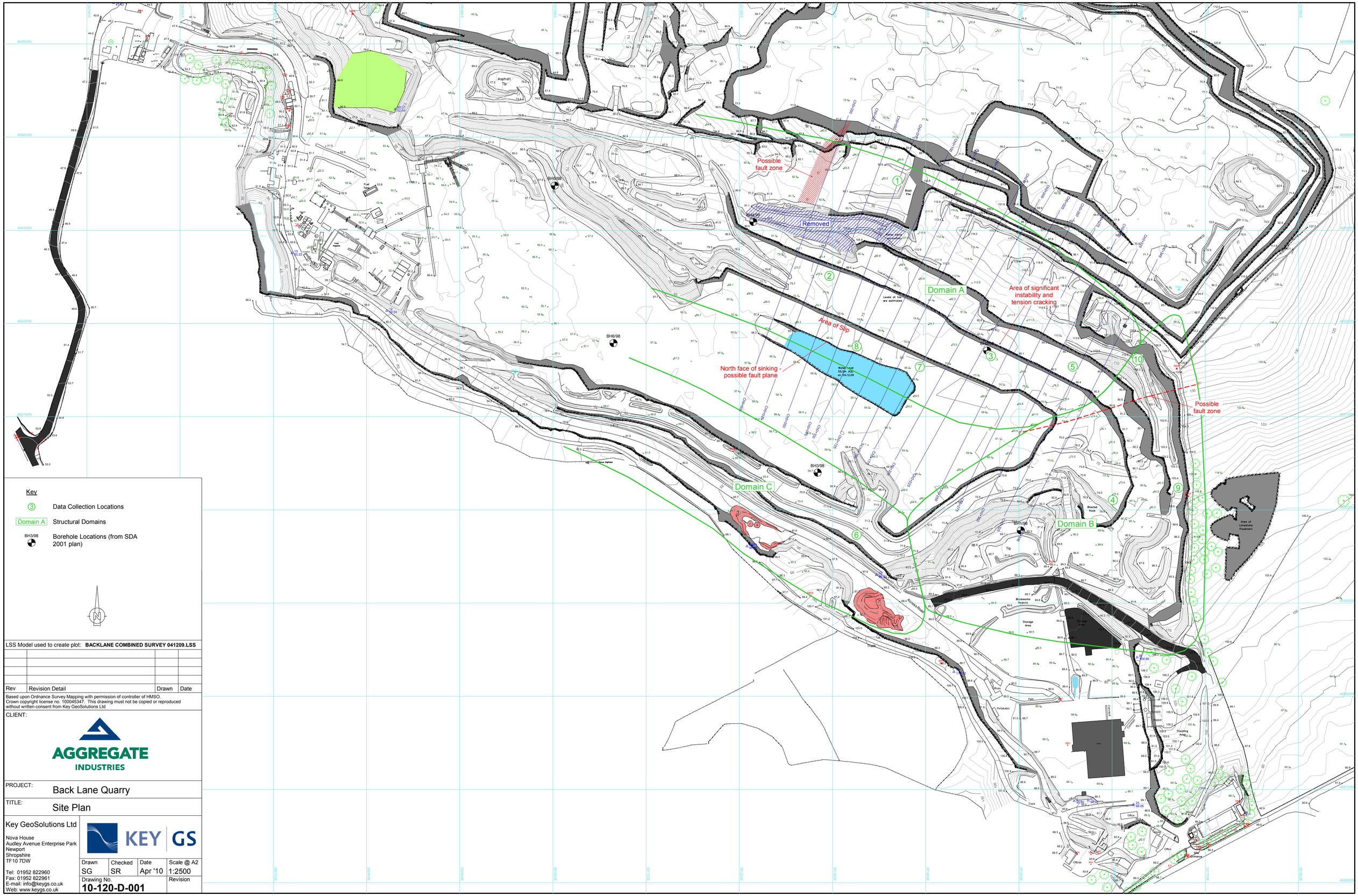
Technical Appendix K

Geotechnical Stability Assessment – Boreholes and Drawings



Key

③	Data Collection Locations
Domain A	Structural Domains
BH3/98	Borehole Locations (from SDA 2001 plan)

LSS Model used to create plot: **BACKLANE COMBINED SURVEY 041209.LSS**

Rev	Revision Detail	Drawn	Date

CLIENT: AGGREGATE INDUSTRIES

PROJECT: Back Lane Quarry

TITLE: Site Plan

Key GeoSolutions Ltd

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Audley Avenue Enterprise Park
Newport
Shropshire
TF10 7DW

Tel: 01952 822960
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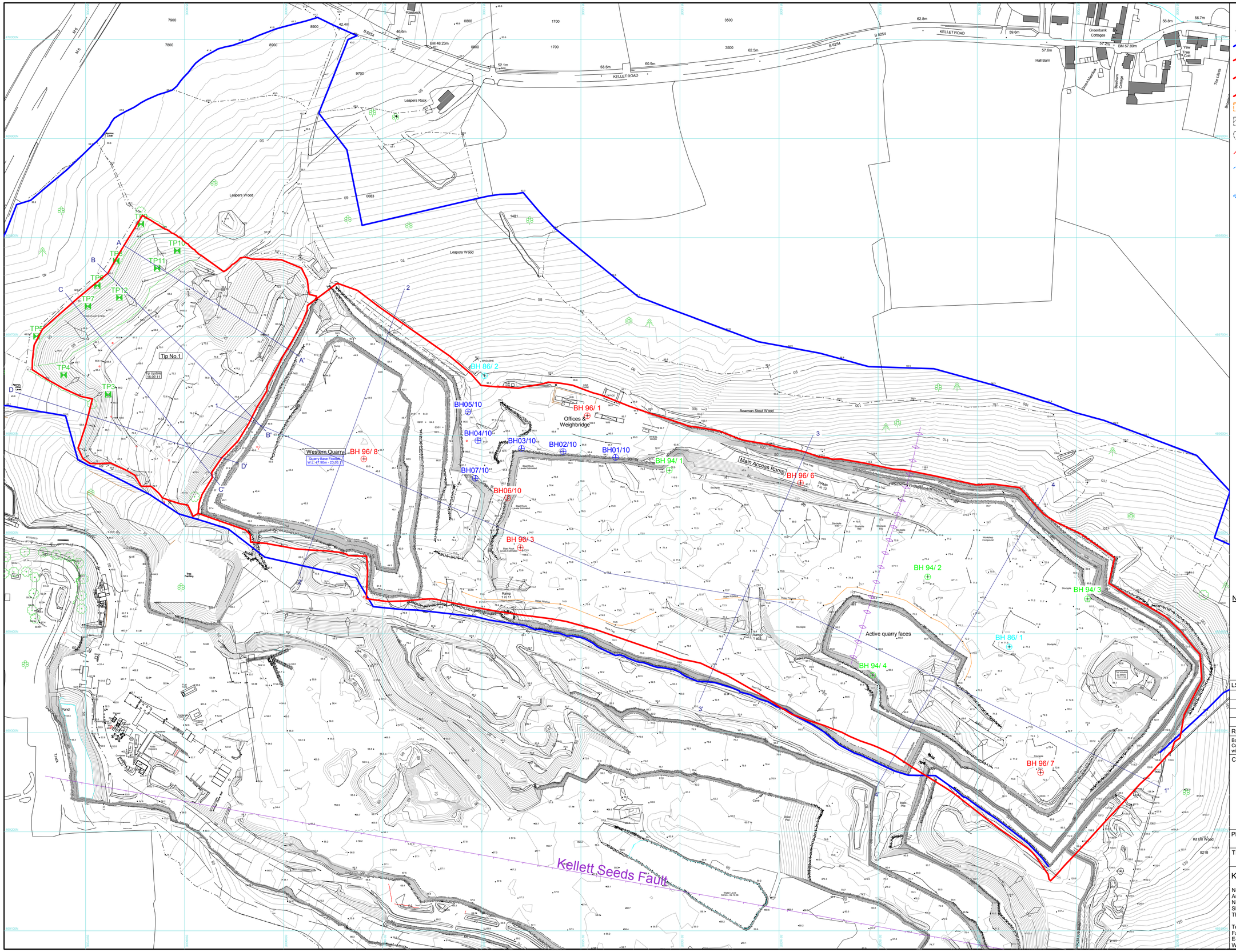
E-mail: info@keygs.co.uk
Web: www.keygs.co.uk

Drawn	Checked	Date	Scale @ A2
SG	SR	Apr '10	1:2500

Drawing No. **10-120-D-001**

Revision



Key

	Data Supplied Y	N	n/a
Site Quarry Boundary	X		
Boundary of Existing Significant Hazards	X		
Boundary of Existing Significant Hazards (boundary limit undefined)		X	
Boundary of Proposed Significant Hazards		X	
Mine Workings (active or abandoned) (where known)		X	
Buried Quarry Workings (excludes tips) (where known)		X	
Cave Systems (where known)		X	
Active or Former Landslips (where known)		X	
Springs (where known)		X	
Artesian Wells (where known)		X	
Watercourses (where known)		X	

Other relevant natural or man-made features (marked on plan as appropriate)

Kellett Seeds Fault

Leapers Wood Anticline (Hinge line)

Notes

Plan contoured to Ordnance Datum Newlyn (at vertical intervals ≤5m).

Plan orientated and correlated with Ordnance Survey National Grid.

Plan marked with squares corresponding to 100x100m grid.

LSS Model used to create plot: ****MODEL DETAIL****

Rev	Revision Detail	Drawn	Date

CLIENT: Tarmac

PROJECT: Leapers Wood Quarry

TITLE: Plan on Site Investigation

Key GeoSolutions Ltd
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Drawn	Checked	Date	Scale @ A2
SG	BD	Jun '12	1:2000

Drawing No. **12-188-D-004** Revision

CURRENT TOPO (JULY 2023)

PROPOSED DESIGN

KEY

	DATA SUPPLIED Y	N	N/A
SITE BOUNDARY	Y		
BOUNDARY OF EXISTING SIGNIFICANT HAZARDS	Y		
DEVELOPMENT PHASE BOUNDARIES		X	
MINE WORKINGS (ACTIVE OR ABANDONDED, WHERE KNOWN)		X	
BURIED QUARRY WORKINGS (EXCLUDES TIPS, WHERE KNOWN)		X	
CAVE SYSTEMS (WHERE KNOWN)		X	
ACTIVE OR FORMER LANDSLIPS (WHERE KNOWN)			X
SPRINGS (WHERE KNOWN)			X
ARTESIAN WELLS (WHERE KNOWN)			X
WATERCOURSES (WHERE KNOWN)			X
OTHER RELEVANT NATURAL OR MAN-MADE FEATURES MARKED ON PLAN AS APPROPRIATE			

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES (mm) & ALL LEVELS ARE IN METRES (m) UNLESS NOTED OTHERWISE.

REV.	AMENDMENTS	DRW.	CHK.	DATE
P01	FIRST ISSUE	ZG	SR	18.09.23

CLIENT

TARMAC
A CRH COMPANY

PROJECT

LEAPERS WOOD &
BACK LANE QUARRIES

TITLE

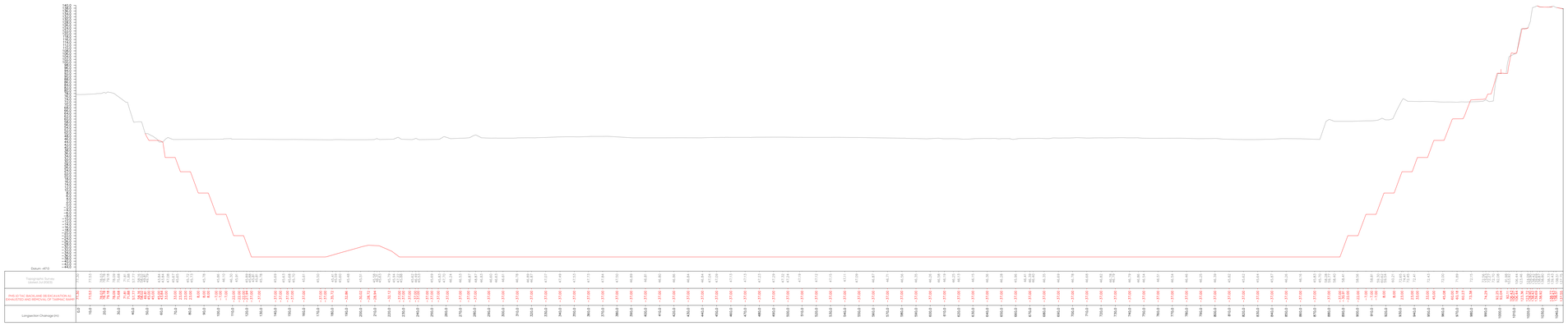
CURRENT TOPOGRAPHIC SURVEY & FINAL PROPOSED DESIGN

DRAWN: ZG	DESIGN: DESIGN
CHECKED: SR	APPROVED: BD
DATE: SEP '23	SCALE: 1:2000

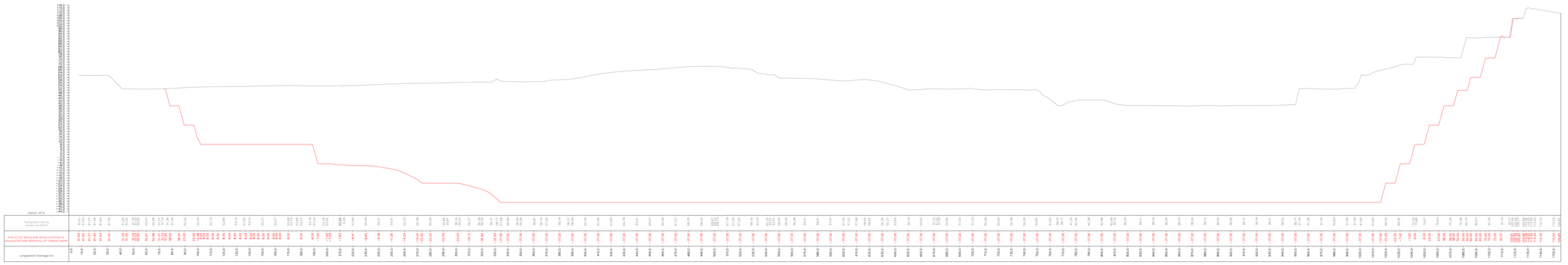
KEY | GS
PART OF RICHTER

STATUS: PRELIMINARY	SHEET SIZE: A0
DRAWING NO.: 8345-002-001	REV.: P01

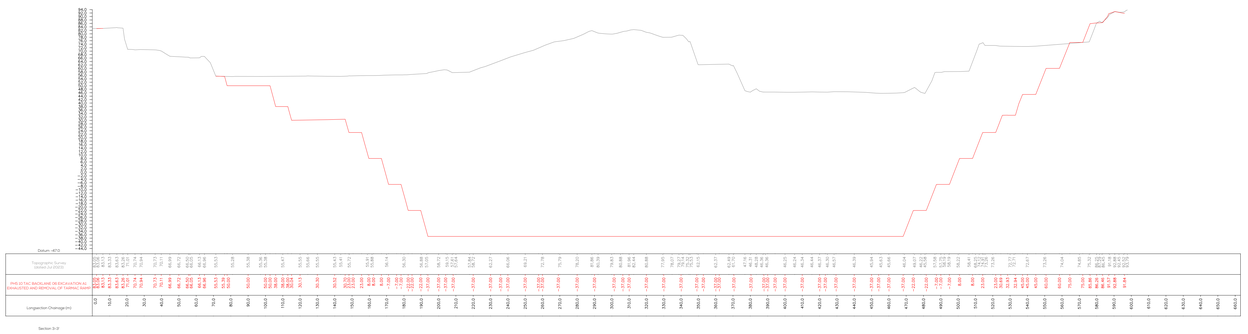
ENGINEERING VALUE TOGETHER



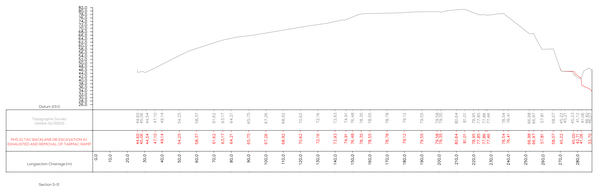
Section 1-1'



Section 2-2'



Section 3-3'



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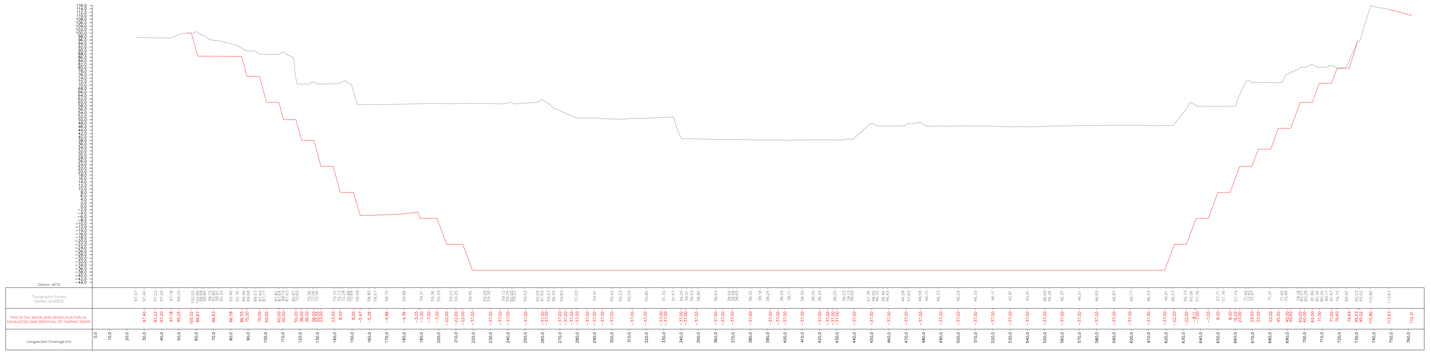
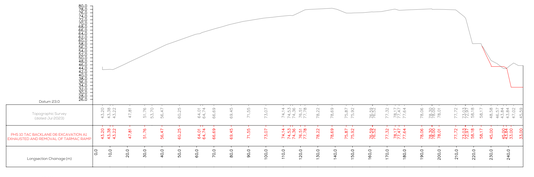


Section 4-4'



Section 6-6'

GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES (mm) & ALL LEVELS ARE IN METRES (m) UNLESS NOTED OTHERWISE.

REV.	AMENDMENTS	DRW.	CHK.	DATE
P01	FIRST ISSUE	ZG	SR	18.09.23

CLIENT

TARMAC
A CRH COMPANY

PROJECT

LEAPERS WOOD & BACK LANE QUARRIES

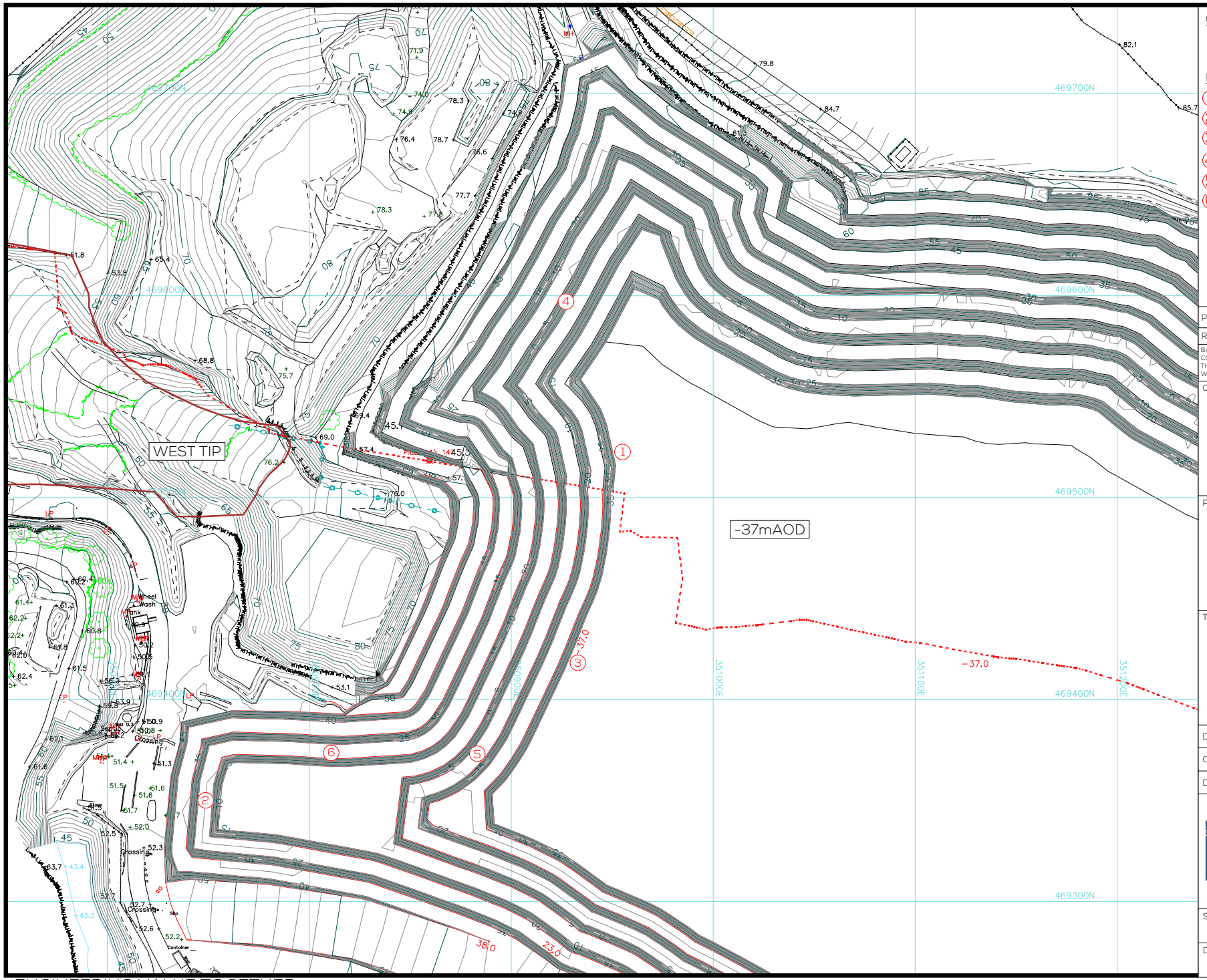
TITLE

CROSS SECTIONS

DRAWN:	ZG	DESIGN:	---
CHECKED:	SR	APPROVED:	BD
DATE:	SEP '23	SCALE:	1:1250

KEY | GS
PART OF RICHTER

STATUS	SHEET SIZE
PRELIMINARY	A0
DRAWING NO. 8345-002-002	REV. P01



GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES (mm) & ALL LEVELS ARE IN METRES (m) UNLESS NOTED OTHERWISE.

KEY

1. 70°/77° (DIP/ DIP DIRECTION)
2. 75°/95° (DIP/DIP DIRECTION)
3. 75°/110° (DIP/DIP DIRECTION)
4. 70°/120° (DIP/DIP DIRECTION)
5. 75°/155°(DIP/DIP DIRECTION)
6. 75°/181° (DIP/DIP DIRECTION)

REV.	AMENDMENTS	DRW.	CHK.	DATE
P01	FIRST ISSUE	ZG	SR	18.09.23

CLIENT

TARMAC
A CRH COMPANY

PROJECT

LEAPERS WOOD &
BACK LANE QUARRY

TITLE

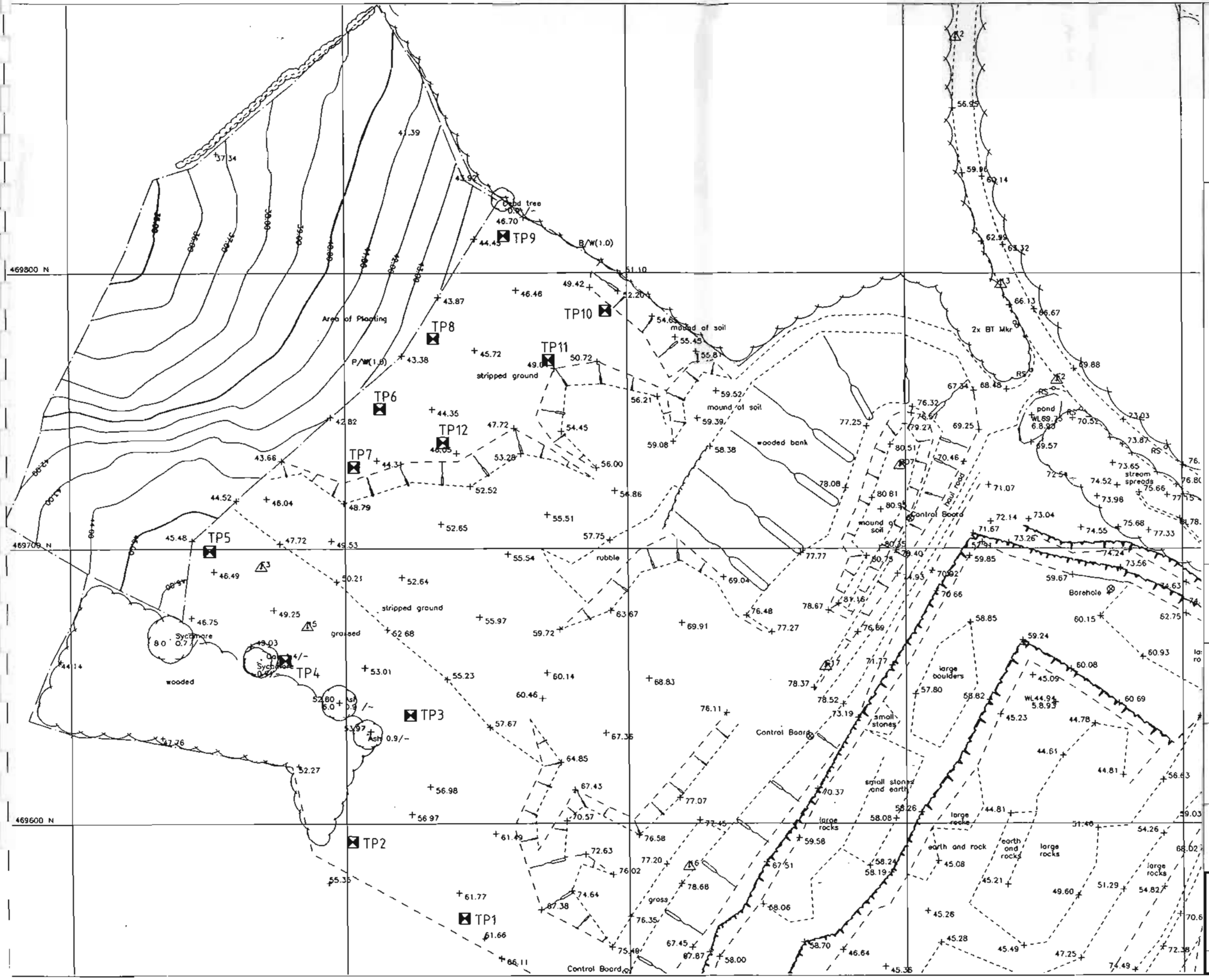
AZIMUTHS OF PROPOSED FINAL FACES

DRAWN:	ZG	DESIGN:	
CHECKED:	SR	APPROVED:	BD
DATE:	SEP '23	SCALE:	1:2500

KEY | GS
PART OF RICHTER

STATUS	SHEET SIZE
PRELIMINARY	A4
DRAWING NO. 8345-002-003	REV. P01

ENGINEERING VALUE TOGETHER



NOTE: -

This plan is based on Org No. 51000A Site Survey dated September 1993 compiled by Grove Projects.

rev	date	description	by	chkd. by

client :

WIMPEY MINERALS

project :

LEAPERS WOOD QUARRY
TIP 1

section :

PLAN OF TIP AREA
SWOWING POSITIONS OF
EXPLORATORY HOLES

drawn by : JPC
checked by : ~~JPC~~
approved by : ~~JPC~~
date : OCT '93

scale :
1 : 1250

drg. no.
CBCGE042/G1

MRM PARTNERSHIP
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Queen Victoria House
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Tel: 0272 739090 Fax: 0272 743491
Bangor Birmingham Bristol Cardiff Carmarthen Exeter
London Plymouth Portsmouth Taunton Warrington Berlin

AGGREGATE INDUSTRIES

Borehole Number: 01/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name	RQD %
0.5	0.5		Very strong, thickly bedded, dark grey/brown and mottled, fine to fine/medium, sparry DOLOMITE. Partially weathered with no discernable jointing.		DOLOMITE	20
1.25	0.75		Very strong, no discernable bedding, dark grey/brown and mottled, fine/medium grained, sparry DOLOMITE. Partially weathered, heavily jointed, orientation unknown, minor clay infill but generally clean on surfaces		DOLOMITE	
2	0.75		Very strong, massive bedding, dark grey/brown and mottled, fine to fine/medium grained, sparry DOLOMITE. Rare fossils (<10 mm overall) crinoids/echnoids, partially weathered at joint surfaces to overall fresh. Generally horizontal to sub-horizontal, slightly rough, no joint infill, some orange/brown alteration near joint surfaces, unknown aperture.		DOLOMITE	35.33
5.1	3.1		Very strong to extremely strong, massive bedding, pale grey LIMESTONE. Abundant fossil debris throughout, fresh. Between 2.00 to 2.47, heavily fractured with evidence of scoring from drill bit. Yellow/orange on rough joint surfaces, moderately effervescent. @ 2.65 m, sub-vertical jointing, tight aperture; @ 2.95 m and 3.05 m, stylolite; @ 4.10 m, sub-vertical jointing, clean and rough; @ 4.74 m, heavily fractured with orange/brown clay infill.		LIMESTONE	40.67 86
7.6	2.5		Moderately strong, massive, dark grey, fine grained, slightly sparry DOLOMITIC LIMESTONE. Vuggy/pitted texture throughout, partially weathered. Sub-vertical/vertical joints throughout, orange/brown, clay infill present on rough surfaces, joint surfaces weathered.		DOLOMITIC LIMESTONE	62.67
			Moderately strong, massive, pale grey, fine/medium grained, sparry LIMESTONE. Fossil debris throughout (up to 15 mm in individual size), overall fresh. Horizontal to sub-horizontal joints, rough but clean. Rare sub-vertical joints, rough with orange/brown staining on clay infill.			47.33

0 1 2 3 4 5 6 7 8

Comments:

Borehole Number: 01/2019

AGGREGATE INDUSTRIES

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	5.38				LIMESTONE	9 10 11 12	28 74 77.33
12.98	1.02		Strong to moderately strong, massive, pale grey to grey, fine/medium grained, sparry LIMESTONE. Vuggy/pitted texture throughout, some minor fossil debris present. Sub-vertical joints, planar/rough, with dark brown staining on clay infill on joint surfaces.		LIMESTONE	13	
14			Moderately strong to strong, massive, pale grey, fine/medium grained, micritic LIMESTONE. Abundant fossil debris, overall fresh. Predominant vertical, sub-vertical joints, planar rough, orange/brown, some staining on joint surfaces which are medium close to close aperature.			14 15 16 17	50 59.33 50

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 01/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	7.5				LIMESTONE	18	
							21.33
						19	
							37.33
						20	
						21	
21.5							66
	5.17		Moderately strong to strong, massive, pale grey LIMESTONE with abundant fossil debris, fresh. @ 21.5 m - 22.6 m, off-white/pale-grey, fine/medium grained, sparry. predominantly horizontal to sub-horizontal jointing, some clay infill, clean, planar, rough; @ 25.39 m, sub-horizontal to horizontal planar rough joint, clean; @ 26.40 m, sub vertical, stepped rough, vertically striated vugs.		LIMESTONE	22	
							53.33
						23	
						24	
							80
						25	

Comments:

Borehole Number: 01/2019

AGGREGATE INDUSTRIES

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
						26	50
26.67							
	6.83		Moderately strong to strong, massive, pale grey LIMESTONE, abundant fossil debris, fresh but heavily jointed and fractured throughout. predominantly vertical to sub-vertical jointing, smooth planar, dark brown, clay covering or clean.		LIMESTONE	27	52
						28	
						29	13.33
						30	24
						31	
						32	7.33
						33	
33.5							8
			Moderately strong, massive, pale grey, fine/medium, sparry LIMESTONE with randomly distributed fossil debris (<15 mm). @ 41 m to 41.8 m, colour change to mid/pale grey. No discernable jointing.			34	

Comments:

Borehole Number: 01/2019

AGGREGATE INDUSTRIES

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	10				LIMESTONE	35	67.33
						36	51.33
						37	
						38	70
						39	68.67
						40	
						41	60
						42	64.67
						43	

Comments:

Borehole Number: 01/2019

AGGREGATE INDUSTRIES

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
43.5						43	
	2.9		Strong to very strong, massive, dark brown/grey, fine/medium grained, sparry DOLOMITE. Overall fresh but partically weathered on joint surfaces. Sub-horizontal jointing, planar smooth and clean.		DOLOMITE	44	89.33
						45	67.33
46.4						46	
	1.2		Strong to very strong, massive, pale greay with 'speckles' of brown, fine to fine/medium grained sparry LIMESTONE (with small dolomitisation). Abundant fossil fragments throughout. Sub-vertical orange/brown clay smearings, planar smooth.		LIMESTONE	47	93.33
47.6							
	0.9		Moderately strong, fine to fine/medium grained, brown, massive, sparry DOLOMITE, fresh. Sub-vertical, planar smooth, clean jointing.		DOLOMITE	48	32.67
48.5							
	3		Moderately strong, massive, light brown/grey, fine to fine medium grained, slightly sparry, dolomitised LIMESTONE. Fresh, scattered shell debris. Sub-vertical, planar smooth, orange/brown coating or weathing.		DOLOMITIC LIMESTONE	49	
						50	65.33
						51	
51.5							86.67

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 01/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	14.9		At transitional boundary to previous; stylolite, rough, sub-horizontal. Moderately strong to strong, massive, pale grey, generally fine grained, abundant fossil debris throughout LIMESTONE. Fresh overall. predominantly sub-vertical, planar smooth, clean. @ 56.5 m to 57.5 m highly broken, sub-vertical joints with orange staining. Horizontally orientated striation texture. Crystalline infill of pink/red crystals up to 4 mm, rounded calcite, highly effervescent on HCl application. @ 60.9 m to 62 m , frequent calcite veinlets up to 2 mm wide. @ 65.17 m to 65.68 m vertical to sub-vertical planar/smooth joint (4 mm thick aperture), pale pink/red stained, haematite staining.		LIMESTONE	52 53 54 55 56 57 58 59 60	27.33 22 8 0 29.33

Comments:

Borehole Number: 01/2019

AGGREGATE INDUSTRIES

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
						61	74
						62	75.33
						63	
							72.67
						64	
						65	34.67
						66	
66.4							
66.5	0.1		Strong to very strong, massive, mid to dark brown, fine/medium to medium grained, sparry, DOLOMITE, fresh overall. No visible fossil evidence. Vertical to sub-vertical planar smooth, brown to dark brown with clay infill.		DOLOMITE		42
			Moderately strong, massive, pale grey with light brown mottling on surface, fine to fine/medium grained, orange staining present (distinctly dull, not sparry) LIMESTONE. Abundant fossil debris up to 5 mm, fresh, with occasional iron staining. predominantly sub-vertical, planar smooth, clean. @ 68.25 m to 68.62 m, sub-vertical joint with coarse crystalline, mildly effervescent, red/orange/white calcite (heavily fractured/broken).			67	
						68	60

Comments:

Borehole Number: 01/2019

AGGREGATE INDUSTRIES

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	7.4				LIMESTONE	69	18.67
						70	
						71	98.67
						72	
						73	54.67
73.9							
74.07	0.07		Moderately strong, thickly bedded, dark grey/brown, fine/medium, sparry DOLOMITE. Very occasional pitting texture, fresh to partically weathered on joint surfaces. Horizontal rough, potentially to bedding plans, fine grained sandy clay. Little no to jointing with abundant fossil debris throughout.		DOLOMITE	74	53.33
74.5	0.43		Strong, massive, pale grey, fine to fine medium grained, sparry LIMESTONE. Abundant fossil fragments, fresh overall. Single sub-horizotnal planar rough, clean joint.		LIMESTONE		
74.65	0.15		Moderately strong, dark grey, fine medium, sparry, fresh DOLOMITE; no joints.		DOLOMITE		
			Moderately strong to strong, thickly bedded, pale grey, fine/medium grained, slightly sparry to dull LIMESTONE. Frequent fossil debris throughout. Adundant fossil debris @ 77.65 m for 0.1 m. Occasional calculte veinlets. @ 77.78 m to 78.5 m, heavily broken and fracturered; @79.2 m, sub-vertical joint, planar, smooth with mineral striations, horizontal to joint; @ 79.8 m, large fossily, 30 mm in length (potentially crinoidal; @80.36 m, stylolite.			75	61.33
						76	
						77	37.33

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 01/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	6.55				LIMESTONE	78	18.67
						79	
						80	46
81.2			Moderately strong to strong, thickly bedded pale grey, fine grained, sparry LIMESTONE; frequent fossil debris throughout, fresh. Frequent joints, sub-vertical to vertical, planar smooth, clean, fresh. @ 85.8 m joint with coarse calcite, creamy red in colour with some clay infill. Rare calcite veinlets throughout.				92.67
							59.33
	7.05				LIMESTONE		13.33
							41.33

Comments:

Borehole Number: 01/2019

AGGREGATE INDUSTRIES

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
							50
88.25							
			Moderately strong to strong, thickly bedded, pale grey, interbedded with mid grey, lollipop pattern, fine grained, slightly sparry to sparry LIMESTONE. Frequent fossil debris throughout, fresh. @ 93.13 m to 93.48 m, heavily jointed, planar smooth. Infrequent horizontal joints, rough with minor covering of clay. Occasional greeny/red vuggy calcite veins, @ 93.40 m vertical to sub-vertical planar smooth, infill is coarse calcite crystals of brown/cream colour, ending at 94.25 m. @ 96.0 m, frequent clay infill on joint surfaces. @ 96.86 m, horizontal joint, smooth, planar with red/black infilling.		LIMESTONE		81.33
							74
							66
	11.25						100

Comments:

Borehole Number: 01/2019

AGGREGATE INDUSTRIES

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 14/11/2019
Logged by: RW, JM
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
							44.67
							100
							100
99.5							100
			End of Hole				

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
0.3	0.3		Made ground, concrete.		MADE GROUND	0	
1.4	1.1		Very strong, thickly bedded, dark brown/grey, mottled DOLOMITE. Partially weathered to fresh, medium grained, abundant fossil debris up to 10 mm in size, weakly effervescent. Sub-vertical, smooth, planar, clean jointing.		DOLOMITIC LIMESTONE	1	
1.5	0.1						44
2	0.5		Strong to very strong, fine to fine/medium grained, grey/brown, sparry LIMESTONE. Partially weathered, weak, moderate effervescence. No discernable jointing.		LIMESTONE	2	0
3.1	1.1		Strong to very strong, fine to fine/medium grained, grey to light grey, sparry LIMESTONE. Partially weathered to fresh, moderately effervescent clayey on surface. Vertical to core veining, black up to 0.5 mm thick, no jointing. Moderately strong, fine to fine/medium grained, grey slightly weathered LIMESTONE. Partially weathered, effervescent with no fossiliferous remains. Sub-horizontal jointing, aperture of <10 mm, rough on joint surfaces.		LIMESTONE	3	
3.9	0.8		Strong, fine grained, dark grey with brown mottling, partially weathered to weathered LIMESTONE. Sporadic fossiliferous fragments, effervescent. Sub-vertical jointing, planar rough, weathered brown on surface with silty clayey infill.		LIMESTONE		62
4.8	0.9		Moderately strong, thickly bedded, fine grained, grey to light grey LIMESTONE. Sporadic fossils with brown mottling, fresh. Sub-horizontal, planar smooth joints/ fractures.		LIMESTONE	4	
5.29	0.49		Moderately strong, thickly bedded, fine grained, grey to light grey, rare fossiliferous LIMESTONE. No discernable jointing, fresh to moderately weathered with weak effervescence.		LIMESTONE	5	90
6.15	0.86		Moderately strong, fine grained, sparry, pale grey LIMESTONE. Sub-vertical veinlets, dark grey/black, very fine infill. Sub-vertical to sub-horizontal jointing, dark brown/red clay infill on sub-horizontal joints. Sub-vertical joints, smooth, planar, weathered brown with black speckling.		LIMESTONE	6	
	3.45		Strong, dark grey/brown, sparry, fine grained DOLOMITE. Regularly interbedded with extremely weak bands of dark brown silty clay and mud. Heavily broken with no obvious jointing.		DOLOMITE	7	78
						8	24

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
						9	
9.6							17.33
	3.8		Moderately strong to strong, grey to light grey with pink/red veining and mottling throughout, fine to fine/medium grained LIMESTONE. Crystalline, sparry with some iron staining on surfaces. Abundance of fine veinlets infilled with calcite <10 mm thick. predominantly vertically to sub-vertically orientated. Sub-horizontal jointing, undualting surfaces with no infill/clean.		LIMESTONE	10	
						11	48.67
						12	
							82.5
13.4						13	
14	0.6		Strong to very strong, dark grey to mottled brown, fine to medium grained, sparry LIMESTONE. Partially weathered with no fossiliferous remains identifiable. No jointing present.		LIMESTONE		97.14
	2.55		Strong to very strong, pale grey, fine grained, sparry LIMESTONE. Highly effervescent. No veining to note but clear 'lollipop' shading of alternating light to dark grey. Sub-horizontal planar smooth jointing, no infill or alteration visible on surfaces.		LIMESTONE	14	
						15	96.67
16.55						16	
			Moderately strong, pale grey, fine to fine/medium grained, crystalline and sparry LIMESTONE. Heavily fractured with abundant veining of no obvious orientation up to 5 mm thick. Infilled with quartz/calcite, highly effervescent. Vertical to			17	74.67

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
			sub-vertical jointing, planar smooth jointing. Fracture surfaces distinctly rough in comparison to joint surfaces and highly crystalline. Frequent vuggy textures as a result of crossing veins. Frequent fossiliferous debris and shell fractures.		LIMESTONE	18	69.33
						19	
						20	53.33
	8.87					21	55.33
						22	
						23	16.67
						24	
						25	35.33
25.42							
	0.68		Strong to very strong, fine grained, light grey with dark grey circular mottling LIMESTONE. Abundance of fine veinlets infilled with pale yellow calcite. Vertical		EST NE		

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
26.1			vein, 3 mm aperture exhibiting red staining at edges, infilled with coarsely crystalline quartz (very weak reaction with HCl application). Vuggy texture. Sub-horiztonal jointing/fracturing, rough on surfaces- no infill though slightly clayey/powdery coating.		LIMESTONE	26	71.25
28.32	2.22		Strong to very strong thickly bedded, alternating grey to dark grey, same 'lollipop' pattern as 14.00 m to 16.55 m, medium/coarse crystalline LIMESTONE. Little to no shelly fossiliferous debris visible, some fine veining (1.5 mm thick) of milky white infill, strongly effervescent on HCl application, indicating quartz. Single, sub-vertical fracture (joint undulating) with brown crystalline infill, some weathering on surface, coarse crystals up to 3 mm in size.		LIMESTONE	27 28	22
29.35	1.03		Strong to very strong, fine grained, light grey with dark grey circular mottling LIMESTONE. Abundance of fine veinlets infilled with pale yellow calcite. some vertically veining infilled with coarsely cryallisne quartz (very weak reaction with HCl application). Vuggy texture. No jointing.		LIMESTONE	29	93.33
31.38	2.03		Moderately strong to strong, pale grey with alternativng dark grey band in 'lollipop' texture. Medium grained, crystalline with 1 mm thick veinlets running vertically infilled with translucent crystalline mineral with red alteration at edges; LIMESTONE. No reaction with HCl indicating quartz. No fossiliferous debris present. Sub-vertical to vertical jointing with brown weathering on surfaces, some minor powdering/decomposition but mostly clean/rough. Occasional horizontal joining infilled with clay, varying from fresh to decomposed- no brown weathering on surface.		LIMESTONE	30 31	52.67
33.02	1.64		Very strong, light grey with red/pink veining and alteration, very fine to fine grained crystalline LIMESTONE. Frequent veining of white/yellow calcite and quartz (variation between strongly effervescent and no reaction). Application of HCl leaches red staining from edges, potentially iron content. No jointing.		LIMESTONE	32	55.33
33.33	0.31		Extremely weak, dark red/brown, very fine (clay), crumbly but malleable where fresh CLAY. Heavily oxidised and weathered, crumbly at transition edges. Some lithorelics preserves in fresh clay centre. Sharp transitional boundary.		CLAY	33	
	1.3		Moderately strong to strong, light grey, brecciated within dark grey matrix, fine grained BRECCIATED LIMESTONE. Matriz- dark grey to medium/coarse grained, reactive on HCl application. Limestone is light grey, fine to very fine fragments vary from <1 mm in matriz to 40 mm suspended cobbles. Some horizontal to sub-horizontal jointing infilled with dark grey, slightly weathered crumble at edges		BRECCIATED LIMESTONE	34	88

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
34.63			CLAY. Joint surfaces rough where clay has been washed away.		BRECCIATED LIMESTONE		
	1.4		Weak, dark grey, fine grained CLAY with lithorelics of light grey weathered limestone. @ 35.27 m to 25.75 m, weathered, moderately weak to moderately strong LIMESTONE- dark grey, exhibiting elements of decomposition. Regular sub-horizontal jointing of soft, crumbly, dark grey clay.		CLAY	35	83.33
36.03						36	
	11.07		Strong to very strong, light grey, fine grained LIMESTONE. Frequent veining of calcite ranging from <1 mm to 3 mm thick, coarsely grained to uniform. Frequent sub-horizotnal jointing, unduating to rough with weathered brown, crystalline infill. Occasional fossil debris though poorly preserved and entrely altrered to calcite. Strongly effervescent with HCl.		LIMESTONE	37	94
						38	63.33
						39	
						40	97.33
						41	92
						42	
						43	100

Comments:

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
						43	
						44	74
						45	
							96
						46	
47.1						47	92.67
			Strong, mid-grey, fine to fine/medium grained LIMESTONE. Frequent predominantly horizontal to sub-horizontal vein structures, dark grey, very fine <0.5 mm thick. Infrequent, sporadic fossiliferous relics, heavily fractured throughout entirely altered to calcite. Occasional horizontal jointing, planar, undulating and rough with varying degrees of weathing/alteration. Some brown/finely crystalline infill present on smoother surfaces, fresh.		LIMESTONE	48	100
	3.78					49	
50.88						50	98.67
51	0.12		Moderately strong, fine/medium to medium grained, light grey to brown LIMESTONE. Occasional coarse crytals, weakly effervescent. @ 50.88 m to 51.10 m brecciated LIMESTONE with clayey/silty brown sandy infilling. Rough jointing. Absence of fossil reclics; overall fresh.		LIMESTONE	51	100

Comments:

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	5.48		Moderately strong, fine/medium to medium grained, mid-grey, mottled LIMESTONE. Frequent hairline fractures, predominantly sub-vertical calcite veinlets up to 3 mm thick. Absent fossil debris. Horizontal to sub-horizotnal planar to undulating, rough, often brecciated around joints. Surfaces dark grey to black with slightly silty/clayey coating. Brecciation interbedded throughout. Fresh.		LIMESTONE	52 53 54 55 56	94.67 98 99.33
56.48							
	1.77		Moderately strong to strong, mottled light grey to dark grey with brown discolouration around brecciation, fine grained, sparry LIMESTONE. Fresh surfaces exhibit orange/red iron staining and occasional vuggy textures. Veinlets up to 2 mm, quartz infill with no reaction to HCl though matrix is strongly effervescent. Jointing predominantly horizontal, planar, smooth with silty infill.		LIMESTONE	57 58	92
58.25							
			Moderately strong, fine grained, mid grey LIMESTONE. Finely crystalline, interbedded @ 64.3 m abundant red veinlets and brown surface staining. Jointing predominantly vertical to sub-vertical, planar, smooth surfaces, brown striated crystals, infill effervescent, calcite generally 2-4 mm aperture. @ 63.38 m sub-vertical joint infill of quartz crystals up to 10 mm. @ 64.38 m horizontal joint infilled with red/brown soft clay (20 mm thick) with possible washout, planar smooth; and quartz vein up to 3 mm thick. Below joint sharp transition back to LIMESTONE. 11 cm veined LIMESTONE with quartz and infilled with red/brown clay. From @66.10 m joints continue predominantly horizontal to sub vertical infilled with silty orange/yellow clay, occasional red/brown veinlets throughout- fresh.			59 60	63.33

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	10.9				LIMESTONE	61 62 63 64 65 66 67 68	100 106 78.67 90..67 98.67 91.33

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
69.15						69	65.33
	1.45		Moderately strong, red/grey, very fine to fine grained with some vuggy textures LIMESTONE. Veinlets predominantly calcite, red iron alteration staining throughout. Joints horizontal to sub-horizontal planar to undulating smooth, partially infilled with coarse calcite and silty clayey red infill.		LIMESTONE	70	
70.6							88
	5.3		Moderately strong to strong, light grey/brown, very fine to fine grained, finely crystalline LIMESTONE. Fresh with occasionnal preserved fossils up to 4 mm in size, replaced with calcite. Sub-horizontal veining. Jointing, sub-horizontal predominantly clean, crystalline calcite; @ 75.35 m to 75.9 m; heavily jointed and fractured, orange/brown sandy silt. Rare sylolites @ 73.97 m . After stylolite frequents 'larger fossil debris (>40 mm) of bivalvia, and 'smaller' (<15 mm) fossil debris towards base @ 74.76 m. Additional stylolite at base.		LIMESTONE	71	
						72	49.33
						73	
							71.33
						74	
						75	90.67
75.9							
			First 62 cm; strong, medium to medium/coarse grained, mid grey LIMESTONE. Abundant fossil debris (replaced with calcite), gradational contact into light grey fine grained, moderately strong LIMESTONE. Interbedded onwards. Sporadic fossils and fossil debris, occasional veinlets throughout, likely calcite. Jointing; @ 75.9 m, continuation of previous sub-vertical joint; @78.1 m heavily fractured and jointed predominantly sub-vertical to vertical, planar smooth with yellow/cream, silty/sandy infill with coarse crystalline calcite infilling to 79.28 m; @ 79.28 m, predominantly horizontal to sub-horizontal smooth, planar, clean. Fresh. Becoming black and weathered towards base of 82.60 m; @ 82.50 heavily fracturered and			76	
							44.67
						77	

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	13.84		jointed zone up to 85.10 m, planar smooth to planar rough and crystalline (likely calcite). Some brown/orange (likely iron) staining, otherwise clean, with some rare black weathering towards base, predominantly vertical joint set.		LIMESTONE	78 79 80	81.33 15.33 69.33 43.33 40 36.67

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name	RQD %
						58
						64.67
89.74						
	2.46		Moderately strong to strong, mid grey to brown, abundant calcite grains, sparry, fine/medium grained, occasionaly pitted DOLOMITIC LIMESTONE. Jointing; vertical and horizontal joint set throughout, clean, smooth, planar infilled with fine to fine/medium calcite crystals with occasional staining/weathering. Fresh.		DOLOMITIC LIMESTONE	77.33
						87.33
92.2						
	4.28		Moderately strong, mid-grey, fine grained LIMESTONE. Occasional veinlets, frequent fossil debris throughout. Fresh. Jointing; @ 94.10 m calcite vein, 38 mm predominantly horizontal to sub-horizontal throughout, planar smooth to undulating rough. Occassional stylolite; @ 95.20 m, some 'bleaching' or rock and orange staining (likely iron), potential bedding plane, planar rough with red staining.			90
						56

Comments:

Borehole Number: 02/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 16/11/2019
Logged by: RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name	RQD %
					DOLOMITIC LIMESTONE	
						71.33
96.48						
	3.9		Moderately strong, mottled dark grey/brown, fine/medium to medium grained DOLOMITIC LIMESTONE, 'sparry-brown texture'. Mottled orange staining throughout. Occasional veinlets, likely calcite infill. Occasional vuggy textures. Very occasional fossil debris, fresh. Jointing; sub-vertical and sub-horizontal throughout, sub-vertical, planar smooth, orange and black staining, clean. Sub-horizontal, planar smooth, clean, fresh. @ 97.60 m, approximately 12 cm orange/brown clay infill, soft, sub-horzointal joint. Joint area no all clay. @ 99.33 m, sub-vertical joint, planar, smooth, clack staining/weathering, striated. Remainder predominantly horizontal joints, planar, smooth, clean.		DOLOMITIC LIMESTONE	25.33
						58.67
100.38						
100.6	0.22		Strong to very strong, Pale grey, fine grained LIMESTONE, fresh. Orange/brown discolouration around joint surfaces, occasional veinlets of calcite (up to 2 mm).		LIMESTONE	50.67
			End of Hole			

Comments:

Borehole Number: 03/2019

AGGREGATE INDUSTRIES

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 17/12/2019
Logged by: SC, RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name	RQD %
	0.03		Tarmac			
	1.27		Very strong, very fine grained, grey/brown, thickly bedded, sparry LIMESTONE. Crystalline.		LIMESTONE	
1.3						26
	1.1		Strong, medium grained, brown/grey, sparry LIMESTONE. Sparry, lightly weathered, thickly weathered, iron stained.		LIMESTONE	27
2.4						
	1.8		Very strong, cream to buff, thickly bedded, porcellaneous LIMESTONE. Micritic, fresh. Jointing; 32° dip, stylolite. Sub-vertical jointing.		LIMESTONE	57
4.2						
	1.9		Moderately strong, medium brown, indistinct bedding, sparry with vugs DOLOMITE. Partially to distinctly weathered.		DOLOMITE	57
6.1						
	2.9		Very strong, cream to buff, thickly bedded, porcellaneous LIMESTONE.		LIMESTONE	56
						86

0 1 2 3 4 5 6 7 8

Comments:

Borehole Number: 03/2019

AGGREGATE INDUSTRIES

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 17/12/2019
Logged by: SC, RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
9						9	
9.2	0.2		Weak CLAY and LIMESTONE rubble, likely cavity.		CLAY		
	3.1		Very strong, light grey, thickly bedded, very fine grained, occasionally sparry, occasionally vuggy LIMESTONE. Horizontal bedding, fresh with occasional fossil debris.		LIMESTONE	10	68
12.3						11	90
13.4	1.1		Very strong, light grey, thickly bedded, very fine grained, occasionally sparry, occasionally vuggy LIMESTONE. Horizontal bedding, fresh with occasional fossil debris.		LIMESTONE	12	95
14	0.6		Strong, fine to medium grained, grey/borwn LIMESTONE. Biosparite, frequent crinoids and fossil fragments present. Fresh, horizontal bedding with calcite veins.		LIMESTONE	13	95
15.5	1.5		Moderately strong, medium brown, indistinct bedding, sparry with vugs DOLOMITE. Partially to distinctly weathered.		DOLOMITE	14	
	2.02		Moderately strong to strong, light grey, fine to medium grained LIMESTONE. Crystalline texture, sub-vertical veins of alternating pure quartz, pure calcite and mixed coarsely crystalline veining. Horizontal to sub-horizontal jointing, clean, smooth, planar, fresh.		LIMESTONE	15	86.67
						16	
						17	98

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 03/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 17/12/2019
Logged by: SC, RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
17.52							
18.12	0.6		Moderately strong, mid grey, fine grained LIMESTONE. Biosparite. Small (<0.5 mm) black flecks, suspended in matrix. Frequent veining, cross-cutting core. Pitted texture, infilled with calcite. No noticeable jointing, overall partially weathered.		LIMESTONE	18	
21.18	3.06		Moderately strong, dark brown/grey, fine to fine/medium grained LIMESTONE. Distinctly weathered to gritty/powdery texture on newly exposed surfaces. Transition from previous in vuggy/veined but sharp. Frequent veins up to 15 mm, thick infilled with pure quartz. Some orange/red staining on more extensively weathered surfaces. Minimal horizontal to sub-horizontal jointing, planar, smooth, clean surfaces. Highly vuggy (>3 mm).		LIMESTONE	19 20 21	90.67 80
24.5	3.32		Strong to very strong, light grey, mottled with dark grey, very fine to fine grained LIMESTONE. Finely crystalline matrix, extensive hairline veining around mottled textures. No notable jointing. Fresh, strongly effervescent.		LIMESTONE	22 23 24	84.67 79.33 96
			Moderately strong to strong, fine grained, interbedded with fine/medium to coarse LIMESTONE. Occasional vugs infilled with quartz/calcite. Infrequent, large, well preserved fossils. @ 24.8 m, bivalve of 70 mm; @ 25.80, coral across 15 mm, broken with vuggy/veined quartz and calcite. Occasional mottled though infrequent. Little to no jointing up to 27.50 m. @ 27.50 m, sub-vertical jointing, clean, smooth, planar to undulating surface weathered to light brown. @ 28.50 m to 30.50 m, horizontal to sub-horizontal jointing, rough. Some sandy/silty infill,			25	

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 03/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 17/12/2019
Logged by: SC, RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	8.25		light brown/yellow in colour, partially weathered and heavily fractured. @ 30.50 m to 32.75 m, sub-vertical jointing, clean, planar, smooth to undulating, weathered to brown/dark brown with black flecks. Some red/orange iron staining present, highly fractured.		LIMESTONE	26 27 28 29 30 31 32	86.67 66 58.67 51.33 0
32.75			Moderately strong, mid grey, heavily mottled with dark grey/brown. Very fine to fine grained LIMESTONE. Overall partially weathered with interbedded bands of heavily weathered material. Frequent hairline veining throughout infilled with yellow calcite. Occasionally black where heavy weathering occures. Thick (3 mm) veritical veins of quartz throughout with red staining of iron at edges. Occasional fossil debris, rare and poorly preserved. Regular horizontal joining and occasional bedding, rough and highly weathered. Dark grey silty clay infills joints. @ 38.7 m for minimum of 20 mm, entirely decomposed, altered LIMESTONE.			33 34	48

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 03/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 17/12/2019
Logged by: SC, RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	9.25				LIMESTONE	35	92
						36	84.67
						37	
						38	91.33
						39	78
						40	
						41	96
42						42	
			Moderately strong to strong, very fine grained, light brown/grey LIMESTONE. No significant textures to note. Sub-vertical veining of quartz, thick (up to 4 mm). Occasional horizontal veining, black with fracturing. Sub-vertical joining, planar smooth to rough, weathered but clean, brown staining on surfaces. Little to no fossiliferous relics preserved. Occasional horizontal jointing, planar, rough, highly weathered and infilled with fine clayey black material. Associated with horizontal			43	89.33

Comments:

AGGREGATE INDUSTRIES

Borehole Number: 03/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 17/12/2019
Logged by: SC, RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
			black hairline fractures. Frequent stylolites throughout. @ 44.30 m, stylolite directly prior to joining 'crumple' zone.		LIMESTONE	43	
	4.7					44	68
						45	90
46.7						46	
			Weak to moderately strong, light brown/grey, medium grained LIMESTONE. Frequent broken, poorly preserved fossiliferous fragments, dark grey/black in colour. Crystalline texture on freshly broken surfaces. Fresh. Occasional vertical to sub-vertical veins of quartz up to 4 mm thick. Horizontal jointing rough, weathered black surfaces with sandy infill (frequent). Occasional sub-vertical with brown/orange weathering on surfaces.		LIMESTONE	47	86
	4.3					48	
						49	89.67
						50	56
51						51	
			Moderately strong, dark grey, medium to medium/coarse grained LIMESTONE with weak dolomitisation. No preserves fossiliferous debris. Fresh. Occsasional quartz veining, vertical up to 3 mm.				91.33

Comments:

Borehole Number: 03/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 17/12/2019
Logged by: SC, RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
	1.27				LIMESTONE	52	
52.27			Strong to very strong coarse grained, dark grey DOLOMITISED LIMESTONE. Sparry on freshly broken surfaces, effervescent on HCl application. Frequent black staining and black mineralogy within matrix. Highly brecciated textures, no fossiliferous debris present. Coarsely crystalline, overall fresh. Horizontal jointing, rough planar, 50% clean, 50% exhibiting weathering to powdery sandy grey covering.		DOLOMITE	53	70
	1.63						
53.9			Moderately strong, fine grained, mid grey LIMESTONE. Frequent sub-horizontal veining possibly related to bedding no fossiliferous remains visible. Thin, black calcite veins. Occasional quartz veins, rare with no pattern of orientation. Rare interbeds of coarser grained limestone, finely crystalline texture visible on fresh surface. @ 55.0, sub-vertical joint exhibiting weathering to dark brown sandy infill on rough undulating surface. @ 56.65 to 56.86 m, zone of brecciation, limestone fragments suspended within dark grey, fine grained calcitic matrix. Jointing at regular intervals, consistenly horizontal to sub-horizontal following pattern of hairline fractures and veins. Jointing planar smooth to rough. Black weathering on surfaces producing fine powdery/clay infill. Overall partially weathered, effervescent throughout.		LIMESTONE	54	84
						55	
						56	70
	7.2					57	
						58	50.67
						59	80
						60	

Comments:

Borehole Number: 03/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 17/12/2019
Logged by: SC, RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
							82.67
61.1						61	
	1.6		Moderately strong to strong, fine to fine/medium grained, light brown/grey LIMESTONE. Occasional fossil fragments up to 40 mm in size, replaced with calcite, fresh to partially weathered. No internal texutes to note. Infrequent veining of quartz/calcite producing pitted texture. Light grey mottling/speckling present though no change in effervescence or grain size. Horizontal to sub-horizontal jointing, rough but clean. Weathering on surface produces black specling. Infrequent black hairline fractures, likely weathered black as opposed to black mineralisation.		LIMESTONE	62	83.33
62.7							
	8.3		Moderately strong to strong, fine/medium to medium grained light brown LIMESTONE. Interbedded with coarser brown/grey limestone. Rare fossiliferous fragments, replaced with calcite, fresh. Occasional pitted texture where grain size coarsens and becomes visibly crystalline. Vertical to sub-horizontal quartz/calcite veining present. Frequent horizontal to sub-horizontal rough, clean jointing. Some weathering to brown on surfaces with rare decomposition to powdery yellow/brown covering.		LIMESTONE	63	96
						64	
						65	69.33
						66	
							92.67
						67	
						68	93.33

Comments:

Borehole Number: 03/2019

Site: Back Lane Quarry, Carnforth

Ground Level:
Easting:
Northing:
Inclination: Vertical
Direction:

Contractor: APEX Drilling
Drill Rig: T44 Coring
Type of Drilling: 57"
Casing:

Date: 17/12/2019
Logged by: SC, RW
Water Level:

Depth (m)	Thickness (m)	Level (m AOD)	Description	Log	Lithological Name		RQD %
						69	
							70
						70	
71							92
						71	
			End of Hole				

Comments:

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site: **BACK LANE QUARRY, OVER KELLETT**

borehole no: **1/98**

sheet 1 of 3

contractor:	Millfields Geotechnical	coordinates:	not surveyed
drill rig:	Diamec 250	elevation:	85 m.a.o.d. (not surveyed)
type of drilling:	T46 water flush core	inclination:	vertical
casing:		direction:	

logged by:	R M Simon
date started:	3 February 1998
date completed:	4 February 1998
reference:	**back lane/borehole logs 98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
0.00	9.49	9.49	**FILL - MADE UP GROUND**	mixture of broken and rounded fragments of limestone with occasional blocks of concrete and sandstone, poor core recovery	1		46%	0	non intact	0.00 to 9.49 not sampled
					2					
					3		55%	0		
					4					
					5		49%	0		
					6					
					7		50%	0		
					8					
					9		66%	0		
9.49	10.02	0.53	**DOLOMITE**	medium to dark brown, fine to medium grained, sparry, indistinct bedding, slightly vuggy (less than 1 mm), slightly weathered, moderately hard to hard	10		54%	26		9.49 to 15.40
					11					
10.02	13.07	3.05	**LIMESTONE**	pale grey to off white, fine to very fine grained, very slightly sparry, occasional and scattered shell debris, no distinct bedding planes, intensely fractured, mostly oblique at 50° to 70°, fresh, hard, transitional base	12		92%	8		
					13		100%	48	128	
					14					

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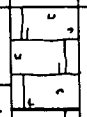
site: **BACK LANE QUARRY, OVER KELLETT**

borehole no: **1/98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
13.07	15.40	2.33	**DOLOMITE AND DOLOMITIC LIMESTONE**	dark brown, fine to medium grained, very sparry, scattered shell debris, massive, occasional smooth bedding planes at 15°, no joints, slightly weathered, moderately hard to hard, transitional base	15				296	
15.40	31.27	15.87	**LIMESTONE**	generally pale grey to off white, locally with indistinct medium grey mottling, fine grained, slightly sparry, very little shell debris increasing below 26 m., no stylolites except below 25 m., massive with occasional irregular and rough bedding planes at 5° to 20°, beds greater than 40 cm, no joints, very occasional oblique (30°) tight fractures, fresh, hard	16		98%	97		
					17				250	
					18					
					19		100%	100		
					20				273	
					21					
					22		100%	94		
					23				600	15.40 to 31.27
					24					
					25		100%	93		
					26				429	
					27					
					28		100%	98		
					29				250	
					30					

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from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	Fracture index	sample depths metres
					31		100%	89		
31.27	35.00	3.73	**BRECCIATED LIMESTONE**	generally medium grey, locally mottled dark gray, fine grained, not sparry, occasional shell debris, brecciated appearance with rounded to sub-angular limestone up to 25 mm. set between numerous thin (less than 1mm) irregular veinlets, either oxidised or with grey-green clay matrix, brecciation increases with depth, massive, very occasional oblique joint (30° to 50°), one with slickenslides, moderately hard to hard, slightly weathered	32 33 34 35		100%	97	333	31.27 to 37.62
35.00	36.05	1.05	**FAULT**	variable mixture of broken limestone set in a matrix of grey-green mylonitic clay with several soft red-brown clay seams up to 20 mm thick, all heavily oxidised, overall soft to moderately soft, weathered	36 37		100%	80	55	
36.05	37.62	1.57	**BRECCIATED LIMESTONE**	similar to 31.27 to 35.00	38		99%	100	343	
37.62	46.22	8.60	**LIMESTONE**	variable sequence but generally pale grey, fine grained, slightly sparry with little shell debris, locally stylolitic, occasional oblique tight joint at 40° to 60°, massive with irregular and rough bedding planes at 10° to 20°, hard and fresh, with at 39.40 – 6 mm thick, pale grey-green, soft bedded clay 39.70 to 41.20 – slightly pink-brown speckling, slight dolomitisation (?) 42.85 to 43.05 – slightly darker grey and slight brecciation	39 40 41 42 43 44 45		98% 100%	88 81	231 150	37.62 to 46.22
46.22				**END OF BOREHOLE**	46		100%	89	160	

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contractor:	Millfields Geotechnical	coordinates:	not surveyed
drill rig:	Diamec 250	elevation:	88 m.a.o.d. (not surveyed)
type of drilling:	T46 water flush core	inclination:	vertical
casing:		direction:	

logged by:	R M Simon
date started:	9 February 1998
date completed:	10 February 1998
reference:	**back lane/borehole logs 98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
0.00	4.25	4.25	**LIMESTONE**	pale grey to off white, very fine grained, very little shell debris intensely stylolitic below 1.7 m., stylolites are oxidised and irregular generally massive with indistinct bedding planes core intensely broken to 1.7 m., below which the core is intact, no joints hard, fresh	1 2 3 4		100% 100%	27 90	non intact 58	0.00 to 6.46
4.25	6.46	2.21	**BRECCIATED LIMESTONE**	generally greenish grey, locally red-brown with oxidisation fine to very fine grained, little spar or shell debris limestone in rounded fragments up to 20 mm. set in a grey-green mylonitic clay matrix, locally soft and shaley, medium bedding to 20 cm. occasional oblique tight joints at 20° to 60°, one with slickensides generally moderately hard to hard, slightly weathered	5 6 7 8		100%	74	289	
6.46	15.60	9.14	**LIMESTONE**	pale to medium grey with occasional and localised brown oxidation generally fine grained and locally with spar, little shell debris moderate to locally intensely stylolitic, massive with near horizontal massive with bedding planes at 20 to 60 cm intervals very occasional, sub-vertical, tight joints, hard and fresh	9 10 11 12 13 14		100% 100%	92 93	242 214	6.46 to 15.60

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from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
					15		100%	95		
15.60	28.00	12.40	**LIMESTONE**	pale to medium grey, very fine grained, almost micritic little scattered shell debris, intensely stylolitic with hematite (< 1mm.) massive with beds up to 1.2 m., no joints, very hard and fresh 27.92 to 27.95 - quartz vein, oblique	16				429	15.60 to 28.00
					17		100%	95		
					18					
					19				750	
					20		100%	100		
					21					
					22				600	
					23		100%	98		
					24					
					25				273	
					26		100%	94		
					27					
					28				282	
28.00	36.60	8.60	**LIMESTONE**	as above but stylolites are localised and less intensely developed	29		100%	94		
					30					

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from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
					31				264	
					32					
							100%	96		28.00 to 36.60
					33					
					34				750	
					35					
							100%	97		
					36					
					37				231	
36.60	42.20	5.60	**LIMESTONE**	medium grey, fine to very fine grained, little shell debris massive with bedding planes at 20 to 60 cm. intervals, dip at 10° to 20° intensely stylolitic with hematite, no joints, hard, fresh	38					
							100%	97		
					39					
					40				273	36.60 to 42.20
					41					
							100%	92		
					42					
42.20	44.00	1.80	**DOLOMITE AND DOLOMITIC LIMESTONE**	brown and grey brown, fine grained with slight spar, strongly speckled with numerous small vugs (1 to 5 mm.) with oxidisation, massive up to 1.0 m., occasional stylolites, very occasional sub-vertical oxidised joints, moderately hard, slightly weathered, transitional base	43				375	
					44					
							100%	100		
					45					
44.00	45.47	1.47	**LIMESTONE**	pale gray, very fine grained, micritic, occasional and scattered shell debris, no joints, massive with indistinct bedding planes, hard, fresh	46				300	42.20 to 49.19

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from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
45.47	49.19	3.72	DOLOMITE AND DOLOMITIC LIMESTONE	medium brown and grey brown, fine grained with slight spar, strongly speckled with numbered small vugs (1 to 5 mm.) generally oxidised, massive up to 1.0 m, occasional stylolites, very occasional sub-vertical oxidised joints, moderately hard, slightly weathered	47		100%	96		
					48				320	
49.19				**END OF BOREHOLE**	49		100%	94		
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					
					60					
					61					
					62					

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contractor: Millfields Geotechnical	coordinates: not surveyed	logged by: R M Simon	
drill rig: Diamec 250	elevation: 90 m.a.o.d. (not surveyed)	date started: 11 February 1998	
type of drilling: T46 water flush core	inclination: vertical	date completed: 13 February 1998	
casing:	direction:	reference: **back lane/borehole logs 98**	

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
0.00	0.70	0.70	**FILL**	broken fragments of pale grey limestone set in a brown silty clay matrix	1		80%	14	non intact	0.00 to 11.90
0.70	11.90	11.20	**LIMESTONE AND DOLOMITE**	variable and intermixed sequence consisting of 2.90 m. (26% of total)- limestone, pale grey to white, very fine grained, micritic, little shell debris, occasional stylolite, fresh, hard to very hard 4.70 m. (42% of total) - limestone, pale grey-brown, fine grained, sparry, locally speckled dark grey, considerable shell debris, stylolitic, fresh, hard 3.60 m. (32% of total) - dolomite, dark brown, fine to medium grained, slightly vuggy, localised oxidation around vugs and along thin veinlets, generally hard, locally soft to moderately hard generally massive, 20 to 60 cm beds, inclined at 10° to 20°, bedding bedding planes are rough and irregular, occasional sub-vertical tight joint, very occasional calcite lined vugs up to 15 mm., clay infilled joint at 3.83 m. transitional base	2				157	
					3		97%	76		
					4					
					5				211	
					6		100%	86		
					7				231	
					8					
					9		100%	94		
					10				250	
					11					
					12		97%	96		
11.90	22.25	10.35	**LIMESTONE**	pale grey to off white, very fine grained, micritic, locally slightly sparry, very scattered and localised shell debris in beds up to 15 cm. thick, one distinct dark grey reef at 15.77 to 16.85 m., massive with indistinct bedding planes (60 to 120 cm), occasional weak stylolites,	13				375	
					14					

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site: **BACK LANE QUARRY, OVER KELLETT**

borehole no: **4/98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
				very occasional oblique and tight joints, fresh, hard to very hard	15		100%	100		11.90 to 22.25
					16				188	
					17		100%	86		
					18					
					19				429	
					20		100%	100		
					21					
					22				176	
22.25	25.54	3.20	**LIMESTONE**	pale and medium grey, mottled, fine grained, sparry with much shell debris, slightly stylolitic, massive with generally indistinct bedding planes @20 to 60 cm.), numerous thin (< 1 mm.) irregular veinlets with either quartz or hematite infill, very occasional oblique to sub-vertical tight joint, hard, fresh	23		100%	75		22.25 to 29.00
					24					
					25				200	
25.54	27.49	1.95	**LIMESTONE**	off white, very fine grained micrite, slight shell debris, numerous thin (<2 mm.) irregular veinlets with either quartz or hematite infill, fresh hard	26		99%	95		
					27					
27.49	27.57	0.08	**FAULT**	broken angular limestone set in a heavily oxidised mylonitic clay matrix	28				420	
27.57	29.00	1.43	**LIMESTONE**	as 25.54 to 27.49 m.	29		98%	84		
29.00	31.16	2.16	**FAULT**	Dark grey-purple sub-angular fragments of limestone up to 30 mm., set	30				67	

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from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
				in a grey-green matrix of soapy mylonitic clay, soft to moderately soft, 29.48 to 29.73 and 30.09 to 30.36 m. - grey green mylonitic clay, broken, heavily oxidised, soft to very soft	31					29.00 to 31.16
31.16	37.10	5.94	**LIMESTONE**	generally pale to medium grey, locally mottled, fine grained, sparry, scattered shell debris, slightly stylolitic, massive with beds greater than 60 cm., numerous thin (1 to 3 mm) oblique and irregular quartz veinlets, becoming slightly brown and dolomitic below 36 m., dolomitisation is scattered and indistinct, occasional oblique and irregular joint, slightly open with thin brown clay veneer, white clayey silt in joint at 35.55 to 36.65 m., fresh, hard	32 33 34 35 36 37		100% 90%	73 95	164 429 270	31.16 to 37.10
37.10	41.20	4.10	**LIMESTONE**	pale grey, fine grained, sparry with frequent very irregular thin (< 1 mm.) quartz veinlets, little shell debris, massive with beds greater than 60 cm., no joints except one sub-vertical open fissure lined with calcite crystals at 38.95 to 39.28 m., hard, fresh, transitional base	38 39 40 41		100% 100%	93 91	322	37.10 to 44.13
41.20	44.13	2.93	**LIMESTONE**	medium and dark grey, fine grained, sparry, locally intense very irregular very thin veinlets and stylolites, brecciated texture, massive with irregular and rough bedding planes at intervals of 30 to 50 cm. inclined at 10° to 20°, occasional very irregular sub-vertical tight joint, hard, fresh	42 43 44		99%	97	271	
44.13	51.85	7.72	**LIMESTONE**	medium grey, locally mottled dark grey, fine grained, sparry, scattered shell debris, locally stylolitic, massive with irregular and rough bedding planes at 10°, very occasional oblique tight joint, occasional irregular	45 46		100%	90	242	

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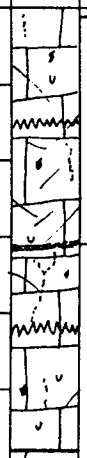
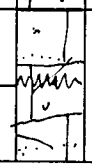
site: **BACK LANE QUARRY, OVER KELLETT**

borehole no: **4/98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
				quartz veinlet up to 2 mm., fresh, hard at 49.18 m. – 8 mm. soft brown bedded clay inclined at 8°	47 48 49 50 51 52		94% 97%	68 69	135 465	44.13 to 51.85
51.85	60.00	8.15	**DOLOMITIC(?) LIMESTONE**	generally pale pinkish grey with dark brown speckled zones and rounded patches up to 8 mm., generally fine grained, locally medium grained, very sparry, scattered shell debris, not vuggy, massive with indistinct bedding planes, very occasional oblique tight joint, hard to very hard, fresh, transitional base	53 54 55 56 57 58 59 60		96% 100% 99%	84 88 91	200 167 333	51.85 to 60.00
60.00	67.12	7.12	**DOLOMITIC(?) LIMESTONE**	pale grey or pale grey-brown, locally slightly speckled, very occasionally darker brown patches, fine grained, sparry with scattered shell debris, very occasional stylolite, massive, indistinct bedding planes, occasional oblique (40° to 60°) joints, hard to very hard, fresh	61 62				273	

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from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
				at 63.1 m. – 6mm. soft green-brown clay in joint	63		93%	88		60.00 to 67.12
					64				214	
					65					
					66		100%	69		
					67				138	
67.12	88.10	20.98	**LIMESTONE**	pale grey to pale buff, slightly and locally speckled dark grey, slight brown coloration at 73.78 to 73.80 and 81.65 to 82.08 m., fine grained, locally medium grained, sparry, scattered shell debris, concentrated shell debris (crinoid ossicles) at 76.43 to 76.62 m., very occasional and indistinct bedding planes at 12° to 16°, stylolitic, very occasional oblique to sub-vertical tight joint increasing slightly with depth, hard, fresh at 68.0 m. - 4 mm. soft brown-green bedded clay at 69.0 m. - 5 mm. soft brown-green bedded clay at 73.0 m. - 2 mm. soft brown-green bedded clay	68		100%	64		67.12 to 78.00
					69					
					70		97%	95		
					71				253	
					72					
					73		94%	91		
					74				200	
					75					
					76		98%	87		
					77				167	
					78					

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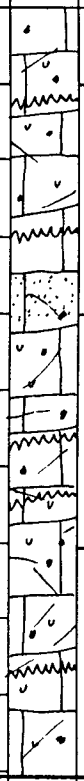
site: **BACK LANE QUARRY, OVER KELLETT**

borehole no: **4/98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
					79		99%	87		78.00 to 88.10
					80				231	
					81					
					82		100%	96		
					83				158	
					84					
					85		98%	81		
					86				119	
					87					
88.10			END OF BOREHOLE		88		100%	71		
					89					
					90					
					91					
					92					
					93					
					94					

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site: **BACK LANE QUARRY, OVER KELLETT**

borehole no: **5/98**

sheet 1 of 2

contractor:	Millfields Geotechnical	coordinates:	not surveyed
drill rig:	Diamec 250	elevation:	57 m.a.o.d. (not surveyed)
type of drilling:	T46 water flush core	inclination:	vertical
casing:		direction:	

logged by:	R M Simon
date started:	17 February 1998
date completed:	17 February 1998
reference:	**back lane/borehole logs 98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
0.00	0.80	0.80	**FILL**	intensely broken pale grey limestone in sub-rounded fragments	1		100%	0	non intact	0.00 to 2.58
0.80	2.58	1.78	**DOLOMITIC LIMESTONE**	variably pale and dark brown, generally fine grained, locally very fine grained, sparry, scattered shell debris, indistinct bedding, occasional sub-vertical joint, hard to very hard, fresh	2		84%	43	23	
2.58	19.54	16.96	**LIMESTONE**	generally off white to pale grey, pale brown from 6.86 to 7.30 m., locally mottled pale and medium grey particularly at depth, generally fine to very fine grained, scattered shell debris, very occasional whole fossil (brachiopod), massive with beds up to 2m., indistinct bedding planes, strongly stylolitic with hematite from 15.57 to 16.65 m., very occasional sub-vertical tight joint, rock is hard and fresh	3		96%	82	288	2.58 to 19.54
					4					
					5					
					6		100%	75		
					7		100%	71	100	
					8				200	
					9					
					10		100%	98	273	
					11					
					12					
					13				308	
					14					

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from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
					15		100%	88		
					16					
					17				218	
					18		100%	96		
					19					
19.54			END OF BOREHOLE				99%	91		
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30					

GEOPLAN LIMITED	Geological, Planning and Development Consultants 60 Bank Road, Matlock, Derbyshire DE4 3GL tel: +44 (0)1629 57174 fax: +44 (0)1629 57770	site: **BACK LANE QUARRY, OVER KELLETT**	borehole no: **6/98** sheet 1 of 2

contractor: Millfields Geotechnical	coordinates: not surveyed	logged by: R M Simon
drill rig: Diamec 250	elevation: 57 m.a.o.d. (not surveyed)	date started: 18 February 1998
type of drilling: T46 water flush core	inclination: vertical	date completed: 18 February 1998
casing:	direction:	reference: **back lane/borehole logs 98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
0.00	5.55	5.55	**LIMESTONE**	generally off white to pale grey, medium brown from 0.0 to 0.6 m., fine to very fine grained, locally micritic, locally much shell debris, weakly developed stylolites, bedding is massive up to 1.0 m., very occasional tight sub-vertical joint except for 0.0 to 0.5 and 1.2 to 1.65 m. where core is intensely broken, very hard and fresh	1				non intact	0.00 to 5.55
					2		79%	26		
					3				113	
					4		73%	45		
					5		100%	90		
					6		96%	89	200	
5.55	9.65	4.10	**DOLOMITIC LIMESTONE**	medium to very dark brown, locally speckled, fine to medium grained, sparry, weakly developed massive bedding, very occasional stylolite, very occasional sub-vertical tight joint, hard and fresh 5.85 to 5.88 - 3 cm pale brown sandy silty clay, bedded	7				322	5.55 to 9.65
					8					
					9		98%	93		
					10				200	
9.65	16.90	7.25	**LIMESTONE**	off white to pale grey, fine grained, locally very fine grained, scattered shell debris, massive with bedding planes at 30 to 60 cm. intervals, occasional stylolite, generally well jointed with sub-vertical both tight and open joints, hard, fresh	11					
					12		100%	79		
					13				258	
					14					

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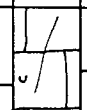
site: **BACK LANE QUARRY, OVER KELLETT**

borehole no: **6/98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
					15		100%	79		9.65 to 19.42
					16				143	
					17					
16.90	18.35	1.45	**LIMESTONE**	variably pale and dark grey, occasionally and locally dark brown and dolomitic, frequent small shell debris including crinoid ossicles, fine to medium grained, massive with beds up to 60 cm., stylolitic, occasional sub-vertical tight joint, very hard, fresh	18		100%	75		
					19				125	
18.35	19.42	1.07	**LIMESTONE**	as 9.65 to 19.42 m.	20		100%	79		
19.42				**END OF BOREHOLE**	21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30					

GEOPLAN LIMITED	Geological, Planning and Development Consultants 60 Bank Road, Matlock, Derbyshire DE4 3GL tel: +44 (0)1629 57174 fax: +44 (0)1629 57770	site: **BACK LANE QUARRY, OVER KELLETT**	borehole no: **3/98** sheet 1 of 4

contractor: Millfields Geotechnical	coordinates: not surveyed	logged by: R M Simon	
drill rig: Diamec 250	elevation: 87 m.a.o.d. (not surveyed)	date started: 5 February 1998	
type of drilling: T46 water flush core	inclination: vertical	date completed: 6 February 1998	
casing:	direction:	reference: **back lane/borehole logs 98**	

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
0.00	1.10	1.10	**LIMESTONE**	pale grey to white, fine grained, intensely broken core, sub-angular	1		100%	0	non intact	0.00 to 10.03
1.10	2.65	1.55	**LIMESTONE**	pale grey to off-white, very fine grained, almost micritic, little shell debris, intensely stylolitic, thin (<2 mm.) irregular sub-vertical quartz veinlets, massive with indistinct bedding planes, generally well fractured with oblique tight joints at 30° to 50°, hard, slightly weathered	2		100%	31	56	
					3		100%	23	329	
					4		98%	87		
2.65	10.03	7.38	**LIMESTONE**	pale gray becoming pale buff below 5.3 m., very fine grained, almost micritic, frequently and locally intensely stylolitic, occasionally and locally mottled dark grey, massive with indistinct bedding planes, occasional sub-vertical or 60° oblique tight joints, hard, fresh	5				250	
					6					
					7		97%	86		
					8				580	
					9					
					10		100%	98		
10.03	28.00	17.97	**LIMESTONE**	variably pale and medium grey, slightly mottled dark grey below 21 m., fine grained and generally sparry, locally very fine grained, scattered shell debris, scattered stylolites and intensely stylolitic between 16.65 and 18.95 m., massive with occasional distinct bedding plane at 5° to 10° bedding planes are rough and irregular, very occasional sub-vertical joint with thin brown clay veneer at 21.6 to 22.04 m., 22.6 to 23.0 m., broken core at 25.35 to 26.05, 26.32 to 26.81 m., very occasional thin quartz veinlets (< 3 mm.), hard to very hard, fresh, transitional base	11				300	10.03 to 19.20
					12					
					13		100%	96		
					14					

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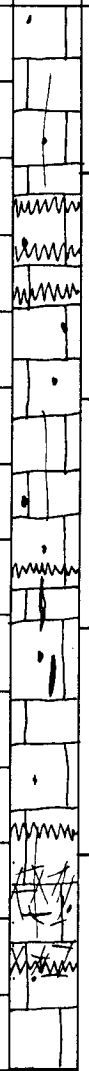
site: **BACK LANE QUARRY, OVER KELLETT**

borehole no: **3/98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
					15				250	
					16		97%	89		
					17				333	
					18					
					19		100%	97		
					20				300	19.20 to 28.00
					21					
					22		100%	92		
					23				333	
					24					
					25		100%	93		
					26				110	
					27					
					28		100%	70		
28.00	28.32	0.32	**DOLOMITIC LIMESTONE**	medium to dark brown, fine to medium grained, very parry, hard, fresh	29				354	
28.32	32.93	4.61	**LIMESTONE**	pale grey, locally medium gray, fine grained, slightly parry, locally with	30					

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site: **BACK LANE QUARRY, OVER KELLETT**

Borehole no: **3/98**

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	Fracture index	sample depths metres
				weak mottling, massive with infrequent irregular and rough bedding planes at 10° to 20°, very occasional oblique tight joint, hard, fresh	31		100%	94		
					32				250	28.00 to 36.72
					33					
32.93	36.72	3.79	**DOLOMITE AND DOLOMITIC LIMESTONE**	generally pale brown, locally dark brown over 10 cm, fine to medium grained, sparry, considerable shell debris locally, occasional calcite lined vug up to 20 mm., dark brown dolomite is slightly pitted, massive with indistinct bedding planes, very occasional oblique tight joint, generally hard and fresh, dark brown dolomite is moderately hard and slightly weathered	34		100%	93		
					35				150	
					36					
					37		100%	82		
36.72	40.82	4.10	**LIMESTONE**	pale grey to off white, very fine grained, slightly sparry, scattered shell debris, weakly stylolitic, massive with bedding at 30 to 70 cm., bedding planes irregular and rough, no joints, hard, fresh	38				289	
					39					
					40		100%	95		
					41					
40.82	41.28	0.46	**DOLOMITIC LIMESTONE**	dark brown, fine to medium grained, sparry, considerable shell debris, massive, no joints, moderately hard, slightly weathered	42				122	36.72 to 48.42
41.28	44.94	3.66	**LIMESTONE**	as 36.72 to 40.82 m. with frequent tight sub-vertical and oblique (60°) joints	43		100%	79		
					44				140	
					45					
44.94	45.26	0.32	**DOLOMITE**	dark brown, fine to medium grained, sparry, with numerous small vugs (1 to 2 mm.), moderately hard, slightly weathered	46		100%	70		

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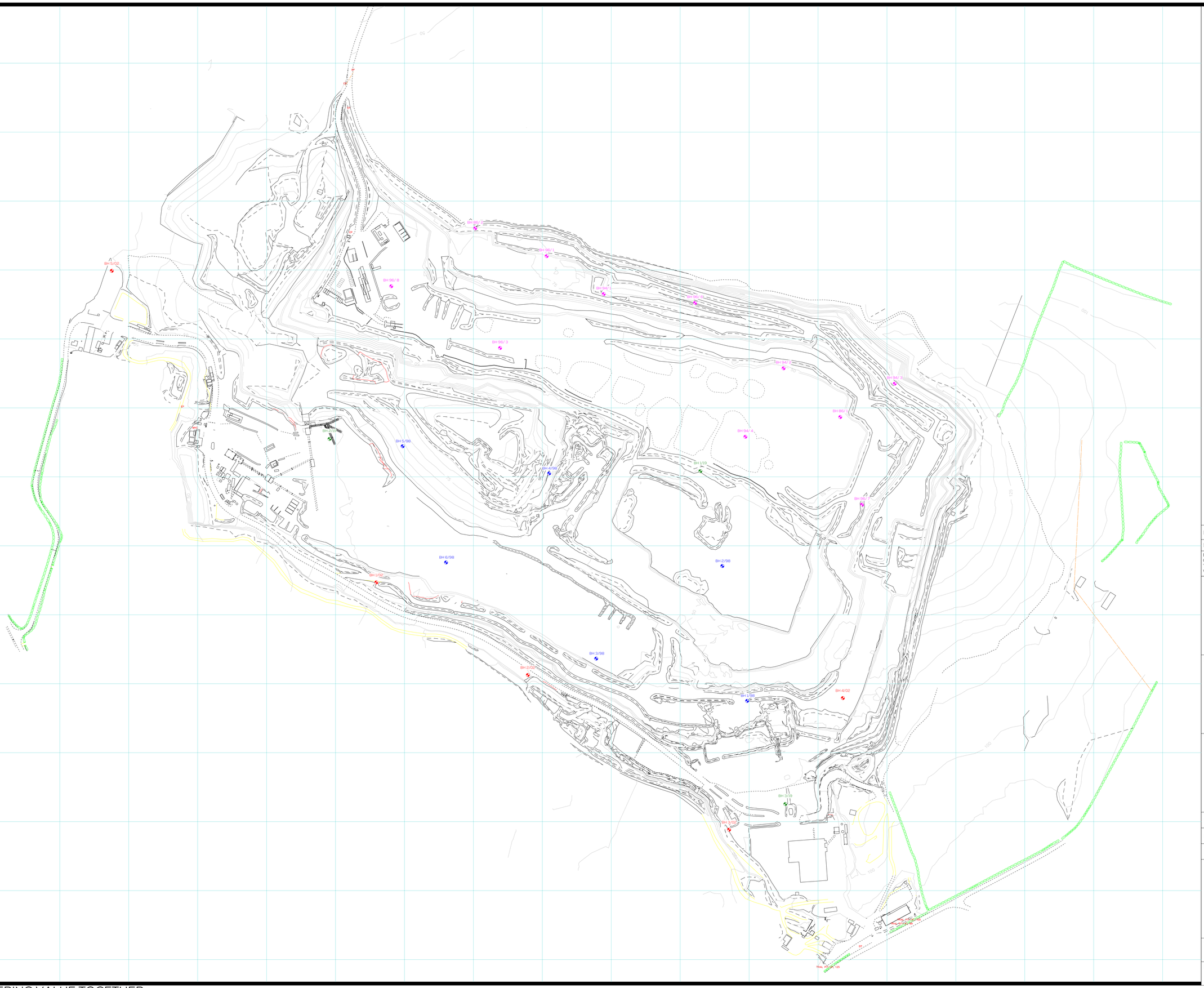
site: **BACK LANE QUARRY, OVER KELLETT**

borehole no: **3/98**

sheet 4 of 4

from metres	to metres	thickness metres	rock type	visual description	depth metres	log	% core recovery	R.Q.D. %	fracture index	sample depths metres
45.26	48.42	3.16	**LIMESTONE**	as 36.72 to 40.82 m.	47				185	
					48					
48.42				**END OF BOREHOLE**			100%	94		
					49					
					50					
					51					
					52					
					53					
					54					
					55					
					56					
					57					
					58					
					59					
					60					
					61					
					62					



GENERAL NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES (mm) & ALL LEVELS ARE IN METRES (m) UNLESS NOTED OTHERWISE.

KEY

- BACK LANE BOREHOLES 1998.LSS
- BOREHOLES 2002.LSS
- BACK LANE BOREHOLES 2019.LSS
- LEAPERS WOOD GEOLOGY.LSS

P01	FIRST ISSUE	VR	SR	19.09.23
REV.	AMENDMENTS	DRW.	CHK.	DATE

CLIENT

TARMAC
A CRH COMPANY

PROJECT

LEAPERS WOOD &
BACK LANE QUARRIES

TITLE

BH LOCATIONS

DRAWN:	VR	DESIGN:	-
CHECKED:	SR	APPROVED:	BD
DATE:	SEP '23	SCALE:	1:2500

KEY|GS
PART OF RICHTER

STATUS: PRELIMINARY	SHEET SIZE: A1
DRAWING NO.: 8345-002-004	REV.: P01

Tarmac Geology Department

TARMAC A CRH COMPANY

Hole No: **BH02**

Sheet No: **1 of 5**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**5/12/19 - 12/12/19**	**71.371**	**E 351693 N 469450**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
0.00	31 (0) 0	NI (NI) NI						light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, occasional fossils becoming frequent with depth, predominantly intact bivalves, brachiopods and crinoids, occasional broken fossil zone cm scale , frequent black flecks through to dendritic structure mm scale, (believed to be maganese), occasional calcite veins, occasional sub vertical fractures 80Â°, undulating , rough, clean (Q1)		
3.00										
3.50	126 (12) 0	NI (NI) NI								
	95 (43) 41	NI (15) 40								
5.00										
	103 (70) 68	NI (15) 56	08 (B)				(11.00)		Q1	
6.50										
	100 (54) 42	NI (10) 30								
8.00										
	102 (87) 84	3 (20) 42								
9.50										
	100 (59) 56	NI (18) 29								
11.00			11		60.37		11.00			
	97 (29) 25	NI (10) 26						Light blueish gray and reddish brown, Strong, medium to coarse crystalline structure, SLIGHTLY DOLOMITISED LIMESTONE, dolomite alteration limit to surface of limestone, in occasional fossils predominantly crinoids, occasional black flecks (duller than layer above), very fractured horizon,		
12.50			09 (B)				(3.00)		Q2	
	102 (8) 0	NI (3) 6								
14.00			14		57.37		14.00			
	102 (79) 78	NI (25) 45						light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, frequent fossils, predominantly intact bivalves, brachiopods and crinoids, occasional broken fossil zone cm scale , frequent black flecks through to dendritic structure mm scale, (believed to be maganese), occasional calcite veins, occasional stylolite surfaces , occasional sub vertical fractures 80Â°, undulating , rough, clean, occasional vertical fractures, undulating, rough, clean		
15.50										
	94 (58) 46	NI (18) 30								
17.00									Q1	
	103 (28) 28	NI (10) 16								
18.50										
	98 (0) 0	NI (NI) NI								
20.00										

Key

Fossiliferous Clastic Limestone

Dolomitic Limestone or Limy Dolomite

General Remarks

C.J = Chris Jones & E.L. = Emma Lindsay - Tarmac Geologist's / Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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Geology Department

Hole No: **BH02**

Sheet No: **2 of 5**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**5/12/19 - 12/12/19**	**71.371**	**E 351693 N 469450**	**-90° / °**

RUN DETAILS			SAMPLES		STRATA DETAILS					
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):	Water Strike	Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description	Geology Code	Monitoring Installation
21.50	101 (103) 82	5 (20) 49						light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, frequent fossils, predominantly intact bivalves, brachiopods and crinoids, occasional broken fossil zone cm scale , frequent black flecks through to dendritic structure mm scale, (believed to be maganese), occasional calcite veins, occasional stylolite surfaces , occasional sub vertical fractures 80Â°, undulating , rough, clean, occasional vertical fractures, undulating, rough, clean *continued*		
23.00	101 (80) 80	26 (30) 31	10 (B)							
24.50	102 (78) 78	21 (25) 30								
26.00	101 (54) 42	4 (15) 24								
27.50	96 (44) 44	NI (10) 19								
28.80	102 (38) 11	NI (5) 15								
30.30	103 (60) 44	NI (12) 29							Q1	
31.80	106 (66) 62	NI (29) 53	30.3				(34.30)			
33.30	100 (54) 42	NI (15) 25						*32.80 clay infilled joint, brown mm clay, fracture ~ 80Â°, undulating, rough*		
34.80	100 (50) 50	9 (20) 38								
36.30	100 (58) 54	NI (15) 24								
37.80	100 (82) 76	1 (30) 55								
39.30	98 (37) 28	NI (10) 45								
	97 (50) 42	NI (20) 33	11 (B)							

Key

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Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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Hole No: **BH02**

Sheet No: **3 of 5**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**5/12/19 - 12/12/19**	**71.371**	**E 351693 N 469450**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
40.80	97 (50) 42	NI (20) 33						light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, frequent fossils, predominantly intact bivalves, brachiopods and crinoids, occasional broken fossil zone cm scale , frequent black flecks through to dendritic structure mm scale, (believed to be maganese), occasional calcite veins, occasional stylolite surfaces , occasional sub vertical fractures 80Â°, undulating , rough, clean, occasional vertical fractures, undulating, rough, clean *continued*		
42.30	102 (62) 36	NI (10) 28								
43.80	100 (46) 33	NI (15) 22								
45.30	102 (16) 6	NI (5) 15							Q1	
46.80	97 (64) 56	NI (20) 39						*45.92 - 46.8 slightly dolomitisation, reddy brown colour, limited surface of limestone baring alteration of calcite vein, (vugs along vein)*		
48.30	101 (83) 80	6 (25) 33	48.3		23.07		48.30			
49.80	68 (24) 20	NI (5) 17						Light blueish gray and reddish brown, Strong, medium to coarse crystalline structure, SLIGHTLY DOLOMITISED LIMESTONE, dolomite alteration limit to surface of limestone, frequent fossils predominantly broken shell fragments, alteration of calcite vein (vugs along vein) occasional stylolites surfaces, occasional black flecks (duller than layer above),		
51.30	104 (60) 60	9 (20) 40	12 (B)				(4.50)		Q2	
52.80	98 (44) 42	NI (20) 32	52.8		18.57		52.80			
54.30	98 (60) 54	8 (20) 22						light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, frequent fossils predominantly intact bivalves, brachiopods and crinoids, occasional broken fossil zone cm scale , occasional calcite veins, occasional stylolite surfaces , occasional to frequent fractures ~70°, undulating to planar, rough, clean,		
55.80	102 (76) 74	2 (25) 30								
57.30	102 (76) 50	1 (10) 40	13 (B)				(8.05)		Q1	
58.80	103 (76) 70	6 (15) 42								
	100 (52) 52	NI (15) 30								

Key

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C.J = Chris Jones & E.L. = Emma Lindsay - Tarmac Geologist's / Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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Hole No: **BH02**

Sheet No: **4 of 5**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**5/12/19 - 12/12/19**	**71.371**	**E 351693 N 469450**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
60.30										
					10.52		60.85		Q1	
	104 (58) 58	NI (15) 53	60.85					Light blueish gray to dark blueish gray, MOTTLED LIMESTONE, strong, medium to coarse crystalline structure, bedding M scale, occasional to frequent fossils predominantly broken bivalves, brachiopods and crinoids, occasional broken limestone clast zones 5-10cm thick mm scale clasts, occasional mm scale calcite veins, gradational boundary with layer below		
61.80										
	102 (74) 68	8 (15) 37								
63.30										
	101 (88) 83	7 (25) 30								
64.80										
	100 (68) 65	101 (20) 33								
66.30										
	99 (93) 93	15 (36) 94	14 (B)				(12.95)		Q1	
67.80										
	103 (76) 68	NI (15) 41								
69.30										
	101 (83) 78	NI (20) 54								
70.80										
	100 (84) 82	5 (40) 85								
72.30										
	100 (88) 88	10 (30) 72								
73.80			73.8		-2.43		73.80			
	99 (74) 64	4 (20) 52						Light blueish gray and reddish brown, Strong, fine to medium crystalline structure, SLIGHTLY DOLOMITISED LIMESTONE, dolomite alteration limit to surface of limestone, occasional fossils predominantly whole crinoids, alteration of calcite vein (vugs along vein)		
75.30										
	96 (54) 40	NI (10) 33					(5.20)	*76.30 - 77.2 large cm scale calcite vein, reworked creating anglur clasts and partially dolomitised*	Q1-2	
76.80			15 (B)							
	104 (71) 58	NI (15) 50								
78.30										
	10 (10) 10	()			-7.63		79.00			
							(0.80)	Light blueish gray and reddish brown, Strong, fine to medium crystalline structure, SLIGHTLY DOLOMITISED LIMESTONE, dolomite alteration limit to surface of limestone, occasional fossils predominantly whole crinoids, alteration of calcite	Q1-2	
79.80					-8.43		79.80			

Key

Fossiliferous Clastic Limestone

Dolomitic Limestone or Limy Dolomite

General Remarks

C.J = Chris Jones & E.L. = Emma Lindsay - Tarmac Geologist's / Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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Hole No: **BH02**

Sheet No: **5 of 5**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	Date drilled:	Ground Level (mAOD):	Coordinates (National Grid):	Orientation (Dip / Bearing):
CR	**5/12/19 - 12/12/19**	**71.371**	**E 351693 N 469450**	**-90° / °**

RUN DETAILS			SAMPLES		STRATA DETAILS					
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):	Water Strike	Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description	Geology Code	Monitoring Installation
								vein (vugs along vein)		

Key

Fossiliferous Clastic Limestone

Dolomitic Limestone or Limy Dolomite

General Remarks

C.J = Chris Jones & E.L. = Emma Lindsay - Tarmac Geologist's / Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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Hole No: **BH03**

Sheet No: **1 of 3**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	Date drilled:	Ground Level (mAOD):	Coordinates (National Grid):	Orientation (Dip / Bearing):
CR	**14/11/19 - 19/11/19**	**45.568**	**E 350886 N 469578**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
0.20										
	97 (0) 0	NI (NI) NI					(1.00)	No recovery - see drillers logs		
1.00			1		44.57		1.00			
	63 (0) 0	NI (NI) NI						Light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, occasional fossils predominantly broken bivalves, brachiopods and crinoids, occasional fossils rich bands - predominantly broken shell fragments and crinoids 10cm thick more common in bottom half of layer, mm scale calcite veins, ocasional stylolite surfaces, rare red veins mm (believed to mineralisation) (1-2.6mbgl none intact)		
2.00										
	128 (0) 0	NI (5) 22								
3.50										
	150 (41) 41	NI (10) 35					(5.95)		Q1	
5.00								*4.00 minor dolomitisation of fracture surface,*		
	150 (76) 51	NI (15) 48	01 (B)							
6.50										
	159 (88) 78	15 (20) 188			38.62		6.95			
8.00								Light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, frequent black flecks through to dendritic structure, pervasive, mm scale, occasional fossils predominantly broken bivalves, brachiopods and crinoids, mm scale calcite veins, ocasional stylolite surfaces,		
	150 (87) 87	1 (15) 67					(4.05)		Q1	
9.50										
	137 (82) 82	37 (40) 49								
11.00			11		34.57		11.00			
	160 (89) 83	10 (17) 30						Dark blueish gray to light blueish gray, Strong, medium to coarse crystalline structure, MOTTLED BRECCIATED LIMESTONE, limestone matrix with angular limestone clasts mm to cm scale, intensity of brecciation varies from moderate to intense throughout horizon (rock predominantly breaks when struck in intense brecciated zones), frequent black flecks through to dendritic structure mm scale (believed to be maganese) , occasional fossils predominantly broken bivalves, brachiopods and crinoids, occasional calcite veins mm scale,		
12.50										
	154 (102) 102	NI (NI) NI					(5.60)		Q3	
14.00										
	159 (90) 87	10 (20) 58								
15.50										
	148 (86) 86	13 (30) 60	02 (B)		28.97		16.60			
17.00								LIMESTONE, light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, occasional black flecks through to dendritic structure, pervasive, mm scale, occasional fossils predominantly broken bivalves, brachiopods and crinoids, mm scale calcite veins, ocasional stylolite surfaces,		
	152 (86) 86	6 (20) 72					(2.80)		Q1	
18.50										
	143 (82) 78	1 (20) 44			26.17		19.40			
20.00									Q3	

Key

LIMESTONE

Fossiliferous Clastic Limestone

Nodular or Irregularly Bedded Limestone

Dolomitic Limestone or Limy Dolomite

General Remarks

Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**Chris Jones**

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Hole No: **BH03**

Sheet No: **2 of 3**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**14/11/19 - 19/11/19**	**45.568**	**E 350886 N 469578**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
21.50	159 (96) 96	16 (30) 60					(2.80)	Dark blueish gray with light blueish gray, Strong, medium to coarse crystalline structure, MOTTLED BRECCIATED LIMESTONE, limestone matrix with angular limestone clasts mm to cm scale, intensity of brecciation varies from minor to intense throughout horizon, RED FLECKS AND VEINS THROUGHOUT (believed to be mineralisation) , occasional black flecks through to dendritic structure mm scale (believed to be maganese) , occasional fossils predominantly broken bivalves, brachiopods and crinoids, occasional calcite veins mm scale, *continued*	Q3	
23.00	156 (57) 52	7 (25) 56	22		23.37		22.20			
24.50	144 (70) 67	4 (15) 17						Light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, occasional fossils predominantly broken bivalves, brachiopods and crinoids, mm scale calcite veins, ocasional stylolite surfaces, *22.20 near horizon fracture / stylolite surface with red clay infill, mm scale, undulating, rough*		
26.00	155 (89) 89	16 (20) 64	03 (B)				(7.70)		Q1	
27.50	149 (93) 93	14 (30) 46								
29.00	150 (77) 77	10 (30) 43								
30.50	150 (92) 91	7 (15) 65	29.9		15.67		29.90			
32.00	153 (96) 96	15 (30) 75						Dark blueish gray with light blueish gray, Strong, medium to coarse crystalline structure, MOTTLED BRECCIATED LIMESTONE, limestone matrix with angular limestone clasts mm to cm scale, intensity of brecciation varies from minor to intense throughout horizon, occasional RED FLECKS AND VEINS THROUGHOUT (believed to be mineralisation) , occasional fossils predominantly broken bivalves, brachiopods and crinoids, occasional calcite veins mm scale,		
33.50	147 (91) 82	2 (20) 60	04 (B)				(4.60)		Q3	
35.00	152 (87) 88	5 (30) 58			11.07		34.50			
36.50	150 (82) 82	10 (15) 35						Light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, frequent to abundance fossils predominantly whole bivalves, brachiopods and crinoids, mm scale calcite veins, ocasional stylolite surfaces,		
38.00	130 (82) 82	23 (30) 50					(3.78)		Q1	
39.50	148 (86) 80	NI (20) 61	38.28		7.29		38.28			
								Light blueish gray to dark orangeish brown, Strong, medium to coarse crystalline structure, DOLOMITISED LIMESTONE, occasional zones of only minor dolomitisation 10-20cm thickness lighter in colour, pitted surface with vugs throughout, occasional to frequent fossils predominantly broken shell fragments and crinoids (duller), occasional calcite veins mm scale, partiality dolomitesed leaving vugs	Q2	

Key

LIMESTONE

Fossiliferous Clastic Limestone

Nodular or Irregularly Bedded Limestone

Dolomitic Limestone or Limy Dolomite

General Remarks

Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**Chris Jones**

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Hole No: **BH03**

Sheet No: **3 of 3**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**14/11/19 - 19/11/19**	**45.568**	**E 350886 N 469578**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
41.00	152 (78) 66	8 (20) 29	05 (B)				(4.87)	Light blueish gray to dark orangeish brown, Strong, medium to coarse crystalline structure, DOLOMITISED LIMESTONE, occasional zones of only minor dolomitisation 10-20cm thickness lighter in colour, pitted surface with vugs throughout, occasional to frequent fossils predominantly broken shell fragments and crinoids (duller), occasional calcite veins mm scale, partiality dolomitesed leaving vugs *continued*	Q2	
42.50	152 (82) 75	5 (10) 17								
44.00	154 (84) 74	5 (15) 25	43.15		2.42		43.15			
45.50	146 (68) 64	3 (30) 66	06 (B)				(3.85)	Light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, frequent to abundance fossils predominantly whole bivalves, brachiopods and crinoids, mm scale calcite veins, ocasional stylolite surfaces, *46.20 15cm zone of DOLOMITISED LIMESTONE, dark brownish gray*	Q1	
47.00	160 (93) 90	5 (30) 67	47		-1.43		47.00			
48.50	151 (89) 81	4 (15) 23			-2.23		(0.80) 47.80	Light blueish gray with dark reddish brown, Strong, medium to coarse crystalline structure, SLIGHTLY DOLOMITISED LIMESTONE, dolomitisation limited to surface of limestone, occasional fossils predominantly broken shell and crinoids,	Q1	
50.00	148 (88) 85	4 (20) 57	07 (B)				(3.10)	Light blueish gray to dark orangeish brown, Strong, medium to coarse crystalline structure, DOLOMITISED LIMESTONE, dolomitisation pervasive throughout, pitted surface with vugs throughout, occasional fossils predominantly broken shell fragments and crinoids (dull), occasional calcite veins mm scale, partiality dolomitesed leaving vugs	Q3	
51.50	150 (97) 97	20 (40) 65			-5.33		50.90			
53.00	149 (88) 80	5 (20) 38			-7.43		(2.10) 53.00	LIMESTONE, light blueish gray with dark reddish brown, Strong, medium to coarse crystalline structure, SLIGHTLY DOLOMITISED LIMESTONE, dolomitisation limited to surface of limestone, partial dolomitisation of calcite vein leaving vugs, occasional fossils predominantly broken shell and crinoids, occasional stylolites surfaces	Q1	
54.50	153 (90) 81	6 (30) 53					(3.00)	Light blueish gray, Strong, medium to coarse crystalline structure, LIMESTONE, bedding M scale, frequent to abundance fossils predominantly broken shell fragments and crinoids, occasional whole fossils, mm scale calcite veins, ocasional stylolite surfaces, occasional minor areas of dolomitisation causing pitted surface 2-5cm thickness, limited to surface of limestone	Q1	
56.00	155 (70) 70	12 (45) 90			-10.43		56.00			

Key

LIMESTONE

Fossiliferous Clastic Limestone

Nodular or Irregularly Bedded Limestone

Dolomitic Limestone or Limy Dolomite

General Remarks

Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**Chris Jones**

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Hole No: **BH04**

Sheet No: **1 of 3**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	Date drilled:	Ground Level (mAOD):	Coordinates (National Grid):	Orientation (Dip / Bearing):
CR	**27/11/19 - 3/12/19**	**58.597**	**E 351533 N 469427**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
0.00	0 (0) 0	NI (NI) NI					(1.00)	No recovery. See drillers logs.		
1.00			1		57.60		1.00			
2.00	60 (0) 0	NI (NI) NI						Light grey LIMESTONE, with darker mottling. Strong. Medium to coarse crystalline structure. Minor surface dolomitisation. Bedding on meter scale. Occasional fossils, broken shell fragments and crinoids. Contains abundant black flecks on mm scale. To 5m depth heavily fractured.		
3.50	101 (40) 33	NI (5) 28								
5.00	71 (21) 0	NI (10) 20								
6.50	105 (75) 75	NI (15) 68	16 (B)				(10.25)	*5.80 - 7.45 o.5cm wide calcite vein with partial alteration leaving vughs*	Q1	
8.00	103 (77) 56	NI (15) 52								
9.50	93 (73) 59	7 (18) 33								
11.00	103 (80) 73	NI (20) 54								
12.50	104 (80) 80	NI (20) 75	11.25		47.35		11.25	Dark brown grey, DOLOMITISED LIMESTONE. Strong. Medium to coarse crystalline structure. Frequent vughs throughout. Occasional broken fossils, shell fragments and crinoids. Occasional alteration of calcite veins. Occasional black flecks on mm scale.		
14.00	98 (84) 62	7 (18) 32					(5.35)		Q2	
15.50	99 (80) 74	8 (20) 63								
17.00	104 (76) 76	NI (15) 37			42.00		16.60			
18.50	101 (86) 86	NI () 130	17 (B)					Light brown grey, SLIGHTLY DOLOMITISED LIMESTONE, limited to surface . Medium to coarse crystalline structure. Occasional broken fossils. Occasional alteration o calcite veins leaving vughs. Rare Stylolitic surfaces. *17.70 - 18 Brown grey dolomitised limestone*	Q1-2	
20.00	92 (60) 41	6 (15) 26					(6.40)			

Key

MADE GROUND

Fossiliferous Clastic Limestone

Dolomitic Limestone or Limy Dolomite

LIMESTONE

Nodular or Irregularly Bedded Limestone

General Remarks

C.J = Chris Jones & E.L. = Emma Lindsay - Tarmac Geologist's / Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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Hole No: **BH04**

Sheet No: **2 of 3**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**27/11/19 - 3/12/19**	**58.597**	**E 351533 N 469427**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
21.50	98 (70) 55	3 (20) 24						Light brown grey, SLIGHTLY DOLOMITISED LIMESTONE, limited to surface . Medium to coarse crystalline structure. Occasional broken fossils. Occasional alteration o calcite veins leaving vughs. Rare Stylolitic surfaces. *continued*	Q1-2	
23.00	98 (82) 77	NI (30) 77	23		35.60		23.00	*21.95 - 22.5 dark brown grey dolomitised limestone*		
24.50	100 (70) 68	7 (20) 28						Light grey LIMESTONE. Strong. Medium to coase crystalline structure. Occasional fossils, broken shell fragments and crinoids. Contains rare black flecks on mm scale.		
26.00	100 (65) 62	NI (15) 22	18 (B)				(5.30)		Q1	
27.50	102 (66) 52	NI (15) 29								
29.00	100 (59) 37	NI (15) 41	28.3		30.30		28.30			
					29.60		(0.70) 29.00	Light grey BRECCIATED LIMESTONE with cm scale white calcite angular clasts in limestone matrix. Strong. Slightly dolomitised on surface leaving vughs. Rare red mm scale veins.	Q3	
30.50	93 (72) 66	7 (15) 27	19 (B)		28.60		(1.00) 30.00	Red brown HEAVILY DOLOMITISED BRECCIATED LIMESTONE. Cm scale limestone clasts, subangular to subrounded. Strong. Medium to coarse crystalline structure. Frequent vughs. *29.80 - 30 completely dolomitised Q5. no clasts.*	Q4	
32.00	73 (60) 60	NI (20) 41			26.60		(2.00) 32.00	Light grey BRECCIATED LIMESTONE with cm scale angular limestone clasts in limestone matrix. Strong. Slightly dolomitised on surface leaving vughs. Rare red mm scale flecks. *31.20 - 31.7 intense dolomitisation. Q5. core loss meaning bottom depth estimate*	Q3	
33.50	64 (43) 36	NI (15) 32	32				(2.30)	Brown grey HEAVILY DOLOMITISED LIMESTONE. Medium strong to strong. Medium to coarse crystalline structure. Occasional broken fossils. Occaisional Banded red staining, vughs throughout.	Q4	
35.00	106 (42) 42	NI (15) 44	20 (B)		24.30		34.30	Light brown grey, SLIGHTLY DOLOMITISED LIMESTONE, limited to surface . Medium to coarse crystalline structure. Occasional broken fossils.		
36.50	94 (23) 23	NI (10) 29	36.5		22.10		(2.20) 36.50		Q2	
38.00	104 (20) 20	NI (15) 30						Light grey LIMESTONE. Strong. Medium to coase crystalline structure. Occasional fossils, broken shell fragments and crinoids. Contains rare black flecks to veins on mm scale. Rare Stylolitic surfaces		
39.50	102 (38) 38	NI (15) 33							Q1	

Key

MADE GROUND

Fossiliferous Clastic Limestone

Dolomitic Limestone or Limy Dolomite

LIMESTONE

Nodular or Irregularly Bedded Limestone

General Remarks

C.J = Chris Jones & E.L. = Emma Lindsay - Tarmac Geologist's / Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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Hole No: **BH04**

Sheet No: **3 of 3**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**27/11/19 - 3/12/19**	**58.597**	**E 351533 N 469427**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
41.00	97 (60) 53	NI (20) 40	21 (B)				(7.50)	Light grey LIMESTONE. Strong. Medium to coase crystalline structure. Occasional fossils, broken shell fragments and crinoids. Contains rare black flecks to veins on mm scale. Rare Stylolitic surfaces *continued*		
42.50	101 (70) 70	NI (40) 68							Q1	
44.00	104 (58) 58	NI (27) 75			14.60		44.00			
45.50	98 (24) 15	NI (15) 27	44				(2.50)	Light brown grey, SLIGHTLY DOLOMITISED LIMESTONE, limited to surface . Medium to coarse crystalline structure.	Q2	
47.00	104 (38) 38	NI (15) 45			12.10		46.50			
48.50	100 (89) 88	6 (30) 50						Light grey LIMESTONE. Strong. Medium to coase crystalline structure. Abundant fossils, broken shell fragments and crinoids. Occaisional mm calcite veins. rare Stylolitic surfaces.		
50.00	96 (75) 69	NI (30) 78	22 (B)					*48.50 - 48.6 void- completely infilled with medium to coarse light pale orange sand*		
51.50	103 (66) 66	NI (30) 67					(8.00)		Q1	
53.00	100 (76) 73	NI (35) 70								
54.50	102 (61) 56	NI (30) 68						*53.05 - 53.5 trace sand on fracture*		
					4.10		54.50			

Key

MADE GROUND

Fossiliferous Clastic Limestone

Dolomitic Limestone or Limy Dolomite

LIMESTONE

Nodular or Irregularly Bedded Limestone

General Remarks

C.J = Chris Jones & E.L. = Emma Lindsay - Tarmac Geologist's / Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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Tarmac Geology Department

TARMAC A CRH COMPANY

Hole No: **BH05**

Sheet No: **1 of 4**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**19/11/19 - 26/11/19**	**47.322**	**E 351155 N 469521**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
0.00	0	NI								
0.50	(0)	(NI)	0.5		46.82		(0.50) 0.50	No Recovery - See Drillers Logs		
	0	NI								
	80	NI						Light grey LIMESTONE. Medium to coarse crystaline structure. Strong. Frequent broken fossils, crinoids and shell fragments. Rare dissolved calcite veins.		
2.00	(3)	(5)								
	0	10								
	93	NI								
3.50	(56)	(10)					(5.60)		Q1	
	40	19								
	84	5								
5.00	(73)	(20)						*4.60 cm scale brecciated limestone. angular limestone clasts and limestone matrix*		
	105	32								
	101	NI								
6.50	(45)	(15)	23 ()		41.22		6.10			
	44	26								
	100	NI						Mottled light and dark grey LIMESTONE. Strong. Medium to coarse crystalline structure. Intense areas of black flecks to dendritic mineral. Rare fossils, rare Stylolitic surfaces.		
8.00	(96)	(40)					(3.40)		Q1	
	144	67								
	100	9								
9.50	(97)	(30)			37.82		9.50			
	135	77								
	100	9						Light grey LIMESTONE. Strong. Medium to coarse crystalline structure. Rare fossils, rare Stylolitic surfaces.		
11.00	(64)	(15)					(2.10)		Q1	
	84	23								
	96	NI	11.6		35.72		11.60			
12.50	(84)	(30)						Dark brown grey SLIGHTLY DOLOMITISED LIMESTONE (limited to surface). Medium to coarse crystalline structure. Strong. Frequent predominately broken fossils. Occasional black flecks on mm scale, vughs and Stylolitic surfaces.		
	100	85						*12.50 - 12.8 dolomitised limestone*		
	101	4								
14.00	(92)	(20)						*13.60 - 14 dolomitised limestone*		
	129	45								
	104	2						*14.20 - 14.4 dolomitised limestone*		
15.50	(88)	(12)	24 (B)				(6.90)		Q2	
	124	44								
	97	NI								
17.00	(88)	(20)								
	133	37								
	106	NI						*17.30 - 17.7 dolomitised limestone. Abundant fossils*		
18.50	(59)	(20)			28.82		18.50			
	76	34	18.5							
	103	2						Light grey LIMESTONE. Strong. Medium to coarse crystalline structure. Frequent black flecks throughout. Rare fossils.		
20.00	(95)	(20)			27.32		(1.50) 20.00		Q1	
	132	62								

Key

MADE GROUND

Fossiliferous Clastic Limestone

LIMESTONE

Dolomitic Limestone or Limy Dolomite

General Remarks

C.J = Chris Jones & E.L. = Emma Lindsay - Tarmac Geologist's / Q1-Q5 visual quailtiy designation Q1= very good & Q5 = very bad

Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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A CRH COMPANY

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Geology Department

Hole No: **BH05**

Sheet No: **2 of 4**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**19/11/19 - 26/11/19**	**47.322**	**E 351155 N 469521**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
21.50	102 (87) 128	2 (23) 56	25 (B)		24.32		(3.00)	Dark brown grey SLIGHTLY DOLOMITISED LIMESTONE (limited to surface). Medium to coarse crystalline structure. Strong. Frequent predominately broken fossils. Occasional black flecks on mm scale, rare stylolitic surfaces.	Q2	
23.00	104 (75) 110	NI (15) 43			23.00					
24.50	102 (82) 120	12 (25) 38			22.52		(1.80)	Light grey LIMESTONE. Strong. Medium to coarse crystalline structure. Intense areas of black dendritic mineral and flecks throughout. Occaisional predominantly broken fossils, rare whole fossils.	Q1	
26.00	105 (85) 115	4 (30) 42	24.8		24.80			Light grey LIMESTONE. Medium to coarse crystaline structure. Strong. Frequent predominately broken fossils, crinoids and shell fragments. Rare whole fossils. Rare 10cm abundant fossil zones. Occasional Stylolitic surfaces throughout. Rare cm calcite vein		
27.50	100 (44) 66	NI (15) 24								
29.00	101 (78) 117	NI (30) 85								
30.50	106 (88) 122	6 (20) 53								
32.00	103 (56) 82	NI (20) 36								
33.50	100 (50) 61	10 (10) 32	26 (B)						Q1	
35.00	100 (64) 74	7 (15) 25								
36.50	99 (84) 113	NI (15) 33								
38.00	100 (71) 91	NI (20) 58								
39.50	100 (65) 76	NI (15) 28								
			39.8							

Key

MADE GROUND

Fossiliferous Clastic Limestone

LIMESTONE

Dolomitic Limestone or Limy Dolomite

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Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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Hole No: **BH05**

Sheet No: **3 of 4**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	**Date drilled:**	**Ground Level (mAOD):**	**Coordinates (National Grid):**	**Orientation (Dip / Bearing):**
CR	**19/11/19 - 26/11/19**	**47.322**	**E 351155 N 469521**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
41.00	98 (92) 125	1 (30) 50						Light grey LIMESTONE. Medium to coarse crystaline structure. Strong. Frequent predominately broken fossils, crinoids and shell fragments. Rare whole fossils. Rare 10cm abundant fossil zones. Occasional Stylolitic surfaces throughout. Rare cm calcite vein *continued*		
42.50	99 (88) 112	1 (15) 64								
44.00	103 (86) 120	1 (20) 43								
45.50	103 (79) 100	NI (20) 37								
47.00	104 (73) 84	NI (15) 39								
48.50	97 (60) 83	NI (20) 59	27 (B)				(46.20)			
50.00	102 (36) 55	NI (15) 46								
51.50	98 (86) 130	13 (15) 44							Q1	
53.00	98 (80) 118	NI (15) 44								
54.50	100 (65) 98	4 (15) 42								
56.00	103 (63) 83	NI (20) 68	55.8							
57.50	102 (70) 102	NI (20) 48						*56.52 - 56.63 pitted disolution texture.*		
59.00	102 (45) 68	NI (20) 27								
	100 (68) 99	NI (20) 54								

Key

MADE GROUND

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Dolomitic Limestone or Limy Dolomite

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Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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Hole No: **BH05**

Sheet No: **4 of 4**

Site Name:	Project/Series:			
Leapers wood	**L043.2019(CP)**			
Hole Type:	Date drilled:	Ground Level (mAOD):	Coordinates (National Grid):	Orientation (Dip / Bearing):
CR	**19/11/19 - 26/11/19**	**47.322**	**E 351155 N 469521**	**-90° / °**

RUN DETAILS			SAMPLES	Water Strike	STRATA DETAILS				Geology Code	Monitoring Installation
Run Depth (m)	TCR (SCR) RQD (%)	Fr. Spacing Min (Avg) Max (mm)	Sample Depth (m). No. (Type):		Reduced Level (mAOD)	Legend	Depth (Thick-ness) (m)	Description		
60.50								Light grey LIMESTONE. Medium to coarse crystaline structure. Strong. Frequent predominately broken fossils, crinoids and shell fragments. Rare whole fossils. Rare 10cm abundant fossil zones. Occasional Stylolitic surfaces throughout. Rare cm calcite vein *continued*		
62.00	103 (89) 132	NI (30) 78								
63.50	100 (90) 129	7 (30) 40	28 (B)					*63.10 clay infilled joint. mm infill of red bound clay. 50 degrees. undulating rough.*		
65.00	100 (90) 136	NI (20) 38								
66.50	98 (90) 129	1 (30) 56							Q1	
68.00	104 (92) 116	8 (20) 42								
69.50	102 (96) 140	1 (30) 43								
71.00	96 (88) 124	9 (20) 39			-23.68		71.00			

Key

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Scale:	Drilling Contractor:	Plant Used:	Logged By:
1:100.0	**Apex**	**T44**	**C.J & E. L.**

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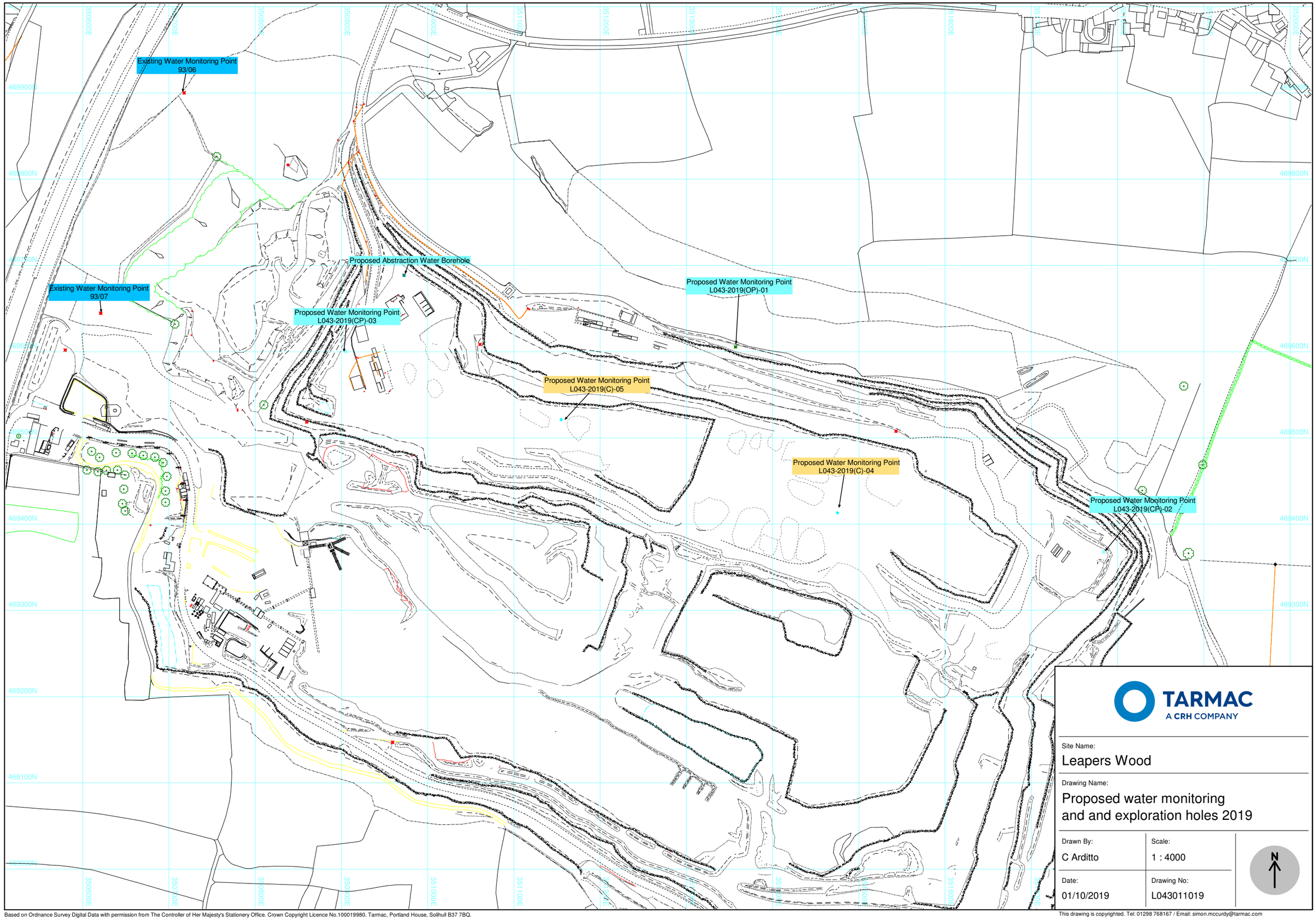

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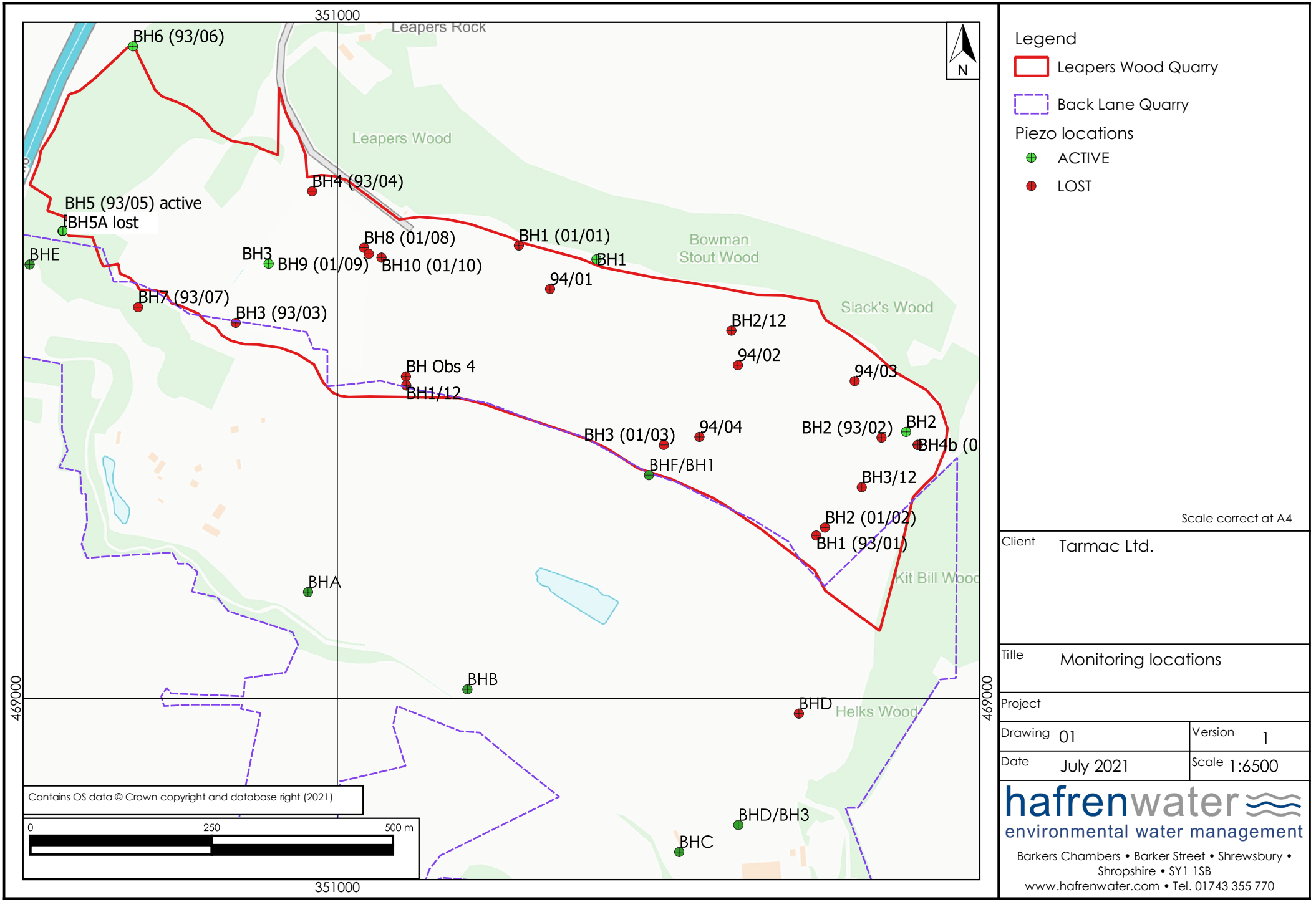
Site Name:
Leapers Wood

Drawing Name:
Proposed water monitoring
and and exploration holes 2019

Drawn By:	Scale:
C Arditto	1 : 4000
Date:	Drawing No:
01/10/2019	L043011019

N



Legend

- Leapers Wood Quarry
- Back Lane Quarry

Piezo locations

- ACTIVE
- LOST

Scale correct at A4

Client	Tarmac Ltd.
Title	Monitoring locations
Project	
Drawing 01	Version 1
Date July 2021	Scale 1:6500

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