

# MEMORANDUM



EXECUTIVE MINING  
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**To:** Kavango Minerals (Pty) Ltd  
Unit 9, Manor Apartments  
Lot 76842 Kgale Manor  
Gaborone, Botswana  
  
Attention: Ben Turney  
Chief Executive Officer

**Date:** 20<sup>th</sup> July 2022

## **High Level financial evaluation – Olympic Dam lookalike mining operation**

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Dear Ben,

This memo is a summary of the work completed by EMG to address the questions presented to EMG by Kavango on the 26<sup>th</sup> January, 2022 and subsequently updated on the 20<sup>th</sup> July with “Consensus Metal Prices”:

### **Description of work required for Prelim Assessment of viability of Ore Model type for KSZ:**

- Kavango is developing a geophysical target based on an Olympic Dam model (Resources below).
- This target probably lies deeper than the Olympic Dam orebody, which lies beneath 300m of cover rock and is mined down to 900m depth.
- Kavango wishes to assess this target viability from an economic perspective, based on its location in the Western Kalahari near the town of Tshane, Botswana.
- The target lies within Proterozoic rocks, below ~650-950m of Karoo sediments and ~50m of Kalahari sediments.
- The target zone for possible mineralisation is certainly below 1000m depth.
- Our question is if an Olympic Dam type and scale of orebody could be economically viable if it was located at (i) 1000m, (ii) 1500m, or (iii) 2000m depth (3 cases), perhaps via the block caving or any other mining method?
- Could the economies of scale of this very large target type enhance the economic viability?
- Kavango is asking this question as a hypothetical, knowing that many variables such as rock type and rock competence are unknowns at this stage. These must be assumed to be positive, for now.
- Kavango does not wish to proceed with representing this target to its shareholders as having potential, unless the Olympic Dam target type could be viable at the depths described.
- Resources (BHP Annual Report, 2018):
  - M, I & I: 10,100M t @ 0.78% Cu, 0.25kg/t U<sub>3</sub>O<sub>8</sub>, 0.33g/t Au, 1g/t Ag
  - Inc. Measured:
    - Open-cut Sulphides: 2,960M t @ 0.66% Cu, 0.21kg/t U<sub>3</sub>O<sub>8</sub>, 0.32g/t Au, 1g/t Ag
    - Underground Sulphides: 555M t @ 1.71% Cu, 0.50kg/t U<sub>3</sub>O<sub>8</sub>, 0.65g/t Au, 4g/t Ag

EMG developed a conceptual financial model based on the BHP Olympic Dam operations as a lookalike IOCG deposit: ore geometry, grades and mineralisation complexity; using historical BHP metallurgy recoveries, plant process flowsheet, OPEX; and CAPEX assumptions based on block cave development starting at 1 km depth beneath the surface.

EMG utilised its in-house geology, mine planning and project engineering skills supplemented with research provided by PCC (Professional Cost Consultants (Pty) Ltd – South Africa). The BHP 2021 Annual report was downloaded but provide limited value.

### Geology inputs included:

- In plan view, the Olympic Dam Breccia Complex (ODBC) is irregular in shape, with hematite–granite breccia bodies arranged around the central barren haematite–quartz breccia core and a relatively long and narrow NW extension.
- The halo of weakly altered and brecciated granite extends out 5–7 km from the core in all directions to an indistinct and gradational margin with the host granite.
- The ODBC strike length of the hematite-altered mineralised breccias within the complex is >5 km in a NW-SE direction, and up to 3 km across. The ODBC locally extends to depths of >1.4 km - the base of the complex has yet to be intersected by drilling.
- Ore zones are a mixture of sub-vertical elongate bodies varying from 100 to 300m wide, up to 1000m strike and in the basal units open at depth, and sub-horizontal 'ore' is 50 to 100m thick with variable extents from 50 to 300m in width and length.
- 2 grade scenarios were tested:

	Cu %	Au g/t	Ag g/t	U3O8 ppm
OD BHP Mill Feed	2.46	0.57	5.54	700
Kavango Estimate	1.71	0.65	4.00	500

### Metallurgy Inputs included:

- Mill feed at 10Mtpa.
- Plant recoveries, Payable value after refining less treatment and external refining charges.
- The plant CAPEX assumes a processing plant and refining capability to produce Cu, Au, Ag metal and U3O8 yellowcake.
- Inputs used to derive the Net Smelter Revenue (NSR):

Plant recoveries		
Cu	%	92
Au	%	64
Ag	%	62
U3O8	%	68
Payable value after refining		
Cu	%	98.5
Au	%	98.5
Ag	%	98.5
U3O8	%	100
Treatment and refining charges		
Cu	\$/t	65
Au	\$/oz	5
Ag	\$/oz	0.8
U3O8	\$/t	0

#### Mining OPEX and CAPEX inputs included:

- The assumption of multiple block caves based on the described ODBC deposit mineralisation geometry.
- A relatively constant mill feed grade based on the 2 grade scenarios described above.
- A 3 year construction period including initial 1 km u/g shaft to access the ore body.
- Adequate mining reserves to support a 30 year mine life (300 Mtonne of recoverable ore).

OPEX		
Block Cave Mining cost per tonne	12.00	\$
Ore Recovery	90	%
Plant processing costs per tonne	15	\$/t
G&A per tonne	6	\$/t
Sustaining CAPEX per tonne	10	\$/t
UG Development CAPEX		
	3,500,000,000	\$
Assume 2 x 2 km deep shaft to access the ore body with multiple block caves producing ore at the agreed mill feed rate.		
Plant CAPEX		
	1,000,000,000	\$
Assume similar requirements as Olympic dam for recovery off all 4 metals. Copper smelter built on-site and Uranium leach plant producing saleable grade yellowcake		

## Financial inputs include:

- Consensus net metal prices were selected by Kavango based on a conservative approach, taking a long-term view of historic trends and selecting a mid-price of the 'normal' trading range, while capping spikes such as that seen for silver in 2011. A non-inflation adjusted approach was used. The outlook for copper and uranium is considered to be exceptionally strong due to trends of electrification and decarbonisation. Significant upside potential is considered to remain when using these price assumptions:

Cu @ \$3.50/lb; Au @ \$1,600/oz; Ag @ \$18/oz and U3O8 @ \$28/lb.

- The Financial model has been setup to calculate the NSR based on the metal price inputs and plant/refining recoveries with all ex-plant processing costs. A Botswana metals royalty of 3% was used. As the final products are metal and yellowcake it is assumed the transport costs are incurred by the buyer and included in the net metal price.
- The Financial model applies the OPEX costs and sustaining CAPEX against the NSR to generate the Pre Tax Cashflow.
- No Tax deductions have been applied.
- The NPV and IRR are shown using a 10% DCF.
- All spreadsheet inputs are highlighted in Yellow and can be altered by Kavango to review alternate scenarios.

## Results:

- Results are presented as a number of options based on 2 grade scenarios and 2 CAPEX scenarios, the first based on 1 km orebody depth, the second on a 2 km depth. Alternative options can be tested by Kavango using the attached Financial model spreadsheet.

<b>Kavango ODBC look-alike Financial Model Summary</b>				
<b>Option 1: Kavango Grades</b>				
Metal Prices	Cu \$/lb	Au \$/oz	Ag \$/oz	U3O8 \$/lb
	\$3.50	\$1,600	\$18	\$28
Mill Feed Grades	1.71	0.65	4.00	500.00
CAPEX US\$B	<b>Plant</b>	\$1.00	<b>Mine</b>	\$3.50
Botswana Royalty	3.00%			
Discount Rate %pa	10.00%			
<b>NPV 30 years US\$B</b>	<b>\$4.13</b>			
<b>IRR</b>	<b>22%</b>			

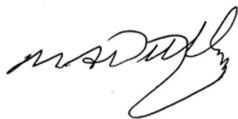
<b>Kavango ODBC look-alike Financial Model Summary</b>				
<b>Option 2: Olympic Dam reported grades</b>				
Metal Prices	Cu \$/lb	Au \$/oz	Ag \$/oz	U3O8 \$/lb
	\$3.50	\$1,600	\$18	\$28
Mill Feed Grades	2.46	0.57	5.54	700.00
CAPEX US\$B	<b>Plant</b>	\$1.00	<b>Mine</b>	\$3.50
Botswana Royalty	3.00%			
Discount Rate %pa	10.00%			
<b>NPV 30 years US\$B</b>	<b>\$8.05</b>			
<b>IRR</b>	<b>31%</b>			

<b>Kavango ODBC look-alike Financial Model Summary</b>				
<b>Option 3: Kavango Grades with higher UG Dev Capex</b>				
Metal Prices	Cu \$/lb	Au \$/oz	Ag \$/oz	U3O8 \$/lb
	\$3.50	\$1,600	\$18	\$28
Mill Feed Grades	1.71	0.65	4.00	500.00
CAPEX US\$B	<b>Plant</b>	\$1.00	<b>Mine</b>	\$5.00
Botswana Royalty	3.00%			
Discount Rate %pa	10.00%			
<b>NPV 30 years US\$B</b>	<b>\$3.00</b>			
<b>IRR</b>	<b>17%</b>			

### Conclusions:

The EMG high level work demonstrates the potential economic viability of mining an Olympic Dam lookalike IOCG deposit at depths greater than 1 km below the surface. It is important to note that this study is conceptual and cannot be construed as a definitive study.

Signed:



**Malcolm Titley**  
**Director EMG**

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