6 MINING

6.1 Mineral Resource and Ore Reserve

The Mineral Resource for the Golpu deposit as at 31 December 2015 was estimated at 820 million metric tonnes (Mt) at 1.0% copper, 0.70 grams per tonne (g/t) gold, 1.3g/t silver (Ag) and 90 parts per million (ppm) molybdenum (Table 6.1)[3]. Contained metal is estimated to be 19 million troy ounces (Moz) gold and 8.6Mt of copper. The Mineral Resource is reported within a break-even value shell representing the limit to eventual economic extraction. The estimation of marginal value includes revenues from gold and copper only and the cost structure from the Golpu 2015 Pre-Feasibility Study LOM Plan (WorleyParsons, 2015) based on 14Mtpa from block cave mining and processing by sulphide flotation producing a copper concentrate, whereby this EIS represents the first stage in a phased portfolio development for the declared Wafi-Golpu Mineral Resource. Revenue assumptions were based on United States Dollars (USD) 1,300/oz gold and copper at USD3.40 per pound (lb).

Table 6.1: Golpu mineral resource (December 2015)[4]

	Mt	Gold		Copper		Silver		Molybdenum	
		g/t	Moz	%	Mt	g/t	Moz	ppm	kt
Total Mineral Resource	820	0.70	19	1.0	8.6	1.3	33	90	74
Measured Mineral Resource	-	-	-	-	-	-	-	-	-
Indicated Mineral Resource	690	0.71	16	1.1	7.5	1.3	28	94	65
Inferred Mineral Resource	140	0.63	2.8	0.85	1.2	1.1	4.6	72	10

Note: All figures are reported to two significant figures to reflect appropriate precision in the estimate.

The Ore Reserve for the Golpu deposit at 31 December 2015 is estimated as 380Mt at 0.91g/t gold and 1.3% copper containing 11Moz gold and 4.8Mt of contained copper (Table 6.2)[5]. The Ore Reserve uses metal prices, cost assumptions and optimised designs in the Golpu 2015 Feasibility Study and Pre-Feasibility Study. The Ore Reserve employs a value based cut-off by determining the net smelter return (NSR) value based on the outcomes of the studies. Revenue assumptions were based on USD1,200/oz for gold and USD3.00/lb for copper.

[3] Mineral Resource and Ore Reserve figures quoted on 100% basis.

[4] Reported within the requirements of the JORC Code. The JORC Code is the Australasian region's code for public reporting of mineral exploration results, mineral resources and ore reserves. The code establishes standards for comparable reporting across the region and has progressively been introduced internationally in recent years. Harmony Mineral Resources and Ore Reserves are reported under SAMREC, a similar code to JORC for South African listed companies.

[5] For full Resource and Reserve declarations please refer to either www.harmony.co.za or to Newcrest's Annual Statement of Mineral Resources and Ore Reserves as at 31 December 2015 at www.newcrest.com.au.

Table 6.2: Golpu ore reserve (December 2015)[6]

	Mt	Gold		Copper	
		g/t	Moz	%	Mt
Total Ore Reserve	380	0.91	11	1.3	4.8
Proven Ore Reserve	-	-	-	-	-
Probable Ore Reserve	380	0.91	11	1.3	4.8

Note: All figures are reported to two significant figures to reflect appropriate precision in the estimate.

6.2 Mining Method

The mining method is block caving, a technique using the controlled collapse of a near-vertical orebody as a means of breaking and extracting the ore. Block caving uses two or three levels (undercut, production/extraction and services/ore handling) as follows (refer to Figure 6.1):

- 'Undercut' is the level at which the initial, once-off drilling and blasting takes place to shatter rock at the bottom of the orebody.
- 'Production/Extraction' is situated below the undercut level. This level is linked to the undercut by funnel-shaped excavations known as draw bells through which the broken rock descends. Ore is extracted by load-haul-dump vehicles (LHD) from a network of draw points. Because the ore in the undercut level is unsupported, once extraction starts, the collapse of the rock in the undercut will continue as long as extraction continues.
- 'Services' is the lowest level that will be used for ventilation and transport of ore to the surface.

Block caving of the orebody will proceed using two 'lifts': Block Cave (BC) 1 and BC2, one above the other (refer to Figure 6.2). Block Cave 1 is situated at 4,825 metres reduced level (mRL), 910m below original ground level (mbgl), and will extract ore over a five year period at a peak production rate of 3Mtpa. During caving operations, ore from the block cave draw points will be delivered by LHD vehicles to an underground jaw crusher. The crushed ore will then be conveyed to the surface.

The extraction level for BC2 is situated at 4,300mRL, 1,540mbgl. Block Cave 2 will be mined at a maximum rate of 6Mtpa and ore will be extracted over a 23 year period. Ore from the draw points will be delivered to an underground gyratory crusher by LHD vehicles, where it will be crushed and conveyed to the surface.

The ore conveyor emerging at the portal terrace will continue overland to deliver crushed ore to a coarse ore stockpile adjacent to the Watut Process Plant.

Once BC2 subsidence reaches BC1, the two caves will merge and ore extraction from BC1 will cease.

[6] Reported within the requirements of the JORC Code. The JORC Code is the Australasian region's code for public reporting of mineral exploration results, mineral resources and ore reserves. The code establishes standards for comparable reporting across the region and has progressively been introduced internationally in recent years. Harmony Mineral Resources and Ore Reserves are reported under SAMREC, a similar code to JORC for South Africa listed companies.

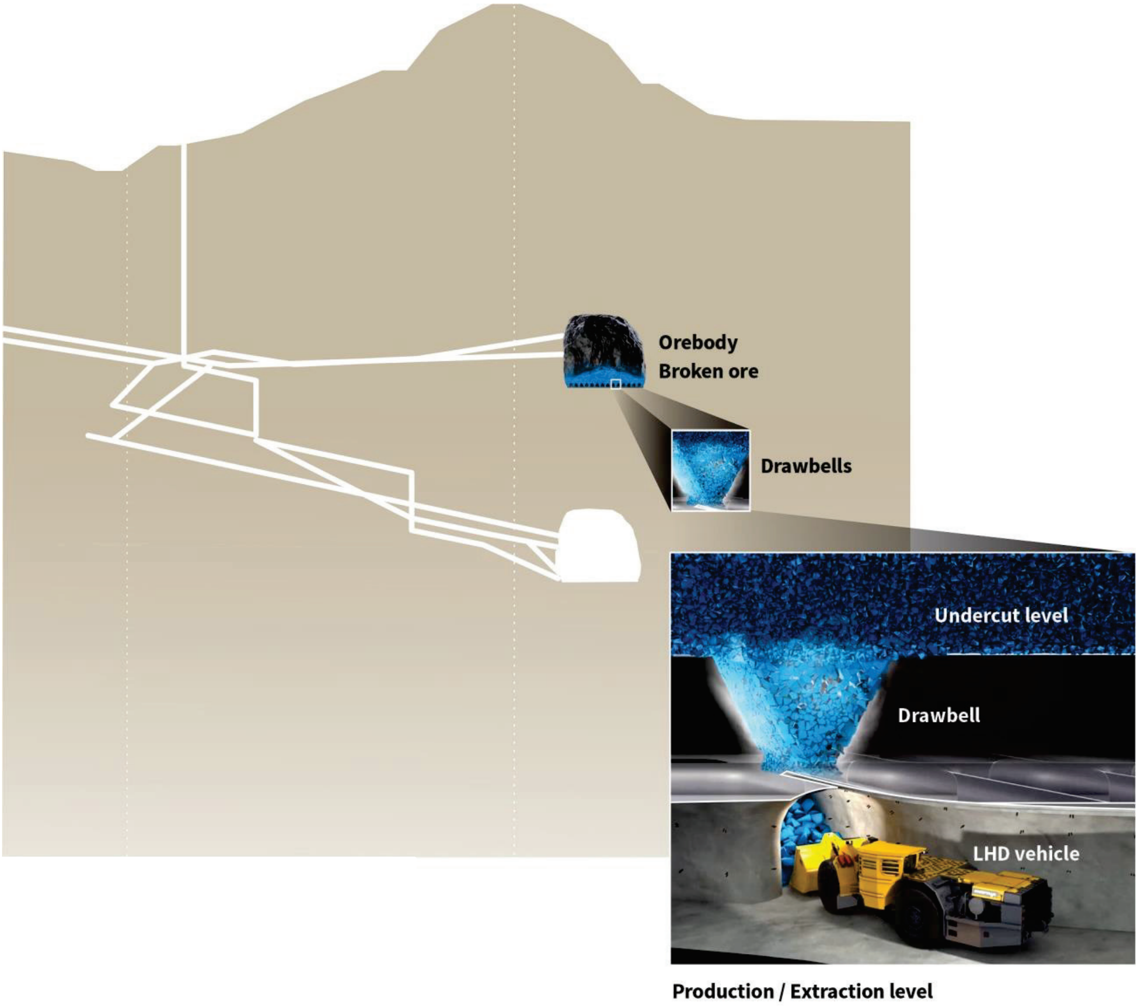

Figure 6.1: View of typical block caving layout

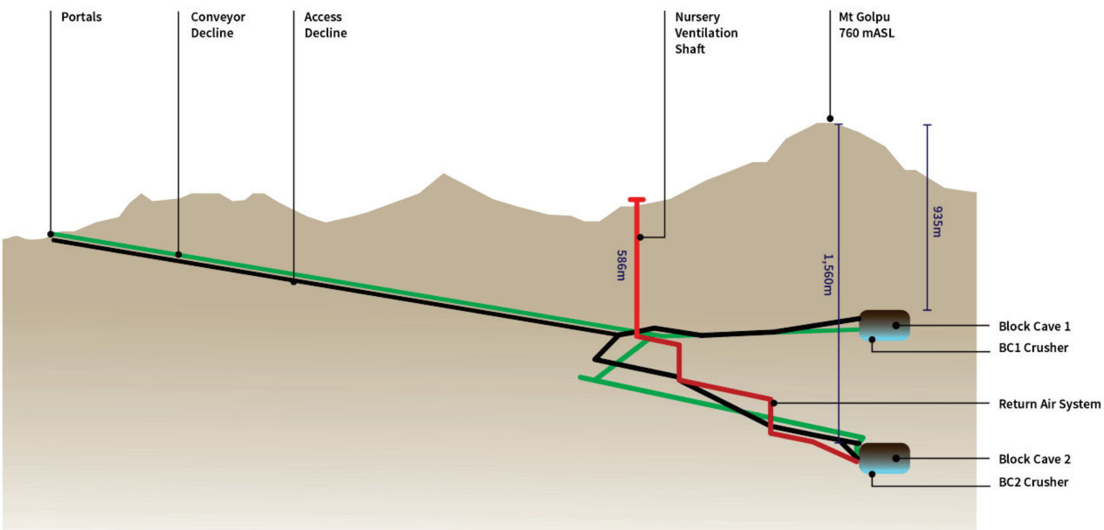

Figure 6.2: Schematic view of declines, ventilation shaft and block caves

Approximately seven years after the start of block caving, a subsidence crater will start to form on the ground surface above the orebody. This is due to the downward collapse of broken rock into the cave zone. This crater is known as the surface breakthrough or subsidence zone. The extent of the subsidence zone of influence over the surface of the orebody has been modelled to estimate the limits for surface breakthrough, cave interaction and influence on surface infrastructure. The subsidence modelling provides an indication of the subsidence zone to be experienced during the life of the Project and after closure.

The depth of the crater, after completion of BC1 and BC2, is expected to be approximately 150m to 160mbgl while the diameter of the subsidence crater at its widest extent will be approximately 600m (an area of approximately 28ha). Further information regarding subsidence is discussed in Volume 3 Chapter 3 Land.

It is expected that following closure and cessation of mine dewatering, the subsidence zone will eventually become partially filled with rainwater and groundwater, creating a crater lake. Estimates on the recharge are provided in Volume 3 Chapter 7 Hydrogeology and Volume 6 Appendix H1 Numerical Groundwater Flow Model Development.

The mine will operate 24 hours per day, every day of the year, apart from scheduled shutdowns.

6.3 Underground Access

Initially, twin declines, an Approved Activity, will provide access to the Golpu orebody to support further underground exploration of the resource and later, will provide for the transport of ore to the surface. The finished declines will be 6.4m high, 5.4m wide within a 6.9m high, 5.9m wide excavation, with a horizontal separation of approximately 25m, and extend from surface at the Portal Terrace to the bottom of BC1, a decline distance of approximately 3,600m. The declines will be supported by refrigeration and ventilation systems and a dewatering system for groundwater entering the declines.

From BC1, a system of access declines, conveyor declines and a return air system will be developed to the base of BC2, located 565m below the base of BC1. The access decline will be used to move personnel and equipment between the surface and the working areas of the mine while the conveyor decline will host the conveyor for moving ore from the block caves to the Watut Process Plant and other services such as power, compressed air and water. The return air system will connect the block caves to the ventilation shaft used to expel air from the mine, with fresh air drawn into the mine from the surface (via the declines).

The declines will be excavated using drill and blast techniques with the waste rock trucked to the surface for placement in the WRD. Rock encountered near the surface will be NAF Babuaf Conglomerate while Potentially Acid Forming (PAF) rock in the later stages of decline development is expected within the altered metasediment. The WRD will be designed and operated to manage both NAF and PAF rock. The acid-forming potential of the excavated rock will be confirmed ahead of the decline face by cover drilling. Further information on the WRD design, geochemical characteristics and estimated quantities of NAF and PAF material requiring storage is provided in Section 7.

A schematic illustration showing the locations of the declines, block cave, Nursery Ventilation Shaft and infrastructure is provided below in Figure 6.2.

6.4 Nursery Ventilation Shaft

A ventilation shaft will be required to service the additional ventilation demands for the operation of the mine once BC2 comes into operation. The Nursery Ventilation Shaft will be blind sunk to a finished diameter of 5m and will terminate at a depth of approximately 590m. It will provide a discharge airway for air flowing through the underground workings. The primary fans for the Nursery Ventilation Shaft will be located underground for cost and efficiency reasons, and to reduce overhead electrical infrastructure and noise pollution at the surface.