S t r a t u m -----		Bulk unit wt.		-----Strength parameters-----		
No.	Description	below GWL	above GWL	C	Phi (deg)	dC/dY Datum for C
		kN/m3	kN/m3	kN/m2		kN/m2/m
1	PILE WALL	23.00	23.00	3000.0	0.00	
2	HARDSTANDING	20.00	20.00	300.00	0.00	
3	Granular Fill	18.00	18.00	0.00	30.00	
4	Granular MADE GROUND	17.80	17.80	10.00	22.50	Ru = 0.250
5	U. Cohesive MADE GROUND	19.70	19.70	4.00	30.00	Ru = 0.350
6	L. Cohesive MADE GROUND	19.60	19.60	4.00	30.00	Ru = 0.400
7	Alluvial Silty CLAY	19.00	19.00	4.00	30.00	Ru = 0.450
8	Residual Silty CLAY	20.10	20.10	10.00	25.00	Ru = 0.500
9	MUDSTONE	20.50	20.50	10.00	30.00	Ru = 0.500

GROUND WATER CONDITIONS

Unit wt. of water = 10.00 kN/m3

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

	Ground water level							
	113.68	113.68	113.68	113.68	113.68	113.68	113.70	113.70
Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

	Ground water level							
	113.70	113.70	113.70	113.72	113.72	113.72	113.72	113.72
Grid line	17	18	19	20	21	22	23	24
X-Coord	8.00	11.50	16.00	18.75	20.20	24.20	25.50	30.00

	Ground water level							
	113.77	114.01	114.31	114.50	114.60	114.87	114.96	115.27
Grid line	25	26	27	28	29	30	31	
X-Coord	32.30	33.00	40.00	40.90	48.60	50.00	52.50	

	Ground water level							
	115.47	115.53	116.12	116.24	117.27	117.46	117.80	

CIRCULAR SLIP SURFACE DATA

Grid of centres: X Y
 Corner of grid 10.00 125.00
 Grid increment 1.00 1.00
 No. of grid lines 10 10
 The grid of centres will be extended automatically
 until a minimum factor of safety has been found.

Radii of circles: Initial radius 1.00
 Increment of radius 0.50

ANALYSIS OPTIONS

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
 Factors of safety calculated on Soil Strength
 Partial factor of safety on tan(phi) = 1.000
 Partial factor of safety on drained cohesion = 1.000
 Partial factor of safety on undrained cohesion = 1.000
 Partial factor of safety on soil weight = 1.000
 Partial factor of safety on surcharge loads = 1.000
 Minimum number of slices = 10

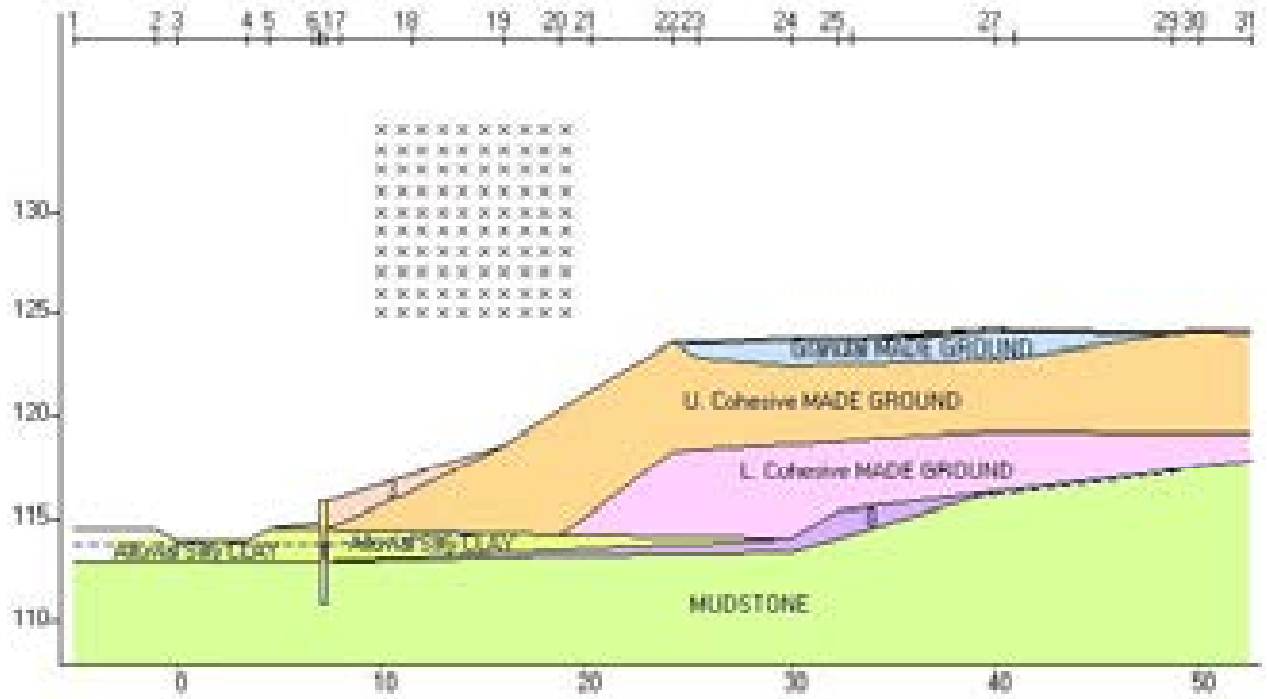
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 Run ID. A4 NE3545A Section A-A' Revised 2 Long
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
 | Checked :

Units:

kN,m



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A4 NE3545A Section A-A' Revised 2 Long	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Run ID. A4 NE3545A Section A-A' Revised 2 Long
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No.
|
| Date: 8-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates									
	10.00	12.00	14.00	16.00	18.00					
134.00	1.224	1.236	1.253	1.269	1.316	1.356	1.426	1.495	1.576	1.647
133.00	1.214	1.212	1.162	1.263	1.277	1.322	1.386	1.469	1.550	1.651
132.00	1.274	1.196	1.157	1.182	1.246	1.291	1.346	1.435	1.531	1.637
131.00	1.346	1.202	1.179	1.117	1.183	1.263	1.307	1.392	1.504	1.617
130.00	1.368	1.247	1.178	1.104	1.119	1.188	1.284	1.349	1.454	1.584
129.00	1.374	1.301	1.198	1.145	1.101	1.121	1.218	1.309	1.404	1.549
128.00	1.368	1.367	1.232	1.168	1.112	1.094	1.115	1.229	1.358	1.500
127.00	1.376	1.410	1.285	1.218	1.160	1.110	1.097	1.125	1.300	1.450
126.00	1.400	1.424	1.353	1.285	1.222	1.149	1.106	1.091	1.196	1.345
125.00	1.438	1.449	1.428	1.357	1.295	1.205	1.154	1.132	1.159	1.220

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A4 NE3545A Section A-A' Revised 2 Long	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.091

Slipped mass = 219 kN/m Out of balance vertical force = 0 kN/m
 Out of balance horizontal force = 10 kN/m
 Centre of circle: X = 17.00 Y = 126.00 Radius = 7.50
 Overturning moment = 736 kN.m/m Restoring moment = 803 kN.m/m

Slip surface coordinates			Piezometric	----- Interslice forces -----		
-----			elevation	----- horizontal -----		vertical
No.	X	Y	Y(w)	E (total)	E' (effective)	Q
				kN/m	kN/m	kN/m
1	15.93	118.58	114.31	0	0	0
2	16.00	118.57	118.59	0	0	0
3	16.92	118.50	118.97	7	5	0
4	17.84	118.55	119.38	15	10	0
5	18.75	118.71	119.82	22	13	0
6	19.49	118.92	120.21	25	13	0
7	20.20	119.22	120.60	25	11	0
8	21.47	119.98	121.36	18	4	0
9	22.57	120.97	122.11	4	-6	0
10	23.45	122.16	122.83	-9	-12	0
11	24.07	123.51	123.51	-10	-10	0

Slice No.	Cohesion	Tan(phi)	Pore pressure	Weight of slice	Forces on base of slice		
	(avge)	(avge)	(avge)	W	--- normal ---	---	shear
	kN/m2		kN/m2	kN/m	P	P'	S
					kN/m	kN/m	kN/m
1	2.71	0.5738	0.00	0	0	0	0
2	4.00	0.5774	2.44	6	7	5	6
3	4.00	0.5774	6.48	17	17	11	9
4	4.00	0.5774	9.72	25	24	15	11
5	4.00	0.5774	11.97	25	23	14	10
6	4.00	0.5774	13.35	27	25	15	11
7	4.00	0.5774	13.83	50	47	26	19
8	4.00	0.5774	12.57	39	39	20	16
9	4.00	0.5774	9.03	23	24	10	11
10	4.00	0.5774	3.35	6	4	-1	5

REVISED 2 LONG TERM A-A'

SUB SURFACE CONSULTANTS LIMITED

Program: SLOPE Version 12.04 Revision A16.B13.R49

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Run ID. A6 NE3545A Section A-A' Revised 2 Long 3

NORTH ROAD, KIRKBURTON

A-A'

| Sheet No. A5

| (FS: 1.39)

| Job No. NE3545A

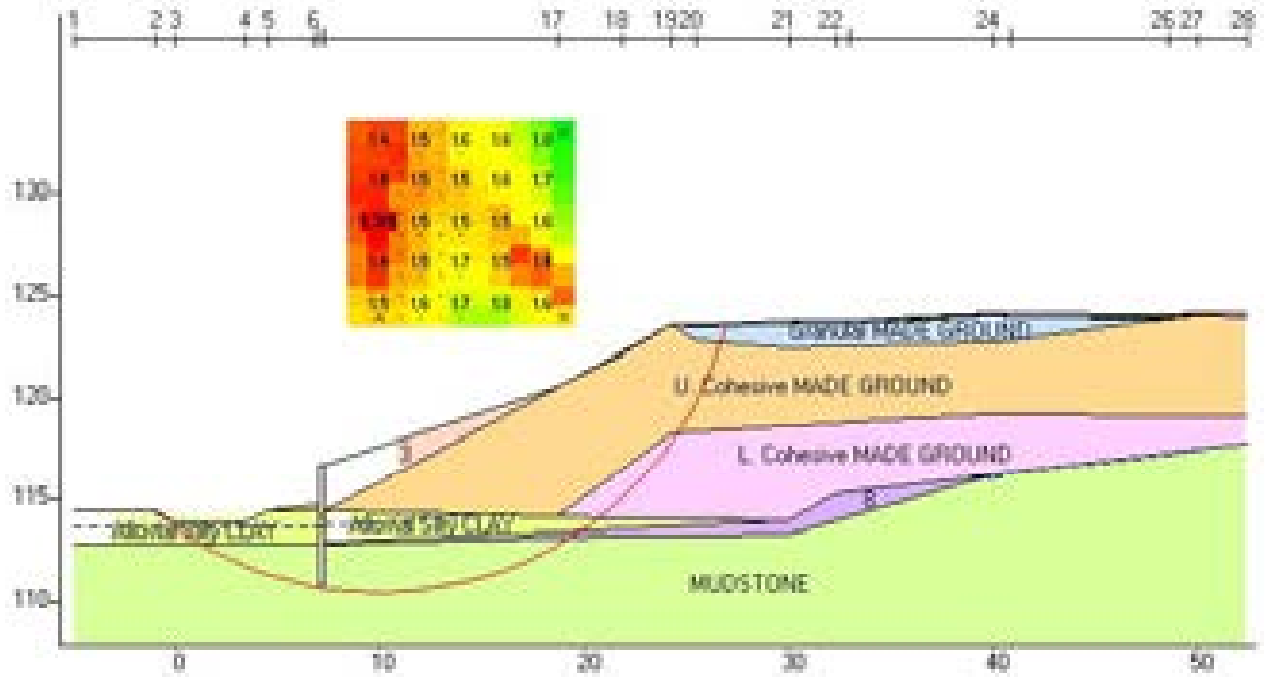
| Made by : TP

| Date: 8-06-2017

| Checked :

Units:

kN,m



SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
 Licensed from GEOSOLVE
 Run ID. A6 NE3545A Section A-A' Revised 2 Long 3
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
 | Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

Stratum	Y-Coordinates							
1 (GL)	114.50	114.50	113.90	113.90	114.50	114.78	114.78	116.78
2	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
3	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
4	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
5	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
6	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
7	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
8	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89
9	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89

Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

Stratum	Y-Coordinates							
1 (GL)	116.78	116.78	116.78	116.78	116.78	116.78	116.78	116.78
2	114.45	112.89	110.89	110.89	112.89	112.91	114.44	116.78
3	114.45	112.89	110.89	110.89	112.89	112.91	114.44	116.78
4	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
5	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
6	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.44
7	114.44	112.89	110.88	110.88	112.89	112.90	114.44	114.44
8	112.89	112.89	110.88	110.88	112.89	112.90	112.91	112.91
9	112.89	112.89	110.88	110.88	112.89	112.89	112.89	112.89

Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

Stratum	Y-Coordinates							
1 (GL)	120.54	122.23	123.58	123.58	123.77	123.77	123.77	124.22
2	120.54	122.23	123.58	123.58	123.77	123.77	123.77	124.22
3	120.54	122.23	123.58	123.48	123.62	123.62	123.62	124.22
4	120.54	122.23	123.58	123.48	123.62	123.62	123.62	124.07
5	120.54	122.22	123.58	122.83	122.47	122.53	122.57	122.72
6	114.20	116.56	118.28	118.36	118.65	118.78	118.82	119.22
7	114.20	114.14	114.09	114.06	113.97	115.37	115.45	116.30
8	113.44	113.59	113.70	113.76	113.97	115.37	115.45	116.30
9	113.13	113.20	113.25	113.28	113.37	113.97	114.18	116.29

Grid line	25	26	27	28
X-Coord	40.90	48.60	50.00	52.50

Stratum	Y-Coordinates			
1 (GL)	124.18	124.10	124.21	124.15
2	124.18	124.10	124.21	124.15
3	124.03	123.94	124.06	124.00
4	124.03	123.94	124.06	124.00
5	122.85	123.94	124.06	124.00
6	119.21	119.10	119.10	119.10
7	116.40	117.33	117.50	117.80
8	116.40	117.33	117.50	117.80
9	116.40	117.33	117.50	117.80

SOIL PROPERTIES

----- S t r a t u m -----		Bulk unit wt.		-----Strength parameters-----		
No.	Description	below GWL	above GWL	C	Phi (deg)	dC/dY Datum for C
		kN/m3	kN/m3	kN/m2		kN/m2/m
1	PILE WALL	23.00	23.00	3000.0	0.00	
2	HARDSTANDING	20.00	20.00	300.00	0.00	
3	Granular Fill	18.00	18.00	0.00	30.00	
4	Granular MADE GROUND	17.80	17.80	10.00	22.50	Ru = 0.250
5	U. Cohesive MADE GROUND	19.70	19.70	4.00	30.00	Ru = 0.350
6	L. Cohesive MADE GROUND	19.60	19.60	4.00	30.00	Ru = 0.400
7	Alluvial Silty CLAY	19.00	19.00	4.00	30.00	Ru = 0.450
8	Residual Silty CLAY	20.10	20.10	10.00	25.00	Ru = 0.500
9	MUDSTONE	20.50	20.50	10.00	30.00	Ru = 0.500

GROUND WATER CONDITIONS

Unit wt. of water = 10.00 kN/m3

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

	Ground water level							
	113.68	113.68	113.68	113.68	113.68	113.68	113.70	113.70
Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

	Ground water level							
	113.70	113.70	113.70	113.72	113.72	113.72	113.72	113.72
Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

	Ground water level							
	114.50	114.71	114.87	114.96	115.27	115.47	115.53	116.12
Grid line	25	26	27	28				
X-Coord	40.90	48.60	50.00	52.50				

	Ground water level							
	116.24	117.27	117.46	117.80				

CIRCULAR SLIP SURFACE DATA

Grid of centres: X Y
 Corner of grid 10.00 124.00
 Grid increment 1.00 1.00
 No. of grid lines 10 10
 The grid of centres will be extended automatically
 until a minimum factor of safety has been found.

Radii of circles: Initial radius 1.00
 Increment of radius 0.50

ANALYSIS OPTIONS

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
 Factors of safety calculated on Soil Strength
 Partial factor of safety on tan(phi) = 1.000
 Partial factor of safety on drained cohesion = 1.000
 Partial factor of safety on undrained cohesion = 1.000
 Partial factor of safety on soil weight = 1.000
 Partial factor of safety on surcharge loads = 1.000
 Minimum number of slices = 10

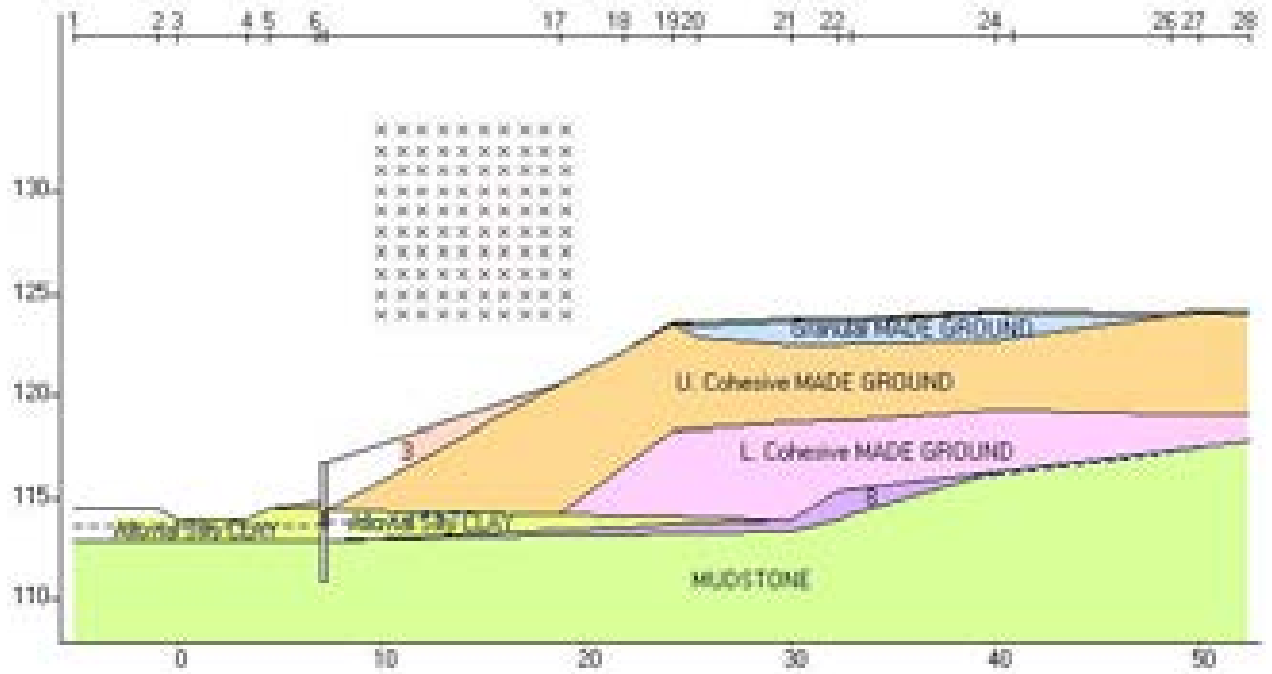
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SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
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 Run ID. A6 NE3545A Section A-A' Revised 2 Long 3
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
 | Checked :

Units:

kN,m



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A6 NE3545A Section A-A' Revised 2 Long 3	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Run ID. A6 NE3545A Section A-A' Revised 2 Long 3
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No.
|
| Date: 8-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates											
	9.00	11.00	13.00	15.00	17.00	19.00						
133.00	1.425	1.414	1.413	1.486	1.482	1.559	1.620	1.668	1.728	1.817	1.934	
132.00	1.416	1.411	1.403	1.468	1.485	1.569	1.601	1.648	1.691	1.798	1.898	
131.00	1.410	1.411	1.409	1.466	1.472	1.538	1.554	1.596	1.654	1.749	1.879	
130.00	1.401	1.398	1.456	1.456	1.477	1.496	1.525	1.562	1.621	1.703	1.833	
129.00	1.411	1.393	1.443	1.462	1.509	1.489	1.510	1.473	1.602	1.662	1.783	
128.00	1.423	1.386	1.445	1.476	1.539	1.526	1.529	1.484	1.478	1.613	1.734	
127.00	1.444	1.393	1.440	1.478	1.542	1.588	1.541	1.508	1.408	1.481	1.659	
126.00	1.439	1.404	1.468	1.485	1.569	1.653	1.610	1.503	1.445	1.428	1.475	
125.00	1.498	1.436	1.493	1.520	1.598	1.691	1.688	1.660	1.546	1.491	1.428	
124.00	1.525	1.507	1.522	1.574	1.633	1.735	1.752	1.752	1.695	1.617	1.557	

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A6 NE3545A Section A-A' Revised 2 Long 3	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.386

Slipped mass = 2967 kN/m Out of balance vertical force = 0 kN/m
 Out of balance horizontal force = 156 kN/m
 Centre of circle: X = 10.00 Y = 128.00 Radius = 17.50
 Overturning moment = 14831 kN.m/m Restoring moment = 20558 kN.m/m

Slip surface coordinates			Piezometric elevation	----- Interslice forces -----		
-----				----- horizontal -----		vertical
No.	X	Y	Y (w)	E (total) kN/m	E' (effective) kN/m	Q kN/m
1	-1.14	114.50	114.50	0	0	0
2	-1.00	114.39	114.48	1	1	0
3	0.00	113.64	113.86	12	12	0
4	3.40	111.79	113.88	114	98	0
5	4.50	111.39	114.46	162	127	0
6	6.70	110.81	114.75	259	200	0
7	6.99	110.76	114.75	271	209	0
8	7.00	110.76	117.05	272	161	0
9	7.01	110.76	117.10	272	160	0
10	7.02	110.76	117.42	273	154	0
11	7.03	110.75	117.67	273	265	0
12	7.30	110.71	117.67	290	278	0
13	7.31	110.71	117.42	291	169	0
14	7.32	110.71	117.41	292	169	0
15	7.33	110.70	117.11	292	177	0
16	7.34	110.70	116.53	293	190	0
17	10.29	110.50	117.55	422	280	0
18	13.23	110.80	118.56	487	340	0
19	16.08	111.59	119.52	473	366	0
20	18.75	112.84	120.42	386	364	0
21	21.90	115.17	120.73	184	114	0
22	24.20	117.77	122.35	-22	-45	0
23	25.50	119.88	122.39	-143	-187	0
24	26.33	121.72	122.98	-197	-207	0
25	26.95	123.64	115.06	-156	-156	0

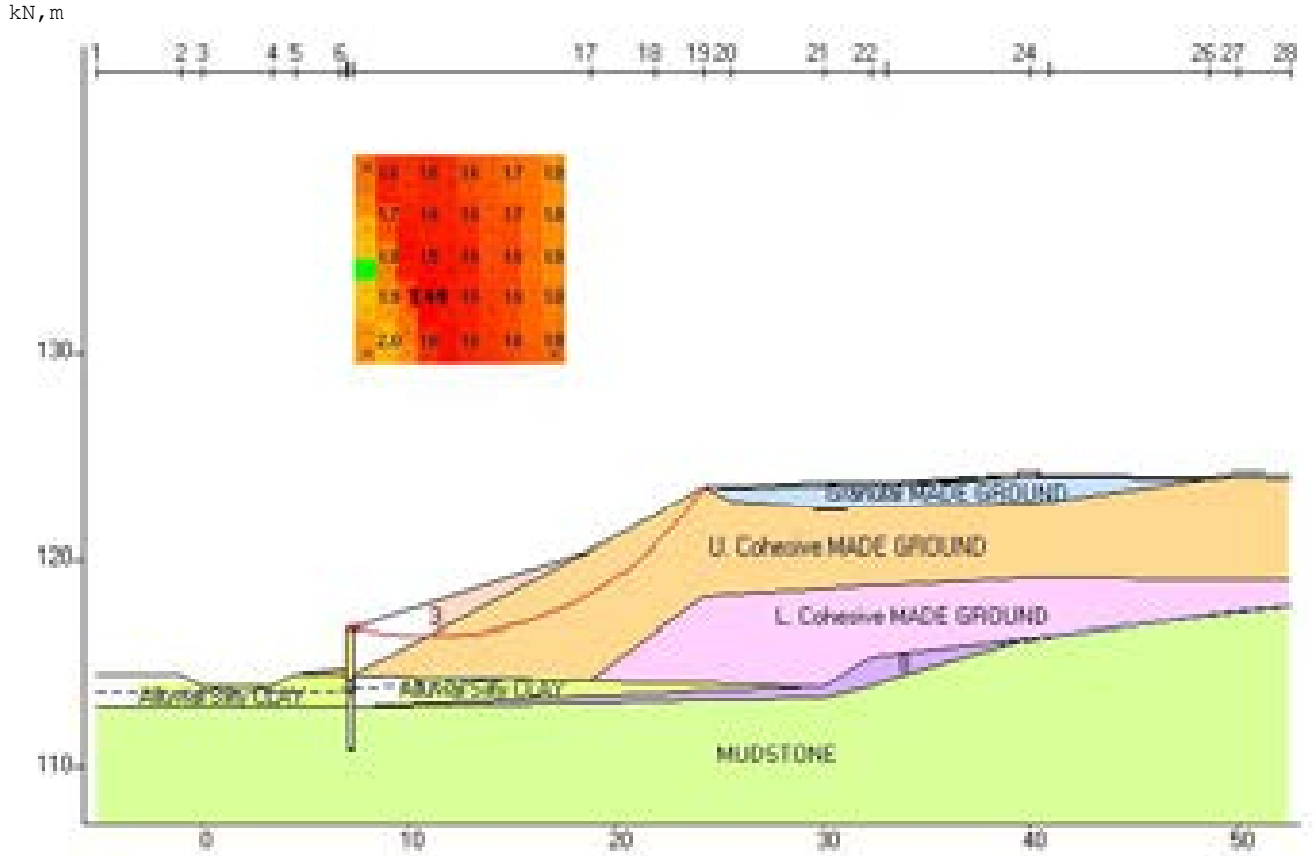
Slice No.	Cohesion	Tan(phi)	Pore pressure	Weight of slice	Forces on base of slice		
	(avge) kN/m2	(avge)	(avge) kN/m2	W kN/m	--- normal P kN/m	--- P' kN/m	shear S kN/m
1	4.00	0.5774	0.47	0	1	1	1
2	4.00	0.5774	1.59	4	9	7	7
3	7.53	0.5773	11.54	79	118	74	52
4	10.00	0.5774	25.77	57	70	39	25
5	10.00	0.5774	35.02	154	174	94	56
6	10.00	0.5774	39.64	23	25	13	8
7	10.00	0.5774	51.42	1	1	1	0
8	10.00	0.5774	63.19	1	1	1	0
9	10.00	0.5774	65.04	1	1	1	0
10	10.00	0.5774	67.86	1	1	1	0
11	10.00	0.5774	69.35	37	40	21	11
12	10.00	0.5774	68.34	1	1	1	0
13	10.00	0.5774	67.09	1	1	1	0
14	10.00	0.5774	65.56	1	1	1	0
15	10.00	0.5774	61.15	1	1	1	0
16	10.00	0.5774	64.38	380	388	197	103
17	10.00	0.5774	74.05	435	427	208	108
18	10.00	0.5774	78.47	447	434	203	106
19	10.00	0.5774	77.53	415	412	183	98
20	5.65	0.5610	65.64	457	488	231	109
21	4.00	0.5774	50.66	291	348	172	82
22	4.00	0.5774	35.43	121	166	78	40
23	4.00	0.5774	18.86	45	68	30	18
24	24.48	0.4756	0.81	11	-35	-37	23

REVISED 2 LONG TERM A-A'

SUB SURFACE CONSULTANTS LIMITED
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Licensed from GEOSOLVE
Run ID. A6 NE3545A Section A-A' Rev 2 Long 3
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No. A6
| (FS: 1.49)
| Job No. NE3545A
| Made by : TP
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Units:



SUB SURFACE CONSULTANTS LIMITED
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 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

Stratum	Y-Coordinates							
1 (GL)	114.50	114.50	113.90	113.90	114.50	114.78	114.78	116.78
2	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
3	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
4	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
5	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
6	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
7	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
8	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89
9	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89

Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

Stratum	Y-Coordinates							
1 (GL)	116.78	116.78	116.78	116.78	116.78	116.78	116.78	116.78
2	114.45	112.89	110.89	110.89	112.89	112.91	114.44	116.78
3	114.45	112.89	110.89	110.89	112.89	112.91	114.44	116.78
4	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
5	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
6	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.44
7	114.44	112.89	110.88	110.88	112.89	112.90	114.44	114.44
8	112.89	112.89	110.88	110.88	112.89	112.90	112.91	112.91
9	112.89	112.89	110.88	110.88	112.89	112.89	112.89	112.89

Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

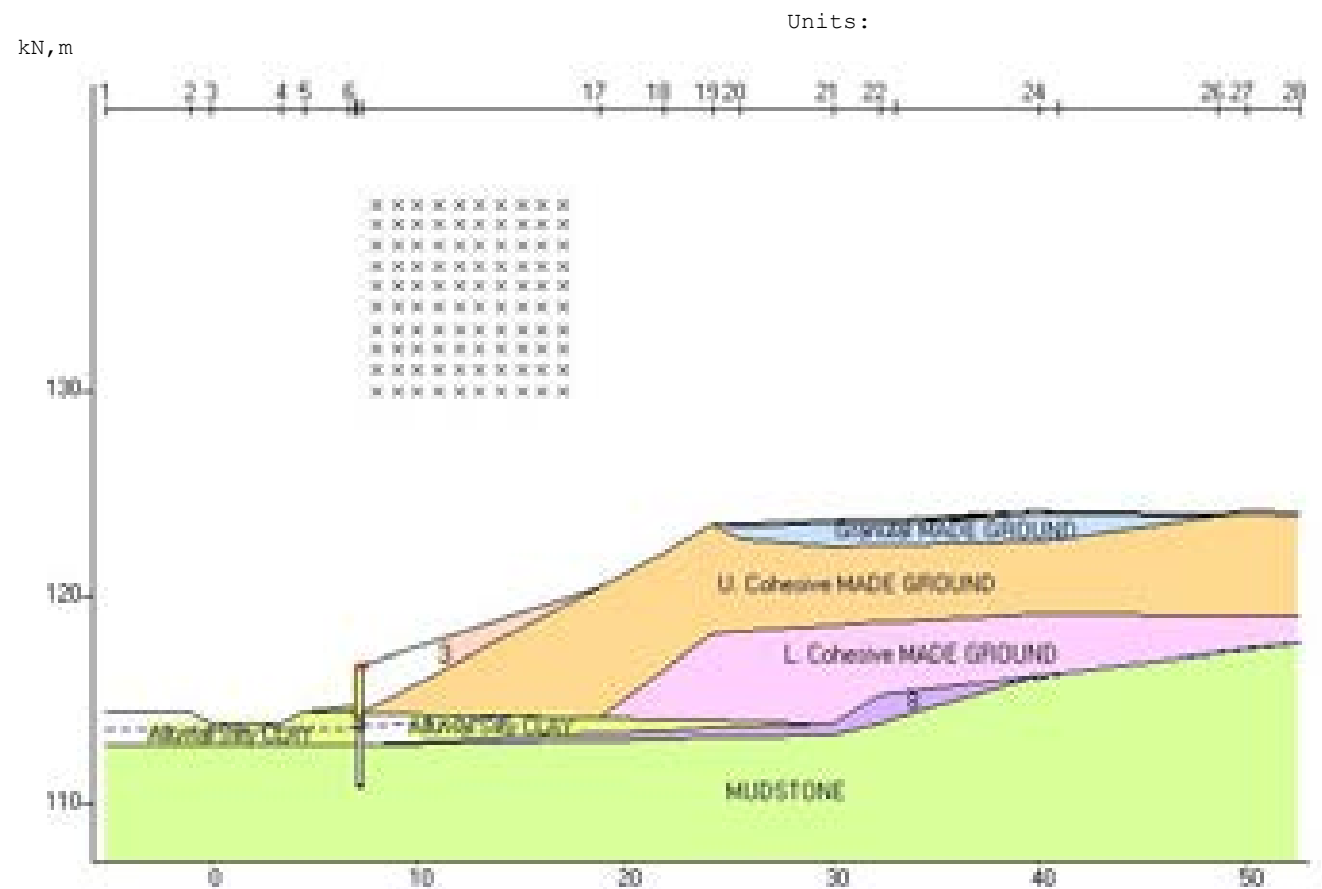
Stratum	Y-Coordinates							
1 (GL)	120.54	122.23	123.58	123.58	123.77	123.77	123.77	124.22
2	120.54	122.23	123.58	123.58	123.77	123.77	123.77	124.22
3	120.54	122.23	123.58	123.48	123.62	123.62	123.62	124.22
4	120.54	122.23	123.58	123.48	123.62	123.62	123.62	124.07
5	120.54	122.22	123.58	122.83	122.47	122.53	122.57	122.72
6	114.20	116.56	118.28	118.36	118.65	118.78	118.82	119.22
7	114.20	114.14	114.09	114.06	113.97	115.37	115.45	116.30
8	113.44	113.59	113.70	113.76	113.97	115.37	115.45	116.30
9	113.13	113.20	113.25	113.28	113.37	113.97	114.18	116.29

Grid line	25	26	27	28
X-Coord	40.90	48.60	50.00	52.50

Stratum	Y-Coordinates			
1 (GL)	124.18	124.10	124.21	124.15
2	124.18	124.10	124.21	124.15
3	124.03	123.94	124.06	124.00
4	124.03	123.94	124.06	124.00
5	122.85	123.94	124.06	124.00
6	119.21	119.10	119.10	119.10
7	116.40	117.33	117.50	117.80
8	116.40	117.33	117.50	117.80
9	116.40	117.33	117.50	117.80

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 A-A'

| Sheet No.
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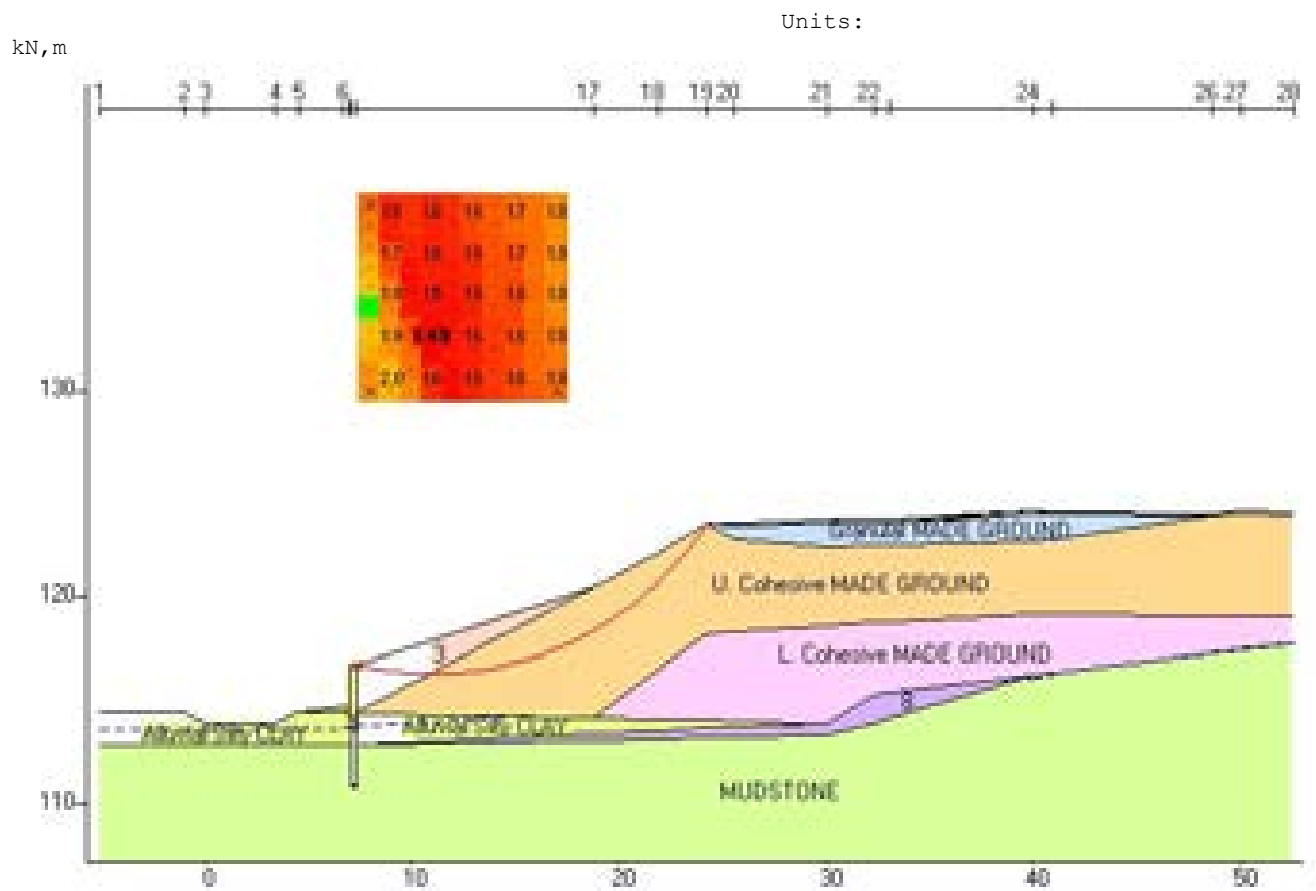
Units: kN,m

Brief results for selected circles through common point no.1

---Centre---	Radius	Factor	Slipped	Overturning	Restoring	Delta
X Y	R	of	mass	moment	moment	
		safety	(Out of	balance	forces)	(Itera
			(Vert.	Horiz.	Moment)	tions)
			kN/m		kN.m/m	
11.00 132.00	15.65	1.493	540	2770	4136	
			(0)	(0)	(0)	(5)
11.00 133.00	16.63	1.497	580	3229	4833	
			(0)	(0)	(0)	(5)
10.00 135.00	18.41	1.514	453	2828	4283	
			(0)	(0)	(0)	(5)
12.00 130.00	14.02	1.515	705	3148	4770	
			(0)	(0)	(0)	(5)
12.00 131.00	14.96	1.518	742	3606	5473	
			(0)	(0)	(0)	(5)
11.00 134.00	17.60	1.525	616	3665	5590	
			(0)	(0)	(0)	(5)
11.00 131.00	14.68	1.530	503	2350	3597	
			(0)	(0)	(0)	(5)
12.00 134.00	17.84	1.531	846	4948	7575	
			(0)	(0)	(0)	(5)
10.00 136.00	19.40	1.532	492	3290	5042	
			(0)	(0)	(0)	(5)
12.00 133.00	16.88	1.537	811	4491	6903	
			(0)	(0)	(0)	(5)
10.00 134.00	17.42	1.539	415	2390	3679	
			(0)	(0)	(0)	(5)
9.00 137.00	20.29	1.540	355	2453	3778	
			(0)	(0)	(0)	(5)
12.00 135.00	18.81	1.540	880	5404	8322	
			(0)	(0)	(0)	(5)
12.00 132.00	15.92	1.543	775	4038	6231	
			(0)	(0)	(0)	(5)
11.00 137.00	20.55	1.549	726	5026	7786	
			(0)	(0)	(0)	(5)
11.00 136.00	19.57	1.552	690	4570	7091	
			(0)	(0)	(0)	(5)
13.00 131.00	15.31	1.553	1015	4870	7562	
			(0)	(0)	(0)	(5)
13.00 132.00	16.24	1.555	1045	5324	8280	
			(0)	(0)	(0)	(5)
12.00 136.00	19.78	1.556	913	5860	9118	
			(0)	(0)	(0)	(5)
13.00 134.00	18.13	1.556	1106	6241	9712	
			(0)	(0)	(0)	(5)

SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
 Licensed from GEOSOLVE
 Run ID. A6 NE3545A Section A-A' Rev 2 Long 3
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
 | Checked :



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A6 NE3545A Section A-A' Rev 2 Long 3	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Critical Factor of Safety for each Common Point

---- Common point ----			----- Critical circle -----			
Point	X	Y	---- Centre ----	Radius	Factor of	
no.	coord	coord	X	Y	safety	
1	7.34	116.78	11.00	132.00	15.65	1.493 <---

Run ID. A6 NE3545A Section A-A' Rev 2 Long 3
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No.
|
Date: 8-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates									
	8.00	10.00	12.00	14.00	16.00					
139.00	1.743	1.590	1.592	1.577	1.588	1.680	1.694	1.734	1.757	1.850
138.00	1.765	1.560	1.592	1.560	1.570	1.647	1.681	1.724	1.749	1.840
137.00	1.847	1.540	1.567	1.549	1.576	1.627	1.674	1.716	1.739	1.843
136.00	1.983	1.668	1.532	1.552	1.556	1.584	1.664	1.652	1.759	1.836
135.00	2.044	1.747	1.514	1.560	1.540	1.568	1.665	1.638	1.732	1.832
134.00	4.734	1.823	1.539	1.525	1.531	1.556	1.651	1.630	1.753	1.831
133.00	2.061	1.834	1.667	1.497	1.537	1.566	1.615	1.632	1.733	1.800
132.00	1.993	1.891	1.745	1.493	1.543	1.555	1.607	1.647	1.720	1.779
131.00	1.861	2.003	1.761	1.530	1.518	1.553	1.604	1.643	1.721	1.768
130.00	1.864	2.003	1.836	1.591	1.515	1.569	1.608	1.645	1.694	1.752

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A6 NE3545A Section A-A' Rev 2 Long 3	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.493

Slipped mass = 540 kN/m Out of balance vertical force = 0 kN/m
 Out of balance horizontal force = 15 kN/m
 Centre of circle: X = 11.00 Y = 132.00 Radius = 15.65
 Overturning moment = 2770 kN.m/m Restoring moment = 4136 kN.m/m

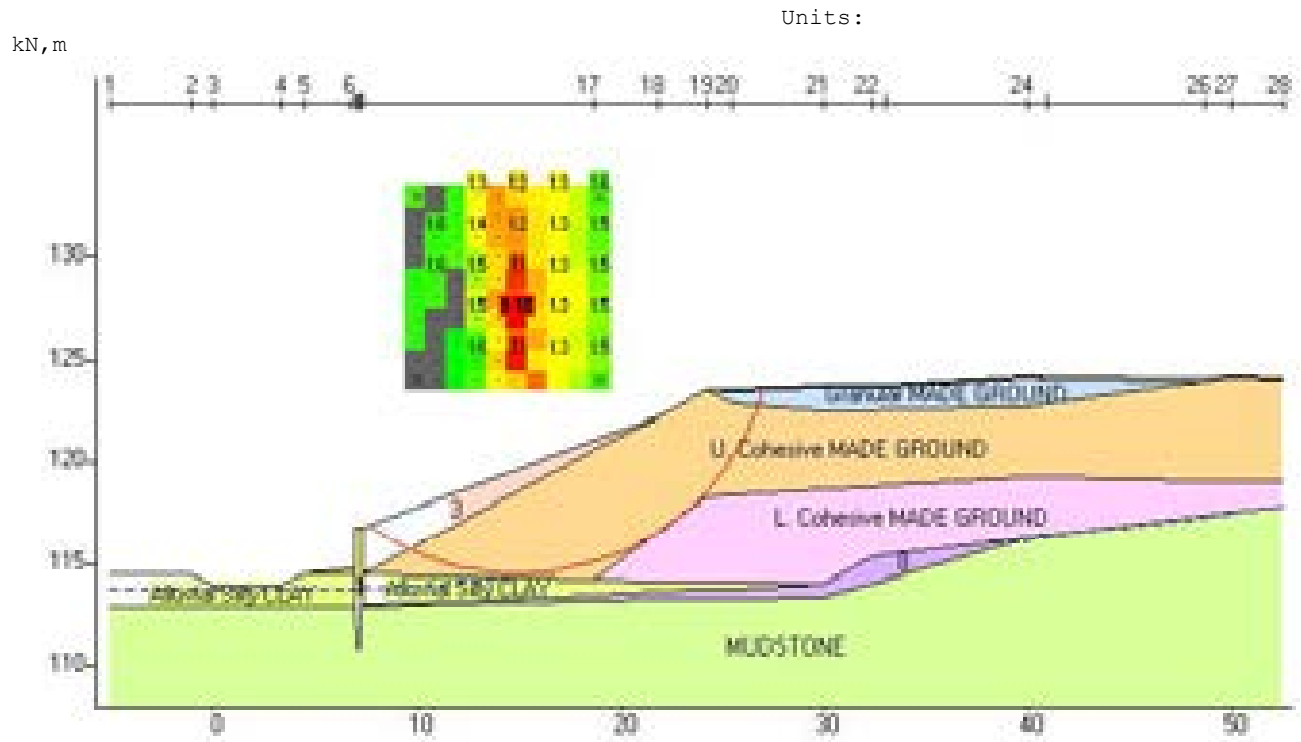
Slip surface coordinates			Piezometric	----- Interslice forces -----		
-----			elevation	----- horizontal -----		vertical
No.	X	Y	Y (w)	E (total)	E' (effective)	Q
				kN/m	kN/m	kN/m
1	7.34	116.78	113.72	0	0	0
2	9.67	116.40	113.88	14	14	0
3	12.03	116.38	117.64	42	36	0
4	14.36	116.71	118.30	57	41	0
5	16.62	117.39	119.05	57	38	0
6	18.75	118.40	119.88	43	27	0
7	20.40	119.48	120.82	23	10	0
8	21.90	120.76	121.77	2	-5	0
9	23.13	122.11	122.69	-13	-15	0
10	24.20	123.58	123.58	-15	-15	0

Slice No.	Cohesion	Tan(phi)	Pore pressure	Weight of slice	Forces on base of slice		
	(avge)	(avge)	(avge)	W	--- normal ---	---	shear
	kN/m2		kN/m2	kN/m	P	P'	S
1	0.00	0.5774	0.00	24	26	26	10
2	1.79	0.5772	2.10	67	67	62	27
3	4.00	0.5774	14.25	95	92	58	29
4	4.00	0.5774	16.27	105	100	62	30
5	4.00	0.5774	15.69	96	93	56	28
6	4.00	0.5774	14.08	66	66	38	20
7	4.00	0.5774	11.74	50	52	29	16
8	4.00	0.5774	7.96	28	30	15	11
9	4.00	0.5774	2.92	9	7	2	6

Revised 2 Short Term A-A'

SUB SURFACE CONSULTANTS LIMITED
Program: SLOPE Version 12.04 Revision A16.B13.R49
Licensed from GEOSOLVE
Run ID. NE3545A Section A-A' Rev Short sheet pile
NORTH ROAD, KIRKBURTON
A-A'

| **Sheet No. A7**
| **(FS: 1.12)**
| Job No. NE3545A
| Made by : TP
| Date: 7-06-2017
| Checked :



SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
 Licensed from GEOSOLVE
 Run ID. NE3545A Section A-A' Rev Short sheet pile
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 7-06-2017
Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

Stratum	Y-Coordinates							
1 (GL)	114.50	114.50	113.90	113.90	114.50	114.78	114.78	116.78
2	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
3	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
4	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
5	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
6	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
7	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
8	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89
9	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89

Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

Stratum	Y-Coordinates							
1 (GL)	116.78	116.78	116.78	116.78	116.78	116.78	116.78	116.78
2	114.45	112.89	110.89	110.89	112.89	112.91	114.44	116.78
3	114.45	112.89	110.89	110.89	112.89	112.91	114.44	116.78
4	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
5	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
6	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.44
7	114.44	112.89	110.88	110.88	112.89	112.90	114.44	114.44
8	112.89	112.89	110.88	110.88	112.89	112.90	112.91	112.91
9	112.89	112.89	110.88	110.88	112.89	112.89	112.89	112.89

Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

Stratum	Y-Coordinates							
1 (GL)	121.05	122.23	123.58	123.58	123.77	123.77	123.77	124.22
2	121.05	122.23	123.58	123.58	123.77	123.77	123.77	124.22
3	121.05	122.23	123.58	123.48	123.62	123.62	123.62	124.22
4	120.54	122.23	123.58	123.48	123.62	123.62	123.62	124.07
5	120.54	122.22	123.58	122.83	122.47	122.53	122.57	122.72
6	114.20	116.56	118.28	118.36	118.65	118.78	118.82	119.22
7	114.20	114.14	114.09	114.06	113.97	115.37	115.45	116.30
8	113.44	113.59	113.70	113.76	113.97	115.37	115.45	116.30
9	113.13	113.20	113.25	113.28	113.37	113.97	114.18	116.29

Grid line	25	26	27	28
X-Coord	40.90	48.60	50.00	52.50

Stratum	Y-Coordinates			
1 (GL)	124.18	124.10	124.21	124.15
2	124.18	124.10	124.21	124.15
3	124.03	123.94	124.06	124.00
4	124.03	123.94	124.06	124.00
5	122.85	123.94	124.06	124.00
6	119.21	119.10	119.10	119.10
7	116.40	117.33	117.50	117.80
8	116.40	117.33	117.50	117.80
9	116.40	117.33	117.50	117.80

SOIL PROPERTIES

----- S t r a t u m -----		Bulk unit wt.		-----Strength parameters-----			
No.	Description	below GWL	above GWL	C	Phi (deg)	dC/dY kN/m2/m	Datum for C
		kN/m3	kN/m3	kN/m2			
1	PILE WALL	23.00	23.00	3000.0	0.00		
2	HARDSTANDING	20.00	20.00	300.00	0.00		
3	Granular Fill	18.00	18.00	0.00	30.00		
4	Granular MADE GROUND	17.80	17.80	0.00	28.00		
5	U. Cohesive MADE GROUND	19.70	19.70	20.00	0.00		
6	L. Cohesive MADE GROUND	19.00	19.00	40.00	0.00		
7	Alluvial Silty CLAY	19.00	19.00	40.00	0.00		
8	Residual Silty CLAY	20.10	20.10	52.00	0.00		
9	MUDSTONE	20.50	20.50	380.00	0.00		

GROUND WATER CONDITIONS

Unit wt. of water = 10.00 kN/m3

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

	Ground water level							
	113.68	113.68	113.68	113.68	113.68	113.68	113.70	113.70
Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

	Ground water level							
	113.70	113.70	113.70	113.72	113.72	113.72	113.72	113.72
Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

	Ground water level							
	114.50	114.71	114.87	114.96	115.27	115.47	115.53	116.12
Grid line	25	26	27	28				
X-Coord	40.90	48.60	50.00	52.50				

	Ground water level							
	116.24	117.27	117.46	117.80				

CIRCULAR SLIP SURFACE DATA

Grid of centres: X Y
 Corner of grid 10.00 124.00
 Grid increment 1.00 1.00
 No. of grid lines 10 10
 The grid of centres will be extended automatically
 until a minimum factor of safety has been found.

Radii of circles: Initial radius 1.00
 Increment of radius 0.50

ANALYSIS OPTIONS

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
 Factors of safety calculated on Soil Strength
 Partial factor of safety on tan(phi) = 1.000
 Partial factor of safety on drained cohesion = 1.000
 Partial factor of safety on undrained cohesion = 1.000
 Partial factor of safety on soil weight = 1.000
 Partial factor of safety on surcharge loads = 1.000
 Minimum number of slices = 10

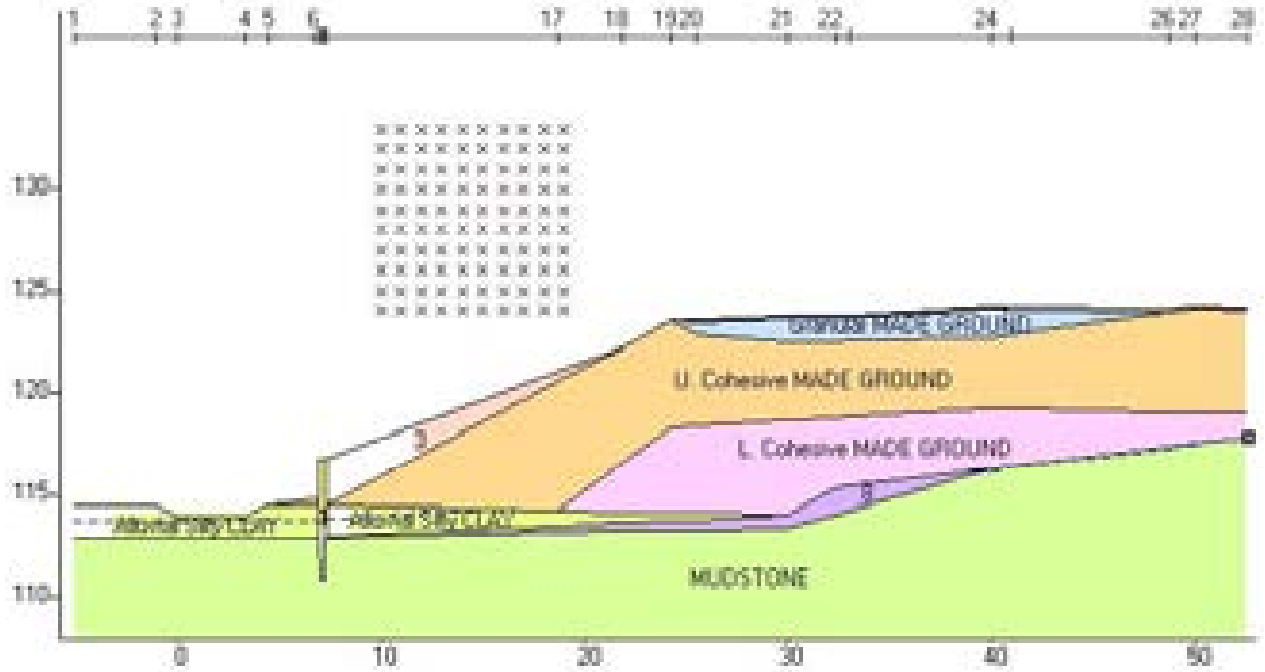
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SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
 Licensed from GEOSOLVE
 Run ID. NE3545A Section A-A' Rev Short sheet pile
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 7-06-2017
 | Checked :

Units:

kN,m



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. NE3545A Section A-A' Rev Short sheet pile	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 7-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Run ID. NE3545A Section A-A' Rev Short sheet pile
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Date: 7-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates									
	10.00	12.00	14.00	16.00	18.00					
133.00	1.567	.	1.589	1.345	1.193	1.240	1.285	1.347	1.436	1.570
132.00	.	.	1.585	1.355	1.197	1.186	1.264	1.337	1.432	1.548
131.00	.	1.597	1.581	1.373	1.206	1.191	1.259	1.345	1.449	1.547
130.00	.	1.594	1.561	1.452	1.245	1.200	1.264	1.345	1.437	1.539
129.00	1.608	1.590	.	1.479	1.258	1.143	1.211	1.326	1.398	1.521
128.00	1.605	1.585	.	1.388	1.200	1.159	1.226	1.295	1.382	1.487
127.00	1.601	.	.	1.467	1.245	1.124	1.251	1.313	1.398	1.502
126.00	1.597	.	1.642	1.538	1.313	1.178	1.204	1.284	1.425	1.530
125.00	.	.	1.642	1.611	1.239	1.131	1.262	1.329	1.404	1.504
124.00	.	.	1.643	1.566	1.299	1.231	1.168	1.333	1.463	1.569

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. NE3545A Section A-A' Rev Short sheet pile	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 7-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi) = 1.000
Partial factor of safety on drained cohesion = 1.000
Partial factor of safety on undrained cohesion = 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.124

Slipped mass = 1590 kN/m Out of balance vertical force = 0 kN/m
Out of balance horizontal force = 16 kN/m
Centre of circle: X = 15.00 Y = 127.00 Radius = 12.50
Overturning moment = 5241 kN.m/m Restoring moment = 5891 kN.m/m

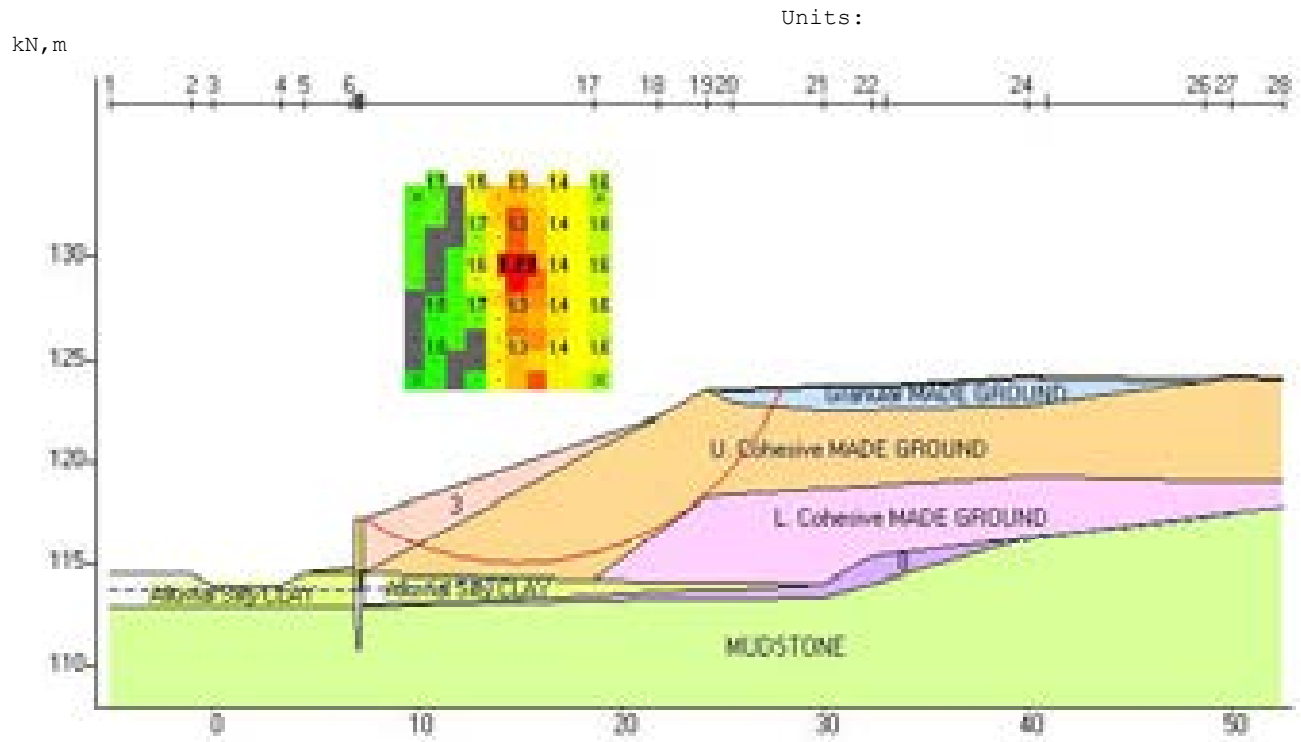
Slip surface coordinates			Piezometric	----- Interslice forces -----		
-----			elevation	----- horizontal ----- vertical		
No.	X	Y	Y (w)	E (total)	E' (effective)	Q
				kN/m	kN/m	kN/m
1	7.64	116.89	113.74	0	0	0
2	9.65	115.70	113.88	56	56	0
3	11.84	114.91	114.03	141	141	0
4	14.14	114.53	114.19	213	213	0
5	16.47	114.59	114.35	249	249	0
6	18.75	115.08	114.50	236	236	0
7	20.38	115.72	114.61	195	195	0
8	21.90	116.58	114.71	132	132	0
9	24.20	118.54	114.87	-4	-4	0
10	25.50	120.22	114.96	-80	-80	0
11	26.40	121.87	115.02	-91	-91	0
12	27.04	123.65	115.07	-16	-16	0

Slice	Cohesion	Tan(phi)	Pore	Weight	Forces on base of slice		
No.	(avge)	(avge)	pressure	of slice	--- normal ---	--- shear	
	kN/m2		(avge)	W	P	P'	S
			kN/m2	kN/m	kN/m	kN/m	kN/m
1	0.00	0.5774	0.00	35	59	59	30
2	19.81	0.0056	0.00	112	134	134	42
3	20.00	0.0000	0.00	184	193	193	41
4	20.00	0.0000	0.00	235	234	234	41
5	20.00	0.0000	0.00	257	254	254	41
6	20.00	0.0000	0.00	190	192	192	31
7	20.00	0.0000	0.00	174	182	182	31
8	20.00	0.0000	0.00	242	273	273	54
9	20.00	0.0000	0.00	107	126	126	38
10	20.00	0.0000	0.00	44	31	31	34
11	29.76	0.2381	0.00	11	-67	-67	36

Revised 2 Short Term A-A'

SUB SURFACE CONSULTANTS LIMITED
Program: SLOPE Version 12.04 Revision A16.B13.R49
Licensed from GEOSOLVE
Run ID. NE3545A Section A-A' Rev Short sheet pile 2
NORTH ROAD, KIRKBURTON
A-A'

| **Sheet No. A8**
| **(FS: 1.23)**
| Job No. NE3545A
| Made by : TP
| Date: 6-06-2017
| Checked :



SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
 Licensed from GEOSOLVE
 Run ID. NE3545A Section A-A' Rev Short sheet pile 2
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 6-06-2017
Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

Stratum	Y-Coordinates							
1 (GL)	114.50	114.50	113.90	113.90	114.50	114.78	114.78	117.28
2	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
3	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
4	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
5	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
6	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
7	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
8	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89
9	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89

Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

Stratum	Y-Coordinates							
1 (GL)	117.28	117.28	117.28	117.28	117.28	117.28	117.28	117.28
2	114.45	112.89	110.89	110.89	112.89	112.91	114.44	117.28
3	114.45	112.89	110.89	110.89	112.89	112.91	114.44	117.28
4	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
5	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
6	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.44
7	114.44	112.89	110.88	110.88	112.89	112.90	114.44	114.44
8	112.89	112.89	110.88	110.88	112.89	112.90	112.91	112.91
9	112.89	112.89	110.88	110.88	112.89	112.89	112.89	112.89

Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

Stratum	Y-Coordinates							
1 (GL)	121.16	122.23	123.58	123.58	123.77	123.77	123.77	124.22
2	121.16	122.23	123.58	123.58	123.77	123.77	123.77	124.22
3	121.16	122.23	123.58	123.48	123.62	123.62	123.62	124.22
4	120.54	122.23	123.58	123.48	123.62	123.62	123.62	124.07
5	120.54	122.22	123.58	122.83	122.47	122.53	122.57	122.72
6	114.20	116.56	118.28	118.36	118.65	118.78	118.82	119.22
7	114.20	114.14	114.09	114.06	113.97	115.37	115.45	116.30
8	113.44	113.59	113.70	113.76	113.97	115.37	115.45	116.30
9	113.13	113.20	113.25	113.28	113.37	113.97	114.18	116.29

Grid line	25	26	27	28
X-Coord	40.90	48.60	50.00	52.50

Stratum	Y-Coordinates			
1 (GL)	124.18	124.10	124.21	124.15
2	124.18	124.10	124.21	124.15
3	124.03	123.94	124.06	124.00
4	124.03	123.94	124.06	124.00
5	122.85	123.94	124.06	124.00
6	119.21	119.10	119.10	119.10
7	116.40	117.33	117.50	117.80
8	116.40	117.33	117.50	117.80
9	116.40	117.33	117.50	117.80

SOIL PROPERTIES

----- S t r a t u m -----		Bulk unit wt.		-----Strength parameters-----			
No.	Description	below GWL	above GWL	C	Phi (deg)	dC/dY kN/m2/m	Datum for C
		kN/m3	kN/m3	kN/m2			
1	PILE WALL	23.00	23.00	3000.0	0.00		
2	HARDSTANDING	20.00	20.00	300.00	0.00		
3	Granular Fill	18.00	18.00	0.00	30.00		
4	Granular MADE GROUND	17.80	17.80	0.00	28.00		
5	U. Cohesive MADE GROUND	19.70	19.70	20.00	0.00		
6	L. Cohesive MADE GROUND	19.00	19.00	40.00	0.00		
7	Alluvial Silty CLAY	19.00	19.00	40.00	0.00		
8	Residual Silty CLAY	20.10	20.10	52.00	0.00		
9	MUDSTONE	20.50	20.50	380.00	0.00		

GROUND WATER CONDITIONS

Unit wt. of water = 10.00 kN/m3

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

	Ground water level							
	113.68	113.68	113.68	113.68	113.68	113.68	113.70	113.70
Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

	Ground water level							
	113.70	113.70	113.70	113.72	113.72	113.72	113.72	113.72
Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

	Ground water level							
	114.50	114.71	114.87	114.96	115.27	115.47	115.53	116.12
Grid line	25	26	27	28				
X-Coord	40.90	48.60	50.00	52.50				

	Ground water level							
	116.24	117.27	117.46	117.80				

CIRCULAR SLIP SURFACE DATA

Grid of centres: X Y
 Corner of grid 10.00 124.00
 Grid increment 1.00 1.00
 No. of grid lines 10 10
 The grid of centres will be extended automatically
 until a minimum factor of safety has been found.

Radii of circles: Initial radius 1.00
 Increment of radius 0.50

ANALYSIS OPTIONS

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
 Factors of safety calculated on Soil Strength
 Partial factor of safety on tan(phi) = 1.000
 Partial factor of safety on drained cohesion = 1.000
 Partial factor of safety on undrained cohesion = 1.000
 Partial factor of safety on soil weight = 1.000
 Partial factor of safety on surcharge loads = 1.000
 Minimum number of slices = 10

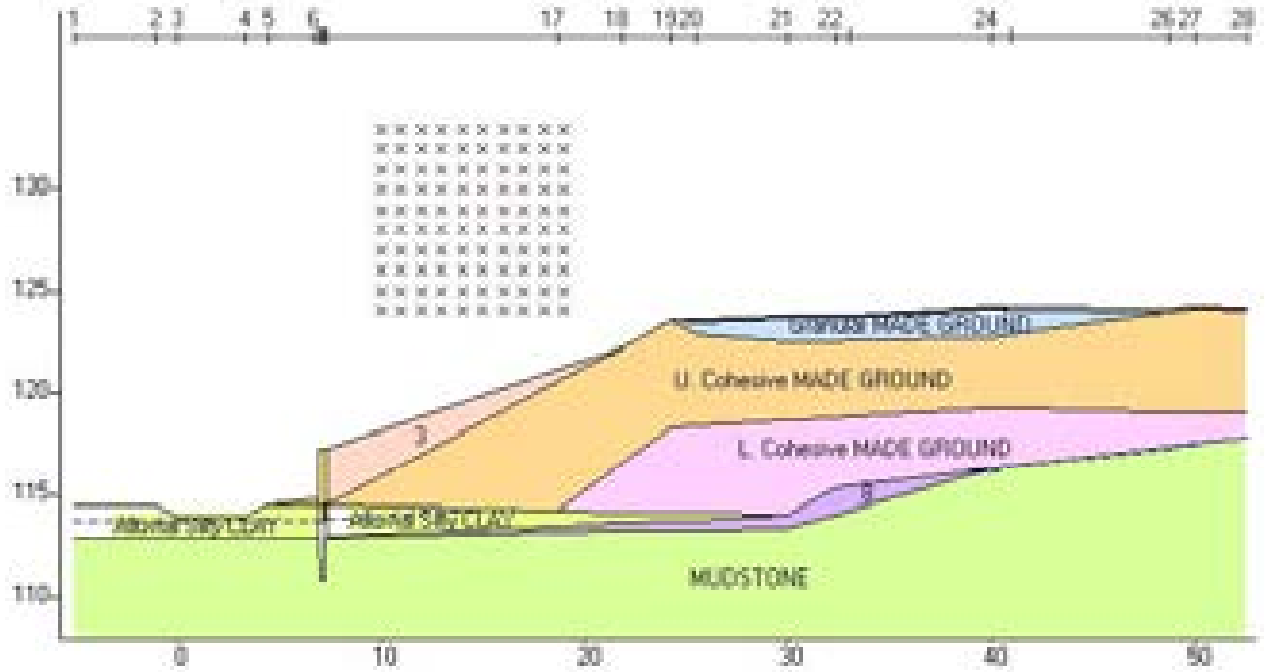
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SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
 Licensed from GEOSOLVE
 Run ID. NE3545A Section A-A' Rev Short sheet pile 2
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 6-06-2017
 | Checked :

Units:

kN,m



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. NE3545A Section A-A' Rev Short sheet pile 2	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 6-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Run ID. NE3545A Section A-A' Rev Short sheet pile 2
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Date: 6-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates									
	10.00	12.00	14.00	16.00	18.00					
133.00	1.750	1.731	.	1.540	1.349	1.333	1.361	1.420	1.489	1.623
132.00	1.747	1.728	.	1.561	1.358	1.260	1.339	1.412	1.485	1.604
131.00	1.745	.	.	1.650	1.400	1.266	1.333	1.420	1.524	1.602
130.00	1.741	.	1.764	1.679	1.415	1.276	1.338	1.421	1.511	1.597
129.00	1.737	.	1.762	1.563	1.444	1.226	1.279	1.398	1.471	1.584
128.00	.	.	1.760	1.647	1.376	1.246	1.299	1.365	1.454	1.552
127.00	.	1.788	1.757	1.714	1.456	1.300	1.325	1.384	1.471	1.571
126.00	.	1.788	1.753	.	1.545	1.274	1.299	1.357	1.500	1.604
125.00	.	1.789	.	.	1.400	1.336	1.361	1.409	1.482	1.553
124.00	1.832	1.790	.	1.792	1.500	1.335	1.262	1.410	1.552	1.654

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. NE3545A Section A-A' Rev Short sheet pile 2	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 6-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.226

Slipped mass = 1588 kN/m Out of balance vertical force = 0 kN/m
 Out of balance horizontal force = 21 kN/m
 Centre of circle: X = 15.00 Y = 129.00 Radius = 14.00
 Overturning moment = 5640 kN.m/m Restoring moment = 6912 kN.m/m

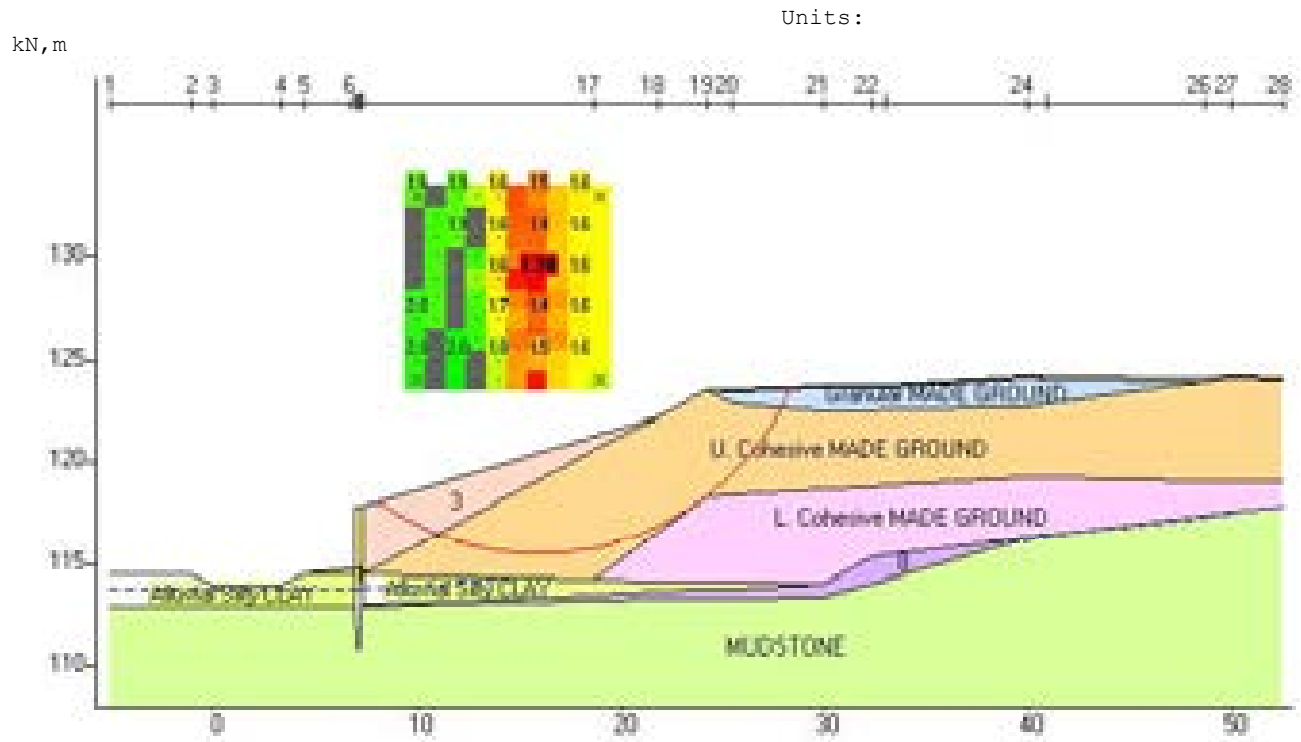
Slip surface coordinates			Piezometric	----- Interslice forces -----		
-----			elevation	----- horizontal ----- vertical		
No.	X	Y	Y(w)	E(total)	E'(effective)	Q
				kN/m	kN/m	kN/m
1	7.34	117.28	113.72	0	0	0
2	9.43	116.15	113.87	47	47	0
3	11.69	115.40	114.02	131	131	0
4	14.04	115.03	114.18	197	197	0
5	16.41	115.07	114.34	233	233	0
6	18.75	115.51	114.50	225	225	0
7	20.36	116.07	114.61	193	193	0
8	21.90	116.82	114.71	143	143	0
9	24.20	118.45	114.87	30	30	0
10	25.50	119.74	114.96	-41	-41	0
11	26.89	121.61	115.06	-83	-83	0
12	27.95	123.68	115.13	-21	-21	0

Slice No.	Cohesion	Tan(phi)	Pore pressure	Weight of slice	Forces on base of slice		
	(avge)	(avge)	(avge)	W	--- normal ---	--- shear ---	
	kN/m2		kN/m2	kN/m	P	P'	S
					kN/m	kN/m	kN/m
1	0.00	0.5774	0.00	35	53	53	25
2	14.04	0.1721	0.00	108	129	129	45
3	20.00	0.0000	0.00	175	184	184	39
4	20.00	0.0000	0.00	225	224	224	39
5	20.00	0.0000	0.00	248	245	245	39
6	20.00	0.0000	0.00	178	179	179	28
7	20.00	0.0000	0.00	167	172	172	28
8	20.00	0.0000	0.00	239	260	260	46
9	20.00	0.0000	0.00	114	131	131	30
10	20.00	0.0000	0.00	79	80	80	38
11	28.98	0.2254	0.00	20	-46	-46	47

Revised 2 Short Term A-A'

SUB SURFACE CONSULTANTS LIMITED
Program: SLOPE Version 12.04 Revision A16.B13.R49
Licensed from GEOSOLVE
Run ID. NE3545A Section A-A' Rev Short sheet pile 3
NORTH ROAD, KIRKBURTON
A-A'

| **Sheet No. A9**
| **(FS: 1.38)**
| Job No. NE3545A
| Made by : TP
| Date: 6-06-2017
| Checked :



SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
 Licensed from GEOSOLVE
 Run ID. NE3545A Section A-A' Rev Short sheet pile 3
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 6-06-2017
Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

Stratum	Y-Coordinates							
1 (GL)	114.50	114.50	113.90	113.90	114.50	114.78	114.78	117.78
2	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
3	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
4	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
5	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
6	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
7	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
8	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89
9	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89

Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

Stratum	Y-Coordinates							
1 (GL)	117.78	117.78	117.78	117.78	117.78	117.78	117.78	117.78
2	114.45	112.89	110.89	110.89	112.89	112.91	114.44	117.78
3	114.45	112.89	110.89	110.89	112.89	112.91	114.44	117.78
4	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
5	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
6	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.44
7	114.44	112.89	110.88	110.88	112.89	112.90	114.44	114.44
8	112.89	112.89	110.88	110.88	112.89	112.90	112.91	112.91
9	112.89	112.89	110.88	110.88	112.89	112.89	112.89	112.89

Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

Stratum	Y-Coordinates							
1 (GL)	121.27	122.23	123.58	123.58	123.77	123.77	123.77	124.22
2	121.27	122.23	123.58	123.58	123.77	123.77	123.77	124.22
3	121.26	122.23	123.58	123.48	123.62	123.62	123.62	124.22
4	120.54	122.23	123.58	123.48	123.62	123.62	123.62	124.07
5	120.54	122.22	123.58	122.83	122.47	122.53	122.57	122.72
6	114.20	116.56	118.28	118.36	118.65	118.78	118.82	119.22
7	114.20	114.14	114.09	114.06	113.97	115.37	115.45	116.30
8	113.44	113.59	113.70	113.76	113.97	115.37	115.45	116.30
9	113.13	113.20	113.25	113.28	113.37	113.97	114.18	116.29

Grid line	25	26	27	28
X-Coord	40.90	48.60	50.00	52.50

Stratum	Y-Coordinates			
1 (GL)	124.18	124.10	124.21	124.15
2	124.18	124.10	124.21	124.15
3	124.03	123.94	124.06	124.00
4	124.03	123.94	124.06	124.00
5	122.85	123.94	124.06	124.00
6	119.21	119.10	119.10	119.10
7	116.40	117.33	117.50	117.80
8	116.40	117.33	117.50	117.80
9	116.40	117.33	117.50	117.80

SOIL PROPERTIES

----- S t r a t u m -----		Bulk unit wt.		-----Strength parameters-----		
No.	Description	below GWL	above GWL	C	Phi (deg)	dC/dY Datum for C
		kN/m3	kN/m3	kN/m2		kN/m2/m
1	PILE WALL	23.00	23.00	3000.0	0.00	
2	HARDSTANDING	20.00	20.00	300.00	0.00	
3	Granular Fill	18.00	18.00	0.00	30.00	
4	Granular MADE GROUND	17.80	17.80	0.00	28.00	
5	U. Cohesive MADE GROUND	19.70	19.70	20.00	0.00	
6	L. Cohesive MADE GROUND	19.00	19.00	40.00	0.00	
7	Alluvial Silty CLAY	19.00	19.00	40.00	0.00	
8	Residual Silty CLAY	20.10	20.10	52.00	0.00	
9	MUDSTONE	20.50	20.50	380.00	0.00	

GROUND WATER CONDITIONS

Unit wt. of water = 10.00 kN/m3

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

	Ground water level							
	113.68	113.68	113.68	113.68	113.68	113.68	113.70	113.70
Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

	Ground water level							
	113.70	113.70	113.70	113.72	113.72	113.72	113.72	113.72
Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

	Ground water level							
	114.50	114.71	114.87	114.96	115.27	115.47	115.53	116.12
Grid line	25	26	27	28				
X-Coord	40.90	48.60	50.00	52.50				

	Ground water level							
	116.24	117.27	117.46	117.80				

CIRCULAR SLIP SURFACE DATA

Grid of centres: X Y
 Corner of grid 10.00 124.00
 Grid increment 1.00 1.00
 No. of grid lines 10 10
 The grid of centres will be extended automatically
 until a minimum factor of safety has been found.

Radii of circles: Initial radius 1.00
 Increment of radius 0.50

ANALYSIS OPTIONS

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
 Factors of safety calculated on Soil Strength
 Partial factor of safety on tan(phi) = 1.000
 Partial factor of safety on drained cohesion = 1.000
 Partial factor of safety on undrained cohesion = 1.000
 Partial factor of safety on soil weight = 1.000
 Partial factor of safety on surcharge loads = 1.000
 Minimum number of slices = 10

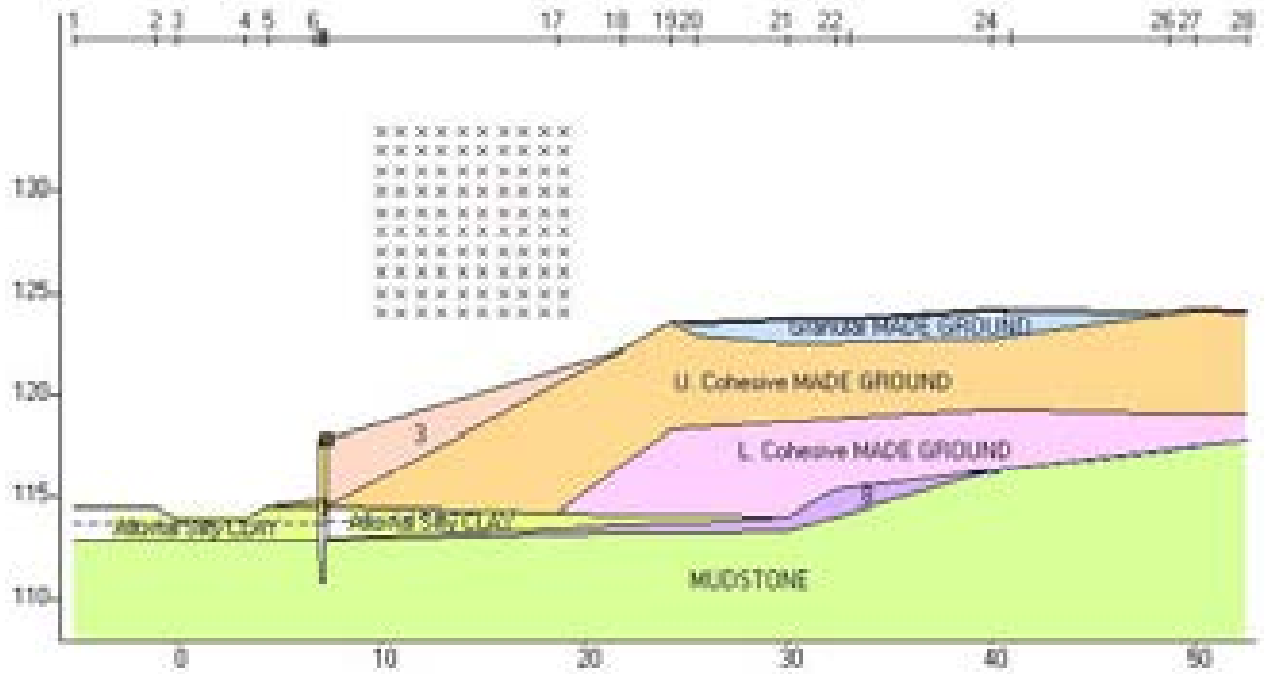
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 Run ID. NE3545A Section A-A' Rev Short sheet pile 3
 NORTH ROAD, KIRKBURTON
 A-A'

Sheet No.
 Job No. NE3545A
 Made by : TP
 Date: 6-06-2017
 Checked :

Units:

kN,m



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. NE3545A Section A-A' Rev Short sheet pile 3	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 6-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Run ID. NE3545A Section A-A' Rev Short sheet pile 3
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Date: 6-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates									
	10.00	12.00	14.00	16.00	18.00					
133.00	1.916	.	1.928	1.808	1.579	1.421	1.455	1.511	1.575	1.707
132.00	.	1.952	1.925	.	1.588	1.426	1.435	1.504	1.572	1.687
131.00	.	1.951	1.922	.	1.606	1.435	1.431	1.515	1.618	1.688
130.00	.	1.949	.	1.966	1.638	1.451	1.439	1.518	1.607	1.671
129.00	.	1.948	.	1.850	1.552	1.393	1.382	1.500	1.568	1.666
128.00	1.981	1.946	.	1.945	1.636	1.450	1.402	1.470	1.555	1.633
127.00	1.983	1.943	.	1.967	1.714	1.484	1.434	1.494	1.576	1.653
126.00	1.986	.	2.015	1.967	1.668	1.446	1.414	1.467	1.612	1.687
125.00	1.989	.	2.024	.	1.788	1.468	1.487	1.525	1.596	1.666
124.00	1.994	.	2.036	.	1.793	1.475	1.390	1.536	1.672	1.776

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. NE3545A Section A-A' Rev Short sheet pile 3	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 6-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.382

Slipped mass = 1533 kN/m Out of balance vertical force = 0 kN/m
 Out of balance horizontal force = 20 kN/m
 Centre of circle: X = 16.00 Y = 129.00 Radius = 13.50
 Overturning moment = 4795 kN.m/m Restoring moment = 6626 kN.m/m

Slip surface coordinates			Piezometric	----- Interslice forces -----		
-----			elevation	----- horizontal ----- vertical		
No.	X	Y	Y(w)	E (total)	E' (effective)	Q
				kN/m	kN/m	kN/m
1	8.14	118.02	113.78	0	0	0
2	10.05	116.88	113.91	40	40	0
3	12.13	116.07	114.05	120	120	0
4	14.31	115.61	114.20	186	186	0
5	16.54	115.51	114.35	227	227	0
6	18.75	115.78	114.50	231	231	0
7	20.36	116.22	114.61	209	209	0
8	21.90	116.86	114.71	167	167	0
9	24.20	118.28	114.87	64	64	0
10	25.50	119.41	114.96	-8	-8	0
11	27.17	121.41	115.07	-73	-73	0
12	28.42	123.70	115.16	-20	-20	0

Slice	Cohesion	Tan(phi)	Pore	Weight	Forces on base of slice		
No.	(avge)	(avge)	pressure	of slice	--- normal ---	---	shear
	kN/m2		(avge)	W	P	P'	S
			kN/m2	kN/m	kN/m	kN/m	kN/m
1	0.00	0.5774	0.00	30	46	46	19
2	9.80	0.2944	0.00	93	116	116	41
3	20.00	0.0000	0.00	153	164	164	32
4	20.00	0.0000	0.00	200	202	202	32
5	20.00	0.0000	0.00	227	224	224	32
6	20.00	0.0000	0.00	173	173	173	24
7	20.00	0.0000	0.00	165	169	169	24
8	20.00	0.0000	0.00	242	260	260	39
9	20.00	0.0000	0.00	121	138	138	25
10	20.00	0.0000	0.00	103	116	116	38
11	28.39	0.2150	0.00	27	-33	-33	48

REVISED 2 LONG TERM A-A'

SUB SURFACE CONSULTANTS LIMITED

Program: SLOPE Version 12.04 Revision A16.B13.R49

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Run ID. A10 NE3545A Section A-A' Rev 2 Long 4

NORTH ROAD, KIRKBURTON

A-A'

Sheet No. A10

(FS: 1.39)

Job No. NE3545A

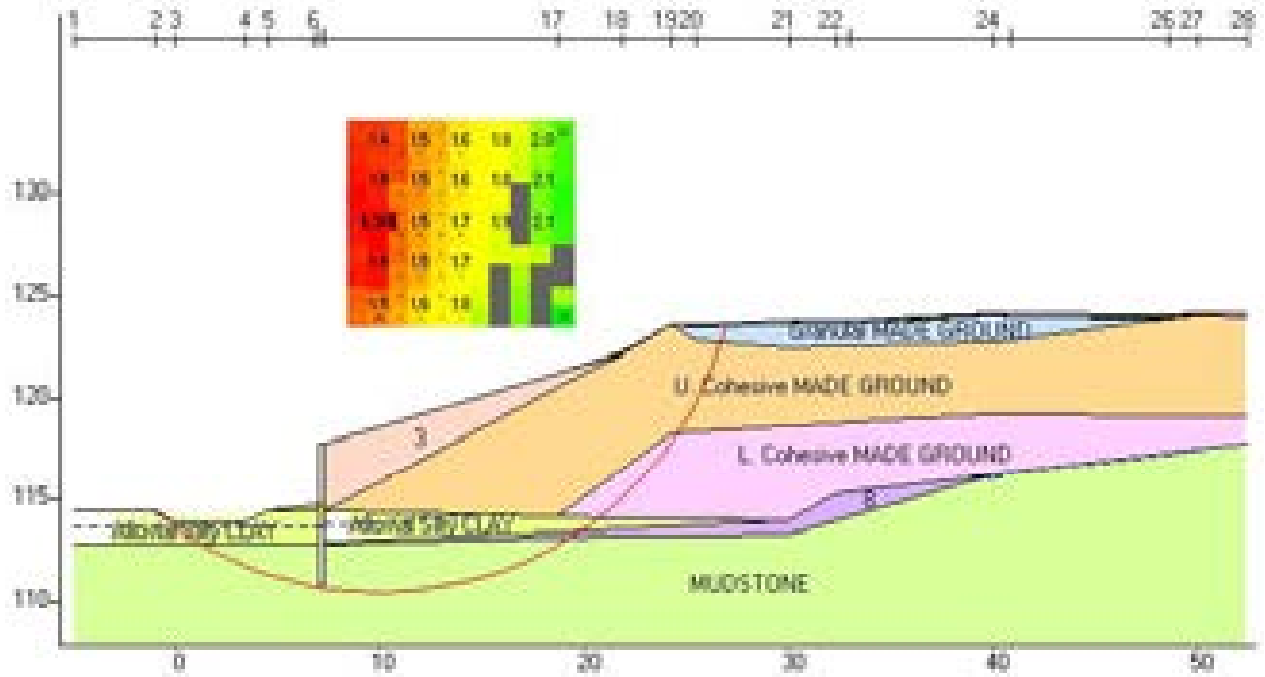
Made by : TP

Date: 8-06-2017

Checked :

Units:

kN,m



SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
 Licensed from GEOSOLVE
 Run ID. A10 NE3545A Section A-A' Rev 2 Long 4
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

Stratum	Y-Coordinates							
1 (GL)	114.50	114.50	113.90	113.90	114.50	114.78	114.78	117.78
2	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
3	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
4	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
5	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
6	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
7	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
8	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89
9	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89

Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

Stratum	Y-Coordinates							
1 (GL)	117.78	117.78	117.78	117.78	117.78	117.78	117.78	117.78
2	114.45	112.89	110.89	110.89	112.89	112.91	114.44	117.78
3	114.45	112.89	110.89	110.89	112.89	112.91	114.44	117.78
4	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
5	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
6	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.44
7	114.44	112.89	110.88	110.88	112.89	112.90	114.44	114.44
8	112.89	112.89	110.88	110.88	112.89	112.90	112.91	112.91
9	112.89	112.89	110.88	110.88	112.89	112.89	112.89	112.89

Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

Stratum	Y-Coordinates							
1 (GL)	121.27	122.23	123.58	123.58	123.77	123.77	123.77	124.22
2	121.27	122.23	123.58	123.58	123.77	123.77	123.77	124.22
3	121.26	122.23	123.58	123.48	123.62	123.62	123.62	124.22
4	120.54	122.23	123.58	123.48	123.62	123.62	123.62	124.07
5	120.54	122.22	123.58	122.83	122.47	122.53	122.57	122.72
6	114.20	116.56	118.28	118.36	118.65	118.78	118.82	119.22
7	114.20	114.14	114.09	114.06	113.97	115.37	115.45	116.30
8	113.44	113.59	113.70	113.76	113.97	115.37	115.45	116.30
9	113.13	113.20	113.25	113.28	113.37	113.97	114.18	116.29

Grid line	25	26	27	28
X-Coord	40.90	48.60	50.00	52.50

Stratum	Y-Coordinates			
1 (GL)	124.18	124.10	124.21	124.15
2	124.18	124.10	124.21	124.15
3	124.03	123.94	124.06	124.00
4	124.03	123.94	124.06	124.00
5	122.85	123.94	124.06	124.00
6	119.21	119.10	119.10	119.10
7	116.40	117.33	117.50	117.80
8	116.40	117.33	117.50	117.80
9	116.40	117.33	117.50	117.80

SOIL PROPERTIES

----- S t r a t u m -----		Bulk unit wt.		-----Strength parameters-----			Datum for C
No.	Description	below GWL	above GWL	C	Phi (deg)	dC/dY kN/m2/m	
		kN/m3	kN/m3	kN/m2			
1	PILE WALL	23.00	23.00	3000.0	0.00		
2	HARDSTANDING	20.00	20.00	300.00	0.00		
3	Granular Fill	18.00	18.00	0.00	30.00		
4	Granular MADE GROUND	17.80	17.80	10.00	22.50	Ru = 0.250	
5	U. Cohesive MADE GROUND	19.70	19.70	4.00	30.00	Ru = 0.350	
6	L. Cohesive MADE GROUND	19.70	19.70	4.00	30.00	Ru = 0.400	
7	Alluvial Silty CLAY	19.00	19.00	4.00	30.00	Ru = 0.450	
8	Residual Silty CLAY	20.10	20.10	10.00	25.00	Ru = 0.500	
9	MUDSTONE	20.50	20.50	10.00	30.00	Ru = 0.500	

GROUND WATER CONDITIONS

Unit wt. of water = 10.00 kN/m3

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

Ground water level								
	113.68	113.68	113.68	113.68	113.68	113.68	113.70	113.70
Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

Ground water level								
	113.70	113.70	113.70	113.72	113.72	113.72	113.72	113.72
Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

Ground water level								
	114.50	114.71	114.87	114.96	115.27	115.47	115.53	116.12
Grid line	25	26	27	28				
X-Coord	40.90	48.60	50.00	52.50				

Ground water level								
	116.24	117.27	117.46	117.80				

CIRCULAR SLIP SURFACE DATA

Grid of centres: X Y
 Corner of grid 10.00 124.00
 Grid increment 1.00 1.00
 No. of grid lines 10 10
 The grid of centres will be extended automatically
 until a minimum factor of safety has been found.

Radii of circles: Initial radius 1.00
 Increment of radius 0.50

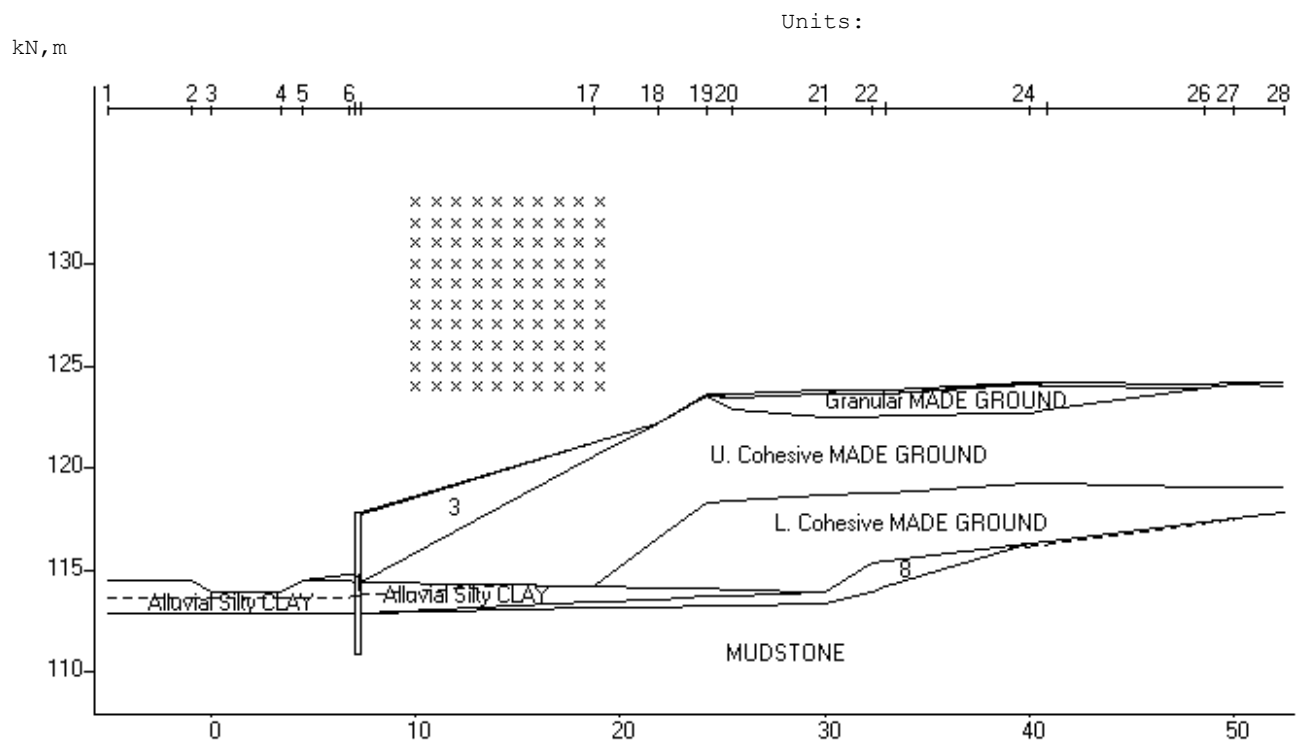
ANALYSIS OPTIONS

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
 Factors of safety calculated on Soil Strength
 Partial factor of safety on tan(phi) = 1.000
 Partial factor of safety on drained cohesion = 1.000
 Partial factor of safety on undrained cohesion = 1.000
 Partial factor of safety on soil weight = 1.000
 Partial factor of safety on surcharge loads = 1.000
 Minimum number of slices = 10

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 Run ID. A10 NE3545A Section A-A' Rev 2 Long 4
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
 | Checked :



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A10 NE3545A Section A-A' Rev 2 Long 4	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Run ID. A10 NE3545A Section A-A' Rev 2 Long 4
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Date: 8-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

	X-coordinates										
	9.00	11.00		13.00		15.00		17.00		19.00	
Y-coord											
133.00	1.425	1.428	1.441	1.533	1.533	1.619	1.702	1.790	1.879	2.024	2.148
132.00	1.413	1.424	1.430	1.507	1.538	1.647	1.730	1.795	1.903	2.031	2.163
131.00	1.404	1.421	1.437	1.505	1.553	1.639	1.728	1.832	1.916	2.045	2.178
130.00	1.392	1.407	1.479	1.496	1.560	1.638	1.735	1.841	.	2.089	2.223
129.00	1.397	1.400	1.466	1.502	1.575	1.643	1.756	1.882	.	2.073	2.214
128.00	1.404	1.390	1.467	1.516	1.594	1.658	1.787	1.886	.	2.071	2.182
127.00	1.417	1.393	1.461	1.519	1.599	1.705	1.806	1.897	1.896	1.950	.
126.00	1.404	1.398	1.485	1.525	1.629	1.730	1.864	.	1.986	.	.
125.00	1.452	1.421	1.507	1.561	1.661	1.774	1.900	.	2.055	.	2.012
124.00	1.462	1.482	1.532	1.612	1.699	1.825	1.962	.	2.082	.	2.290

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 Run ID. A10 NE3545A Section A-A' Rev 2 Long 4
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
 Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi) = 1.000
 Partial factor of safety on drained cohesion = 1.000
 Partial factor of safety on undrained cohesion = 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.390

Slipped mass = 3173 kN/m Out of balance vertical force = 0 kN/m
 Out of balance horizontal force = 160 kN/m
 Centre of circle: X = 10.00 Y = 128.00 Radius = 17.50
 Overturning moment = 15519 kN.m/m Restoring moment = 21572 kN.m/m

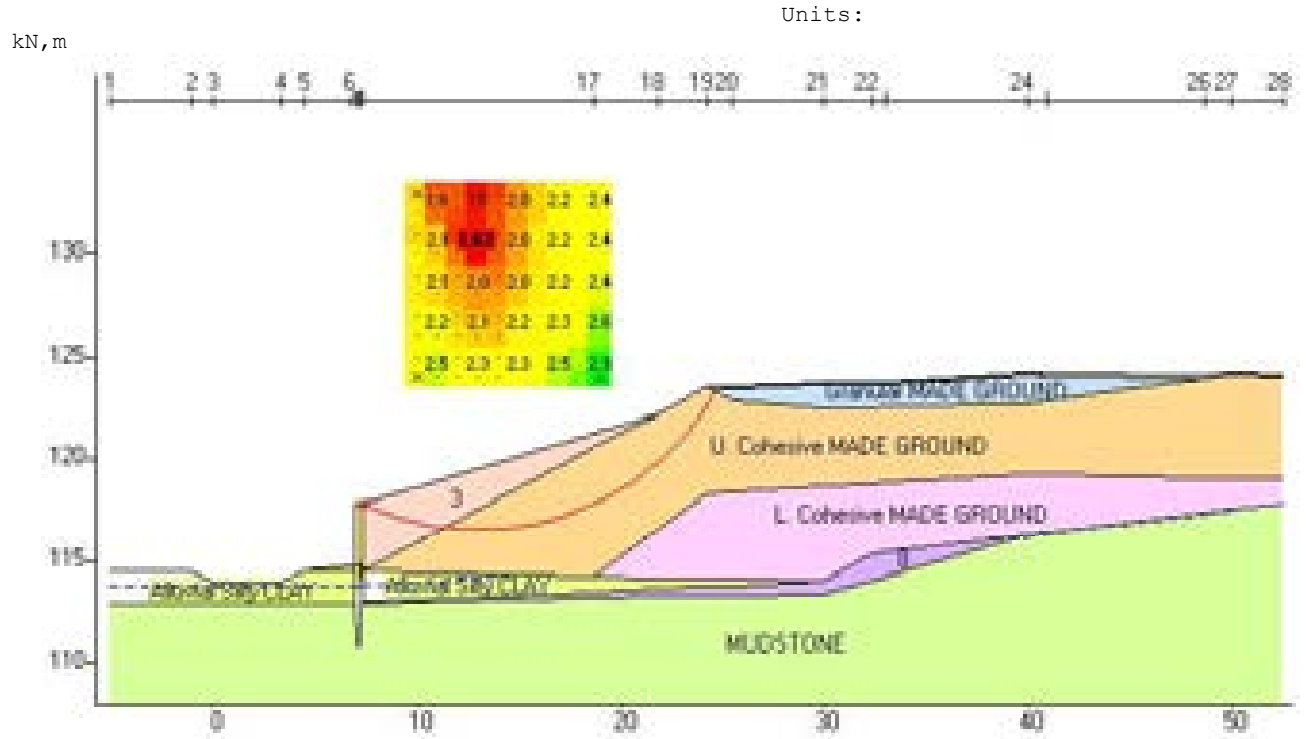
Slip surface coordinates			Piezometric elevation	----- Interslice forces -----		
-----				----- horizontal -----		vertical
No.	X	Y	Y (w)	E (total) kN/m	E' (effective) kN/m	Q kN/m
1	-1.14	114.50	114.50	0	0	0
2	-1.00	114.39	114.48	1	1	0
3	0.00	113.64	113.86	12	12	0
4	3.40	111.79	113.88	114	97	0
5	4.50	111.39	114.46	161	127	0
6	6.70	110.81	114.75	259	199	0
7	6.99	110.76	114.75	271	209	0
8	7.00	110.76	118.20	271	136	0
9	7.01	110.76	118.25	272	135	0
10	7.02	110.76	118.57	272	129	0
11	7.03	110.75	118.82	273	263	0
12	7.30	110.71	118.82	293	279	0
13	7.31	110.71	118.57	293	146	0
14	7.32	110.71	118.56	294	147	0
15	7.33	110.70	118.26	295	154	0
16	7.34	110.70	117.43	295	173	0
17	10.29	110.50	118.39	439	276	0
18	13.23	110.80	119.33	508	344	0
19	16.08	111.59	120.23	490	373	0
20	18.75	112.84	121.07	394	370	0
21	21.90	115.17	120.73	182	112	0
22	24.20	117.77	122.35	-25	-48	0
23	25.50	119.88	122.39	-146	-190	0
24	26.33	121.72	122.98	-200	-210	0
25	26.95	123.64	115.06	-160	-160	0

Slice No.	Cohesion	Tan(phi)	Pore pressure	Weight of slice	Forces on base of slice		
	(avge) kN/m2	(avge)	(avge) kN/m2	W kN/m	--- normal P kN/m	--- P' kN/m	shear S kN/m
1	4.00	0.5774	0.47	0	1	1	1
2	4.00	0.5774	1.59	4	9	7	7
3	7.53	0.5773	11.54	79	118	74	52
4	10.00	0.5774	25.77	57	70	39	25
5	10.00	0.5774	35.02	154	174	94	55
6	10.00	0.5774	39.64	23	25	13	8
7	10.00	0.5774	57.17	1	1	1	0
8	10.00	0.5774	74.69	1	2	1	0
9	10.00	0.5774	76.54	2	2	1	0
10	10.00	0.5774	79.36	2	2	1	0
11	10.00	0.5774	80.85	44	46	24	12
12	10.00	0.5774	79.84	2	2	1	0
13	10.00	0.5774	78.59	2	2	1	0
14	10.00	0.5774	77.06	2	2	1	0
15	10.00	0.5774	71.38	1	2	1	0
16	10.00	0.5774	73.03	431	439	224	114
17	10.00	0.5774	82.08	483	473	231	117
18	10.00	0.5774	85.89	489	476	222	114
19	10.00	0.5774	84.36	451	449	200	104
20	5.65	0.5610	68.94	478	511	241	113
21	4.00	0.5774	50.70	292	348	172	81
22	4.00	0.5774	35.44	121	166	78	40
23	4.00	0.5774	18.86	45	68	30	18
24	24.48	0.4756	0.81	11	-35	-37	23

REVISED 2 LONG TERM A-A'

SUB SURFACE CONSULTANTS LIMITED
Program: SLOPE Version 12.04 Revision A16.B13.R49
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Run ID. A11 NE3545A Section A-A' Rev 2 Long 5
NORTH ROAD, KIRKBURTON
A-A'

| **Sheet No. A11**
| **(FS: 1.82)**
| Job No. NE3545A
| Made by : TP
| Date: 8-06-2017
| Checked :



SUB SURFACE CONSULTANTS LIMITED
Program: SLOPE Version 12.04 Revision A16.B13.R49
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Run ID. A11 NE3545A Section A-A' Rev 2 Long 5
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No.
|
| Job No. NE3545A
| Made by : TP
| Date: 8-06-2017
| Checked :

Units: kN,m

INPUT DATA

PROFILE DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-5.00	-1.00	0.00	3.40	4.50	6.70	6.99	7.00

Stratum	Y-Coordinates							
1 (GL)	114.50	114.50	113.90	113.90	114.50	114.78	114.78	117.78
2	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
3	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
4	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
5	114.50	114.50	113.90	113.90	114.50	114.78	114.78	114.78
6	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
7	114.49	114.49	113.89	113.89	114.49	114.45	114.45	114.45
8	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89
9	112.88	112.88	112.88	112.88	112.88	112.88	112.89	112.89

Grid line	9	10	11	12	13	14	15	16
X-Coord	7.01	7.02	7.03	7.30	7.31	7.32	7.33	7.34

Stratum	Y-Coordinates							
1 (GL)	117.78	117.78	117.78	117.78	117.78	117.78	117.78	117.78
2	114.45	112.89	110.89	110.89	112.89	112.91	114.44	117.78
3	114.45	112.89	110.89	110.89	112.89	112.91	114.44	117.78
4	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
5	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.45
6	114.45	112.89	110.89	110.89	112.89	112.91	114.44	114.44
7	114.44	112.89	110.88	110.88	112.89	112.90	114.44	114.44
8	112.89	112.89	110.88	110.88	112.89	112.90	112.91	112.91
9	112.89	112.89	110.88	110.88	112.89	112.89	112.89	112.89

Grid line	17	18	19	20	21	22	23	24
X-Coord	18.75	21.90	24.20	25.50	30.00	32.30	33.00	40.00

Stratum	Y-Coordinates							
1 (GL)	121.27	122.23	123.58	123.58	123.77	123.77	123.77	124.22
2	121.27	122.23	123.58	123.58	123.77	123.77	123.77	124.22
3	121.26	122.23	123.58	123.48	123.62	123.62	123.62	124.22
4	120.54	122.23	123.58	123.48	123.62	123.62	123.62	124.07
5	120.54	122.22	123.58	122.83	122.47	122.53	122.57	122.72
6	114.20	116.56	118.28	118.36	118.65	118.78	118.82	119.22
7	114.20	114.14	114.09	114.06	113.97	115.37	115.45	116.30
8	113.44	113.59	113.70	113.76	113.97	115.37	115.45	116.30
9	113.13	113.20	113.25	113.28	113.37	113.97	114.18	116.29

Grid line	25	26	27	28
X-Coord	40.90	48.60	50.00	52.50

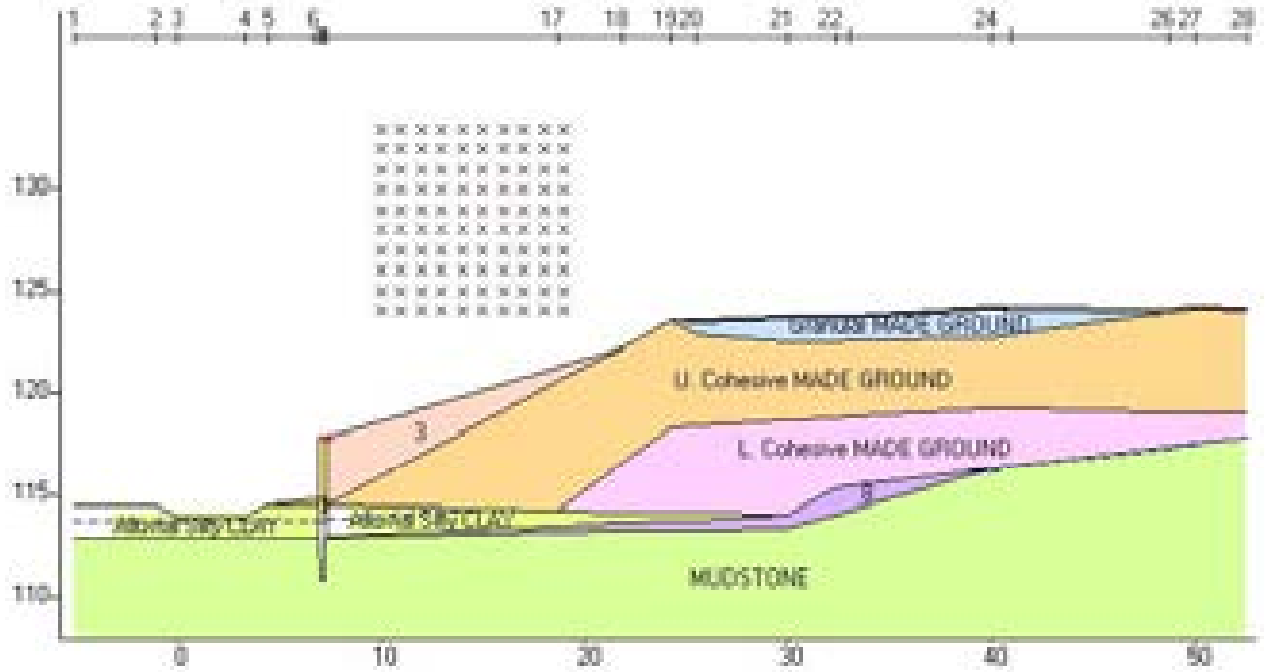
Stratum	Y-Coordinates			
1 (GL)	124.18	124.10	124.21	124.15
2	124.18	124.10	124.21	124.15
3	124.03	123.94	124.06	124.00
4	124.03	123.94	124.06	124.00
5	122.85	123.94	124.06	124.00
6	119.21	119.10	119.10	119.10
7	116.40	117.33	117.50	117.80
8	116.40	117.33	117.50	117.80
9	116.40	117.33	117.50	117.80

SUB SURFACE CONSULTANTS LIMITED
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 Run ID. A11 NE3545A Section A-A' Rev 2 Long 5
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
 | Checked :

Units:

kN,m



SUB SURFACE CONSULTANTS LIMITED
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 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
Checked :

Units: kN,m

Brief results for selected circles through common point no.1

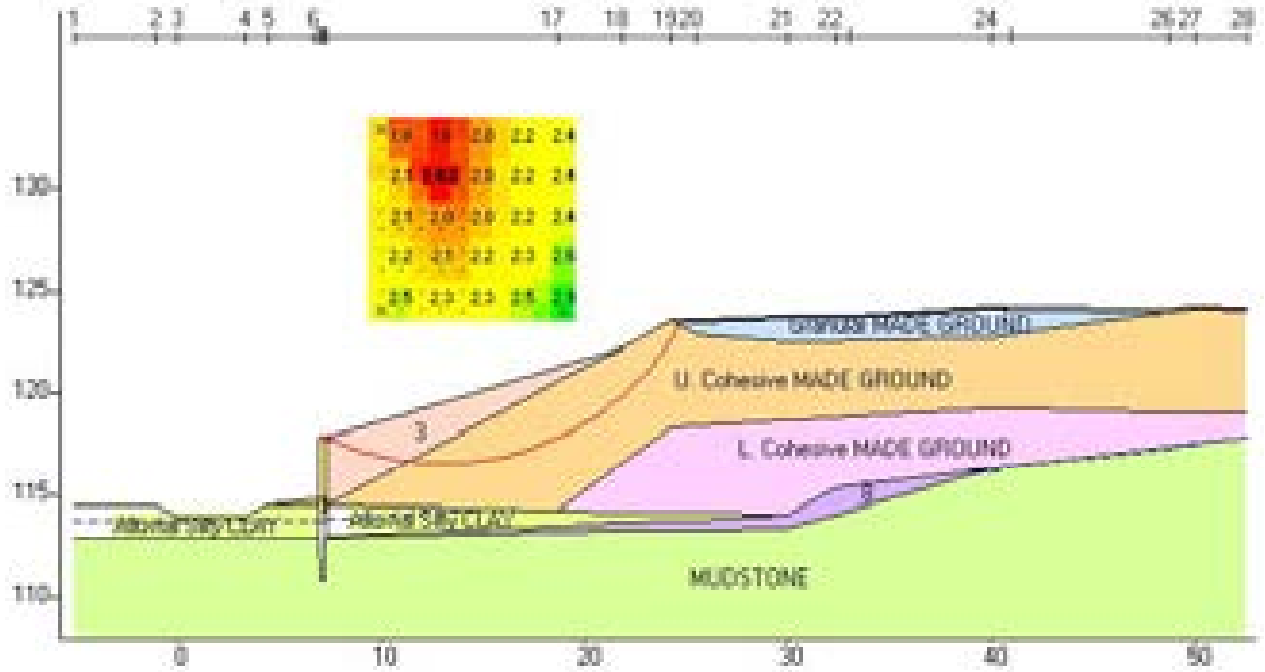
---Centre---	Radius	Factor	Slipped	Overturning	Restoring	Delta
X Y	R	of	mass	moment	moment	
		safety	(Out of	balance	forces)	(Itera
			(Vert.	Horiz.	Moment)	tions)
			kN/m		kN.m/m	
13.00 130.00	13.47	1.821	813	2942	5359	
			(0)	(0)	(0)	(4)
13.00 133.00	16.24	1.828	871	3911	7149	
			(0)	(0)	(0)	(5)
13.00 132.00	15.31	1.837	850	3583	6581	
			(0)	(0)	(0)	(5)
13.00 131.00	14.38	1.839	830	3252	5981	
			(0)	(0)	(0)	(5)
12.00 131.00	14.02	1.859	581	2206	4101	
			(0)	(0)	(0)	(4)
14.00 133.00	16.61	1.869	1148	5002	9347	
			(0)	(0)	(0)	(4)
11.00 133.00	15.65	1.879	428	1840	3456	
			(0)	(0)	(0)	(4)
12.00 132.00	14.96	1.880	605	2516	4728	
			(0)	(0)	(0)	(4)
14.00 131.00	14.80	1.885	1121	4335	8173	
			(0)	(0)	(0)	(4)
14.00 132.00	15.70	1.887	1133	4663	8802	
			(0)	(0)	(0)	(4)
12.00 133.00	15.92	1.892	629	2829	5352	
			(0)	(0)	(0)	(5)
14.00 130.00	13.92	1.895	1111	4005	7589	
			(0)	(0)	(0)	(4)
13.00 129.00	12.57	1.899	796	2617	4969	
			(0)	(0)	(0)	(4)
11.00 132.00	14.68	1.914	406	1616	3093	
			(0)	(0)	(0)	(4)
12.00 130.00	13.08	1.924	559	1930	3713	
			(0)	(0)	(0)	(4)
14.00 129.00	13.05	1.928	1102	3671	7079	
			(0)	(0)	(0)	(4)
13.00 127.00	10.82	1.961	768	2021	3962	
			(0)	(0)	(0)	(4)
15.00 132.00	16.15	1.964	1456	5765	11325	
			(0)	(0)	(0)	(4)
15.00 133.00	17.04	1.967	1460	6103	12006	
			(0)	(0)	(0)	(4)
15.00 131.00	15.28	1.968	1454	5430	10685	
			(0)	(0)	(0)	(4)

SUB SURFACE CONSULTANTS LIMITED
 Program: SLOPE Version 12.04 Revision A16.B13.R49
 Licensed from GEOSOLVE
 Run ID. A11 NE3545A Section A-A' Rev 2 Long 5
 NORTH ROAD, KIRKBURTON
 A-A'

| Sheet No.
 |
 | Job No. NE3545A
 | Made by : TP
 | Date: 8-06-2017
Checked :

Units:

kN,m



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A11 NE3545A Section A-A' Rev 2 Long 5	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Critical Factor of Safety for each Common Point

---- Common point ----			----- Critical circle -----			
Point	X	Y	---- Centre ----	Radius	Factor of	
no.	coord	coord	X	Y	safety	
1	7.34	117.78	13.00	130.00	13.47	1.821 <---

Run ID. All NE3545A Section A-A' Rev 2 Long 5
NORTH ROAD, KIRKBURTON
A-A'

| Sheet No.
|
Date: 8-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates									
	10.00	12.00	14.00	16.00	18.00					
133.00	2.108	1.879	1.892	1.828	1.869	1.967	2.059	2.177	2.318	2.350
132.00	2.130	1.914	1.880	1.837	1.887	1.964	2.057	2.205	2.338	2.375
131.00	2.069	2.026	1.859	1.839	1.885	1.968	2.129	2.215	2.270	2.365
130.00	2.218	2.054	1.924	1.821	1.895	1.979	2.093	2.234	2.298	2.373
129.00	2.140	2.121	1.981	1.899	1.928	2.001	2.119	2.218	2.311	2.346
128.00	2.163	2.077	2.005	1.972	1.971	2.037	2.143	2.212	2.276	2.417
127.00	2.192	2.167	2.054	1.961	2.001	2.112	2.199	2.283	2.276	2.486
126.00	2.229	2.228	2.122	2.052	2.037	2.177	2.188	2.286	2.379	2.611
125.00	2.280	2.368	2.217	2.247	2.185	2.292	2.243	2.362	2.510	2.726
124.00	2.352	2.460	2.306	2.269	2.359	2.322	2.371	2.495	2.640	2.894

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. A11 NE3545A Section A-A' Rev 2 Long 5	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
A-A'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.821

Slipped mass = 813 kN/m Out of balance vertical force = 0 kN/m
 Out of balance horizontal force = 23 kN/m
 Centre of circle: X = 13.00 Y = 130.00 Radius = 13.47
 Overturning moment = 2942 kN.m/m Restoring moment = 5359 kN.m/m

Slip surface coordinates			Piezometric	----- Interslice forces -----		
-----			elevation	----- horizontal ----- vertical		
No.	X	Y	Y (w)	E (total)	E' (effective)	Q
				kN/m	kN/m	kN/m
1	7.34	117.78	113.72	0	0	0
2	9.55	116.98	113.87	23	23	0
3	11.87	116.58	118.23	65	61	0
4	14.23	116.59	118.76	97	71	0
5	16.54	117.01	119.41	105	67	0
6	18.75	117.82	120.15	86	48	0
7	20.40	118.75	120.81	56	25	0
8	21.90	119.89	121.50	20	2	0
9	23.14	121.13	122.39	-10	-22	0
10	24.20	122.52	123.25	-33	-37	0
11	24.84	123.58	114.91	-23	-23	0

Slice	Cohesion	Tan(phi)	Pore	Weight	Forces on base of slice		
No.	(avge)	(avge)	pressure	of slice	--- normal ---	---	shear
	kN/m2		(avge)	W	P	P'	S
			kN/m2	kN/m	kN/m	kN/m	kN/m
1	0.00	0.5774	0.00	29	35	35	11
2	0.72	0.5773	2.85	85	91	85	28
3	4.00	0.5774	19.07	128	128	83	32
4	4.00	0.5774	22.83	151	147	94	35
5	4.00	0.5774	23.65	149	147	91	34
6	4.00	0.5774	21.98	103	105	63	24
7	4.00	0.5774	18.37	79	84	49	20
8	4.00	0.5774	14.34	51	58	32	14
9	4.00	0.5774	9.93	30	37	19	10
10	18.69	0.5163	0.28	7	-5	-6	11

**SLOPE STABILITY ANALYSIS
FOR SECTION B-B'**



SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Slope Stability

Site: NORTH ROAD, KIRKBURTON, WEST YORKSHIRE
Client: BAYSWATER LTD
Engineer: SIMBA CONSULTANTS LTD

Job Number:
NE3545A
Sheet:
1 / 1

Chainage & Ground Levels for Slope Stability Analysis - Section B-B'

No.	Chainage (m)	Existing Levels (mSD)	Remarks
1	-2.00	119.53	
2	2.80	119.53	HD5
3	3.21	120.11	Retaining Wall
4	3.41	120.11	
5	3.60	120.20	
6	3.65	120.23	
7	6.20	121.13	HD4
8	10.50	123.06	
9	11.00	123.10	M4
10	13.50	123.51	BH6
11	16.00	123.62	
12	19.50	123.76	M3
13	21.00	123.83	

Remarks:

EXISTING LONG TERM B-B'

SUB SURFACE CONSULTANTS LIMITED

Program: SLOPE Version 12.04 Revision A16.B13.R49

Licensed from GEOSOLVE

Run ID. NE3545A Section B-B' Existing Long Term 3

NORTH ROAD, KIRKBURTON

B-B'

| Sheet No. B1

| (FS: 1.55)

| Job No. NE3545A

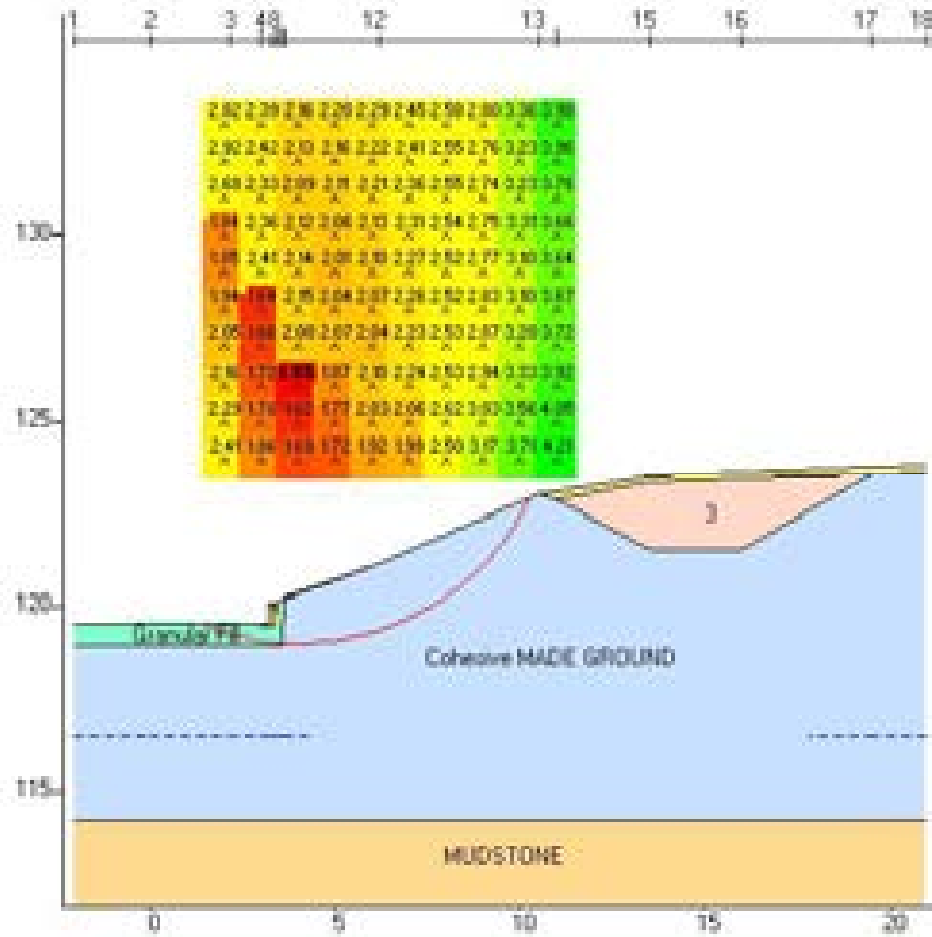
| Made by : TP

| Date: 8-06-2017

| Checked :

Units:

kN,m



```
| Sheet No.
|
| Job No. NE3545A
| Made by : TP
| Date: 8-06-2017
| Checked :
```

INPUT DATA

Grid line	1	2	3	4	5	6	7	8
X-Coord	-2.00	0.00	2.20	3.02	3.03	3.20	3.21	3.40

Grid line	9	10	11	12	13	14	15	16
X-Coord	3.41	3.60	3.65	6.20	10.50	11.00	13.50	16.00

Grid line	17	18
X-Coord	19.50	21.00

SOIL PROPERTIES

GROUND WATER CONDITIONS

Grid line	1	2	3	4	5	6	7	8
X-Coord	-2.00	0.00	2.20	3.02	3.03	3.20	3.21	3.40

Grid line	9	10	11	12	13	14	15	16
X-Coord	3.41	3.60	3.65	6.20	10.50	11.00	13.50	16.00

[illegible]

GROUND WATER CONDITIONS (continued)

Grid line	17	18
X-Coord	19.50	21.00

	Ground water level	
	116.46	116.46

CIRCULAR SLIP SURFACE DATA

Grid of centres:	X	Y
Corner of grid	2.00	124.00
Grid increment	1.00	1.00
No. of grid lines	10	10

The grid of centres will be extended automatically
until a minimum factor of safety has been found.

Radii of circles:	Initial radius	1.00
	Increment of radius	0.50

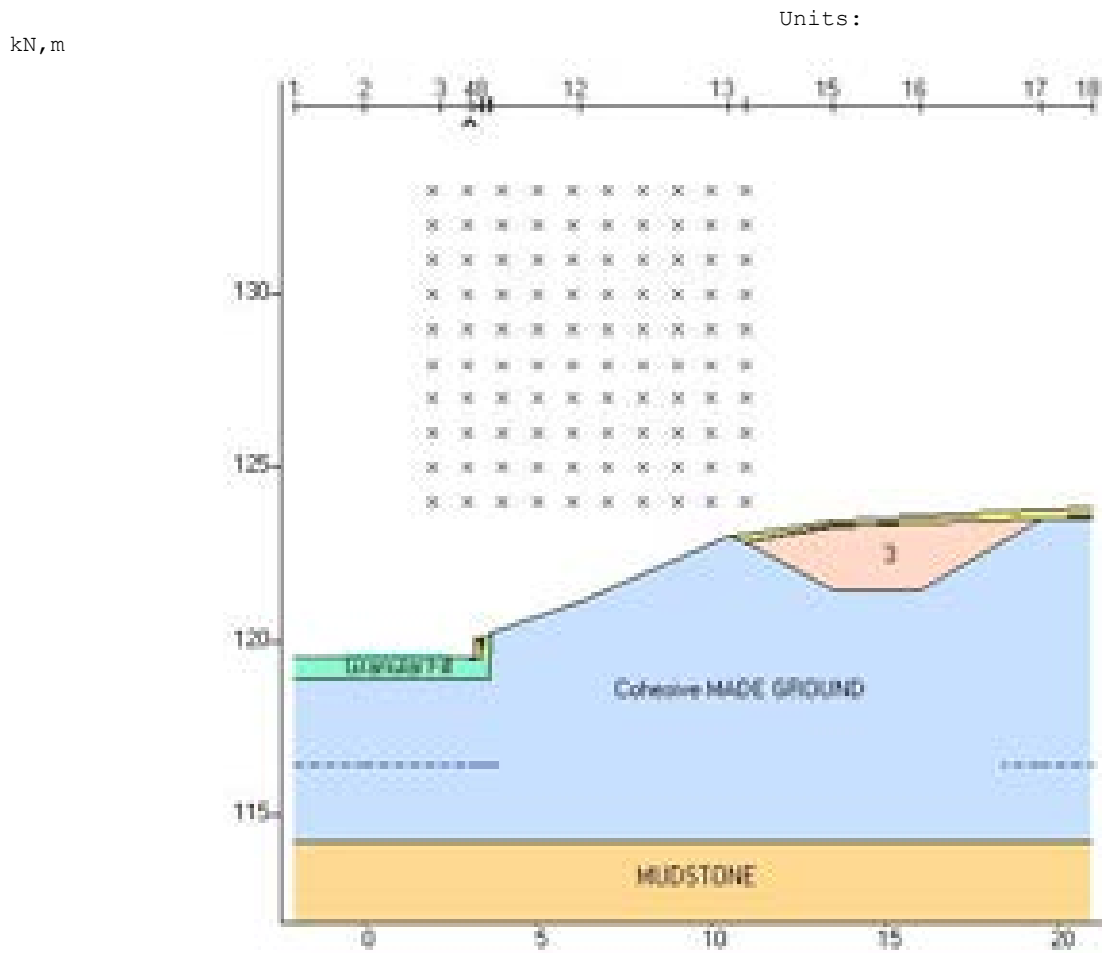
ANALYSIS OPTIONS

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength
Partial factor of safety on $\tan(\phi)$ = 1.000
Partial factor of safety on drained cohesion = 1.000
Partial factor of safety on undrained cohesion = 1.000
Partial factor of safety on soil weight = 1.000
Partial factor of safety on surcharge loads = 1.000
Minimum number of slices = 10

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SUB SURFACE CONSULTANTS LIMITED
Program: SLOPE Version 12.04 Revision A16.B13.R49
Licensed from GEOSOLVE
Run ID. NE3545A Section B-B' Existing Long Term 3
NORTH ROAD, KIRKBURTON
B-B'

Sheet No.
Job No. NE3545A
Made by : TP
Date: 8-06-2017
Checked :



SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. NE3545A Section B-B' Existing Long Term 3	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
B-B'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

Exclusion options

The summary results and selected results for each exit point exclude:
All slip surfaces where the interlock value in any slice is less than 0.1000
All slip surfaces where the slipped mass is less than 10 kN/m run

Run ID. NE3545A Section B-B' Existing Long Term 3
NORTH ROAD, KIRKBURTON
B-B'

| Sheet No.
|
Date: 8-06-2017

FACTORS OF SAFETY AT CENTRES OF CIRCLES

Y-coord	X-coordinates									
	2.00	4.00	6.00	8.00	10.00					
133.00	2.823	2.395	2.158	2.198	2.287	2.447	2.577	2.801	3.359	3.979
132.00	2.924	2.425	2.128	2.157	2.224	2.410	2.554	2.759	3.228	3.964
131.00	2.682	2.327	2.091	2.112	2.209	2.357	2.550	2.737	3.225	3.761
130.00	1.839	2.364	2.118	2.065	2.129	2.309	2.538	2.746	3.306	3.662
129.00	1.848	2.413	2.141	2.008	2.100	2.267	2.517	2.772	3.099	3.635
128.00	1.936	1.637	2.149	2.038	2.070	2.257	2.515	2.826	3.102	3.674
127.00	2.046	1.660	2.084	2.068	2.037	2.233	2.529	2.866	3.204	3.722
126.00	2.162	1.718	1.548	1.868	2.097	2.238	2.534	2.942	3.330	3.923
125.00	2.292	1.783	1.615	1.774	2.027	2.062	2.615	3.033	3.558	4.054
124.00	2.414	1.858	1.690	1.722	1.924	1.991	2.501	3.174	3.713	4.206

SUB SURFACE CONSULTANTS LIMITED	Sheet No.
Program: SLOPE Version 12.04 Revision A16.B13.R49	
Licensed from GEOSOLVE	Job No. NE3545A
Run ID. NE3545A Section B-B' Existing Long Term 3	Made by : TP
NORTH ROAD, KIRKBURTON	Date: 8-06-2017
B-B'	Checked :

Units: kN,m

Analysis options

Method of analysis: BISHOP - Simplified : Horizontal interslice forces
Factors of safety calculated on Soil Strength

Partial factor of safety on tan(phi)	= 1.000
Partial factor of safety on drained cohesion	= 1.000
Partial factor of safety on undrained cohesion	= 1.000

DETAILED RESULTS FOR CRITICAL CIRCLE

Factor of safety = 1.548

Slipped mass = 207 kN/m Out of balance vertical force = 0 kN/m

Out of balance horizontal force = 7 kN/m

Centre of circle: X = 4.00 Y = 126.00 Radius = 7.00

Overturning moment = 487 kN.m/m Restoring moment = 753 kN.m/m

Slip surface coordinates			Piezometric elevation	----- Interslice forces -----		
-----				----- horizontal -----		vertical
No.	X	Y	Y (w)	E (total) kN/m	E' (effective) kN/m	Q kN/m
1	1.33	119.53	116.46	0	0	0
2	2.20	119.24	116.46	2	2	0
3	3.02	119.07	116.46	5	5	0
4	3.03	119.07	116.46	5	5	0
5	3.20	119.05	116.46	6	6	0
6	3.21	119.04	116.46	6	6	0
7	3.40	119.03	116.46	8	8	0
8	3.41	119.02	116.46	8	8	0
9	3.60	119.01	116.46	10	10	0
10	3.65	119.01	119.85	11	5	0
11	4.51	119.02	120.06	18	10	0
12	5.37	119.13	120.31	23	13	0
13	6.20	119.35	120.58	24	13	0
14	7.48	119.93	121.15	19	8	0
15	8.63	120.75	121.76	7	-1	0
16	9.58	121.78	122.38	-5	-8	0
17	10.31	122.97	122.97	-7	-7	0

Slice No.	Cohesion (avge) kN/m2	Tan(phi) (avge)	Pore pressure (avge) kN/m2	Weight of slice W kN/m	Forces on base of slice		
					--- normal --- P kN/m	P' kN/m	shear S kN/m
1	0.00	0.5774	0.00	2	3	3	1
2	0.00	0.5774	0.00	6	6	6	2
3	0.00	0.5774	0.00	0	0	0	0
4	0.00	0.5774	0.00	1	2	2	1
5	0.00	0.5774	0.00	0	0	0	0
6	0.00	0.5774	0.00	4	4	4	2
7	0.00	0.5774	0.00	0	0	0	0
8	0.00	0.5774	0.00	4	4	4	1
9	3.75	0.5772	1.05	1	1	1	1
10	4.00	0.5774	9.45	23	23	15	8
11	4.00	0.5774	11.10	27	26	17	8
12	4.00	0.5774	11.99	29	27	17	9
13	4.00	0.5774	12.25	45	43	26	13
14	4.00	0.5774	11.20	37	37	21	11
15	4.00	0.5774	8.08	22	24	12	8
16	4.00	0.5774	3.00	6	5	1	4

INSITU TEST RESULTS



SUB SURFACE

SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

Standard Penetration Test Results

Site : NORTH ROAD, KIRKBURTON, WEST YORKSHIRE

Client : BAYSWATER LTD

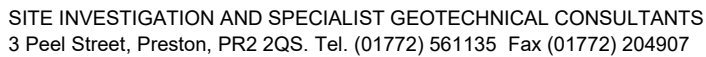
Engineer : SIMBA CONSULTANTS LTD

Job Number
NE3545A

Sheet
1 / 2

Borehole Number	Base of Borehole (m)	End of Seating Drive (m)	End of Test Drive (m)	Test Type	Seating Blows per 75mm		Blows for each 75mm penetration				Result	Comments
					1	2	1	2	3	4		
BH4	1.00	1.15	1.45	SPT	2	1	1	2	4	2	N=9	
BH4	2.00	2.15	2.45	SPT	1	2	4	4	2	3	N=13	
BH4	3.00	3.15	3.45	SPT	1	1	1	2	1	1	N=5	
BH4	4.00	4.15	4.45	SPT	1	2	1	2	2	2	N=7	
BH4	5.00	5.15	5.45	SPT	1	2	3	2	2	2	N=9	
BH4	6.00	6.15	6.45	SPT	2	3	4	3	3	3	N=13	
BH4	7.00	7.15	7.45	SPT	3	4	2	3	4	3	N=12	
BH4	8.00	8.15	8.45	SPT	2	3	4	5	4	4	N=17	
BH4	9.00	9.10	9.40	SPT	20	5	18	19	29	29	25*/100mm N=95	
BH4	10.00	10.08	10.15	SPT	25		52				25*/75mm 52/75mm	
BH5	1.00	1.15	1.45	SPT	1	1	2	2	1	2	N=7	
BH5	2.00	2.15	2.45	SPT	2	2	1	2	1	2	N=6	
BH5	3.00	3.15	3.45	SPT	2	4	2	1	1	1	N=5	
BH5	4.00	4.15	4.45	SPT	2	1	1	2	1	1	N=5	
BH5	5.00	5.15	5.45	SPT	3	2	2	3	2	3	N=10	
BH5	6.00	6.15	6.45	SPT	3	2	2	3	2	2	N=9	
BH5	7.00	7.15	7.45	SPT	2	2	4	2	3	2	N=11	
BH5	8.00	8.15	8.45	SPT	4	5	4	3	2	6	N=15	
BH5	9.00	9.15	9.45	SPT	10	8	7	8	10	9	N=34	
BH5	10.00	10.15	10.45	SPT	10	9	10	12	12	15	N=49	
BH5	11.00	11.08	11.23	SPT	25		31	42			25*/75mm 73/150mm	
BH6	1.00	1.15	1.45	SPT	1	1	2	1	0	1	N=4	
BH6	2.00	2.15	2.45	SPT	1	2	1	1	1	1	N=4	
BH6	3.00	3.15	3.45	SPT	2	1	1	2	2	1	N=6	
BH6	4.00	4.15	4.45	SPT	1	1	1	2	3	2	N=8	
BH6	5.00	5.15	5.45	SPT	2	2	3	2	3	2	N=10	
BH6	6.00	6.15	6.45	SPT	2	1	3	1	2	4	N=10	
BH6	7.00	7.15	7.45	SPT	2	3	4	3	3	4	N=14	
BH6	8.00	8.15	8.45	SPT	3	3	2	2	3	2	N=9	
BH6	9.00	9.15	9.45	SPT	5	6	6	6	20	27	N=59	
BH6	9.50	9.58	9.70	SPT	25		29	32			25*/75mm 61/125mm	
BH6	10.00	10.06	10.12	SPT	25		51				25*/60mm 51/60mm	
M1	1.00	1.15	1.45	CPT	1	2	1	1	1	2	N=5	
M1	2.00	2.15	2.45	CPT	1	2	1	1	2	2	N=6	
M1	3.00	3.15	3.45	CPT	1	1	1	1	1	1	N=4	
M1	4.00	4.15	4.45	CPT	2	1	2	9	5	5	N=21	
M1	5.00	5.15	5.45	CPT	3	3	3	3	4	4	N=14	
M3	1.00	1.15	1.45	CPT	0	0	0	0	0	0	N=0	
M3	2.00	2.15	2.45	CPT	0	0	0	0	0	0	N=0	
M3	3.00	3.15	3.45	CPT	1	1	1	1	1	1	N=4	
M3	4.00	4.15	4.45	CPT	1	2	2	2	2	3	N=9	
M3	5.00	5.15	5.45	CPT	4	3	3	6	5	7	N=21	

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907					Standard Penetration Test Results							
Site : NORTH ROAD, KIRKBURTON, WEST YORKSHIRE Client : BAYSWATER LTD Engineer: SIMBA CONSULTANTS LTD												Job Number NE3545A Sheet 2 / 2
Borehole Number	Base of Borehole (m)	End of Seating Drive (m)	End of Test Drive (m)	Test Type	Seating Blows per 75mm		Blows for each 75mm penetration				Result	Comments
					1	2	1	2	3	4		
M4	1.00	1.15	1.45	CPT	3	2	2	2	2	4	N=10	Bouncing
M4	2.00	2.15	2.45	CPT	1	1	2	1	2	1	N=6	
M4	2.60	2.62	2.62	CPT	50						50*/20mm 0/0mm	
M5	1.00	1.15	1.45	CPT	1	1	1	1	1	1	N=4	
M5	2.00	2.15	2.45	CPT	1	1	1	1	1	2	N=5	
M5	3.00	3.15	3.45	CPT	1	1	2	1	2	2	N=7	
M5	4.00	4.15	4.45	CPT	3	1	1	1	1	2	N=5	
M5	5.00	5.15	5.45	CPT	2	2	3	3	4	5	N=15	



Sheet:
1 / 1

Remarks:

LABORATORY TEST RESULTS

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907							Laboratory Test Results				
Site : NORTH ROAD, KIRKBURTON, WEST YORKSHIRE										Job Number NE3545A	
Client : BAYSWATER LTD										Sheet 1 / 1	
Engineer : SIMBA CONSULTANTS LTD											
DETERMINATION OF MOISTURE CONTENT, LIQUID LIMIT AND PLASTIC LIMIT AND DERIVATION OF PLASTICITY AND LIQUIDITY INDEX											
Borehole/ Trial Pit	Depth (m)	Sample	Natural Moisture Content %	Sample Passing 425µm Sieve		Liquid Limit %	Plastic Limit %	Plasticity Index %	Liquidity Index	Group Symbol	Laboratory Description
				Percentage %	Moisture Content %						
BH4	1.50	B	28	65	43	38	24	14	1.36	CI	MADE GROUND: dark greyish brown gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse brick, glass, clinker and stone.
BH4	3.50	B	28	86	33	38	23	15	0.67	CI	MADE GROUND: dark greyish brown slightly gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse brick, stone and clinker.
BH4	6.50	B	32	50	64	40	26	14	2.71	MI	MADE GROUND: dark grey slightly gravelly slightly sandy clayey silt. Gravel sized fragments are fine to medium stone and brick.
BH5	1.50	B	22	59	37	35	21	14	1.14	CL/CI	MADE GROUND: greyish brown gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone, brick and clinker.
BH5	5.50	B	25	91	27	33	20	13	0.54	CL	MADE GROUND: greyish brown gravelly slightly sandy silty clay. Gravel sized fragments are fine to medium stone, brick and clinker.
BH5	8.50	B	30	98	31	41	23	18	0.44	CI	MADE GROUND: greyish brown slightly gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone, brick and occasional wood.
BH6	2.50	B	24	84	29	32	22	10	0.70	CL	MADE GROUND: yellowish brown and brown slightly gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone, brick and clinker.
BH6	5.50	B	29	59	49	32				NP	MADE GROUND: dark greyish brown and brown slightly ashy gravelly slightly sandy silt.
BH6	6.50	B	26	65	40	32	23	9	1.89	CL	MADE GROUND: dark brown and greyish brown slightly organic gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone, brick and clinker.
Method of Preparation : BS 1377:PART 1:1990:7.4 Preparation of samples for classification tests BS 1377:PART 2:1990:4.2 & 5.2 Sample preparations											
Method of Test : BS 1377:PART 2:1990:3 Determination of moisture content 1990:4 Determination of the liquid limit BS 1377:PART 2:1990:5 Determination of the plastic limit and plasticity index											
Remarks :											

Site: NORTH ROAD, KIRKBURTON, WEST YORKSHIRE Client: BAYSWATER LTD Engineer: SIMBA CONSULTANTS LTD	Job Number NE3545A Sheet 1 / 1
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Summary of Effective Stress Tests

Consolidated Drained Peak Shear Box Test

Borehole No.	Depth (m)	Bulk Density (Mg/m ³)	Cohesion (kN/m ²)	Friction (degrees)	Description
BH4	2.50	1.96	12	25.0	MADE GROUND: dark greyish brown gravelly slightly sandy silty clay
BH4	5.50	1.89	7	27.8	MADE GROUND: dark grey gravelly slightly sandy silty clay
BH5	3.50	1.93	25	23.0	MADE GROUND: greyish brown gravelly slightly sandy silty clay
BH5	7.50	1.87	2	28.0	MADE GROUND: greyish brown slightly gravelly slightly sandy silty clay
BH6	1.50	1.81	10	22.5	MADE GROUND: dark grey slightly clayey slightly sandy gravel
BH6	4.50	1.98	36	20.0	MADE GROUND: dark greyish brown gravelly slightly sandy silty clay

Consolidated Drained Residual Shear Box Test

Borehole No.	Depth (m)	Bulk Density (Mg/m ³)	Cohesion (kN/m ²)	Friction (degrees)	Description
BH4	2.50	1.96	10	21.8	MADE GROUND: dark greyish brown gravelly slightly sandy silty clay
BH4	5.50	1.89	7	24.5	MADE GROUND: dark grey gravelly slightly sandy silty clay
BH5	3.50	1.93	21	20.0	MADE GROUND: greyish brown gravelly slightly sandy silty clay
BH5	7.50	1.87	0	24.5	MADE GROUND: greyish brown slightly gravelly slightly sandy silty clay
BH6	1.50	1.81	8	18.0	MADE GROUND: dark grey slightly clayey slightly sandy gravel
BH6	4.50	1.98	32	18.0	MADE GROUND: dark greyish brown gravelly slightly sandy silty clay



Laboratory Report



GEO Site & Testing Services Ltd

Contract Number: 34926

Client's Reference: **NE3545A**

Report Date: **12-05-2017**

Client **Sub Surface**
3 Peel Street
Preston
PR2 2QS

Contract Title: **Former Petrol Station, North Road, Kirkburton**
For the attention of: **Simon Gabbatt**

Date Received: **19-04-2017**
Date Commenced: **19-04-2017**
Date Completed: **12-05-2017**

Test Description	Qty
Consolidated Drained Peak and Residual Shear Strength - set of 3 60 x 60mm Shear Box Specimens (5 days) 1377 : 1990 Part 7 : 4 - * UKAS	6
Disposal of Samples on Project	1

Notes: Observations and Interpretations are outside the UKAS Accreditation

* - denotes test included in laboratory scope of accreditation

- denotes test carried out by approved contractor

@ - denotes non accredited tests

This certificate is issued in accordance with the accreditation requirements of the United Kingdom Accreditation Service. The results reported herein relate only to the material supplied to the laboratory. This certificate shall not be reproduced except in full, without the prior written approval of the laboratory.

Approved Signatories:

Alex Wynn (Associate Director) - Ben Sharp (Contracts Manager) - Emma Sharp (Office Manager)

Paul Evans (Quality/Technical Manager) - Richard John (Advanced Testing Manager) - Sean Penn (Administrative/Quality Assistant)

Vaughan Edwards (Managing Director) - Wayne Honey (Administrative/Quality Assistant)

GEO Site & Testing Services Ltd

Unit 3-4, Heol Aur, Dafen Ind Estate, Dafen, Llanelli, Carmarthenshire SA14 8QN

Tel: 01554 784040 Fax: 01554 784041 info@gstl.co.uk gstl.co.uk

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

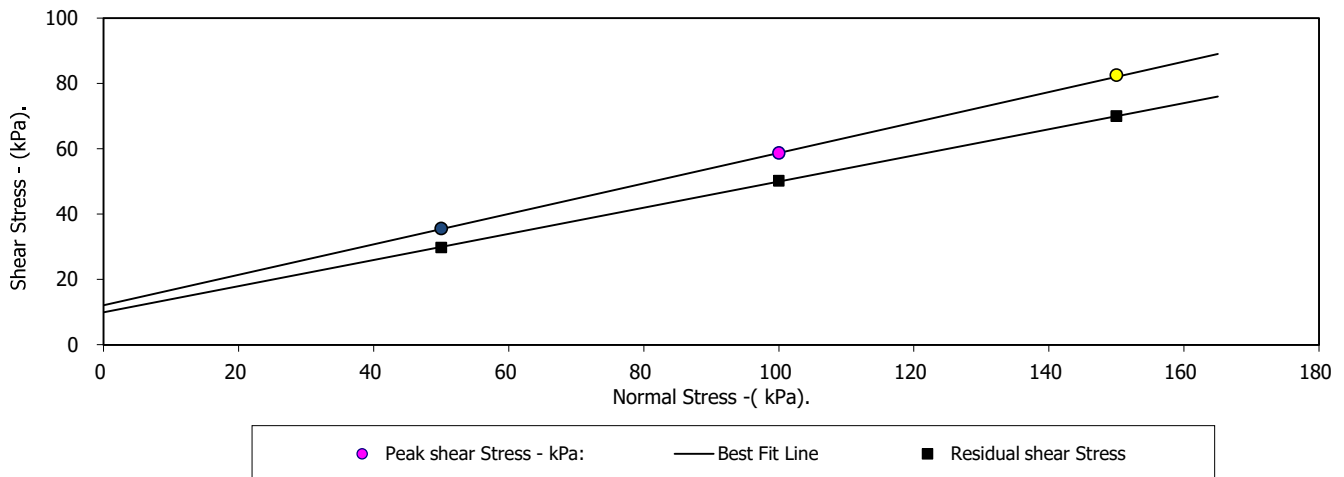
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole Number: BH4 Depth from (m): 2.50
Sample Number: 312 Depth to (m): 0.00

Sample Type: B	Remoulded (Light Tamping) material above 2.5mm removed		
Particle Density - Mg/m3:	2.65 (Assumed)		
Specimen Tested:	Submerged		
Sample Description: Brown sandy gravelly (fine-medium) CLAY			
STAGE	1	2	3
Initial Conditions			
Height - mm:	24.27	24.27	24.27
Length - mm:	59.97	59.97	59.97
Moisture Content - %:	26	26	26
Bulk Density - Mg/m3:	1.95	1.96	1.96
Dry Density - Mg/m3:	1.55	1.55	1.55
Voids Ratio:	0.7105	0.7077	0.7075
Normal Pressure- kPa	50	100	150
Consolidation			
Consolidated Height - mm:	23.46	22.88	22.30
Shear			
Rate of Strain (mm/min)	0.010	0.010	0.010
Strain at peak shear stress (mm)	3.44	4.07	7.11
Peak shear Stress - kPa:	36	59	83

PEAK	
Angle of Shearing Resistance: (θ)	25.0
Effective Cohesion - kPa:	12
RESIDUAL	
Angle of Shearing Resistance: (θ)	21.8
Effective Cohesion - kPa:	10

Failure Conditions



DPG 12/05/17
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DPG 12/05/17
Approved Pages 1-4 by: Date

Contract No.:
34926

Client Ref Number:
NE3545A

Former Petrol Station, North Road, Kirkburton



Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

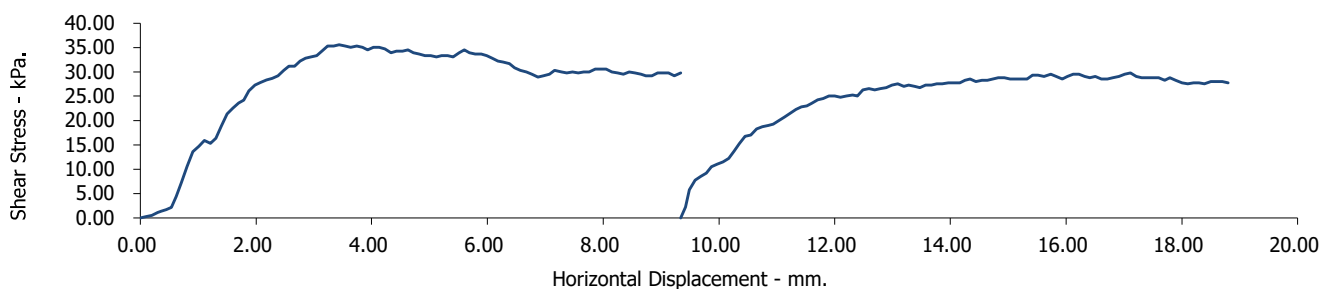
Borehole/Sample Number:

BH4

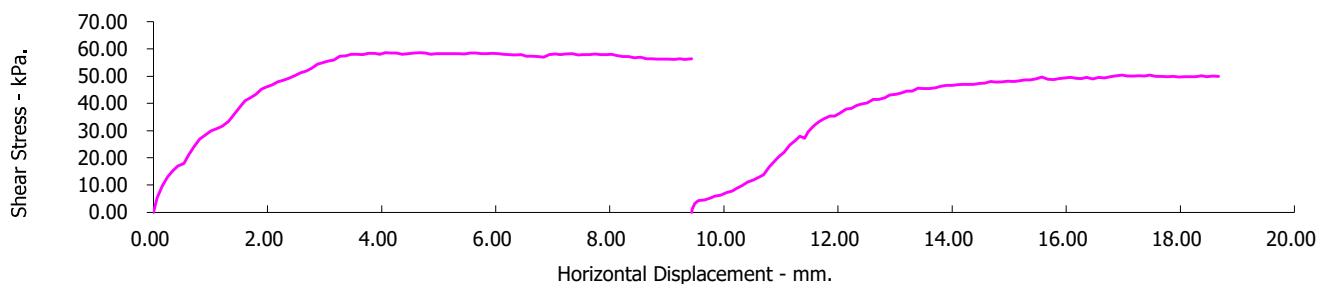
Depth (m):

2.50

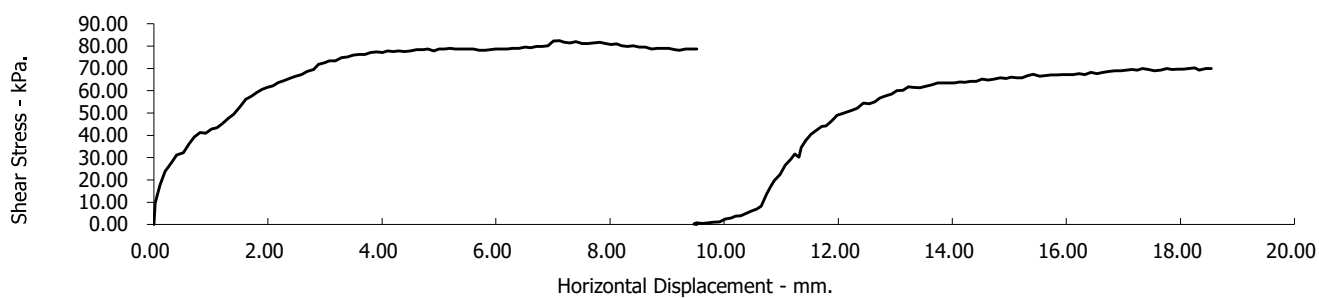
SHEARING STAGE 1.



SHEARING STAGE 2.



SHEARING STAGE 3.



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
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Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

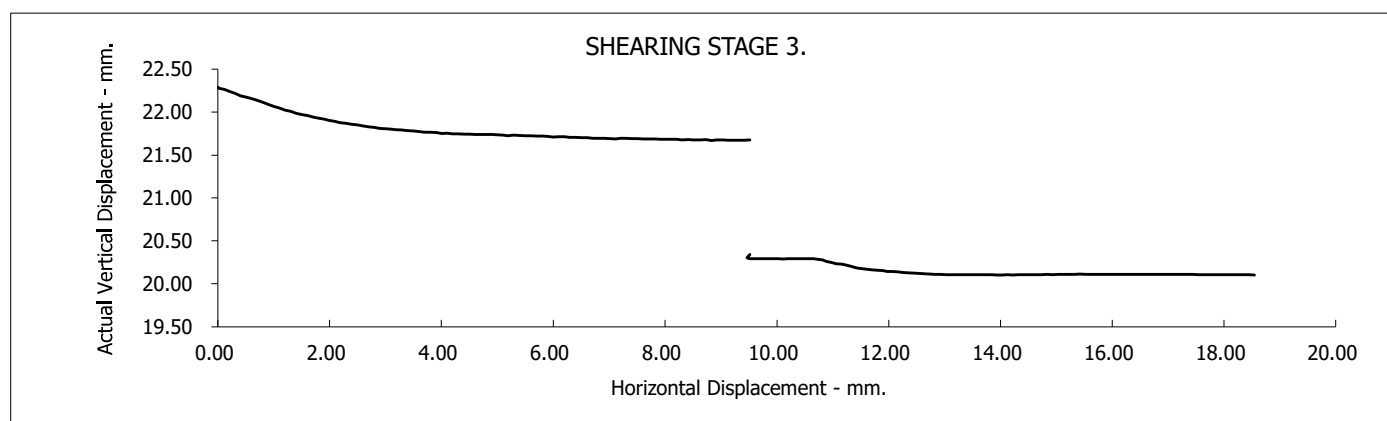
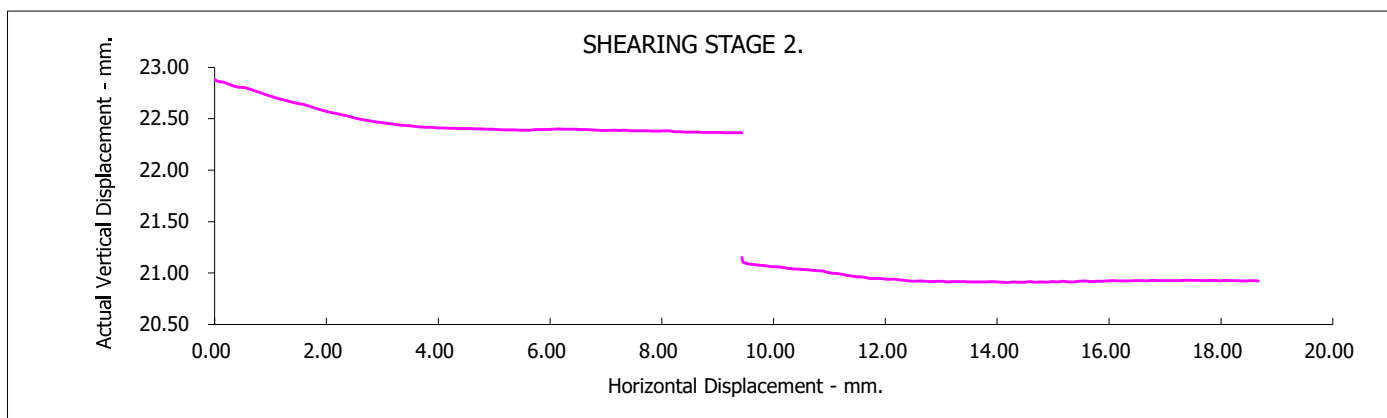
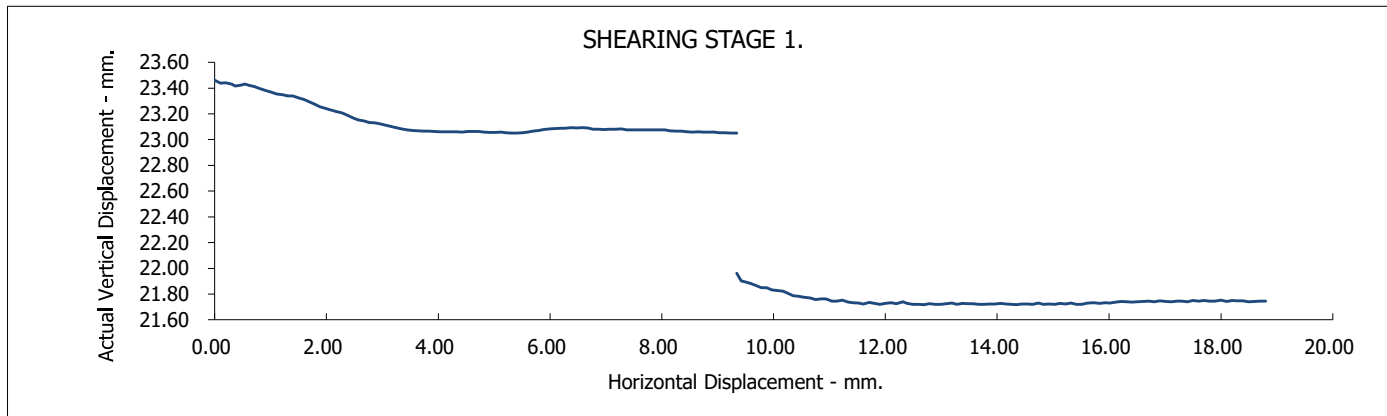
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH4

Depth (m):

2.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A



04070405 CDP

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

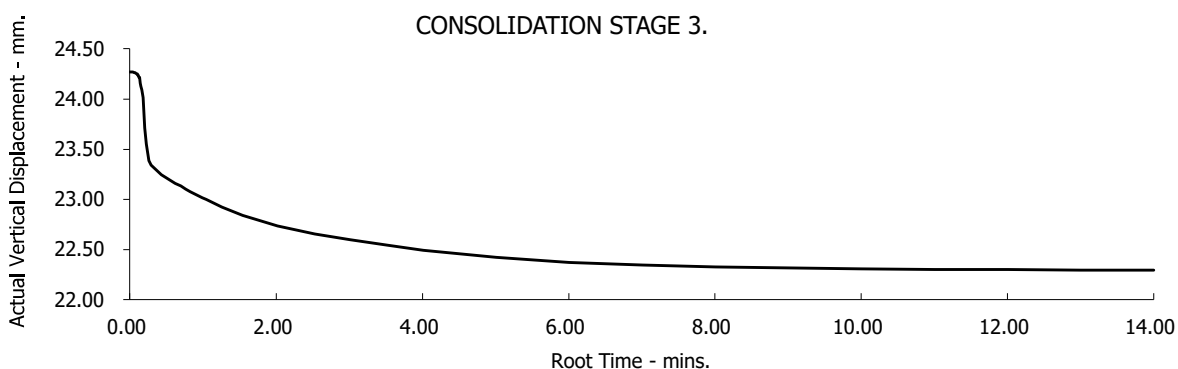
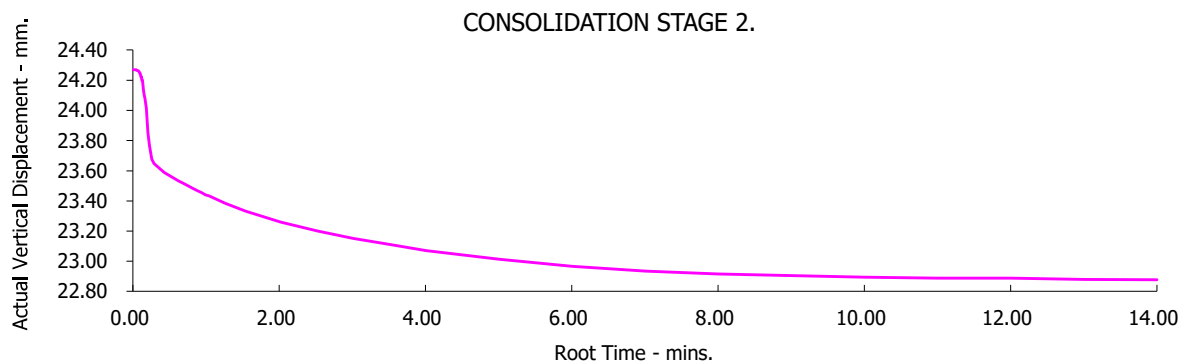
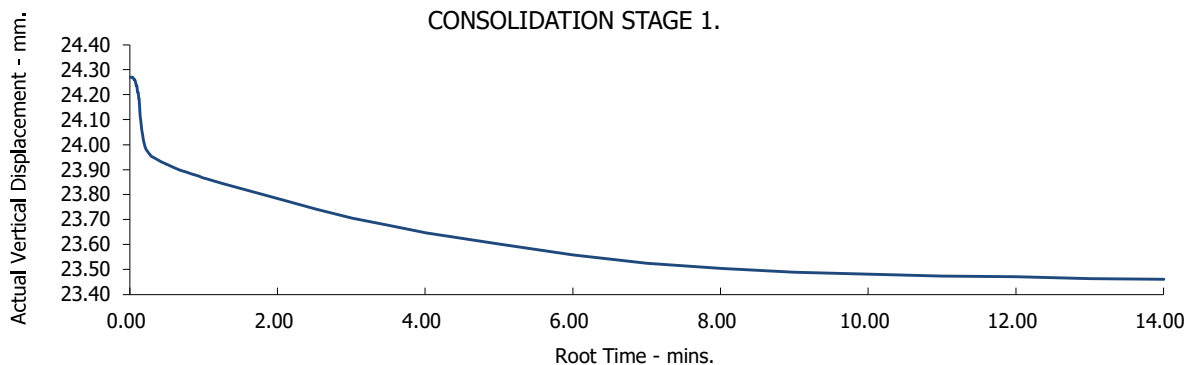
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH4

Depth (m):

2.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A

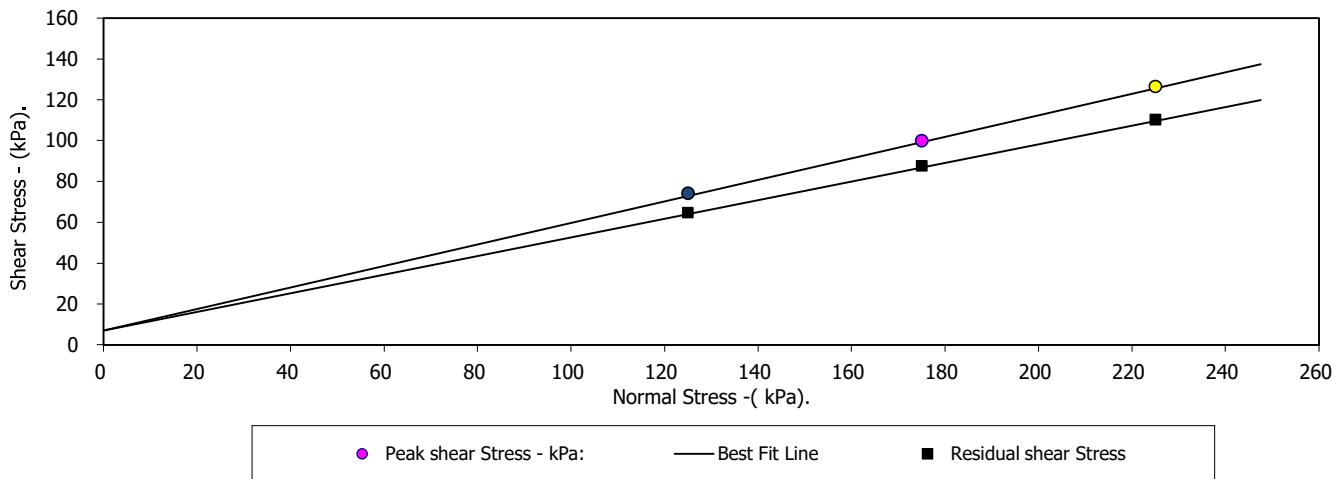
Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole Number:	BH4	Depth from (m):	5.50
Sample Number:		318 Depth to (m):	0.00
Sample Type:	B	Remoulded (Light Tamping) material above 2.5mm removed	
Particle Density - Mg/m3:	2.65	(Assumed)	
Specimen Tested:	Submerged		
Sample Description:			
Dark brown soft sandy silty gravelly CLAY			
STAGE	1	2	3
Initial Conditions			
Height - mm:	24.27	24.27	24.27
Length - mm:	59.97	59.97	59.97
Moisture Content - %:	27	27	27
Bulk Density - Mg/m3:	1.89	1.89	1.89
Dry Density - Mg/m3:	1.49	1.49	1.49
Voids Ratio:	0.7729	0.7746	0.7782
Normal Pressure- kPa	125	175	225
Consolidation			
Consolidated Height - mm:	21.91	21.56	21.21
Shear			
Rate of Strain (mm/min)	0.010	0.010	0.010
Strain at peak shear stress (mm)	3.88	6.68	6.69
Peak shear Stress - kPa:	74	100	127

PEAK	
Angle of Shearing Resistance:(θ)	27.8
Effective Cohesion - kPa:	7
RESIDUAL	
Angle of Shearing Resistance:(θ)	24.5
Effective Cohesion - kPa:	7

Failure Conditions



[Signature]

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[Signature]

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Contract No.:
34926

Client Ref Number:
NE3545A

Former Petrol Station, North Road, Kirkburton



Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

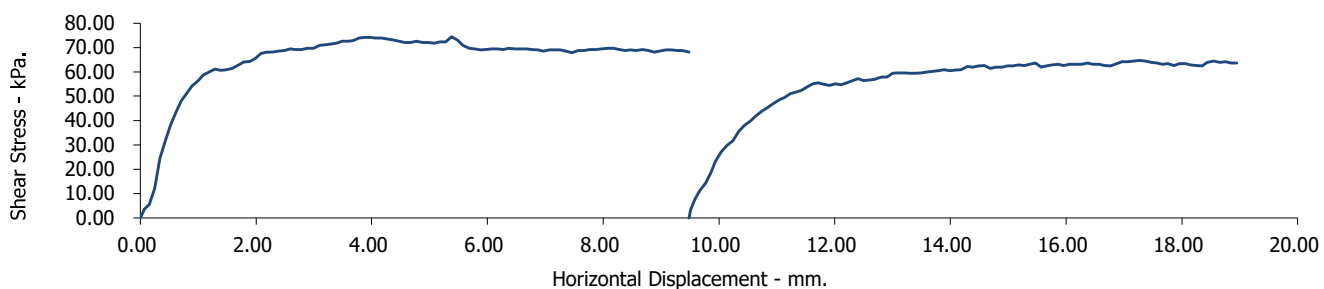
Borehole/Sample Number:

BH4

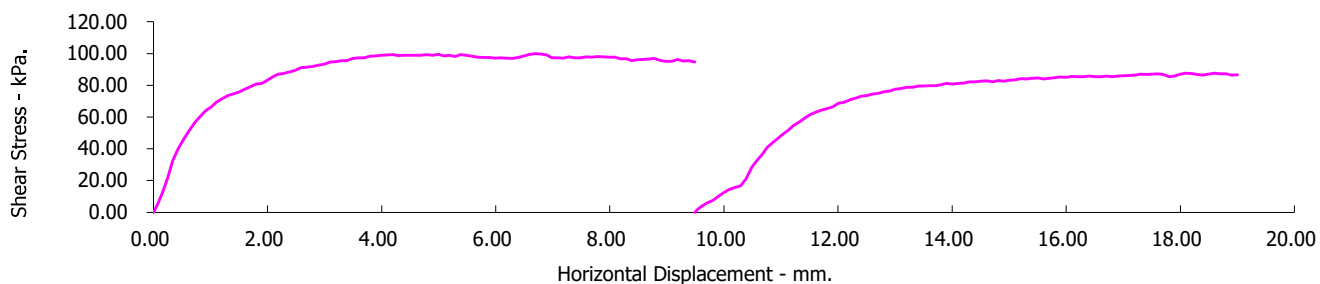
Depth (m):

5.50

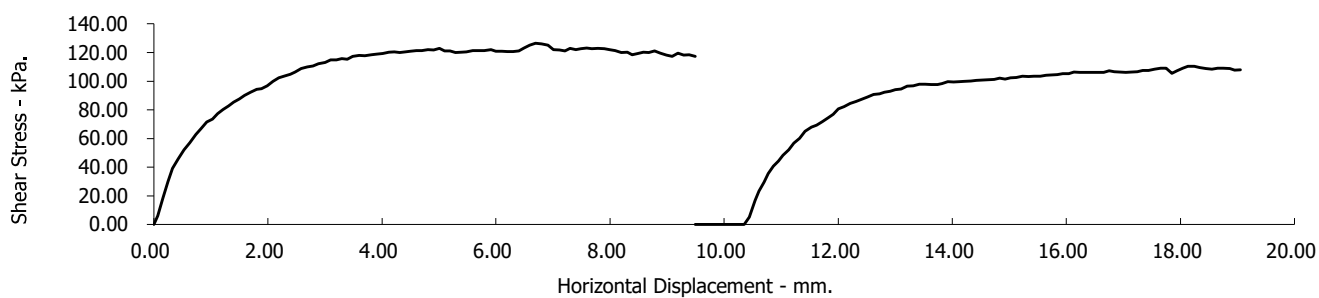
SHEARING STAGE 1.



SHEARING STAGE 2.



SHEARING STAGE 3.



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

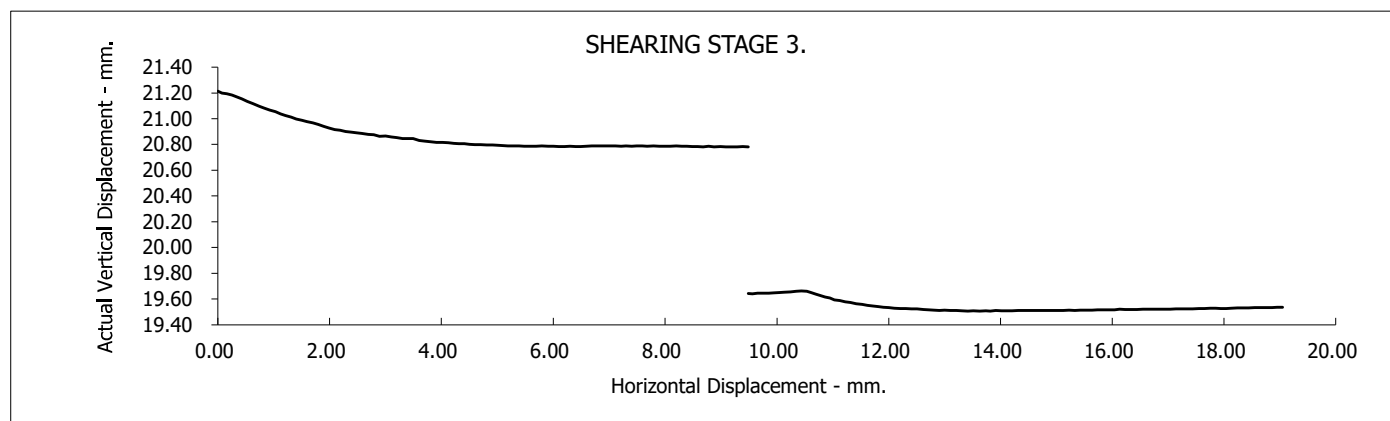
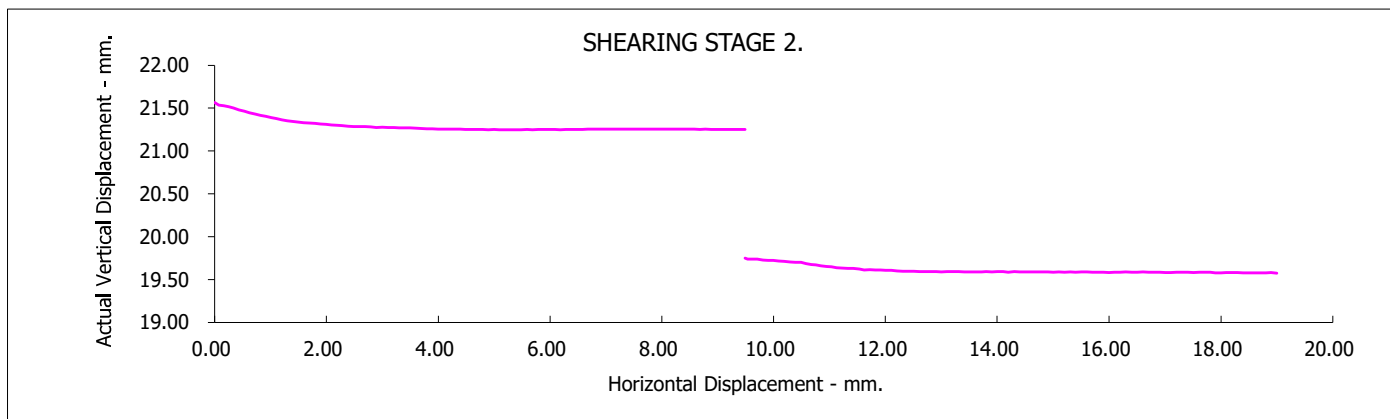
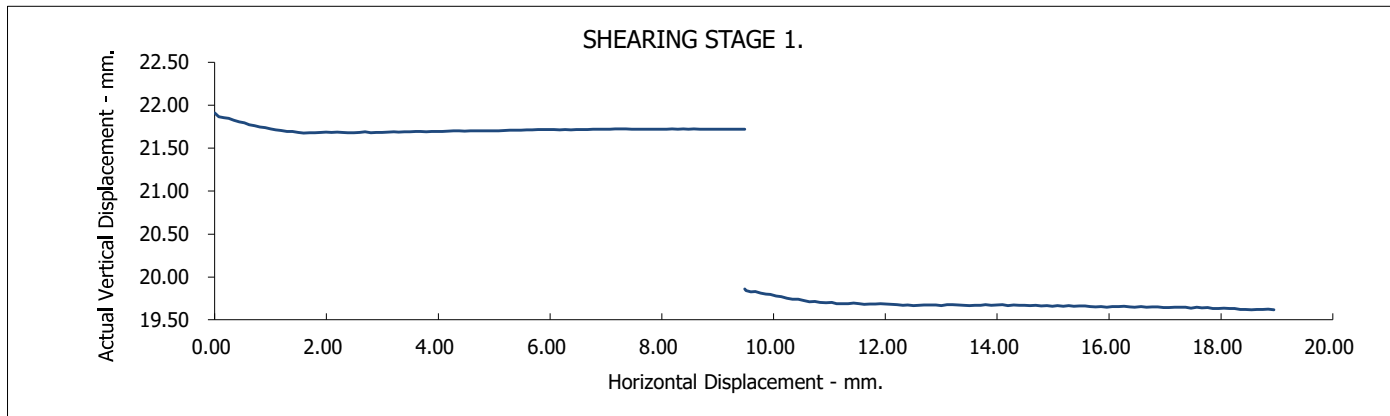
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH4

Depth (m):

5.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A



04070405 CDP

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

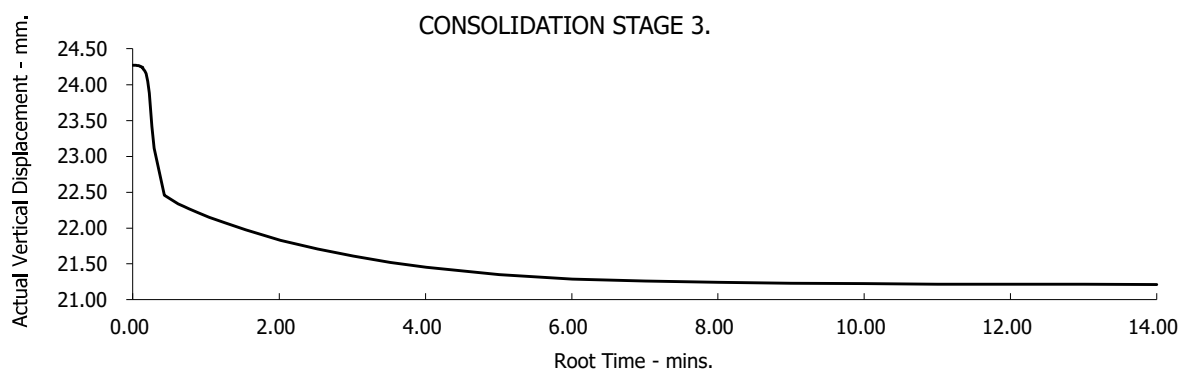
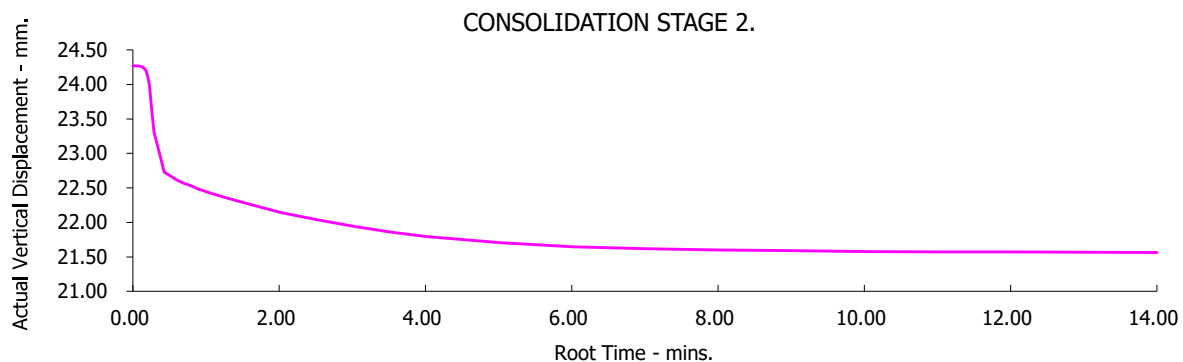
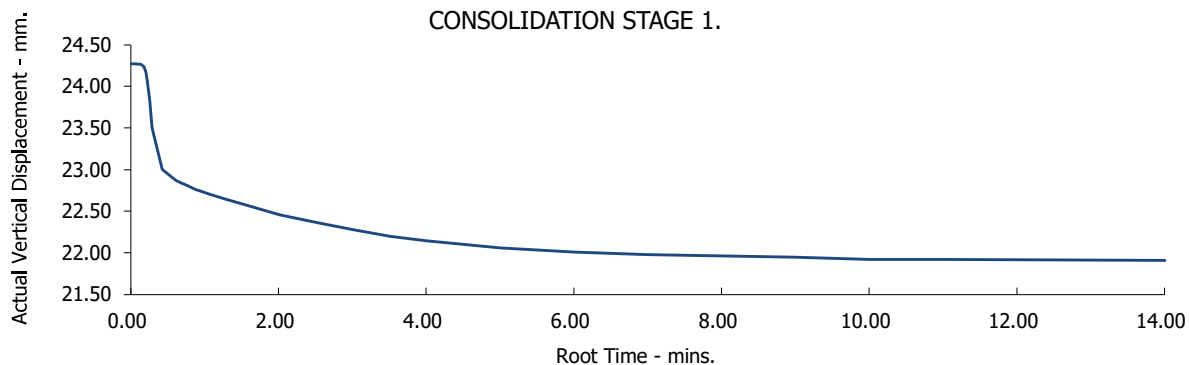
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH4

Depth (m):

5.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole Number: BH5 Depth from (m): 3.50
Sample Number: 292 Depth to (m): 0.00

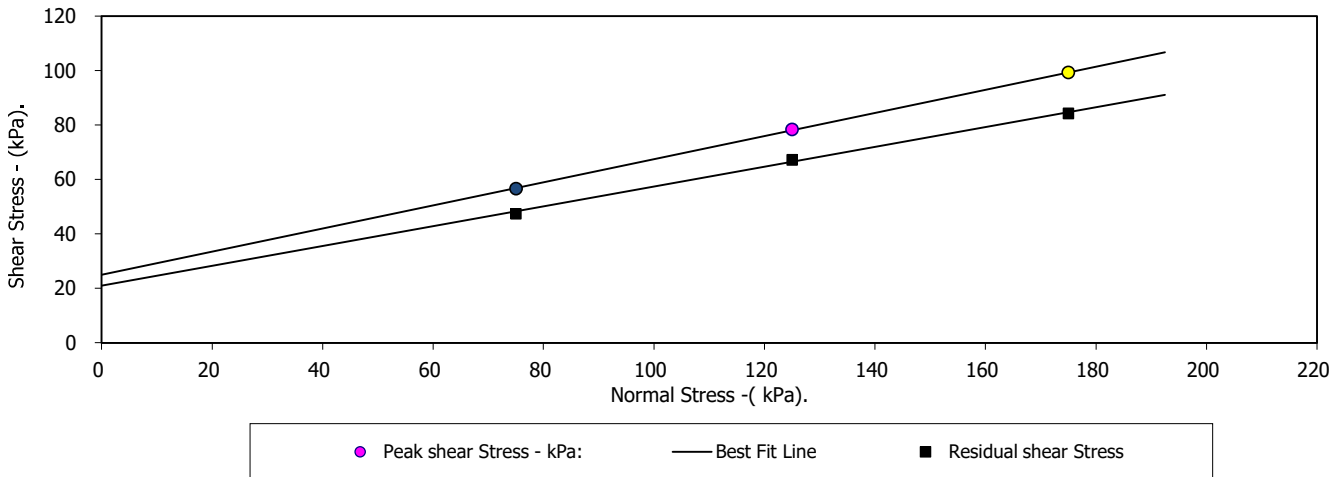
Sample Type: B	Remoulded (Light Tamping) material above 2.5mm removed
Particle Density - Mg/m ³ :	2.65 (Assumed)
Specimen Tested:	Submerged

Sample Description:
Brown soft slightly silty sandy gravelly (fine-coarse/angular-subangular) CLAY

STAGE	1	2	3
Initial Conditions			
Height - mm:	24.50	24.50	24.50
Length - mm:	59.90	59.90	59.90
Moisture Content - %:	23	23	23
Bulk Density - Mg/m ³ :	1.93	1.93	1.93
Dry Density - Mg/m ³ :	1.57	1.57	1.57
Voids Ratio:	0.6875	0.6853	0.6846
Normal Pressure- kPa	75	125	175
Consolidation			
Consolidated Height - mm:	23.43	23.13	22.99
Shear			
Rate of Strain (mm/min)	0.010	0.010	0.010
Strain at peak shear stress (mm)	5.79	4.53	4.20
Peak shear Stress - kPa:	57	78	99

PEAK	
Angle of Shearing Resistance:(θ)	23.0
Effective Cohesion - kPa:	25
RESIDUAL	
Angle of Shearing Resistance:(θ)	20.0
Effective Cohesion - kPa:	21

Failure Conditions



DPG 12/05/17
Checked Pages 1-4 by: Date

DPG 12/05/17
Approved Pages 1-4 by: Date

Contract No.:
34926

Client Ref Number:
NE3545A

Former Petrol Station, North Road, Kirkburton



Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

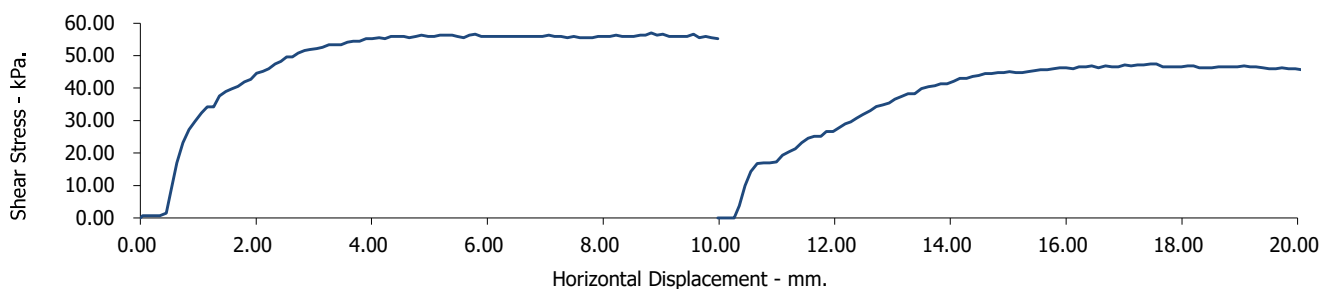
Borehole/Sample Number:

BH5

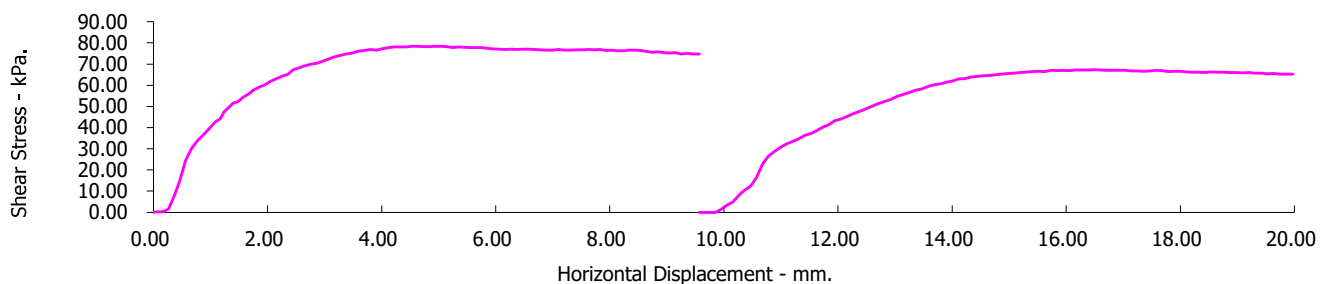
Depth (m):

3.50

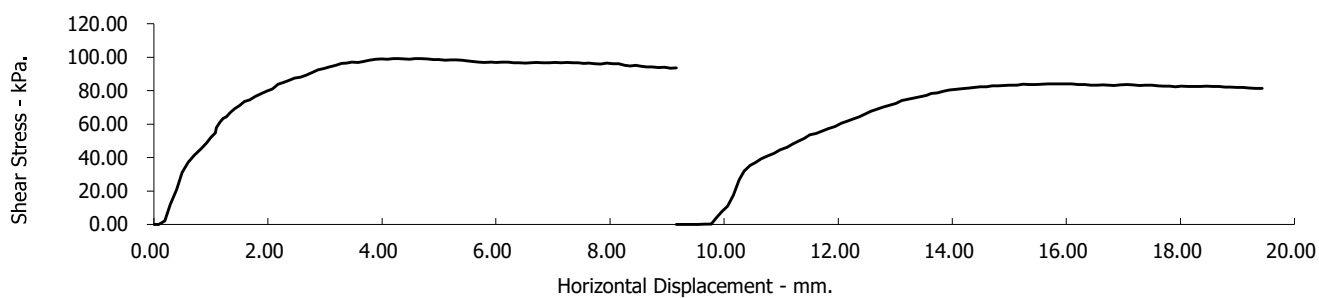
SHEARING STAGE 1.



SHEARING STAGE 2.



SHEARING STAGE 3.



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

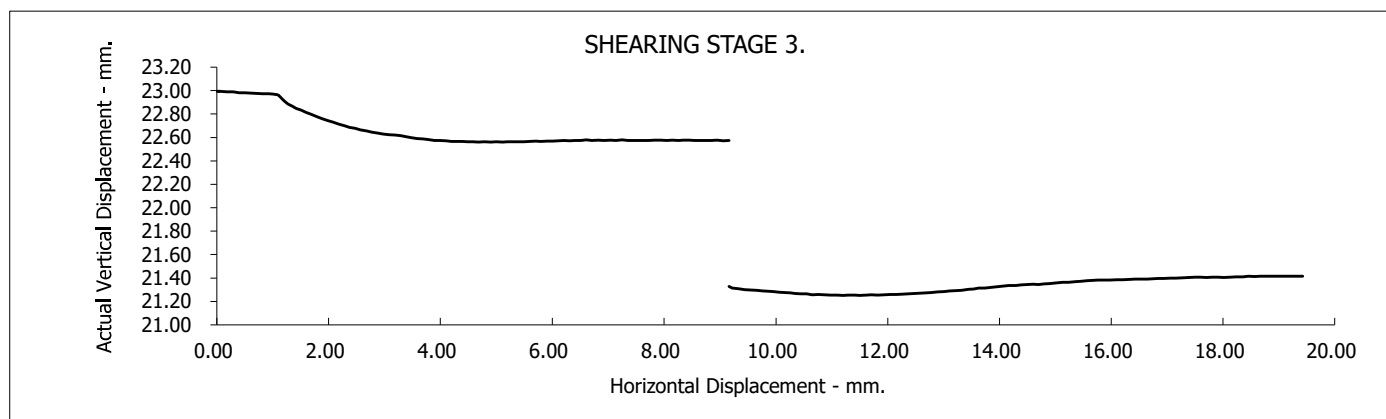
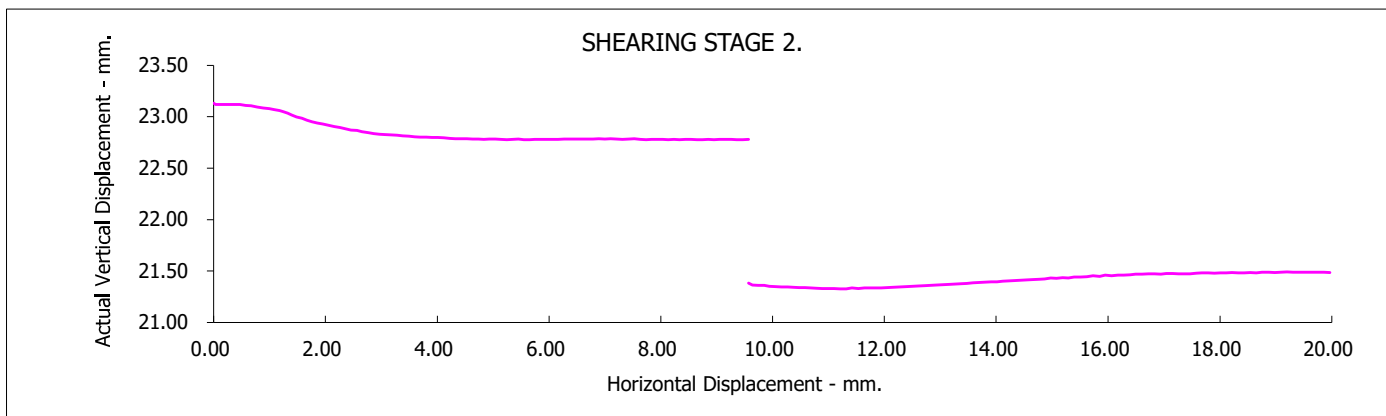
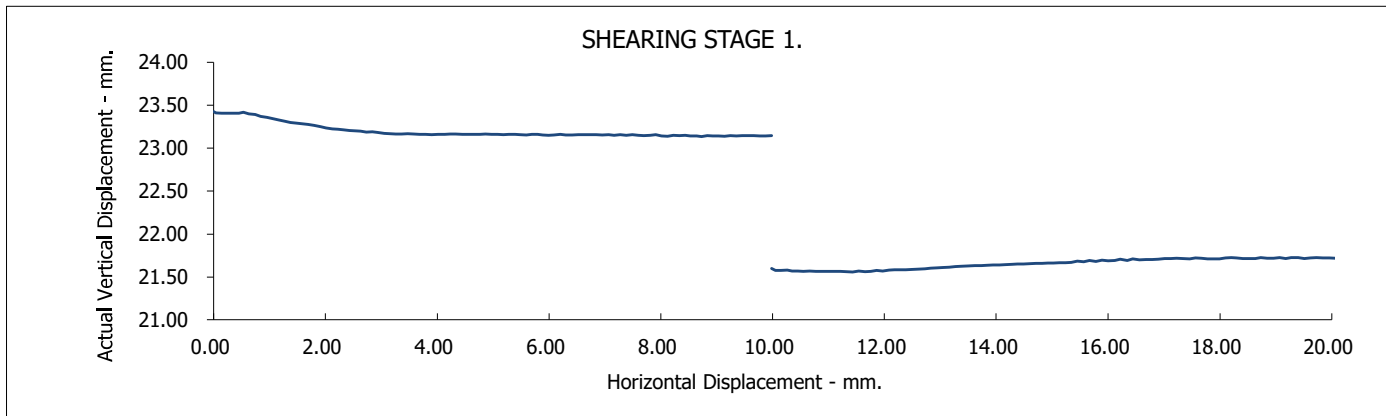
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH5

Depth (m):

3.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A



04070405 CDP

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

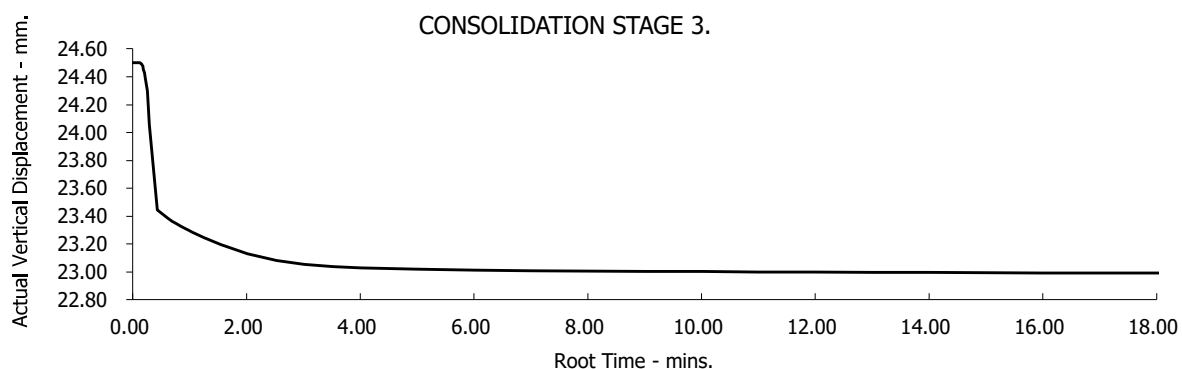
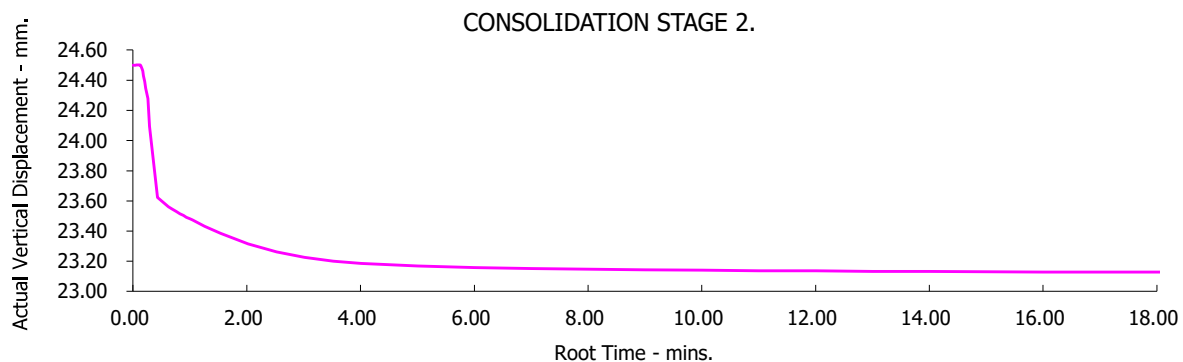
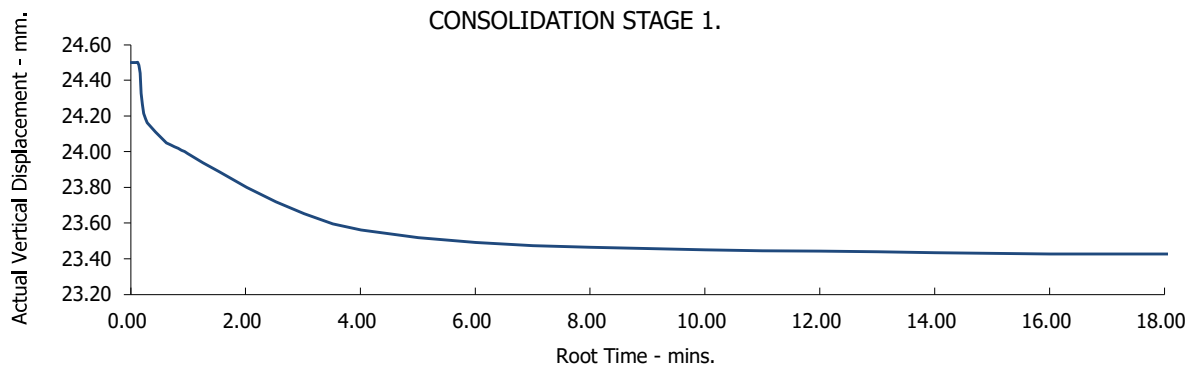
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH5

Depth (m):

3.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole Number: BH5 Depth from (m): 7.50
Sample Number: 300 Depth to (m): 0.00

Sample Type: B	Remoulded (Light Tamping) material above 2.5mm removed
Particle Density - Mg/m ³ :	2.65 (Assumed)
Specimen Tested:	Submerged

Sample Description:

Brown soft silty sandy slightly gravelly CLAY

STAGE	1	2	3
Initial Conditions			
Height - mm:	24.27	24.27	24.27
Length - mm:	59.97	59.97	59.97
Moisture Content - %:	29	29	29
Bulk Density - Mg/m ³ :	1.87	1.87	1.87
Dry Density - Mg/m ³ :	1.45	1.45	1.46
Voids Ratio:	0.8214	0.8219	0.8208
Normal Pressure- kPa	150	200	250
Consolidation			
Consolidated Height - mm:	21.81	21.38	21.13
Shear			
Rate of Strain (mm/min)	0.010	0.010	0.010
Strain at peak shear stress (mm)	4.69	4.74	4.67
Peak shear Stress - kPa:	81	109	136

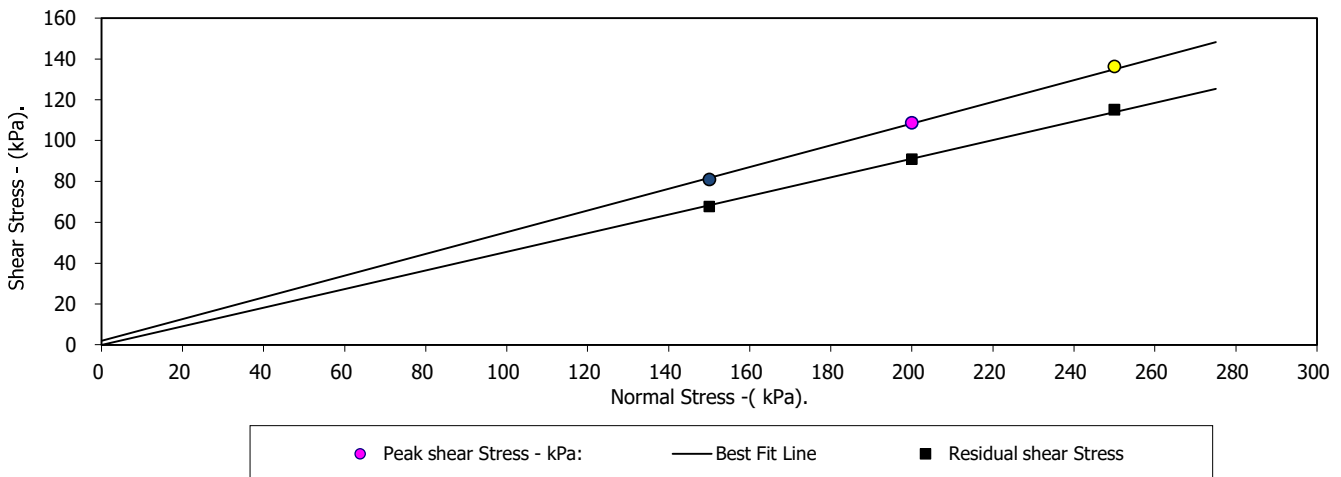
PEAK

Angle of Shearing Resistance:(θ)	28.0
Effective Cohesion - kPa:	2

RESIDUAL

Angle of Shearing Resistance:(θ)	24.5
Effective Cohesion - kPa:	0

Failure Conditions



DPG

Checked Pages 1-4 by: Date 12/05/17

DPG

Approved Pages 1-4 by: Date 12/05/17

Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A



Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

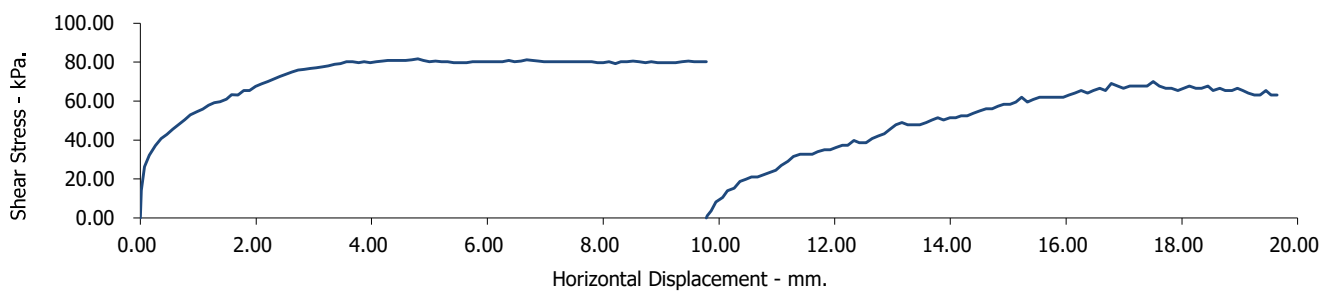
Borehole/Sample Number:

BH5

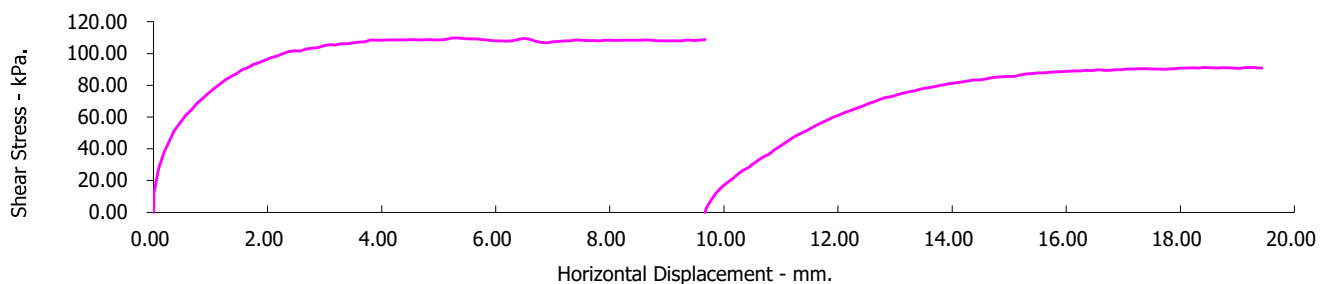
Depth (m):

7.50

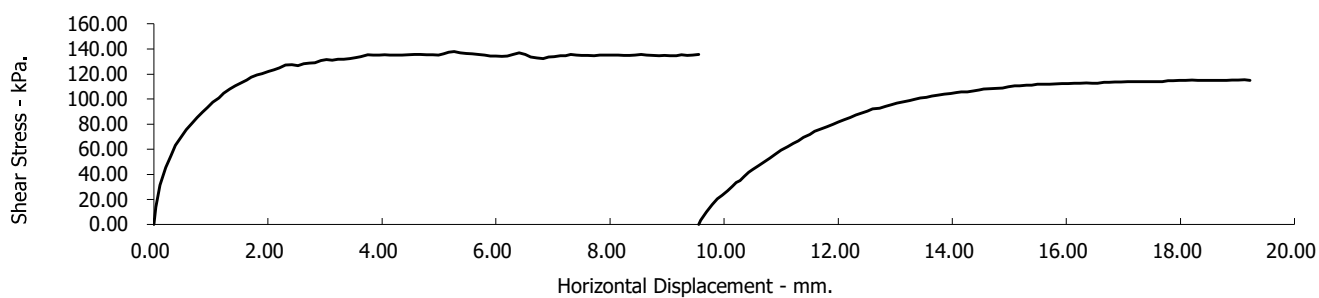
SHEARING STAGE 1.



SHEARING STAGE 2.



SHEARING STAGE 3.



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

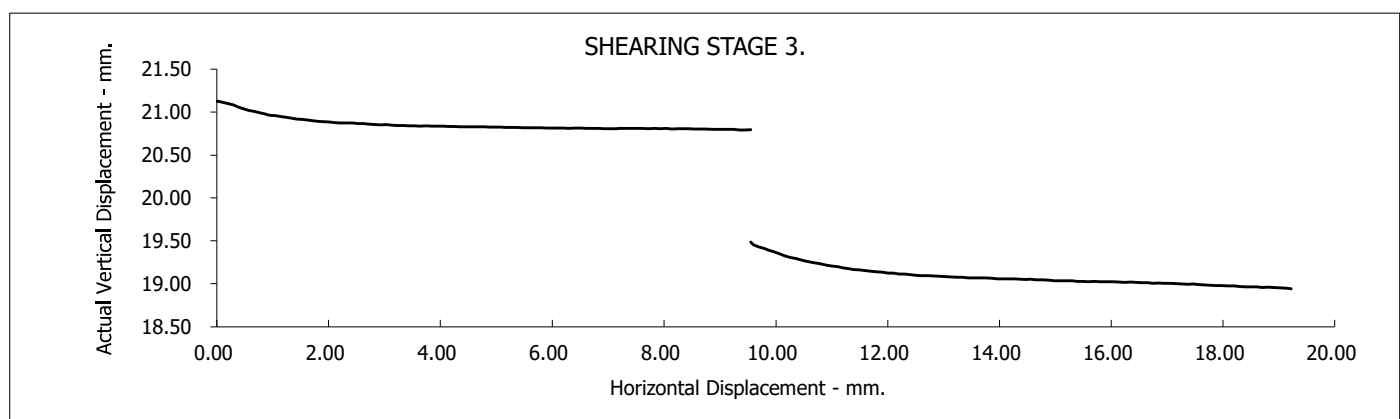
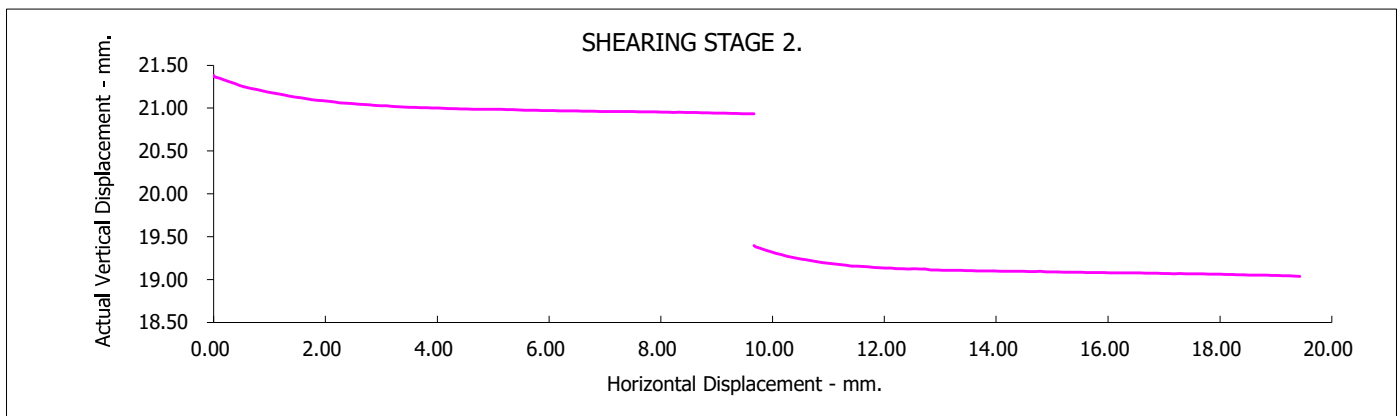
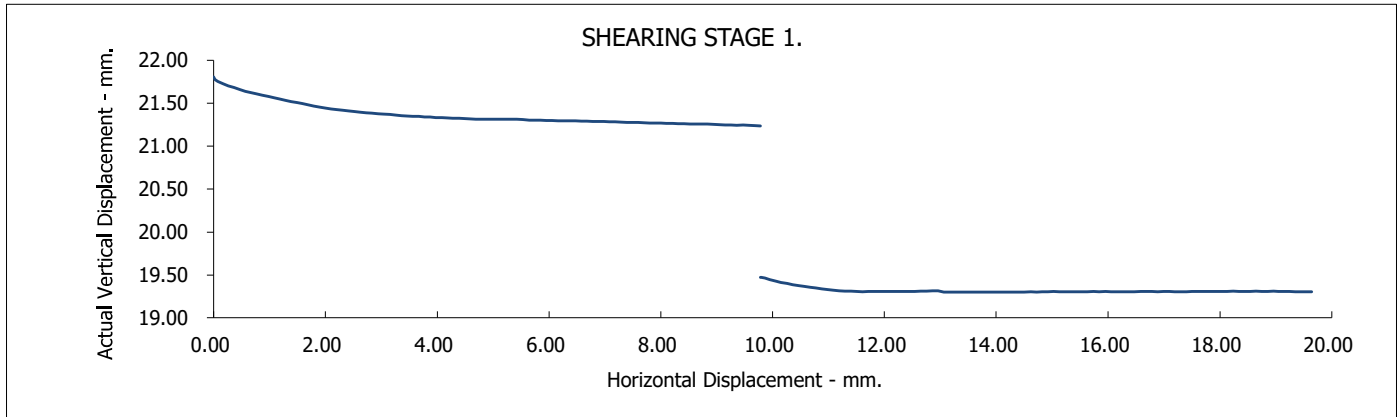
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH5

Depth (m):

7.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A



04070405 CDP

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

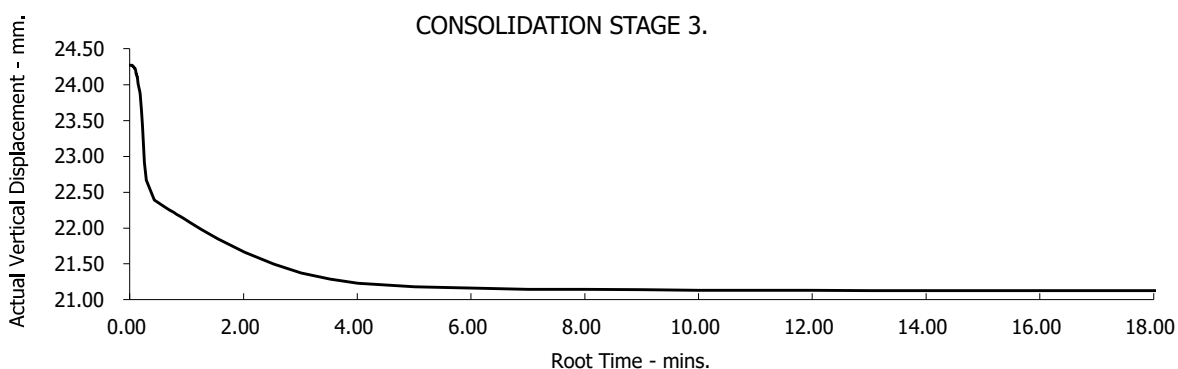
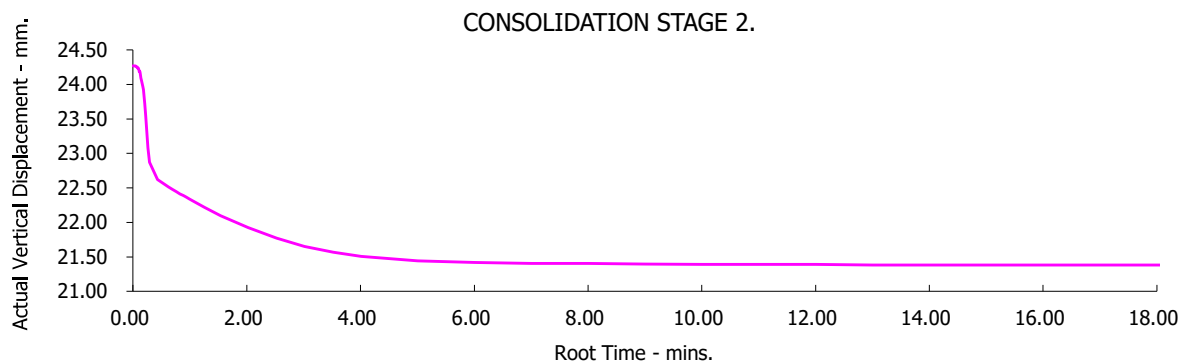
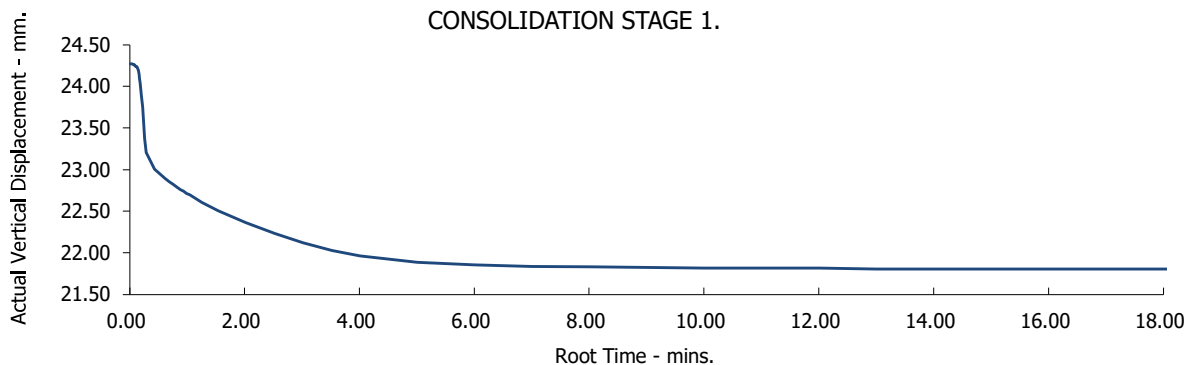
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH5

Depth (m):

7.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole Number: BH6 Depth from (m): 1.50
Sample Number: 331 Depth to (m): 0.00

Sample Type: B	Remoulded (Light Tamping) material above 2.5mm removed
Particle Density - Mg/m ³ :	2.65 (Assumed)
Specimen Tested:	Submerged

Sample Description:

Brown soft silty sandy gravelly (fine-coarse/angular-subangular) CLAY

STAGE	1	2	3
Initial Conditions			
Height - mm:	24.27	24.27	24.27
Length - mm:	59.97	59.97	59.97
Moisture Content - %:	27	27	27
Bulk Density - Mg/m ³ :	1.81	1.81	1.81
Dry Density - Mg/m ³ :	1.42	1.42	1.42
Voids Ratio:	0.8652	0.8642	0.8626
Normal Pressure- kPa	50	100	150
Consolidation			
Consolidated Height - mm:	23.33	22.77	22.22
Shear			
Rate of Strain (mm/min)	0.010	0.010	0.010
Strain at peak shear stress (mm)	2.89	5.26	6.74
Peak shear Stress - kPa:	31	52	72

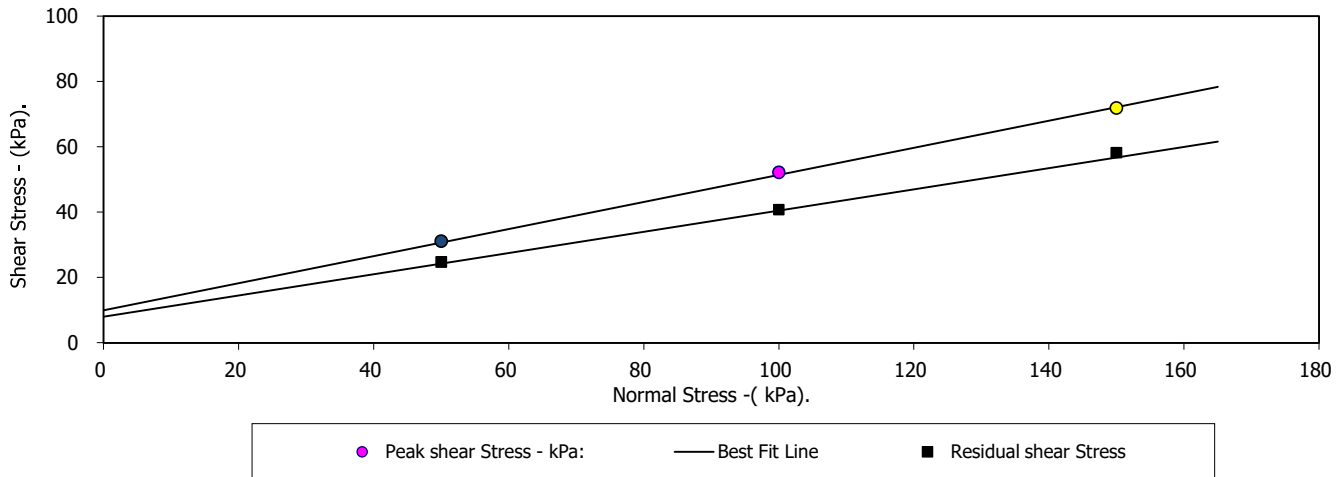
PEAK

Angle of Shearing Resistance:(θ)	22.5
Effective Cohesion - kPa:	10

RESIDUAL

Angle of Shearing Resistance:(θ)	18.0
Effective Cohesion - kPa:	8

Failure Conditions



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Approved Pages 1-4 by: Date 12/05/17

Contract No.:
34926

Client Ref Number:
NE3545A

Former Petrol Station, North Road, Kirkburton



Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

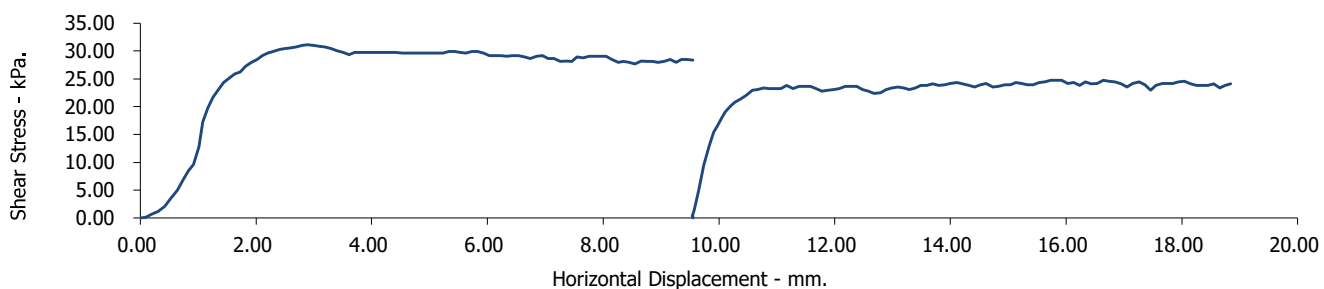
Borehole/Sample Number:

BH6

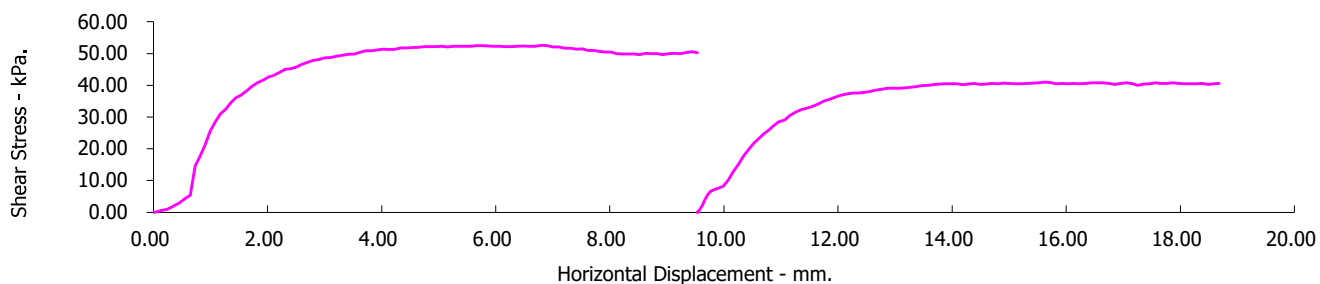
Depth (m):

1.50

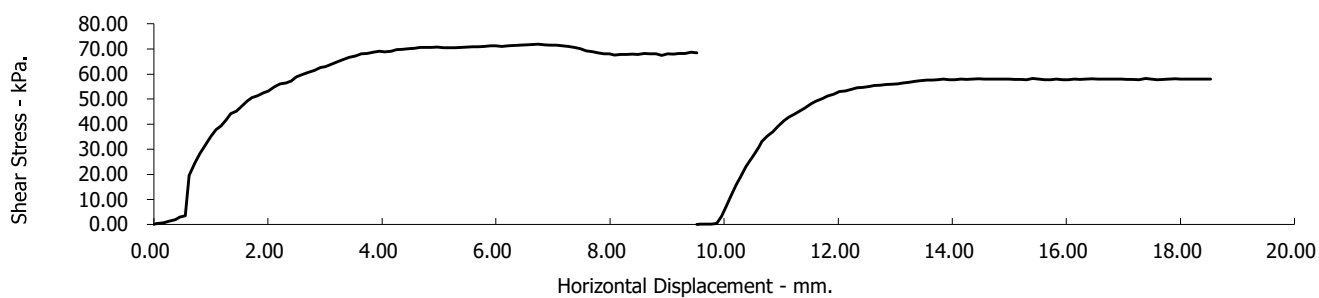
SHEARING STAGE 1.



SHEARING STAGE 2.



SHEARING STAGE 3.



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

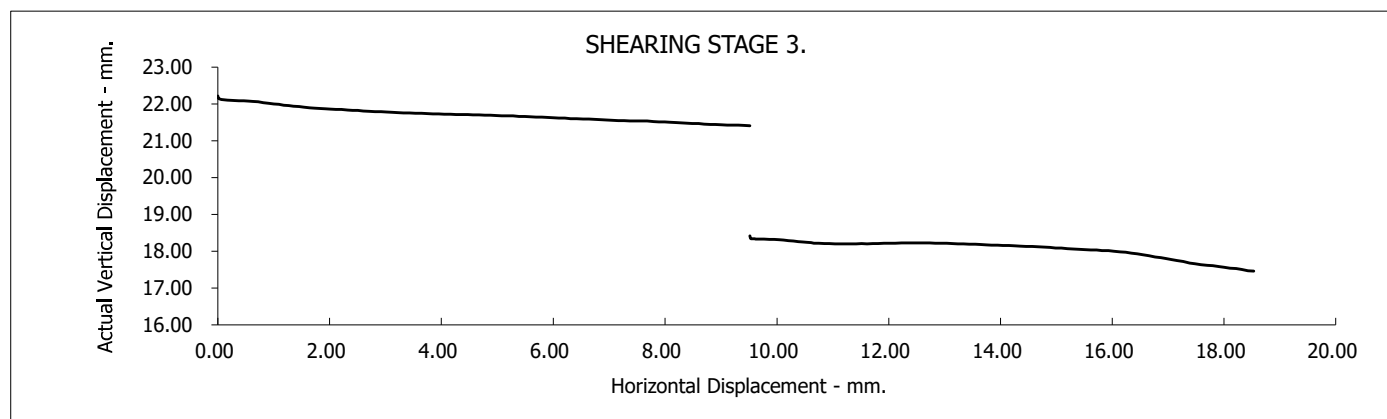
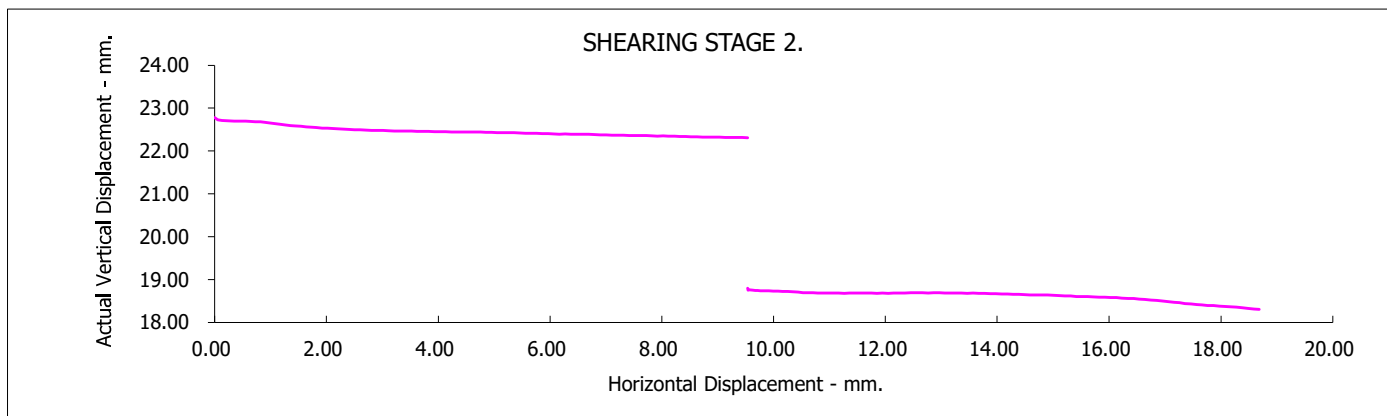
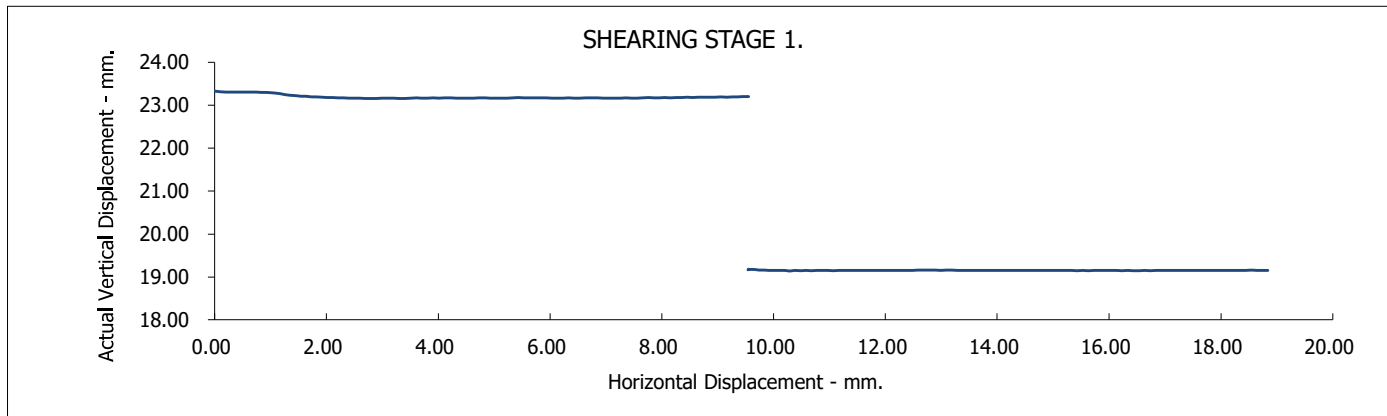
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH6

Depth (m):

1.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A



04070405 CDP

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

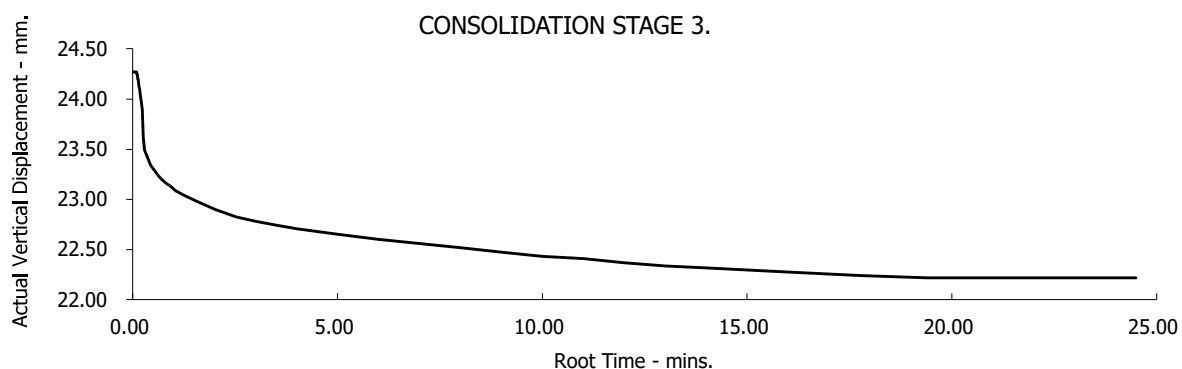
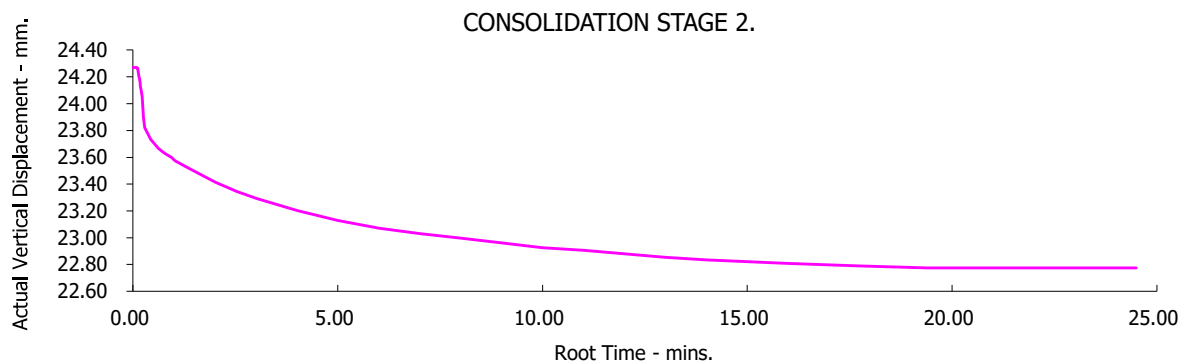
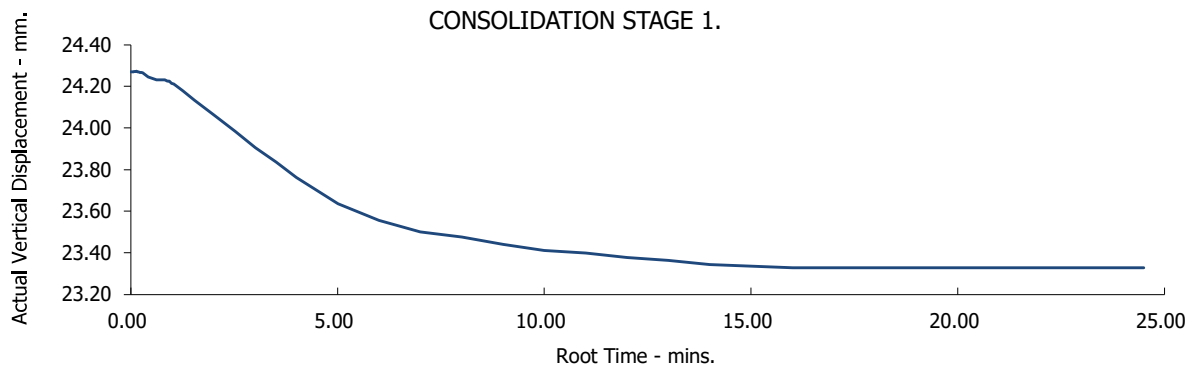
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH6

Depth (m):

1.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole Number: BH6 Depth from (m): 4.50
Sample Number: 337 Depth to (m): 0.00

Sample Type: B	Remoulded (Light Tamping) material above 2.5mm removed
Particle Density - Mg/m ³ :	2.65 (Assumed)
Specimen Tested:	Submerged

Sample Description:

Brown silty sandy gravelly (fine-coarse-angular-subrounded) CLAY

STAGE	1	2	3
Initial Conditions			
Height - mm:	24.27	24.27	24.27
Length - mm:	59.97	59.97	59.97
Moisture Content - %:	24	24	24
Bulk Density - Mg/m ³ :	1.97	1.98	1.98
Dry Density - Mg/m ³ :	1.59	1.60	1.60
Voids Ratio:	0.6635	0.6606	0.6596
Normal Pressure- kPa	100	150	200
Consolidation			
Consolidated Height - mm:	22.89	22.69	22.50
Shear			
Rate of Strain (mm/min)	0.010	0.010	0.010
Strain at peak shear stress (mm)	4.25	6.52	6.91
Peak shear Stress - kPa:	73	91	109

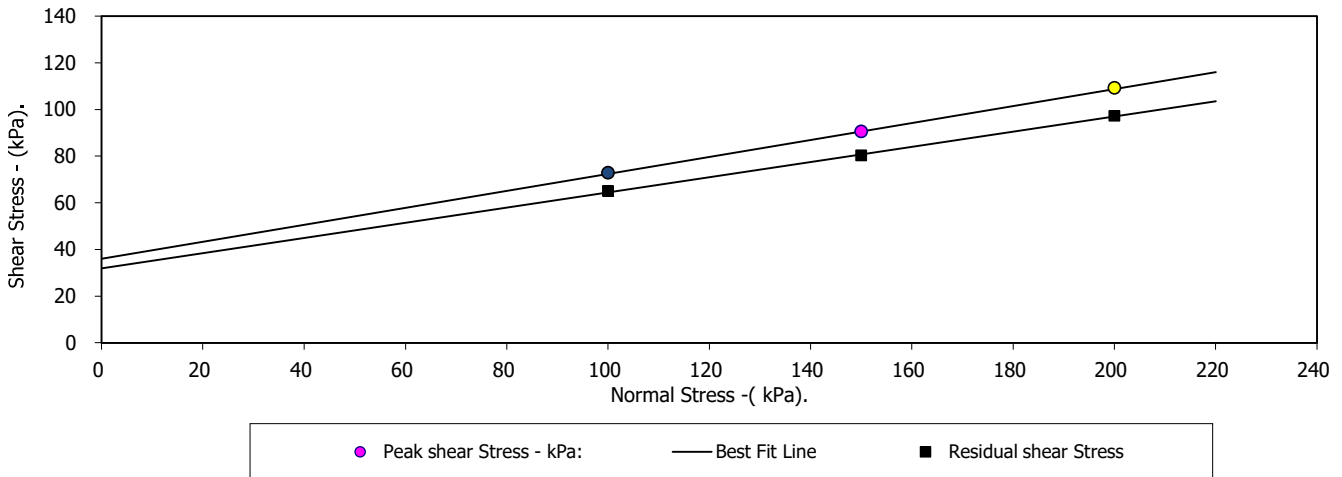
PEAK

Angle of Shearing Resistance:(θ)	20.0
Effective Cohesion - kPa:	36

RESIDUAL

Angle of Shearing Resistance:(θ)	18.0
Effective Cohesion - kPa:	32

Failure Conditions



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Approved Pages 1-4 by: Date 12/05/17

Contract No.:
34926

Client Ref Number:
NE3545A

Former Petrol Station, North Road, Kirkburton



Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

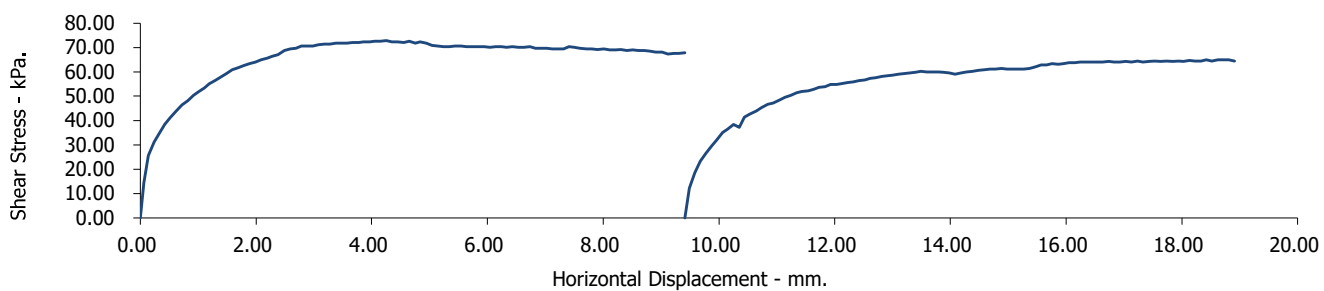
Borehole/Sample Number:

BH6

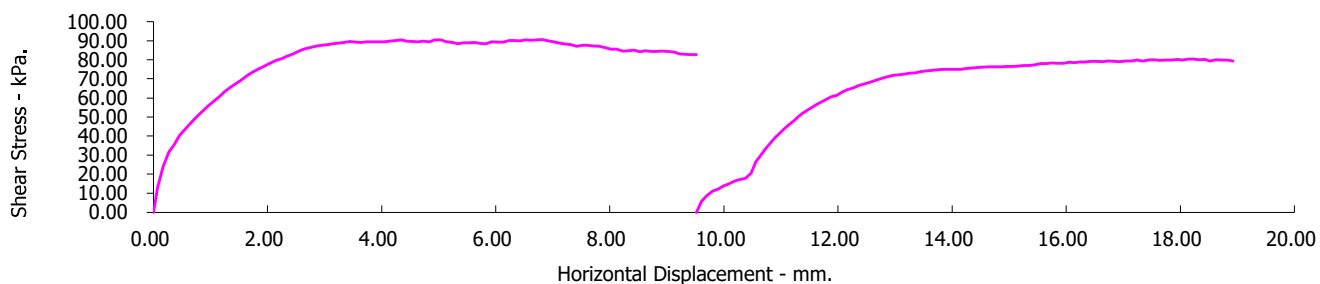
Depth (m):

4.50

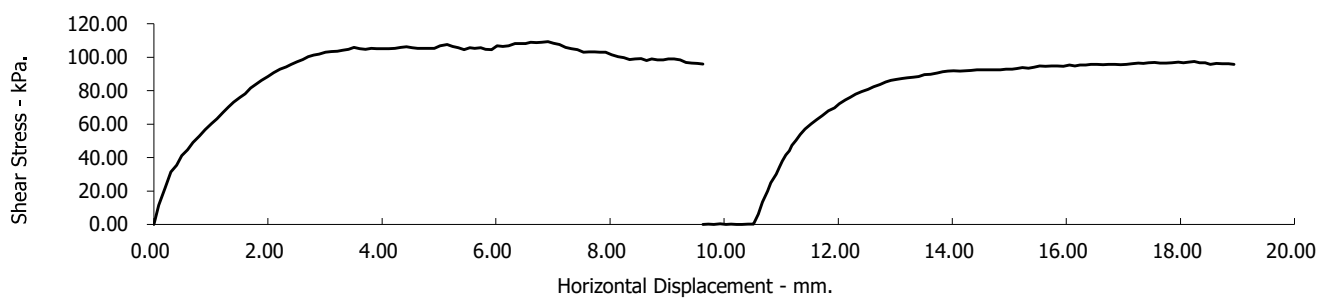
SHEARING STAGE 1.



SHEARING STAGE 2.



SHEARING STAGE 3.



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

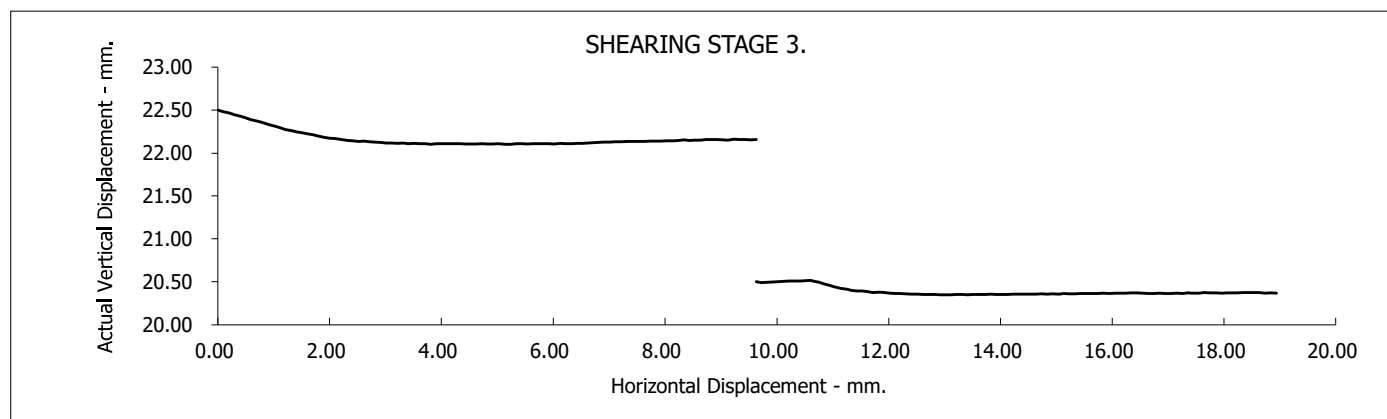
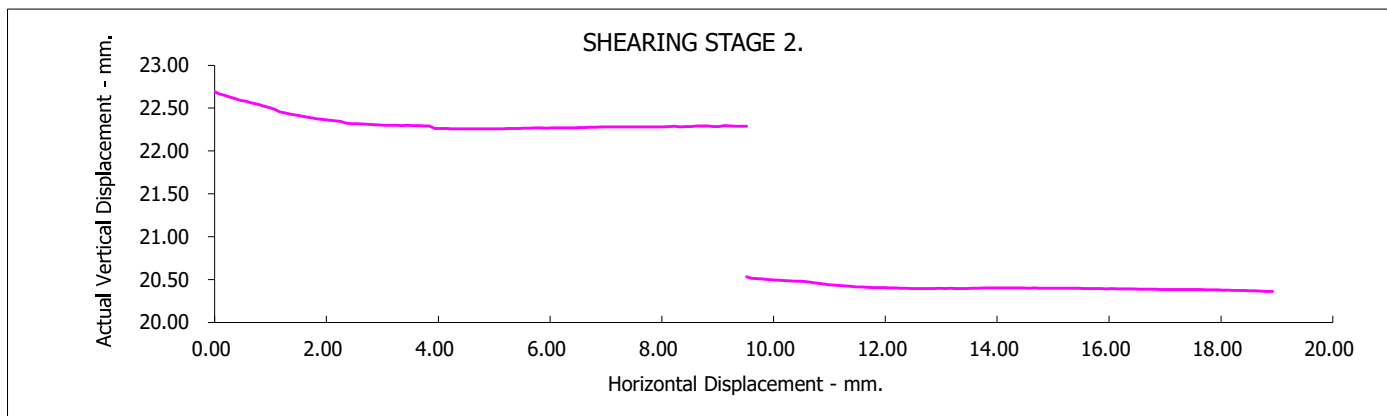
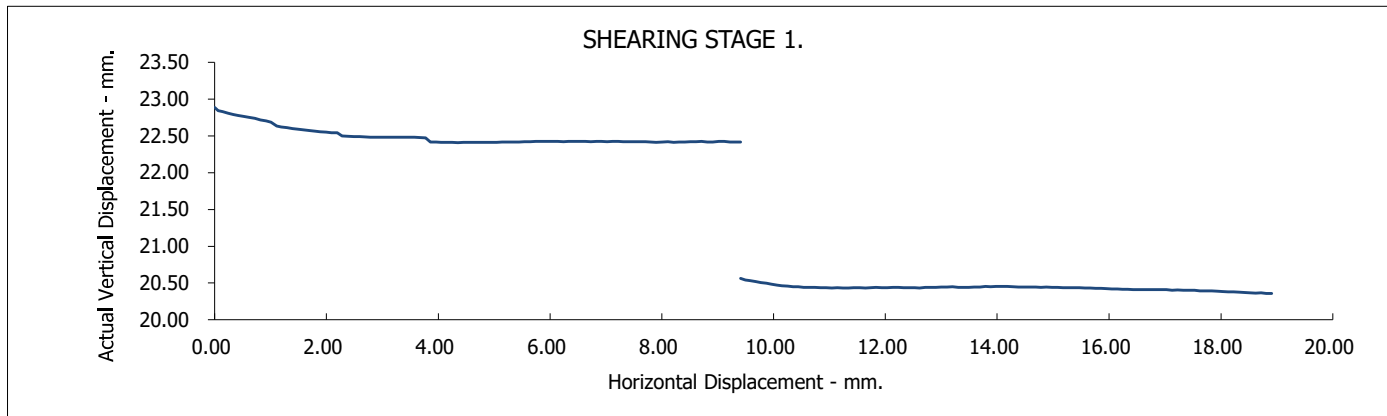
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH6

Depth (m):

4.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

Client Ref Number:
NE3545A



04070405 CDP

Test Report: CONSOLIDATED DRAINED PEAK AND RESIDUAL SHEARBOX TEST.

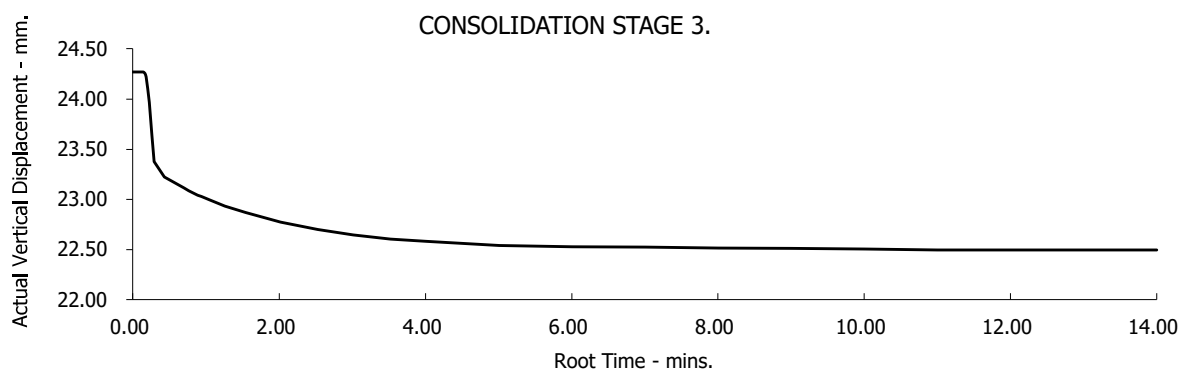
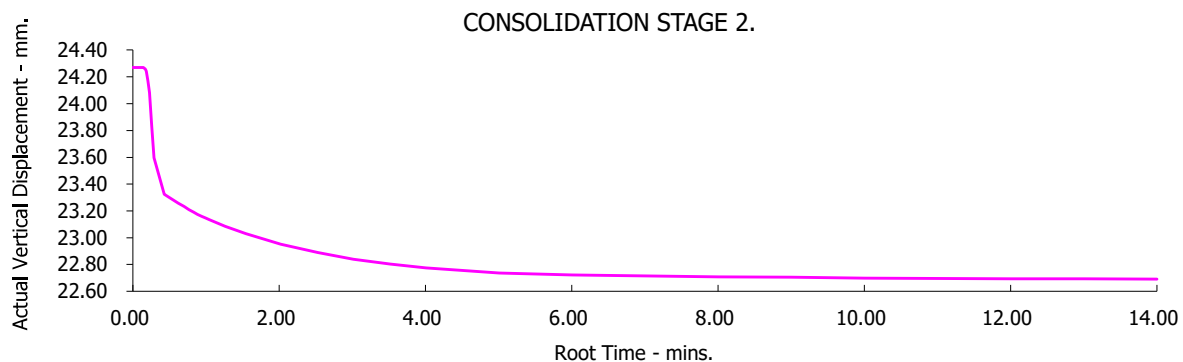
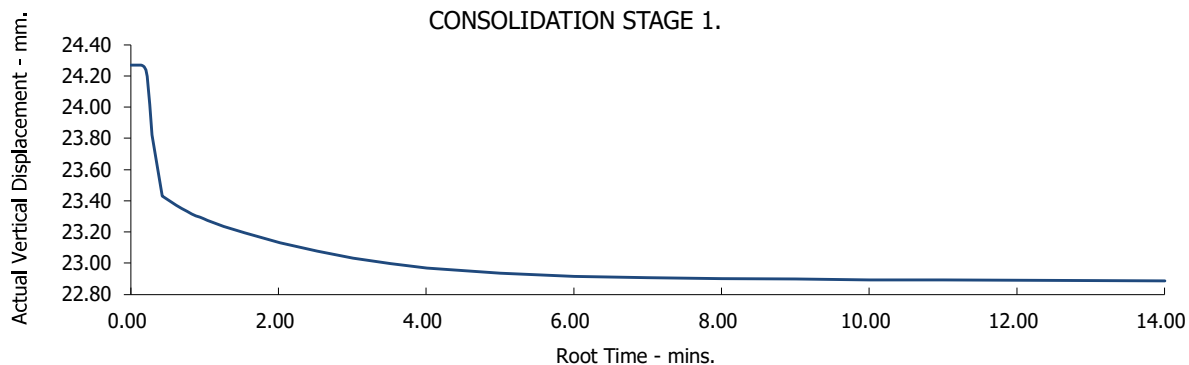
BS1377:Part 7.4.5.5 Shearing: multi-reversal test :1990

Borehole/Sample Number:

BH6

Depth (m):

4.50



Contract No.:
34926

Former Petrol Station, North Road, Kirkburton

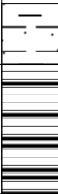
Client Ref Number:
NE3545A

BOREHOLE RECORD SHEETS

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907						Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE			Borehole Number BH4	
Boring Method LIGHT CABLE PERCUSSIVE		Casing Diameter 150mm to 9.00m		Ground Level (mOD) 124.22		Client BAYSWATER LTD			Job Number NE3545A	
		Location AS PLAN		Dates 29/03/2017-30/03/2017		Engineer SIMBA CONSULTANTS LTD			Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.20-1.00	B				124.07	(0.15) 0.15	MADE GROUND: concrete.			
1.00-1.45 1.00-1.45	SPT N=9 D			2,1/1,2,4,2		(1.35)	MADE GROUND: loose dark grey ashy clayey slightly sandy fine to coarse gravel sized fragments of stone, brick, clinker and glass. at 0.20m : medium stone cobble content			
1.50-2.00	B				122.72	1.50	MADE GROUND: soft dark greyish brown gravelly slightly sandy silty clay locally very gravelly. Gravel sized fragments are fine to coarse brick, glass, clinker and sandstone.			
2.00-2.45 2.00-2.45	SPT N=13 D			1,2/4,4,2,3		(1.50)				
2.50-3.00	B									
3.00-3.45 3.00-3.45	SPT N=5 D			1,1/1,2,1,1	121.22	3.00	MADE GROUND: soft low strength dark greyish brown slightly gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse brick, stone and clinker.			
3.50-4.00	B					(1.10)				
4.00-4.45 4.00-4.45	SPT N=7 D			1,2/1,2,2,2	120.12	4.10	MADE GROUND: soft low strength becoming firm medium strength dark grey gravelly slightly sandy silty clay. Gravel sized fragments are fine to medium brick, stone and clinker. Strong hydrocarbon odour.			
4.50-5.00	B									
5.00-5.45 5.00-5.45	SPT N=9 D			1,2/3,2,2,2						
5.50-6.00	B									
6.00-6.45 6.00-6.45	SPT N=13 D			2,3/4,3,3,3		(4.60)	from 6.15m: firm medium strength.			
6.50-7.00	B						 at 6.50m : clayey silt			
7.00-7.45 7.00-7.45	SPT N=12 D			3,4/2,3,4,3						
7.50-8.00	B									
8.00-8.45 8.00-8.45	SPT N=17 D			2,3/4,5,4,4						
8.60-8.70 8.70-9.00	B B				115.52	8.70	Extremely weak to very weak thinly laminated grey highly weathered MUDSTONE.			
9.00-9.40 9.00-9.40	SPT 25*/100 N=95 D			20,5/18,19,29,29		(1.45)				
9.60-10.00 10.00-10.15	B 52/75 SPT 25*/75			25/52						
Remarks Hand dug inspection pit from GL to 1.20m to check for services - 1hr Chiselling from 9.60m to 10.00m - 1hr On completion backfilled with arisings and installed a 50mm hdpe slotted standpipe with a gravel surround to 10.00m, a Bentonite seal from 1.00m to 0.20m and a concreted in lockable steel protective cover from 0.20m to GL.								Scale (approx) 1:50	Logged By DI/SJ	
								Figure No. NE3545A.BH4		

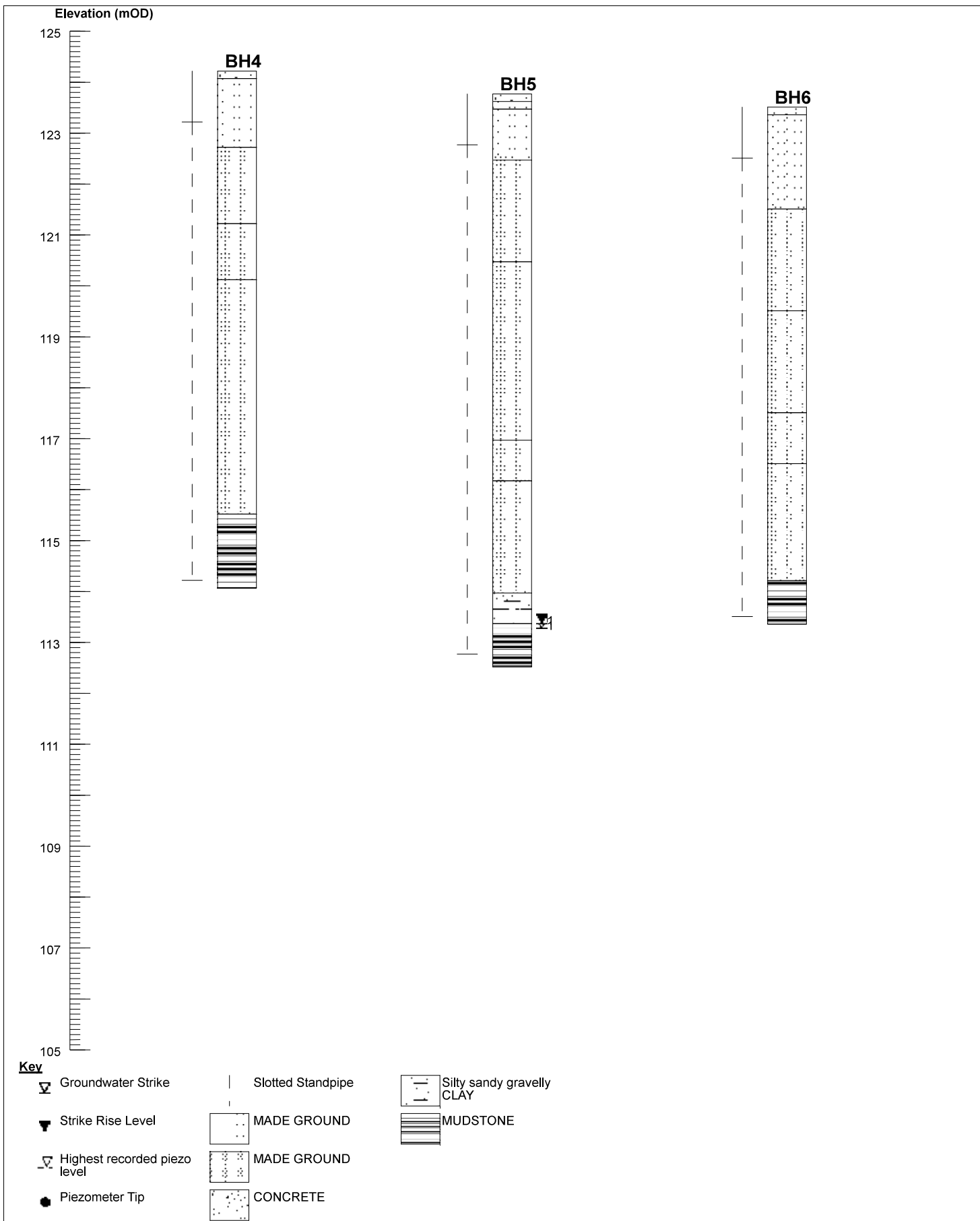
 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907							Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE			Borehole Number BH4	
Boring Method LIGHT CABLE PERCUSSIVE		Casing Diameter 150mm to 9.00m		Ground Level (mOD) 124.22		Client BAYSWATER LTD			Job Number NE3545A		
		Location AS PLAN		Dates 29/03/2017- 30/03/2017		Engineer SIMBA CONSULTANTS LTD			Sheet 2/2		
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
10.00-10.15	D			30/03/2017: DRY	114.07	10.15	Extremely weak to very weak thinly laminated grey highly weathered MUDSTONE. Complete at 10.15m				
Remarks							Scale (approx) 1:50		Logged By DI/SJ		
							Figure No. NE3545A.BH4				

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907						Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE			Borehole Number BH5	
Boring Method LIGHT CABLE PERCUSSIVE		Casing Diameter 150mm to 10.00m		Ground Level (mOD) 123.77		Client BAYSWATER LTD			Job Number NE3545A	
		Location AS PLAN		Dates 28/03/2017		Engineer SIMBA CONSULTANTS LTD			Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.10-0.30 0.30-1.00	B B				123.62 123.47	(0.15) (0.15) 0.30	MADE GROUND: concrete.			
							MADE GROUND: dark brown slightly ashy very sandy fine to coarse gravel sized fragments of concrete and stone.			
1.00-1.45 1.00-1.45	SPT N=7 D			1,1/2,2,1,2	122.47	(1.00) 1.30	MADE GROUND: loose dark grey slightly clayey sandy fine to coarse gravel sized fragments of brick, concrete and stone with medium brick cobble content.			
1.50-2.00	B						MADE GROUND: soft low strength greyish brown gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone, brick and clinker.			
2.00-2.45 2.00-2.45	SPT N=6 D			2,2/1,2,1,2		(2.00)				
2.50-3.00	B									
3.00-3.45 3.00-3.45	SPT N=5 D			2,4/2,1,1,1	120.47	3.30	MADE GROUND: soft to firm low strength greyish brown gravelly slightly sandy silty clay. Gravel sized fragments are fine to medium stone, brick and clinker.			
3.50-4.00	B									
4.00-4.45 4.00-4.45	SPT N=5 D			2,1/1,2,1,1						
4.50-5.00	B									
5.00-5.45 5.00-5.45	SPT N=10 D			3,2/2,3,2,3		(3.50)				
5.50-6.00	B									
6.00-6.45 6.00-6.45	SPT N=9 D			3,2/2,3,2,2						
6.50-7.00	B				116.97	6.80	MADE GROUND: firm medium strength grey slightly gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse brick and stone. at 7.00m : occasional rootlets			
7.00-7.45 7.00-7.45	SPT N=11 D			2,2/4,2,3,2		(0.80)				
7.50-8.00	B				116.17	7.60	MADE GROUND: firm medium strength greyish brown slightly gravelly slightly sandy silty clay, gravelly in places. Gravel sized fragments are fine to coarse stone, brick and occasional wood.			
8.00-8.45 8.00-8.45	SPT N=15 D			4,5/4,3,2,6						
8.50-9.00	B					(2.20)				
9.00-9.45 9.00-9.45	SPT N=34 D			10,8/7,8,10,9						
9.50-10.00	B						 at 9.50m : many lenses of silt			
10.00-10.45	SPT N=49			10,9/10,12,12,15	113.97	9.80	Firm yellowish brown very gravelly slightly sandy			
Remarks Hand dug inspection pit from GL to 1.20m to check for services - 1hr Chiselling from 10.60m to 11.00m - 1hr On completion backfilled with arisings and installed a 50mm hdpe slotted standpipe with a gravel surround to 11.00m, a Bentonite seal from 1.00m to 0.20m and a concreted in lockable steel protective cover from 0.20m to GL.								Scale (approx) 1:50	Logged By DI/SJ	
								Figure No. NE3545A.BH5		

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907						Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE			Borehole Number BH5	
Boring Method LIGHT CABLE PERCUSSIVE		Casing Diameter 150mm to 10.00m		Ground Level (mOD) 123.77		Client BAYSWATER LTD			Job Number NE3545A	
		Location AS PLAN		Dates 28/03/2017		Engineer SIMBA CONSULTANTS LTD			Sheet 2/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
10.00-10.45	D			Water Inflow(1) at 10.50m, rose to 10.40m in 20 mins. 25/31,42 <u>28/03/2017:10.90m</u>	113.37	(0.60)	silty CLAY. Gravel is subangular fine to coarse sandstone lithorelicts. (completely weathered mudstone with very thin sandstone beds.			
10.60-11.00	B					10.40				
11.00-11.23	SPT 25*/75 73/150					(0.85)	Extremely weak to very weak thinly laminated brownish grey and occasional yellowish brown highly weathered MUDSTONE with occasional very thin sandstone beds.			
11.00-11.23	D					11.25				
Remarks								Scale (approx) 1:50	Logged By DI/SJ	
								Figure No. NE3545A.BH5		

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907						Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE			Borehole Number BH6	
Boring Method LIGHT CABLE PERCUSSIVE		Casing Diameter 150mm to 9.00m		Ground Level (mOD) 123.51		Client BAYSWATER LTD			Job Number NE3545A	
		Location AS PLAN		Dates 30/03/2017-31/03/2017		Engineer SIMBA CONSULTANTS LTD			Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.20-1.00	B				123.36	(0.15) 0.19	MADE GROUND: concrete.			
1.00-1.45 1.00-1.45	SPT N=4 D			1,1/2,1,0,1		(1.85)	MADE GROUND: very loose dark grey ashy slightly clayey slightly sandy fine to coarse gravel sized fragments of brick, concrete and clinker.			
1.50-2.00	B									
2.00-2.45 2.00-2.45	SPT N=4 D			1,2/1,1,1,1	121.51	2.00	MADE GROUND: soft very low to low strength yellowish brown and brown slightly gravelly slightly sandy silty clay. Gravel sized fragments are fine to medium stone, brick and clinker.			
2.50-3.00	B									
3.00-3.45 3.00-3.45	SPT N=6 D			2,1/1,2,2,1		(2.00)				
3.50-4.00	B									
4.00-4.45 4.00-4.45	SPT N=8 D			1,1/1,2,3,2	119.51	4.00	MADE GROUND: soft low strength dark greyish brown and brown slightly ashy gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone, brick and clinker.			
4.50-5.00	B									
5.00-5.45 5.00-5.45	SPT N=10 D			2,2/3,2,3,2		(2.00)				
5.50-6.00	B						at 5.50m: pocket of silt.			
6.00-6.45 6.00-6.45	SPT N=10 D			2,1/3,1,2,4	117.51	6.00	MADE GROUND: soft to firm low strength dark brown and greyish brown slightly organic gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone, brick and clinker.			
6.50-7.00	B					(1.00)				
7.00-7.45 7.00-7.45	SPT N=14 D			2,3/4,3,3,4	116.51	7.00	MADE GROUND: soft to firm low to medium strength greyish brown gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse brick, stone and clinker.			
7.50-8.00	B									
8.00-8.45 8.00-8.45	SPT N=9 D			3,3/2,2,3,2		(2.30)				
8.50-9.00	B									
9.00-9.45 9.00-9.45	SPT N=59 D			5,6/6,6,20,27						
9.50-9.70 9.50-9.70 9.70-10.00	SPT 25*/75 61/125 D B			25/29,32	114.21	9.30 (0.85)	Extremely weak to very weak thinly laminated grey highly weathered MUDSTONE.			
Remarks Hand dug inspection pit from GL to 1.20m to check for services - 1hr Chiselling from 9.50m to 10.00m - 1hr On completion backfilled with arisings and installed a 50mm hdpe slotted standpipe with a gravel surround to 10.00m, a Bentonite seal from 1.00m to 0.20m and a concreted in lockable steel protective cover from 0.20m to GL.								Scale (approx) 1:50	Logged By DI/SJ	
								Figure No. NE3545A.BH6		

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907							Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE			Borehole Number BH6	
Boring Method LIGHT CABLE PERCUSSIVE		Casing Diameter 150mm to 9.00m		Ground Level (mOD) 123.51		Client BAYSWATER LTD			Job Number NE3545A		
		Location AS PLAN		Dates 30/03/2017- 31/03/2017		Engineer SIMBA CONSULTANTS LTD			Sheet 2/2		
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
10.00-10.12 10.00-10.12	SPT 25*/60 51/60 D			25/51 31/03/2017: DRY	113.36	10.15	Extremely weak to very weak thinly laminated grey highly weathered MUDSTONE. Complete at 10.15m				
Remarks								Scale (approx) 1:50	Logged By DI/SJ		
								Figure No. NE3545A.BH6			



 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907	Nominal Section			
Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE	Date Drawn 08/06/2017	Date Checked	Sheet 1/1	Job Number NE3545A
Client BAYSWATER LTD	Drawn By	Checked By	Scale 1:100[V]	Figure No. NE3545A.1

MINI BOREHOLE RECORD SHEETS



NORTH ROAD, KIRKBURTON, WEST YORKSHIRE

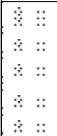
Borehole
Number
M1

Job
Number
NE3545A

Sheet
1/2

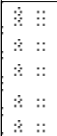
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Figure No.
NE3545A.M1

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907							Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE		Borehole Number M1	
Boring Method MINI PERCUSSIVE		Casing Diameter		Ground Level (mOD) 123.58		Client BAYSWATER LTD		Job Number NE3545A		
		Location AS PLAN		Dates 28/03/2017		Engineer SIMBA CONSULTANTS LTD		Sheet 2/2		
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
				28/03/2017: DRY	118.13	5.45	MADE GROUND: firm medium strength greyish brown and brown slightly gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone.			
							Complete at 5.45m			
Remarks							Scale (approx) 1:25	Logged By DI/SJ		
							Figure No. NE3545A.M1			

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907							Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE			Borehole Number M2	
Boring Method HAND HELD MINI PERCUSSIVE		Casing Diameter			Ground Level (mOD) 114.78		Client BAYSWATER LTD			Job Number NE3545A	
		Location AS PLAN			Dates 28/03/2017		Engineer SIMBA CONSULTANTS LTD			Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.00-1.00	C			0.00m to 1.00m - 96% recovery	114.68 114.58 114.38	(0.10) 0.10 (0.10) 0.20 (0.20) 0.40	MADE GROUND: topsoil (driller's description) MADE GROUND: firm greyish brown slightly gravelly slightly sandy silty clay. Gravel sized fragments are fine to medium brick, glass and stone. MADE GROUND: dark grey ashy sandy gravel sized fragments of clinker, brick and stone. Soft to firm greyish brown becoming orangish brown slightly gravelly slightly sandy silty CLAY. Gravel is subangular fine to coarse sandstone. (possible made ground).	                                         			
1.00-2.00	C			1.00m to 2.00m - 95% recovery	113.38	1.40 (0.50)	 at 1.00m : locally very gravelly with medium cobble content Soft greyish brown slightly gravelly clayey SILT with occasional rootlets. Gravel is angular to subangular fine mudstone and siltstone.	                                 			
2.00-2.50	C			Water Inflow(1) at 1.90m. 2.00m to 2.50m - 63% recovery 28/03/2017:	112.88 112.28	1.90 (0.60) 2.50	Extremely weak to very weak thinly laminated light greyish brown and grey highly weathered MUDSTONE with occasional very thin beds of sandstone. Complete at 2.50m	                           			
Remarks C = Plastic lined core sample Core diameter : 73mm to 1.00m, 63mm to 2.00m and 58mm to 2.50m On completion backfilled with arisings and installed a 50mm hdpe slotted standpipe with a gravel surround to 2.00m, a Bentonite seal from 0.50m to 0.20m and a concreted in lockable steel protective cover from 0.20m to GL.								Scale (approx) 1:25	Logged By DI/SJ		
								Figure No. NE3545A.M2			

SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907							Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE		Borehole Number M3	
Boring Method MINI PERCUSSIVE		Casing Diameter			Ground Level (mOD) 123.76		Client BAYSWATER LTD		Job Number NE3545A	
		Location AS PLAN			Dates 28/03/2017		Engineer SIMBA CONSULTANTS LTD		Sheet 1/2	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.22-1.00	C			0.22m to 1.00m - 97% recovery	123.54 123.31	(0.22)	MADE GROUND: concrete.			
						0.22	MADE GROUND: light brown slightly clayey sandy fine to coarse sandstone, brick and mudstone gravel with medium sandstone cobble content.			
						(0.23) 0.45				
1.00-1.45 1.00-2.00	SPT(C) N=0 C			0.0/0.0,0.0 1.00m to 2.00m - 66% recovery		(2.35)	MADE GROUND: very soft extremely low strength brown and light greyish brown gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse brick and stone.			
2.00-2.45 2.00-3.00	SPT(C) N=0 C			0.0/0.0,0.0 2.00m to 3.00m - 68% recovery			 from 2.00m : slightly gravelly			
3.00-3.45 3.00-4.00	SPT(C) N=4 C			1.1/1.1,1.1,1 3.00m to 4.00m - 70% recovery	120.96 120.76	2.80	MADE GROUND: dark grey slightly ashy slightly clayey sandy fine to coarse gravel sized fragments of brick, concrete and sandstone.			
						(0.20) 3.00	MADE GROUND: firm very low strength dark brown and dark grey slightly ashy very gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse brick, glass, sandstone and mudstone.			
						(0.85)				
4.00-4.45 4.00-5.00	SPT(C) N=9 C			1.2/2.2,2.3 4.00m to 5.00m - 60% recovery	119.91	3.85	MADE GROUND: soft to firm low to medium strength locally stiff high strength light greyish brown and light orangish brown slightly gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone.			
						(1.60)				
						 at 4.40m : some rootlets, hydrocarbon staining and odour.				
5.00-5.45	SPT(C) N=21			4.3/3.6,5,7						
Remarks C = Plastic lined core sample Core diameter : 83mm to 1.00m, 73mm to 2.00m, 63mm to 3.00m, 53mm to 4.00m and 43mm to 5.00m On completion backfilled with arisings.								Scale (approx)	Logged By	
								1:25	DI/SJ	
								Figure No. NE3545A.M3		

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907							Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE		Borehole Number M3	
Boring Method MINI PERCUSSIVE		Casing Diameter		Ground Level (mOD) 123.76		Client BAYSWATER LTD		Job Number NE3545A		
		Location AS PLAN		Dates 28/03/2017		Engineer SIMBA CONSULTANTS LTD		Sheet 2/2		
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
				28/03/2017: DRY	118.31	5.45	 at 5.20m : locally stiff high strength Complete at 5.45m			
Remarks							Scale (approx) 1:25		Logged By DI/SJ	
							Figure No. NE3545A.M3			

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907							Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE			Borehole Number M4	
Boring Method MINI PERCUSSIVE		Casing Diameter			Ground Level (mOD) 123.10		Client BAYSWATER LTD			Job Number NE3545A	
		Location AS PLAN			Dates 28/03/2017		Engineer SIMBA CONSULTANTS LTD			Sheet 1/1	
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr	
0.20-1.00	C			0.20m to 1.00m - 90% recovery	122.90	(0.20)	MADE GROUND: concrete.				
						0.20	MADE GROUND: firm light brownish grey gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone.				
1.00-1.45 1.00-2.00	SPT(C) N=10 C			3,2/2,2,2,4 1.00m to 2.00m - 80% recovery	122.40	(0.50)					
						0.70	MADE GROUND: Firm grey slightly ashy gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone and brick.				
						1.00	MADE GROUND: loose grey clayey slightly sandy fine to coarse gravel sized fragments of brick, concrete and stone.				
						(0.40)					
2.00-2.45 2.00-2.60	SPT(C) N=6 C			1,1/2,1,2,1 2.00m to 2.60m - 100% recovery	121.70	1.40	MADE GROUND: firm grey slightly ashy gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone and brick.				
						(0.60)					
2.60-2.62	SPT(C) 50*/20			1,1/2,1,2,1 2.00m to 2.60m - 100% recovery	121.10	2.00	MADE GROUND: soft low strength gravelly slightly sandy silty clay with low concrete cobble content. Gravel sized fragments are fine to medium brick, concrete and clinker.				
						(0.62)					
2.60-2.62	SPT(C) 50*/20			50/ 28/03/2017:DRY	120.48	2.62	Complete at 2.62m				
Remarks No progress beyond 2.62m due to concrete obstruction. C = Plastic lined core sample Core diameter : 82mm to 1.00m, 76mm to 2.00m and 64mm to 2.50m On completion backfilled with arisings and installed a 50mm hdpe slotted standpipe with a gravel surround to 2.60m, a Bentonite seal from 0.50m to 0.20m and a concreted in lockable steel protective cover from 0.20m to GL.								Scale (approx) 1:25	Logged By DI/SJ	Figure No. NE3545A.M4	

SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907						Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE		Borehole Number M5		
Boring Method MINI PERCUSSIVE		Casing Diameter		Ground Level (mOD) 124.10		Client BAYSWATER LTD		Job Number NE3545A		
		Location AS PLAN		Dates 28/03/2017		Engineer SIMBA CONSULTANTS LTD		Sheet 1/2		
Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	Instr
0.16-1.00	C			0.16m to 1.00m - 90% recovery	123.94 123.80	(0.16)	MADE GROUND: concrete.			
						0.16 (0.14)	MADE GROUND: soft grey ashy gravelly slightly sandy silty clay. Gravel sized fragments are fine to medium brick, clinker and stone.			
						0.30	MADE GROUND: firm light brownish grey slightly gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse stone.			
1.00-1.45 1.00-2.00	SPT(C) N=4 C			1,1/1,1,1,1 1.00m to 2.00m - 70% recovery	123.10	(0.70)				
						1.00	MADE GROUND: soft low strength dark brownish grey and grey ashy gravelly slightly sandy silty clay. Gravel sized fragments are fine to coarse brick, concrete, clinker, stone and coal.			
2.00-2.45 2.00-3.00	SPT(C) N=5 C			1,1/1,1,1,2 2.00m to 3.00m - 90% recovery						
3.00-3.45 3.00-4.00	SPT(C) N=7 C			1,1/2,1,2,2 3.00m to 4.00m - 55% recovery		(4.00)	 at 2.70m : many rootlets and possible hydrocarbon staining			
							from 3.00m: dark grey.			
4.00-4.45 4.00-5.00	SPT(C) N=5 C			3,1/1,1,1,2 4.00m to 5.00m - 50% recovery			from 4.00m to 4.25m: greyish brown and slight gravel of fine coal.			
5.00-5.45	SPT(C) N=15			2,2/3,3,4,5						
Remarks C = Plastic lined core sample Core diameter : 82mm to 1.00m, 73mm to 2.00m, 63mm to 3.00m, 55mm to 4.00m and 42mm to 5.00m On completion backfilled with arisings and installed a 50mm hdpe slotted standpipe with a gravel surround to 5.00m, a Bentonite seal from 1.00m to 0.20m and a concreted in lockable steel protective cover from 0.20m to GL.								Scale (approx) 1:25	Logged By DI/SJ	Figure No. NE3545A.M5



NORTH ROAD, KIRKBURTON, WEST YORKSHIRE

Borehole
Number
M5

Job
Number
NE3545A

Engineer
SIMBA CONSULTANTS LTD

Sheet
2/2

Instr

MADE GROUND: firm medium strength dark grey
ashy gravelly slightly sandy silty clay. Gravel sized
fragments are fine brick, coal and stone.

28/03/2017:DRY

118.65	5.45
--------	------

Complete at 5.45m

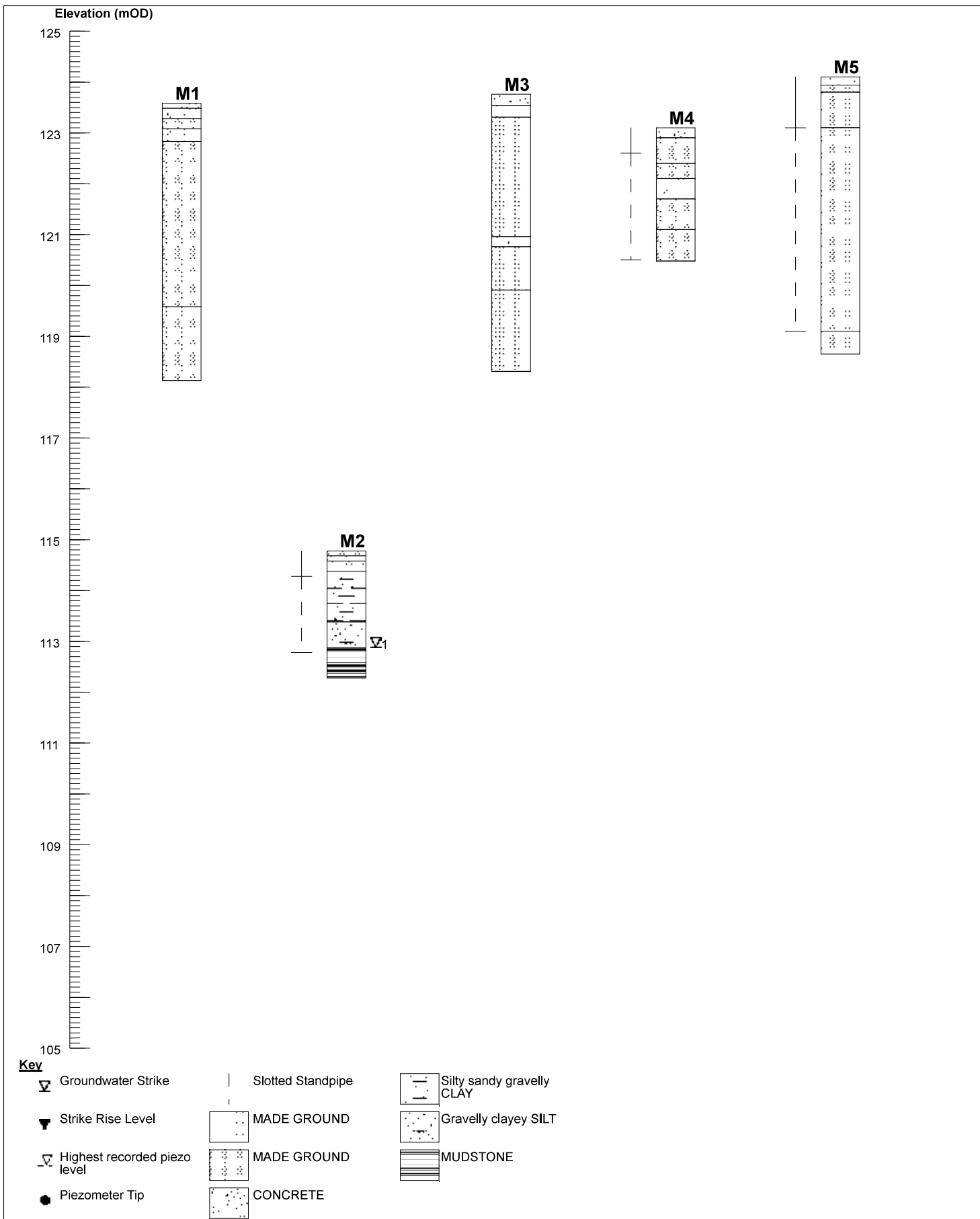
Remarks

Scale (approx)
1:25

Logged
By

DI/SJ

Figure No.
NE3545A.M5



 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907	Nominal Section			
Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE	Date Drawn 08/06/2017	Date Checked	Sheet 1/1	Job Number NE3545A
Client BAYSWATER LTD	Drawn By	Checked By	Scale 1:100[V]	Figure No. NE3545A.1

HAND DUG TRIAL PIT RECORD SHEETS



NORTH ROAD, KIRKBURTON, WEST YORKSHIRE

**Trial Pit
Number
HD1**

HAND DUG

0.30m x 0,30m (approx)

121 33

BAYSWATER LTD

Job
Number
NE3545A

AS PLAN

28/03/2017

SIMBA CONSULTANTS LTD

Sheet
1/1

Sample / Tests

Field Records

Depth
(m)
(Thickness)

Description

Legend

Water

0.20

D

0.50

B

0.70
0.70

BD

120.88

(0.45)

0.45

(0 35)

0.80

MADE GROUND: dark brown clayey topsoil with large boulder sized fragments of concrete.

MADE GROUND: dark brown gravelly silty clay with cobble sized fragments of sandstone and with tree roots. Gravel sized fragments are fine to coarse stone.

Complete at 0.80m

Plan

Remarks

Pit sides remained vertical and stable.
On completion backfilled with arisings.

Scale (approx)

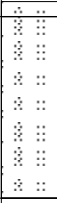
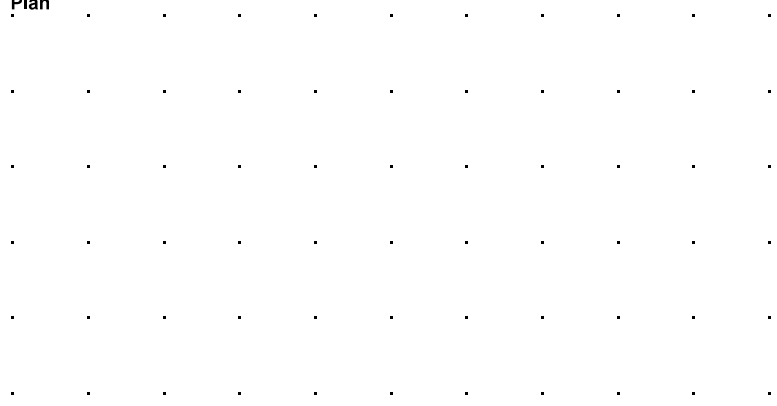
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Logged By

DS/S.J

Figure No.

NE3545A.HD1

 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907						Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE		Trial Pit Number HD3	
Excavation Method HAND DUG		Dimensions 0.30m x 0.30m (approx)		Ground Level (mOD) 116.30		Client BAYSWATER LTD		Job Number NE3545A	
		Location AS PLAN		Dates 28/03/2017		Engineer SIMBA CONSULTANTS LTD		Sheet 1/1	
Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water	
0.30-0.50	B			116.25	0.05	MADE GROUND: dark brown clayey topsoil.			
0.60	D		28/03/2017: DRY	115.65	0.65	MADE GROUND: brown and light brown mottled slightly gravelly silty clay with some to many cobble sized fragments of sandstone. Gravel sized fragments are fine to coarse stone. at 0.65m : boulder sized obstruction Complete at 0.65m			
Plan 						Remarks Pit sides remained vertical and stable. On completion backfilled with arisings.			
						Scale (approx) 1:25		Logged By DS/SJ	
						Figure No. NE3545A.HD3			



NORTH ROAD, KIRKBURTON, WEST YORKSHIRE

**Trial Pit
Number**
HD4

HAND DUG

0.30m x 0.30m (approx)

121 13

BAYSWATER LTD

Job
Number
NE3545A

AS PLAN

28/03/2017

SIMBA CONSULTANTS LTD

Sheet
1/1

Sample / Tests

Field Records

Depth
(m)
(Thickness)

Description

Legend

Water

0.35-0.70
0.50

B
D

28/03/2017:DRY

120.83

120.43

120.28

(0.30)
0.30
(0.40)
0.70
(0.15)
0.85

MADE GROUND: dark brown clayey topsoil with roots.

MADE GROUND: dark brown friable silty clay with roots.

MADE GROUND: brown and dark brown mottled gravelly silty clay. Gravel sized fragments are fine to coarse stone.

Complete at 0.85m

Plan

Remarks

Possible animal burrows noted to 0.70m
Pit sides remained vertical and stable.
On completion backfilled with arisings.

Scale (approx)

1:25

Logged By

DS/S.J

Figure No.

NF3545A.HD4



SUB SURFACE

SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS Tel: (01772) 551135 Fax: (01772) 204907

Site

NORTH ROAD, KIRKBURTON, WEST YORKSHIRE

Trial Pit
Number

HD5

Excavation Method

HAND DUG

Dimensions

1.00m x 0.30m (approx)

Ground Level (mOD)

119.53

Client

BAYSWATER LTD

Job
Number

NE3545A

Location

AS PLAN

Dates

28/03/2017

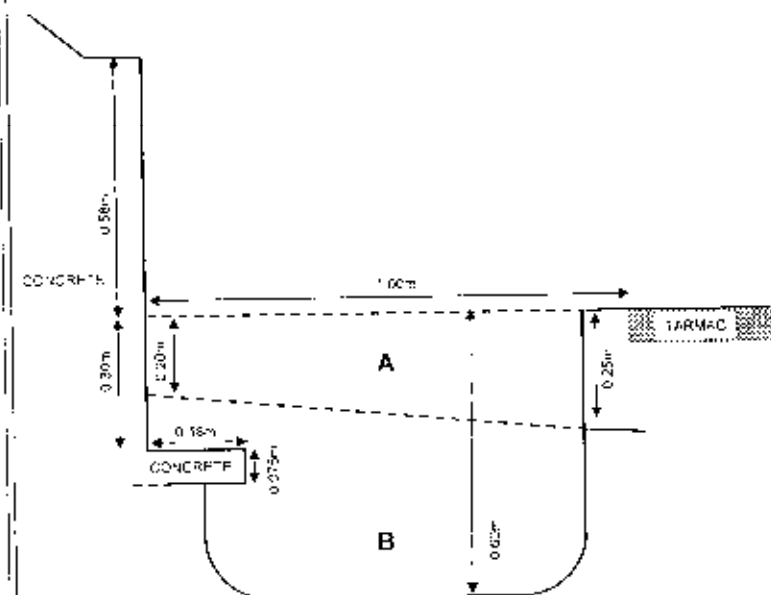
Engineer

SIMBA CONSULTANTS LTD

Sheet

1/1

Depth (m)	Sample / Tests	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
						MADE GROUND: dark brown clayey topsoil with roots (A)		
					(0.25)			
				119.28	0.25	MADE GROUND: compact dark grey silty sand sized ash and fine to coarse gravel sized fragments of clinker and occasional sandstone with low becoming medium cobble sized fragments of sandstone (B)		
					(0.35)			
				118.93	0.60	Complete at 0.60m		
			28/03/2017 DRY					



Remarks

Taken out adjacent to retaining structure.
Pit sides remained vertical and stable.
On completion backfilled with arisings

Scale (approx)

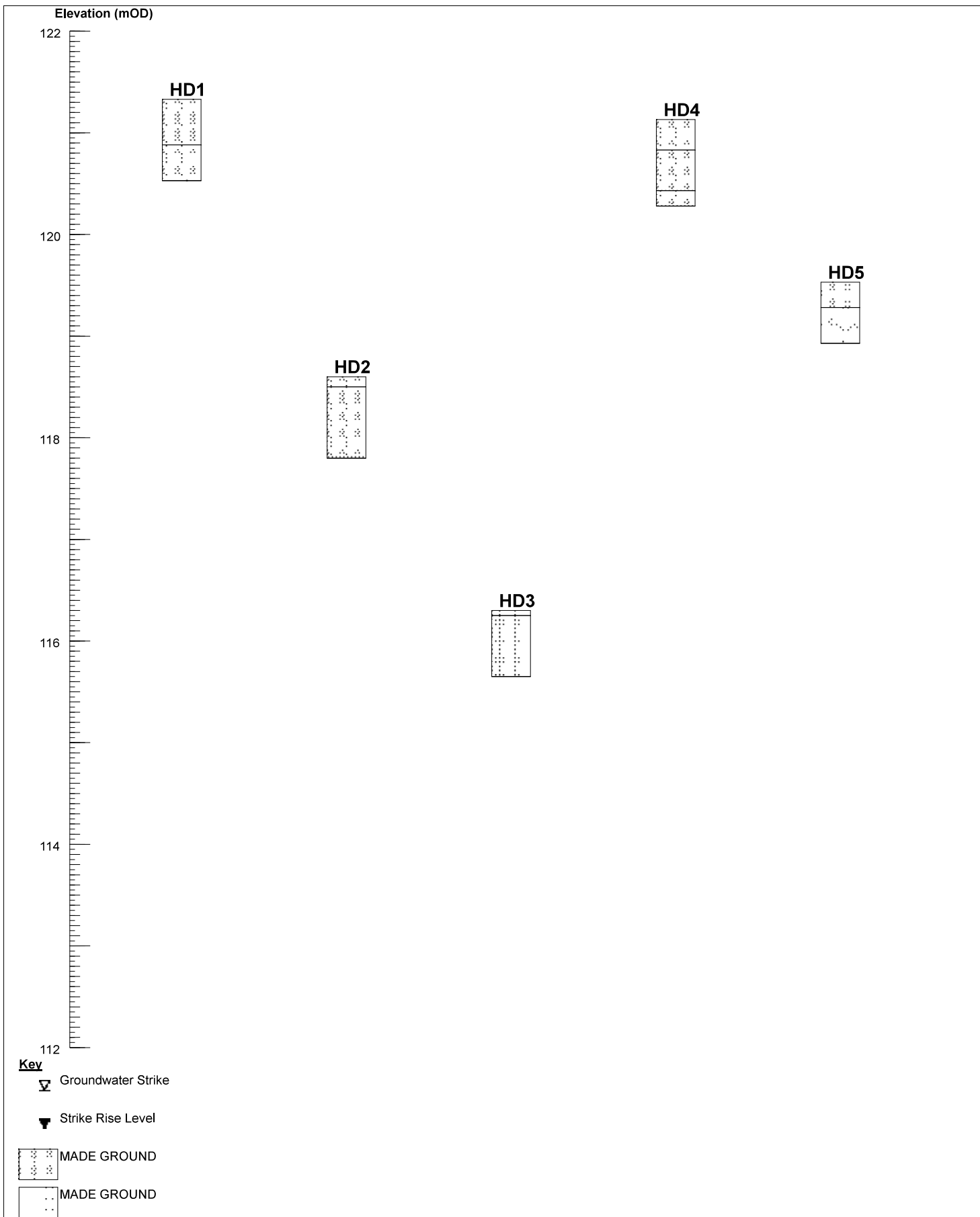
1:25

Logged By

DS/SJ

Figure No.

NE3545A HD5



 SUB SURFACE SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS 3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907	Nominal Section			
Site NORTH ROAD, KIRKBURTON, WEST YORKSHIRE	Date Drawn 08/06/2017	Date Checked	Sheet 1/1	Job Number NE3545A
Client BAYSWATER LTD	Drawn By	Checked By	Scale 1:50[V]	Figure No. NE3545A.1

PREVIOUS REPORT BOREHOLE SHEET (NE3545)



SUB SURFACE

SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Fiel Street, Foston, PR2 2GS, Tel: 01772 561135 Fax: 01772 204897

Site

NORTH ROAD, KIRKBRITTON, WEST YORKSHIRE

Borehole
Number

BH3

Boring Method

LIGHT CABLE PERCUSSIVE

Casing Diameter

150mm to 9.20m

Ground Level (mOD)

Client

BAYSWATER LIMITED

Job
Number

NE3545

Location

AS PLAN

Dates

05/11/2016

Engineer

YEME ARCHITECTS

Sheet

1/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
0.10-0.35	B					0.10	MADE GROUND: bituminous macadam surfacing (dollar's description)		
0.40-0.90	B					(1.10)	MADE GROUND: greyish brown slightly silty and very sandy fine to coarse gravel sized fragments of stone and occasional brick and concrete		
1.10	D			3 2/2,1,1,1		1.20	MADE GROUND: very low becoming low strength dark greyish brown gravelly sandy silty clay. Gravel sized fragments are fine to coarse brick, stone, brick and occasional bituminous macadam at top		
1.20-1.65	SPT N=5								
1.20-1.65	D								
1.50-2.00	B								
2.05-2.50	SPT N=3			0 1/3,1,1,1		(2.50)			
2.05-2.50	D								
2.50-3.00	B						... from 3.05m low strength.		
3.05-3.50	L _c =24kPa						... at 3.65m slight hydrocarbon occur.		
3.55	D					3.70	MADE GROUND: low becoming medium and then low strength grey and brown mottled gravelly slightly sandy to sandy silty clay. Gravel sized fragments are fine to coarse stone, brick and clinker.		
3.70-4.05	B			0 1/4,0 2/3					
4.05-4.50	SPT N=0								
4.75-5.25	B								
5.55-6.00	SPT N=1*			3 3/2,3,3,3		(3.90)	... from 5.70m medium strength.		
5.55-6.00	D						... at 6.25m occasional wood.		
6.25-6.75	B								
7.05-7.50	SPT N=9			6 5/3,2,2,2			... from 7.20m low strength.		
7.05-7.50	D					7.60	MADE GROUND: greyish brown and grey mottled gravelly silty clay. Gravel sized fragments are fine to coarse stone clinker and wood (slight hydrocarbon occur)		
7.75-8.25	B					(0.80)			
8.55-9.00	SPT N=13			3 2/3,3,3,4		8.40	Soft to firm medium strength bluish grey and greyish brown mottled gravelly slightly sandy silty CLAY. Gravel sized fragments are fine to coarse sandstone lithoclasts (Completely weathered mudstone with bands of sandstone)		
8.55-9.00	D					(1.40)			
9.25-9.75	B								
9.50	D					9.80	MUDSTONE (as sheet 2/2)		

Remarks

Broke out and hand dug inspection pit from CL to 1.20m to check for services - 1 hr 15 mins
C/P setting mudstone from 11.20m to 11.30m - 1 hr.
On completion left open, to be continued by Rotary Openhole drill rig. (R3)

Scale (approx)

1:50

Logged By

DA-MJE

Figure No.

NE3545.043



SUB SURFACE

SITE INVESTIGATION, GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS
3 Peel Street, Preston PR2 2GS, Tel: 01772 561135 Fax: 01772 204807

Site

NORTH ROAD, KIRKBYTON, WEST YORKSHIRE

Borehole

Number

BH3

Boring Method

LIGHT CABLE PERCUSSIVE

Casing Diameter

150mm to 9.20m

Ground Level (mOD)

Client

BAYSWATER LIMITED

Job

Number

NE3545

Location

AS PLAN

Dates

01/11/2016

Engineer

YEME ARCHITECTS

Sheet

2/2

Depth (m)	Sample / Tests	Casing Depth (m)	Water Depth (m)	Field Records	Level (mOD)	Depth (m) (Thickness)	Description	Legend	Water
10.00-10.45	U.C. 87xPa						Extremely weak friable brown and greyish brown mottled highly weathered MUDSTONE, in parts completely weathered to high strength slightly gravelly sandy silty clay.		
10.50	D					(1.20)			
11.00	D					11.00	Weak thinly laminated grey slightly weathered MUDSTONE.		
11.30-11.36	D					(0.40)			
11.30-11.36				Slow (inflow?) at 11.20m, rose to 11.04m in 20 mins, not sealed		11.40	Complete at 11.40m		
11.30-11.36	SPT 25/30 50/25			25/30 01/11/2016 11.04m					

Remarks

Scale (approx)

1:50

Logged By

DAMLE

Figure No.

NE3545.B-3

FIGURES



SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 561135 Fax (01772) 204907

General Site Location

Site	Date Drawn	Date Checked	Orientation	Job No.
NORTH ROAD, KIRKBURTON, WEST YORKSHIRE	16-May-17			NE3545A
Client	Drawn By	Checked By	Scale	Figure No.
BAYSWATER LTD	TP		—	1



SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 56135 Fax (01772) 204907

Site Plan

Site	Date Drawn	Date Checked	Orientation	Job No.
NORTH ROAD, KIRKBURTON, WEST YORKSHIRE	16-May-17			NE3545A
Client	Drawn By	Checked By	Scale	Figure No.
BAYSWATER LTD	TP		—	2



SUB SURFACE

SITE INVESTIGATION AND SPECIALIST GEOTECHNICAL CONSULTANTS
3 Peel Street, Preston, PR2 2QS. Tel. (01772) 56135 Fax (01772) 204907

Proposed Development

Site	Date Drawn	Date Checked	Orientation	Job No.
NORTH ROAD, KIRKBURTON, WEST YORKSHIRE	16-May-17			NE3545A
Client	Drawn By	Checked By	Scale	Figure No.
BAYSWATER LTD	TP		—	3

Figure 5: Section A-A'

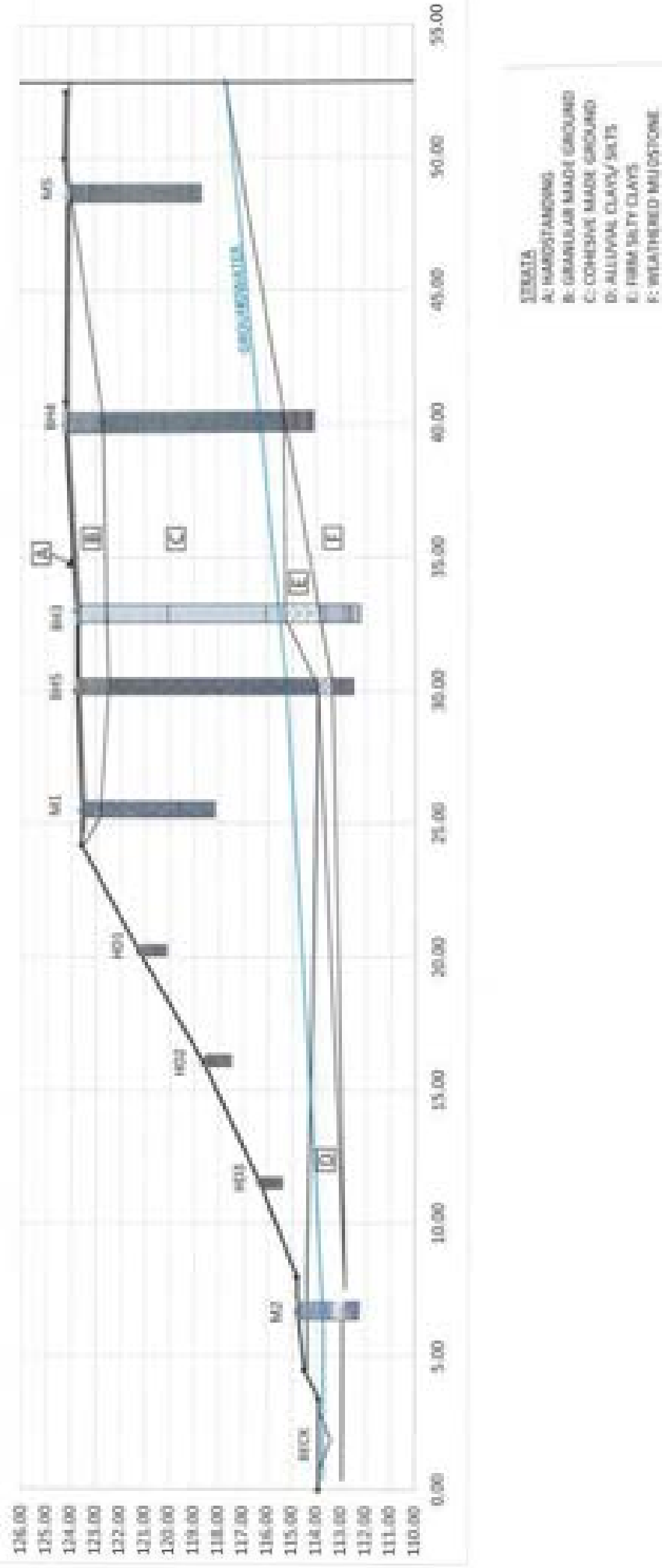


Figure 6: Section B-B'

- STRATA**
A: CONCRETE
B: GRANULAR FILL
C: GRANULAR MADE GROUND
D: COHESIVE MADE GROUND
E: WEATHERED MUDSTONE

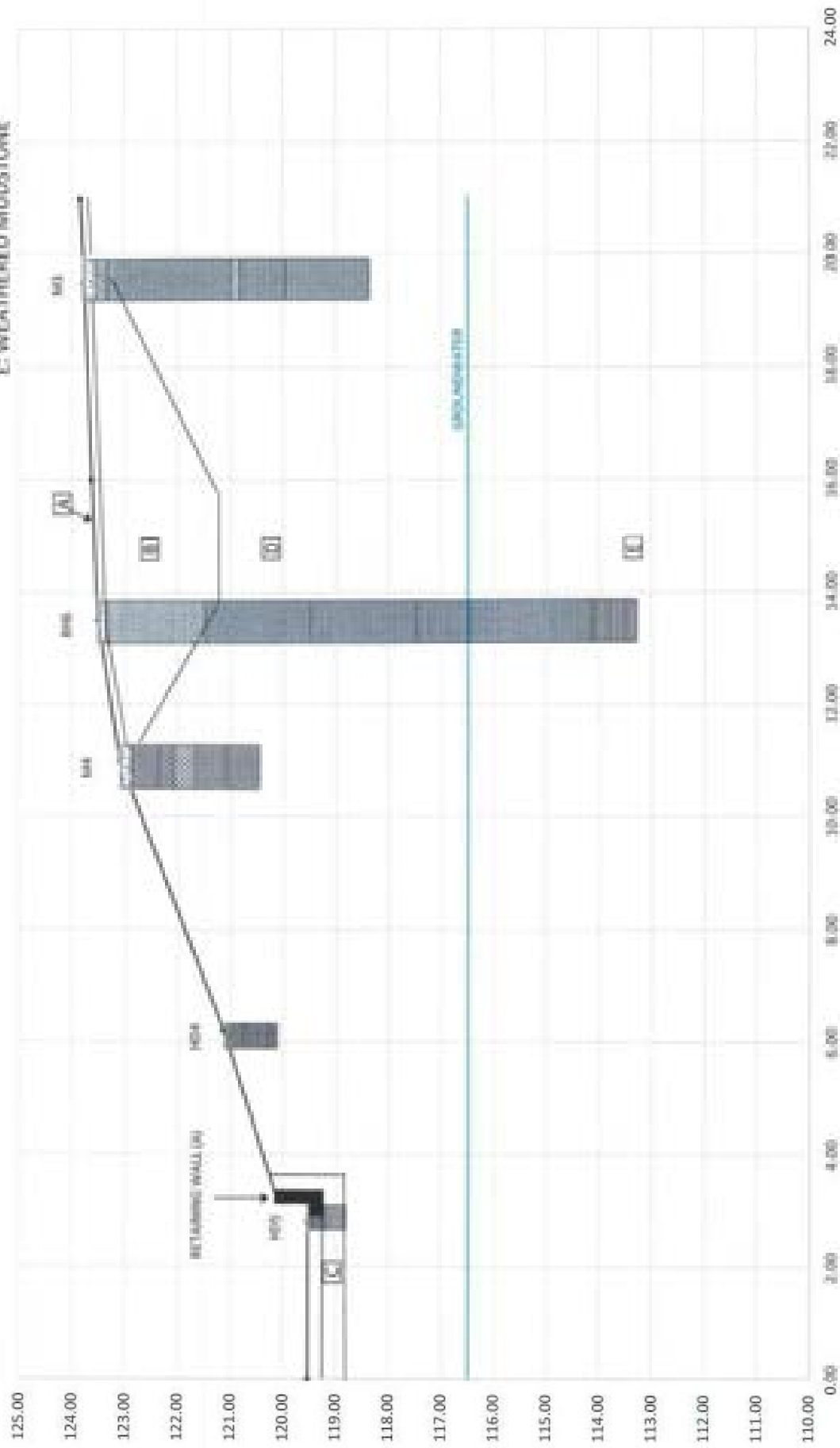


Figure 7: Revised Section A-A'

