

LONMIN

NIRE-XXXX/XXXX-XXXXXX

From (m): 0.00

To (m): 30.0

Direction: 000

Angle: 000

Core Size

From (m)

To (m)

PQ
 HQ
 NQ
 NQ2
 BQ
 AQ

6.0

18.0

18.0

30.0

Project: Northern Ireland

Scale: 1:100

Sampled By: GM

Easting: 333053

Date Logged: 16/10/12

Date Sampled: 28/08 13/00

Northing: 414144

Logged By: JOC

Input By: JOC HD

Drilling Co: PRIORITY DRILLING Lead Driller: ONDREI

Rig: ATLAS COPCO CS14

Coring RC

Depth (m)	Lithology	Recovery	G/S	Struct.	ROD	Mineralisation	PXRF	MAG	Sampled	Geological Description					
										Mineralogy	Texture	Colour	Alteration	Fabric	Jointing
0						NONE				6.00m OF OVERBURDEN. NO CORE RECOVERED					
6.00						NONE				6.00	MEDIUM - DARK GREY BASALT WITH V. RARE (<1%) ZEOLITE AMYGDALAE CIRCUM 2mm. NO WEATHERED TOP. BASALT FRAGMENTED WITH IRON OXIDE STAINED FRACTURES DOWN TO ~ 6.60m.				
7.70						NONE				7.70	GREY TO LIGHT BROWN WEATHERED TOP FROM 7.70 - 8.56m. CONTAINING ~ 20% QUARTZ AMYGDALAE AND QUARTZ VEINS UPTO 1cm WIDE THAT BRECCIATE THE BASALT. CORE FRAGMENTED FROM 7.70 - 8.10m. ALMOST AMYGDALAE PHASE OUT GRADUALLY DOWNHOLE, ABSENT BY 9.44m.				
8.56						AMGH					POSSIBLE KAOLINITE FAULT GOUGE AT 9.95m.				
9.44											FROM 9.44 DOWNWARDS OLIVINE PHENOCRYSTS CIRCUM 2x1mm PRESENT AT 5-10%, ALTERED TO IDINGSITE / FeO FROM 10.0m ONWARDS.				
10.82											QUARTZ / ZEOLITE AMYGDALAE RETURN AT 10.82m AT 20-25% WITH QUARTZ - ZEOLITE VEINLETS.				
11.36						BORNITE				11.36	REDDISH BROWN WEATHERED, AMYGDALOIDAL BASALT TO 13.43m. QUARTZ AMYGDALAE GENERALLY INCREASE IN SIZE DOWNHOLE FROM CIRCUM 2mm TO 7-8mm THOUGH VOLUME % DECREASES. VERY FINE ALTERED RED OLIVINE PHENOCRYSTS.				
13.43											AMYGDALAE PHASE OUT BY 13.43m.				
15.43											FRESH BASALT IS MEDIUM GREY WITH GREY PYROXENE & ALTERED ORANGE OLIVINE PHENOCRYSTS				
16.10											OCCASIONAL HIGH ANGLE QUARTZ ZEOLITE VEINLETS. VERY FINE SPECKS OF BORNITE AT ~ 12.70m.				
16.10											RARE COARSER XENOLITHS OF MAFIC MATERIAL 2x4cm AT 16.10m.				
17.00										17.00	BROWN WEATHERED BASALT TOP WITH OFF WHITE, QUARTZ AMYGDALAE CIRCUM ~ 0.6cm AT 10-15% VOLUME.				
17.76											WEATHERING GRADUAL PHASES OUT AROUND 17.76m.				
17.80											AMYGDALAE ALSO GRADUALLY PHASE OUT BY 17.80m.				
17.80											CENTRE OF FLOW SLIGHTLY COARSER GRAINED WITH RARE ZEOLITE AMYGDALAE (<1%). PIPE AMYGDALAE FROM 18.11m ONWARDS, UPTO 4cm x 0.5cm.				
18.74										18.74	AMYGDALOIDAL WEATHERED TOP. INITIALLY AT ~ 30% VOL. QUICKLY FALLS TO 20%. FRESH BASALT STARTS AT ~ 19.62m.				
19.62						NATIVE COPPER					GREY COAR. AMYGDALAE VOLUME DECREASE DOWNHOLE TO ~ 1% AT 19.40m, (FLOW CENTRE) INCREASES TO ~ 5% AT 19.60m.				
20.00											20.00 NATIVE COPPER SPECKS AT 19.55m				
20.75											BROWN WEATHERED BASALT WITH 15% QUARTZ AMYGDALAE, INCREASING IN SIZE BUT DECREASING IN VOLUME DOWNHOLE. FRESHER, GREY - BROWN BASALT AT ~ 20.75				
21.19											WITH PIPE VESICLES AT ~ 3% VOL.				
21.70						BORNITE				21.19	BROWN - RED, AMYGDALOIDAL BASALT. AMYGDALAE INITIALLY ROUNDED, AT ~ 15% VOL. DECREASE IN VOL & BECOME PIPES.				
21.70											[NO FRESH BASALT MATERIAL. BORNITE SPECKS AT ~ 21.60m				
23.24						NATIVE COPPER					AMYGDALOIDAL BASALT THROUGHOUT. WEATHERED BROWN TO RED TOP DOWN TO ~ 23.24m, FOLLOWED BY DARK GREY FRESH BASALT. SLIGHT DECREASE IN AMYGDALAE VOLUME IN FRESH MATERIAL. 15-20% THROUGHOUT UNIT.				
24.00											QUARTZ ZEOLITE VEINLETS BETWEEN 22.30 & 23.00m				
24.00											HIGH ANGLE AND FRAGMENT THE CORE. VERY RARE, FINE COPPER SPECKS IN THIS ZONE, PIPE VESICLES TOWARDS 24.00m. ALIGNED HORIZONTALY.				
25.13						NATIVE COPPER					RED WEATHERED, AMYGDALOIDAL BASALT CROSS CUT BY HIGH ANGLE, OFF WHITE, QUARTZ VEINLETS. AMYGDALAE AT ~ 5-10% INITIALLY INCREASE IN VOLUME DOWNHOLE BUT CEASE AS BASALT BECOMES FRESH & DARK GREY AT 25.13m. PYROXENE 25.63 PHENOCRYSTS & LESS COMMON ALTERED OLIVINE, CU AT 25.46m				
26.40											REDDISH BROWN WEATHERED AMYGDALOIDAL BASALT TOP, WITH BLACK PYROXENE PHENOCRYSTS. AMYGDALAE LARGE AND ~ 2% VOL PHASING OUT BY 26.60m. WEATHERED TOP CROSS CUT BY HIGH ANGLE QUARTZ VEINLETS. FRESH DARK GREY BASALT AT 26.40m.				
26.40											AMYGDALAE RETURN AT 26.80m. MUCH SMALLER (CIRCUM 1mm) AND GREATER VOLUME. ~ 20-25%. FRESH BASALT CROSS CUT BY HIGH ANGLE ZEOLITE VEINLETS, THROUGHOUT.				
28.60											AMYGDALAE PHASE OUT AGAIN AT ~ 28.00m.				
28.60											ALTERED OLIVINE PHENOCRYSTS FROM 28.41m ONWARDS. BORNITE SPECKS AT 27.60m. NATIVE COPPER SPECKS AT 28.60m.				
29.10										29.10	67cm CORE LOSS, NO RECOVERY AT THE TOP OF THE UNIT. REDDISH BROWN, FRAGMENTED AMYGDALOIDAL WEATHERED TOP. QUARTZ AMYGDALAE CIRCUM 5mm AT 5-10% VOL.				
30.1															

21

17

30

17/10/12 JOC

Project: Northern Ireland

Scale: 1:100

Sampled By: GM

Easting: 333053

Date Logged: 17/10/12

Date Sampled: 28/10 18/10

Northing: 414144

Logged By: 50c

Input By: 50c HD

Drilling Co: PRIORITY DRILLING

Lead Driller: ONDREZ

Rig: ATLAS COPCO CS14

Coring RC

Depth (m)	Lithology	Recovery	G/S	Struct.	RQD	Mineralisation	PXRF	MAG	Sampled	Geological Description				
										Mineralogy	Texture	Colour	Alteration	Fabric
30	V V V				WT.	NONE			V	WEATHERED TOP PHASES OUT AT ~30.07m INTO MEDIUM - DARK GREY FRESH BASALT. AMYGDALOIDAL DECREASE IN VOLUME & INCREASE IN SIZE DOWN TO 30.24m. RETURN AT 30.30m, SMALLER (CIRCUM 2-3mm) AT 25-30% AREA. SLIGHT INCREASE IN SIZE TOWARDS FLOW BASE. NO SULPHIDES OR COPPER OBSERVED				
17	V V V				AMGH	NONE				INITIALLY A THIN 1cm LATERITE. RED-PURPLE-BROWN FOLLOWED BY A BROWN WEATHERED AMYGDALOIDAL BASALT WITH FRESH GREY BASALT AT 32.12m. AMYGDALOIDAL BECOME 32.67 LARGER AND LESS COMMON. CEASE AT 32.25m. SOME PIPES. AMYGDALOIDAL RETURN AT 32.40m. DECREASE IN SIZE DOWN-HOLE. VERY RARE BORNITE SPECKS				
31.61	V V V				WT.	NONE				LIGHT BROWN-RED WEATHERED AMYGDALOIDAL BASALT TO 33.43m AMYGDALOIDAL AT ~20-25% WITH QUARTZ INFILL. AT ~33.43m BECOMES FRESH, DARK GREY BASALT. AMYGDALOIDAL DECREASE IN AREA AND INCREASE IN SIZE DOWNHOLE WITH FINE PIPE AMYGDALOIDAL ~10x1mm, WITH A CONSISTENT ORIENTATION OF HORIZONTAL TO SUBHORIZONTAL. PIPES BECOME VERTICAL AT ~35.30m. AMYGDALOIDAL CEASE AT 35.40m.				
16	V V V				AMGH	NATIVE COPPER				DARK GREY FRESH BASALT, SLIGHT BANNED APPEARANCE. HIGH ANGLE, TALL ZEOLITE VEINLETS FRACTURE THE BASALT FROM 36.20 TO 37.60m. AMYGDALOIDAL RETURN AT 37.60 AT 5% AREA. VERY RARE SPECKS OF NATIVE COPPER AT 34.94m, SPECKS OF BORNITE IN WEATHERED TOP.				
32.67	V V V				WT.	BORNITE				FROM 37.90 TO 40.08m IS WEATHERED RED-BROWN, AMYGDALOIDAL BASALT. AMYGDALOIDAL AT 15% AREA AND CIRCUM 4mm, DECREASING IN AREA & INCREASING IN SIZE DOWNHOLE. FROM 39.60-40.00m HORIZONTAL PIPE AMYGDALOIDAL OBSERVED. AMYGDALOIDAL CEASE AT ~40.08m.				
15	V V V				AMGH	NATIVE COPPER				FRESH BASALT DARK GREY WITH RED, ALTERED OLIVINE PHENOCRYSTS AND HIGH ANGLE ZEOLITE/TALL VEINS. LARGER 2cm WIDE WHITE TALL VEIN FROM 43.40-44.16m CONTAINING OFF WHITE-YELLOWISH, ELONGATE CRYSTALS, HEXAGONAL IN CROSS SECTION. SAMPLED.				
37.90	V V V				WT.	NONE. INGT.				AMYGDALOIDAL RETURN AT ~44.64m, INCREASING IN SIZE AND CONCENTRATION DOWNHOLE TO 10-15%. BORNITE SPECKS, VERY RARE IN FRESH BASALT. Eg 44.84m				
14	V V V				AMGH	BORNITE				REDDISH BROWN WEATHERED BASALT, VERY GRADUALLY TURNING TO FRESH BASALT BY 46.55m. ZEOLITE / CARBONATE VEIN FROM ~44.84-45.10m. SECOND VEIN AT ~46.33 CONSISTS OF ZEOLITE AND NATROLITE. AMYGDALOIDAL CONTAIN CARBONATES & QUARTZ. RED, ALTERED OLIVINE THROUGHOUT. 2mm PRISMATIC TRIGONAL				
40.15	V V V				AMGH	NATIVE COPPER				DARK GREY BASALT WITH ZEOLITE & QUARTZ AMYGDALOIDAL CIRCUM 3-5mm AT ~10% AREA. PHASE OUT BY 47.55m. NO WEATHERED TOP. WHITE-LIGHT GREEN TALL VEIN AT 48.30m BASALT COARSER THAN OVERLYING UNITS, WITH RARE BLACK PYROXENE / OLIVINE PHENOCRYSTS AT 5-10% ZEOLITE / NATROLITE VEINLET AT 48.20 & 49.30m AMYGDALOIDAL RETURN AT 50.75m AT ~5% - HIGH ANGLE 2mm WIDE NATROLITE VEINLETS COMMON FROM ~50.50m FINE SPECKS OF NATIVE COPPER AT 48.90 & 49.70m BORNITE SPECKS IN LAST 30cm OF UNIT. POS. ASSOC. WITH VEINLETS. SAMPLED.				
44.84	V V V				WT.					WEATHERED REDDISH BROWN BASALT FROM 51.07 TO 52.40m CONTAINING NATROLITE AND SILICA AMYGDALOIDAL & PIPE AMYGDALOIDAL CIRCUM 4-6mm BUT REACHING UP TO 1x2cm. SOME VESICLES CONTAIN 'SMOKY' GREY BLUE MATTE CRYSTALS, CUBIC. CHABAZITE? PIPE AMYGDALOIDAL MAINLY HORIZONTAL. NATROLITE VEINS BETWEEN 2 & 10mm WIDE. SOME CONTAIN POSSIBLE PHILIPSITE / ANALCIME / CLEAR GMELNITE? CIRCUM 0.5mm. VERY RARE GREY/BLUE CHABAZITE @ 55.15m. SOME VESICLES FROM 53.00m ONWARDS CONTAIN FRESH COLOURED GMELNITE. VERY RARE. AMYGDALOIDAL AT 54.70m CONTAIN PROBABLE ANALCIME NO BORNITE OR COPPER.				
46.55	V V V				AMGH	NATIVE COPPER				THIN IGNIMBRITE LAYER / BRECCIA AT THE TOP OF THE UNIT.				
46.80	V V V				AMGH	NATIVE COPPER				REDDISH GREY, WEATHERED AMYGDALOIDAL BASALT. AMYGDALOIDAL AT ~10% CIRCUM ~5mm. PREDOMINANTLY NATROLITE. NATROLITE VEINLET AT HIGH ANGLE AT 56.23m TO 57.04m ~2-4mm WITH VERY FINE BORNITE SPECKS IN VEIN. BROWN/GREY SLIGHTLY WEATHERED BASALT WITH 5% NATROLITE AMYGDALOIDAL, SOME CONTAINING GMELNITE. VERY SMALL CHABAZITE AMYGDALOIDAL.				
12	V V V				AMGH	NATIVE COPPER				DARK GREY BASALT BORDERED BY GREEN ASH DEPOSITS. 57.87 AMYGDALOIDAL AT 5-10%. CONTAIN POS GMELNITE, NATROLITE AND ANALCIME. PYROXENE PHENOCRYSTS & VESICLES				
51.07	V V V				AMGH	BORNITE				FROM 57.87 TO 58.50 GREY RED SLIGHTLY WEATHERED BASALT GRADUALLY GRABBING INTO FRESH DARK GREY PORPHYRITIC BASALT. BASALT CONTAINS 20-25% OLIVINE / PYROXENE PHENOCRYSTS. AMYGDALOIDAL AT ~5%. GMELNITE, NATROLITE, POS. ANALCIME & POSSIBLE CHABAZITE. SOME VESICLES CONTAIN GREY ROUNDED MATTE MINERAL - POSSIBLE PREHNITE.				
52.4	V V V				AMGH	BORNITE				NATIVE COPPER SPECKS AT 58.12m & 58.35m.				
56.12	V V V				AMGH	BORNITE								
57.04	V V V				AMGH	BORNITE								
57.57	V V V				AMGH	BORNITE								
57.87	V V V				AMGH	BORNITE								
58.5	V V V				AMGH	BORNITE								

Laterite

Ignimbrite

IGNIMBRITE ZONE
Tuffs

18/10/12

LONMIN

NIRE-XXXX/XXXX-XXXXXX

From (m): 60.0

To (m): 90.0

Direction: 000

Angle: 000

Core Size

From (m)

To (m)

Project: Northern Ireland

Scale: 1:100

Sampled By: GM

Easting: 333053

Date Logged: 18/10/12

Date Sampled: 28/06 18/10

Northing: 414144

Logged By: JO'C

Input By: JO'C HD

Drilling Co: PRIORITY DRILLING Lead Driller: ONDREI

Rig: ATLAS COPCO CS14

Coring RC

Depth (m)	Lithology	Recovery	G/S	Struct.	RQD	Mineralisation	PXRf	MAG	Sampled	Geological Description							
										Mineralogy	Texture	Colour	Alteration	Fabric	Jointing		
60	V V V					GMEI BORNITE				✓	60.38	SEE NOTES ON PREVIOUS PAGE.					
60.38	V V V					AMGH BORNITE GMEI NATIVE CU.				✓	1	NO WEATHERED TOP. BROWN GREY BASALT WITH AMYGDALOIDAL AMYGDALOIDALS. CONTAINING ~30% CIRCUM 1x1mm ZEOLITE AMYGDALOIDALS. NO CHANGE IN FREQ OR SIZE. ABRUPT CHANGE AT 61.43 INTO PORPHYRITIC, GREY BROWN BASALT WITH NO AMYGDALOIDALS. SERPENTINIZED MAFIC PHENOCRYSTS. TACC & POSSIBLE ANAOLITE VEINLETS SPECKS OF RARE BORNITE & VERY RARE CU. GMEINITE TOWARDS BASE.					
62.67	V V V			VEIN		WT BORNITE NATIVE CU.				✓	3	62.67	GREY BROWN WEATHERED BASALT WITH AMYGDALOIDALS UP TO CIRCUM 1x1cm AT 5-10%, CONTAINING POSSIBLE CHABAZITE, GMEINITE & NATROLITE. POSSIBLE ANAOLITE. NATROLITE VEINLETS CROSS CUT ROCK. FRESH, DARK GREY BASALT AT 63.30m. AMYGDALOIDALS PHASE OUT AT ~63.60m. RARE BORNITE & NATIVE COPPER SPECKS. SOME RARE VEINLETS CONTAIN GREY OR GREEN PREHNITE.				
63.3	V V V					AMGH					4						
65.10	V V V					GMEI BORNITE NATIVE CU				✓	5	65.10	THIS RED LATERITE HORIZON AT THE TOP OF THE UNIT. FOLLOWED BY GREY BROWN WEATHERED AMYGDALOIDAL BASALT TURNING GRADUALLY TO FRESH DARK GREY BASALT AT 65.47. AMYGDALOIDALS AT 20%. CIRCUM AVERAGE 6mm. CEASE AT 65.70. RETURN AT 66.10m. CONTAIN ANAOLITE, WEATHERED GMEINITE & NATROLITE. AMYGDALOIDALS AT UNIT BASE JUST NATROLITE. BORNITE IN WT. NATIVE CU SPECKS V. RARE.				
65.47	V V V					WT AMGH				✓	6	65.47	BROWN GREY WEATHERED AMYGDALOIDAL BASALT TO 67.00m. CONTAINS NATROLITE VEINLETS. WT. RICH IN BORNITE. 67.55 FRESH BASALT ALSO BORNITE RICH. NO COPPER. MOST AMYGDALOIDALS INITIALLY DEEP RED, THEN GREY BROWN. NATROLITE. SOME GMEI WEATHERED AMYGDALOIDAL BASALT TO 69.00m. CROSS CUT BY NATROLITE & MESOLITE VEINS. MOST AMYGDALOIDALS NATROLITE, RARE 68.45 GMEINITE. BORNITE SPECKS IN FRESH & WEATHERED				
66.65	V V V			VEINS		BORNITE GMEI				✓	7	67					
67.55	V V V			VEINS		BORNITE GMEI				✓	8	68					
68.45	V V V			VEINS WT.		GMEI BORNITE				✓	9	70					
70.20	V V V					AMGH				✓	3						
71.94	V V V			VEINLETS							1						
71.94	V V V			FAULT?		BORNITE				✓	2						
73.40	V V V			FAULT?							3						
75.40	V V V					AMGH?				✓	5	91cm cl.					
75.40	V V V					BORNITE NATIVE COPPER				✓	6	75.40	DARK GREY, FRESH BASALT WITH NO WEATHERED TOP. ~5-10% FINE WHITE AMYGDALOIDALS PHASE OUT GRADUALLY DOWNHOLE. ABSENT BY 76m. BASALT EQUIGRANULAR. CROSS CUT BY ZEOLITE & SERPENTINITE VEINS. OLIVINES ALSO ALTERED & SERPENTINIZED. DISCONTINUOUS VEINLETS OF NATROLITE & MESOLITE FROM 78.60m. NO AMYGDALOIDALS FROM 76 TO 78.70m. SPECKS OF BORNITE & NATIVE COPPER OBSERVED.				
78.70	V V V			VEINLETS		BORNITE NATIVE COPPER.				✓	9	78.70	RED BROWN WEATHERED BASALT WITH CROSS CUTTING NATROLITE & MESOLITE VEINLETS. CONTINUING FROM THE ABOVE UNIT. VEINS BRECCIATE THE ROCK TO ~79.22 & PHASE OUT TOGETHER BY 79.40m. WEATHERED TOP GIVES WAY GRADUALLY TO FRESH DARK GREY BASALT AT ~79.65m. ANAOLITE & NATROLITE AMYGDALOIDALS CEASE AT 79.70m. FRESH BASALT IS PORPHYRITIC WITH MAFIC PHENOCRYSTS IN NO AMYGDALOIDALS UNTIL 80m. AMYGDALOIDALS AT 5-10% CONTAIN UNIDENTIFIED ZEOLITES, MESOLITE, BORNITE SPECKS THROUGHOUT UNIT. V. RARE NATIVE COPPER SPECKS. CLAY WITH FLINTS FORMATION. IRON OXIDE CLAYS & FLINT NODULES.				
79.65	V V V										1	79.65					
81.38	V V V					NONE					1						
81.80	V V V					NONE					2						
81.80	V V V										3						
81.80	V V V										4						
81.80	V V V										5						
81.80	V V V										6						
81.80	V V V										7						
81.80	V V V										8						
81.80	V V V										9						
90	V V V																

Laterite
'GMEINITE ZONE'

From (m): 90.0

To (m): 96.15

Direction: 000

Angle: 000

Core Size

From (m)

To (m)

- PQ
- HQ
- NQ
- NQ2
- BQ
- AQ

90.0

96.15

Project:
Northern Ireland

Scale: 1:100

Sampled By: GM

Easting: 333053
Northing: 414144

Date Logged: 19/10/12

Date Sampled: 28/08 19/10

Logged By: JO'C

Input By: JO'C

Drilling Co: PRIORITY

DESIGN

Lead Driller: ONDREI

Rig: ATLAS COPCO CS14

Coring RC

Depth(m)	Lithology	Recovery	G/S	Struct.	RQD	Mineralisation	PXRF	MAG	Sampled	Geological Description							
										Mineralogy	Texture	Colour	Alteration	Fabric	Jointing		
90						NONE.				ULTR WHITE LIMESTONE FORMATION CONTINUED (SEE NOTES ON PREVIOUS PAGE.)							
1																	
2																	
3																	
4																	
5																	
6																	
96.15																	
7																	
8																	
9																	
1																	
2																	
3																	
4																	
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FLINT
NODULE

END OF BOREHOLE

96.15m

JO

96.15
19/10/12 JO'C