

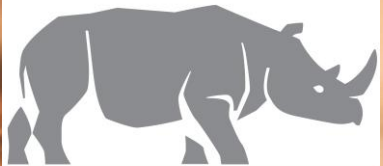


# MOD

RESOURCES LTD



**TSHUKUDU**  
METALS



## T3 FEASIBILITY STUDY ENHANCES VALUE

28 MARCH 2019

# Disclaimer & Forward Looking Statements

## Feasibility Study - Cautionary Statement

The FS is based on Probable Ore Reserves derived from Indicated Mineral Resources only. No Inferred or Measured Mineral Resources were included in the estimation of Ore Reserves. The FS was prepared to an overall level of accuracy of  $\pm 15\%$ . It is based on material assumptions outlined elsewhere in this announcement and in the Reserve update, announced 25 March 2019. There is no certainty that the FS or the Ore Reserve from which it was derived will result in commercial production or the assumptions used in the FS and resulting economic outcomes that are included in this announcement will be realised. Given the uncertainties involved, investors should not make any investment decisions based solely on the FS. The Company has concluded it has a reasonable basis for providing the forward-looking statements included in this announcement.

## Forward Looking Statements and Disclaimers

This announcement includes forward-looking statements that are only predictions and are subject to risks, uncertainties and assumptions, which are outside the control of MOD.

Actual values, results, interpretations or events may be materially different to those expressed or implied in this announcement. Given these uncertainties, recipients are cautioned not to place reliance on forward-looking statements in the announcement as they speak only at the date of issue of this announcement. Subject to any continuing obligations under applicable law and ASX Listing Rules, MOD does not undertake any obligation to update or revise any information or any of the forward-looking statements in this announcement or any changes in events, conditions or circumstances on which any such forward-looking statement is based.

This announcement has been prepared by MOD. The document contains background information about MOD current at the date of this announcement. The announcement is in summary form and does not purport to be all-inclusive or complete. Recipients should conduct their own investigations and perform their own analysis in order to satisfy themselves as to the accuracy and completeness of the information, statements and opinions contained in this announcement.

The announcement is for information purposes only. Neither this announcement nor information contained in it constitutes an offer, invitation, solicitation or recommendation in relation to the purchase or sale of shares in any jurisdiction. The announcement may not be distributed in any jurisdiction except in accordance with legal requirements applicable in such jurisdiction. Recipients should inform themselves of the restrictions that apply to their own jurisdiction as a failure to do so may result in a violation of securities laws in such jurisdiction.

This announcement does not constitute investment advice and has been prepared without taking into account the recipient's investment objectives, financial circumstances or particular needs and the opinions and recommendations in this announcement are not intended to represent recommendations of particular investments to particular persons.

Recipients should seek professional advice when deciding if an investment is appropriate. All securities transactions involve risks, which include (among others) the risk of adverse or unanticipated market, financial or political developments. To the fullest extent of the law, MOD, its officers, employees, agents and advisers do not make any representation or warranty, express or implied, as to the currency, accuracy, reliability or completeness of any information, statements, opinion, estimates, forecasts or other representations contained in this announcement. No responsibility for any errors or omissions from the announcement arising out of negligence or otherwise is accepted.

## Previously Reported Information

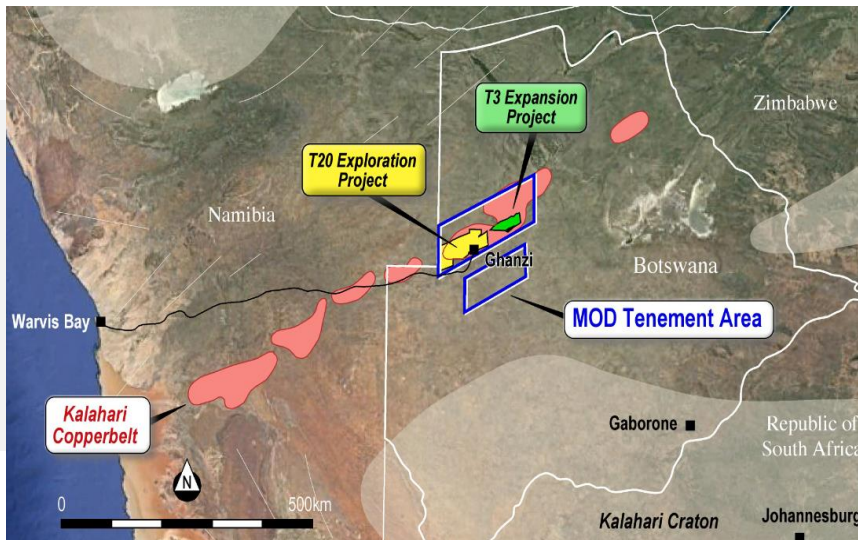
This announcement includes information that relates to the T3 Mineral Resource and T3 Ore Reserve which were prepared in accordance with the requirements of the JORC Code (2012). This information was included in the Company's previous announcements as follows:

ASX announcement dated 25 March 2019, MOD Delivers 61% Increase in T3 Ore Reserve to 34.4Mt.

ASX announcement dated 16 July 2018, 13% Increase to T3 Indicated Resource Category

These announcements are available at the Company's website [www.modresources.com.au](http://www.modresources.com.au)





## T3 COPPER PROJECT

- › T3 Copper Project Feasibility Study completed
- › 342.7Kt (~756mlb) copper T3 Ore Reserve
- › 57% increase in contained Cu; 107% increase in contained Ag<sup>1</sup>
- › 11.5 year mine life producing ~28kt (61mlb) Cu per year
- › 30kt (66mlb) Cu for 7 years after ramp-up
- › Lowest Quartile AISC of \$1.56/lb
- › NPV<sub>8%</sub> = US\$368m (pre-tax) with 33% IRR
- › Payback period = 3.7 years

Notes:

(1) Compared to Pre-Feasibility Study announced 31 January 2018

# FEASIBILITY STUDY HIGHLIGHTS

## ROBUST PRODUCTION

~28ktpa with 7 years<sup>1</sup> over 30ktpa

## COMPELLING NPV<sup>2</sup>

US\$368 million

## EXCELLENT IRR

33%<sup>3</sup>

## LOW PAYBACK

3.7 years (31% LOM)

## STRONG CASHFLOW

US\$777 million<sup>4</sup>

## LOW CAPITAL

US\$182 million<sup>5</sup>

## OUTSTANDING FINANCIALS

Revenue: US\$2.3 billion

EBITDA: US\$1.1 billion

## LOWEST QUARTILE AISC

US\$1.56/lb<sup>6</sup>

## STRONG MARGINS

EBITDA: 47%

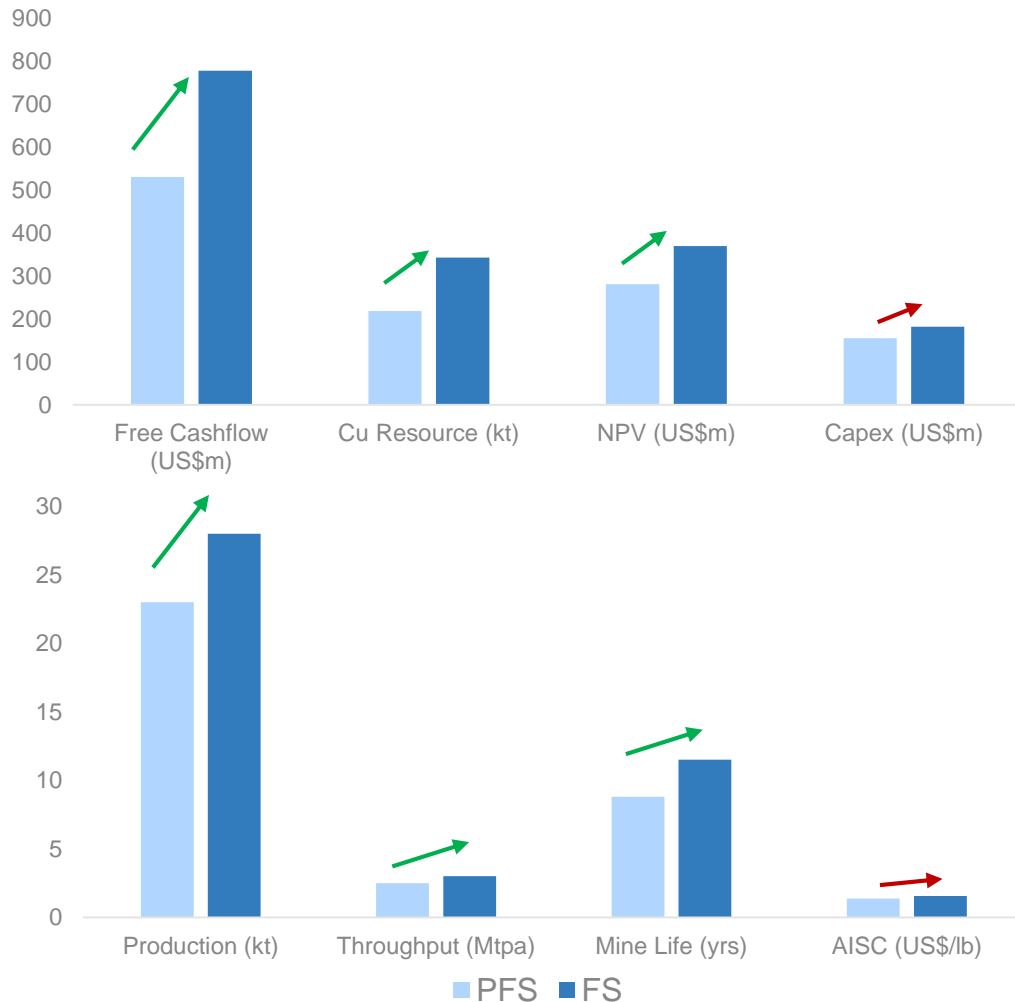
AISC: 49%<sup>7</sup>

### Notes:

- (1) 2021-2028 following ramp-up
- (2) Pre-tax NPV with 8% discount rate
- (3) Pre-tax IRR
- (4) Total Free Cash Flow
- (5) Development capital excludes \$84 m sustaining capital
- (6) AISC = C1 Costs – By-product credits + Royalties + Sust Capital
- (7) AISC margin assumes a long term \$3.08 per pound copper price

# THE VALUE OF T3 COPPER PROJECT

## GROWTH IN KEY METRICS ACROSS STUDIES<sup>1</sup>



FCF ↑ 47%

Capex ↑ 17%

Cu Resource ↑ 57%

Throughput ↑ 20%

NPV ↑ 31%

AISC ↑ 15%

Ave. annual Cu ↑ 22%

Mine Life ↑ 31%

Notes:

(1) Comparing the base case Pre-Feasibility Study to the Feasibility Study

# COPPER DEVELOPMENT PROJECTS

## LOOKING FOR LEVERAGE

### 109 GLOBAL PROJECTS<sup>(1)</sup>

- › Ave. project development capital ~US\$2.4bn
- › Ave. LOM production ~79ktpa Cu
- › Ave. Capital Intensity ~US\$13,629/t Cu eq
- › Ave. Market Cap ~US\$11bn

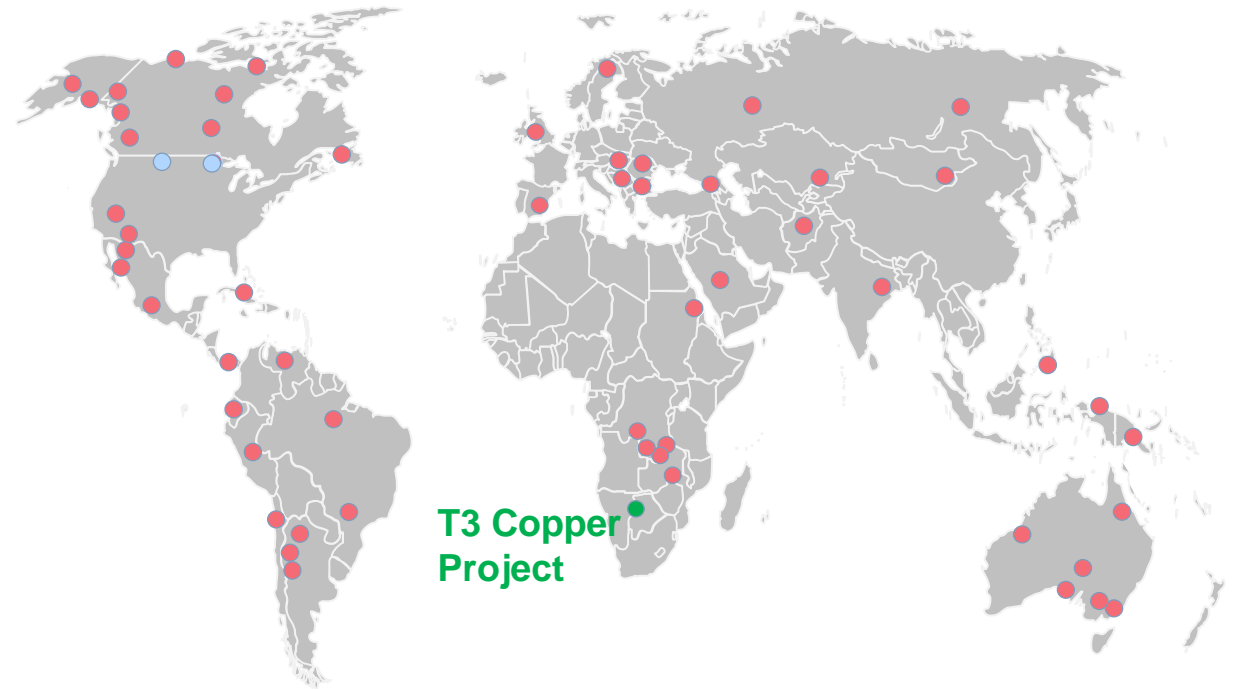
### 3 PROJECTS

- › <US\$2bn market cap
- › <US\$500m development capital
- › Ave. expected annual Cu production +20kt

### 1 PROJECT

- › **Copper-belt scale potential**
- › Supportive and stable jurisdiction
- › Under-explored
- › Robust first mine economics
- › Expandable mining hub
- › Numerous untested regional targets

## GLOBAL COPPER PROJECTS

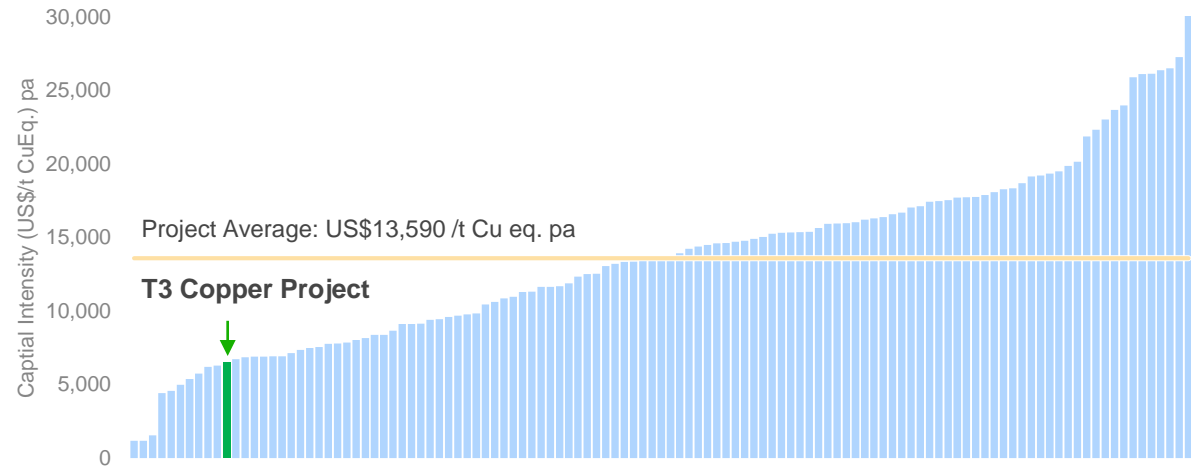


Source:

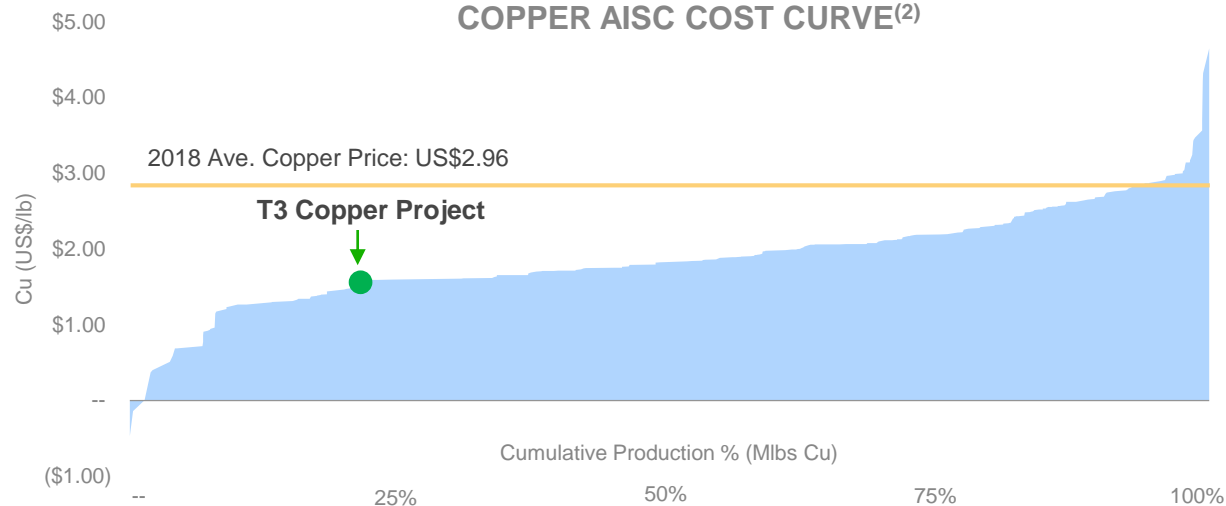
(1) Wood Mackenzie Q4 2018 Possible, Probable and Base case in construction data and Company Reports

# FEASIBILITY STUDY FINANCIALS

PROJECT DEVELOPMENT CAPITAL INTENSITY<sup>(1)</sup>



COPPER AISC COST CURVE<sup>(2)</sup>



## OUTSTANDING ECONOMICS

- › Revenue: US\$2.3 billion
- › EBITDA: US\$1.1 billion
- › NPV 8% pre-tax: US\$368 million
- › Total Free Cash Flow: US\$777 million
- › Development Capex: US\$182 million
- › Sustaining Capex: US\$84 million
- › IRR pre-tax: 33%
- › AISC: US\$1.56 / lb

Notes:

(1) Wood Mackenzie Q4 2018 Possible, Probable and Base case in construction data and Company Reports

(2) BMO Data

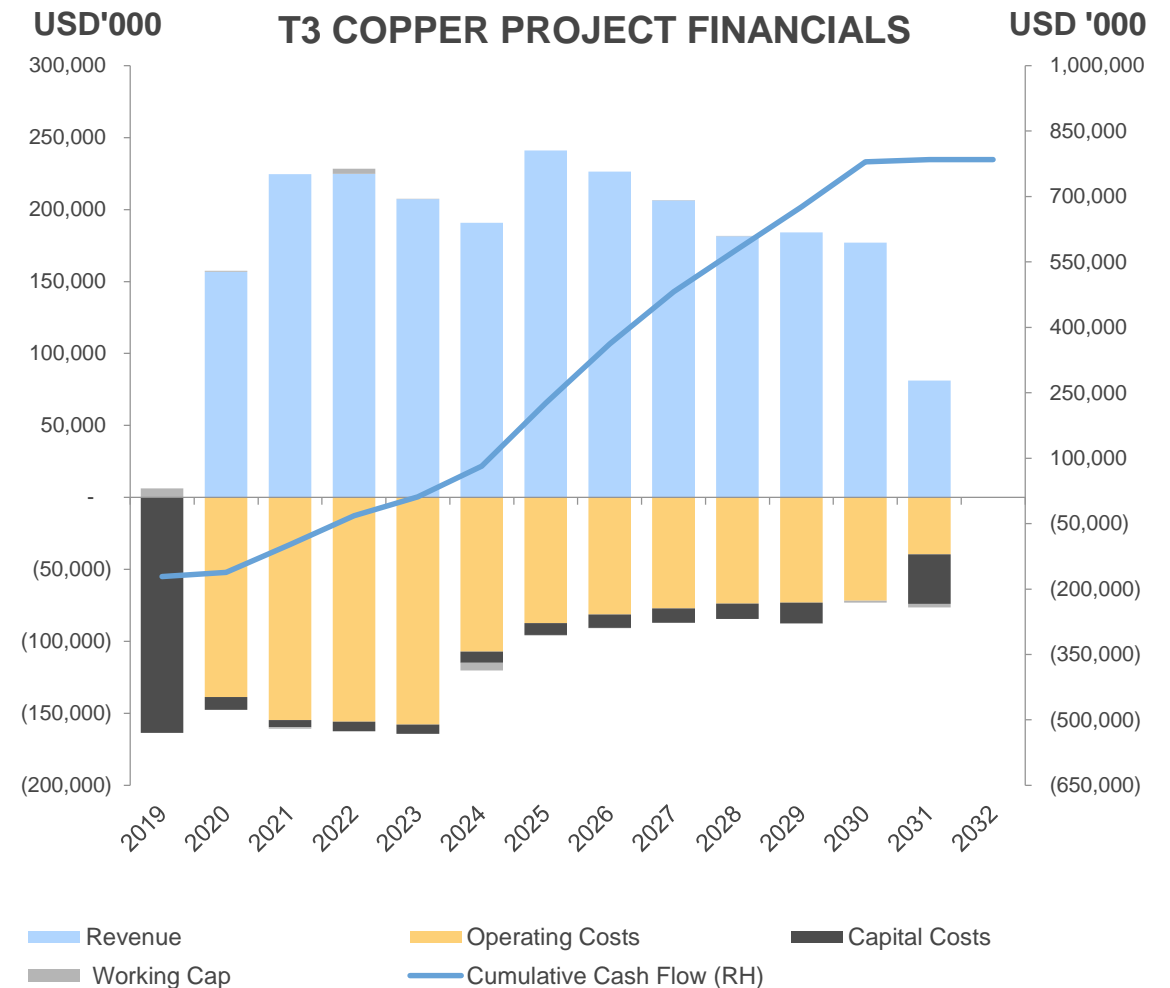
# T3 COPPER PROJECT CAPITAL COSTS

DEVELOPMENT CAPITAL COSTS	FS (US\$m)
<b>Direct Costs</b>	
Mine Establishment	1
Process Plant	49
Site Infrastructure	23
Tailings Storage (incl. SWM <sup>1</sup> )	14
<b>Indirect Costs</b>	
Project Indirects (based on EPC <sup>1</sup> )	32
Corporate and Owners	11
Contingency <sup>2</sup>	11
<b>Mining Pre-strip</b>	41
<b>TOTAL DEVELOPMENT CAPITAL</b>	<b>182</b>

Notes:

(1) SWM relates to surface water management. EPC relates to Engineering, Procurement and Contract services.

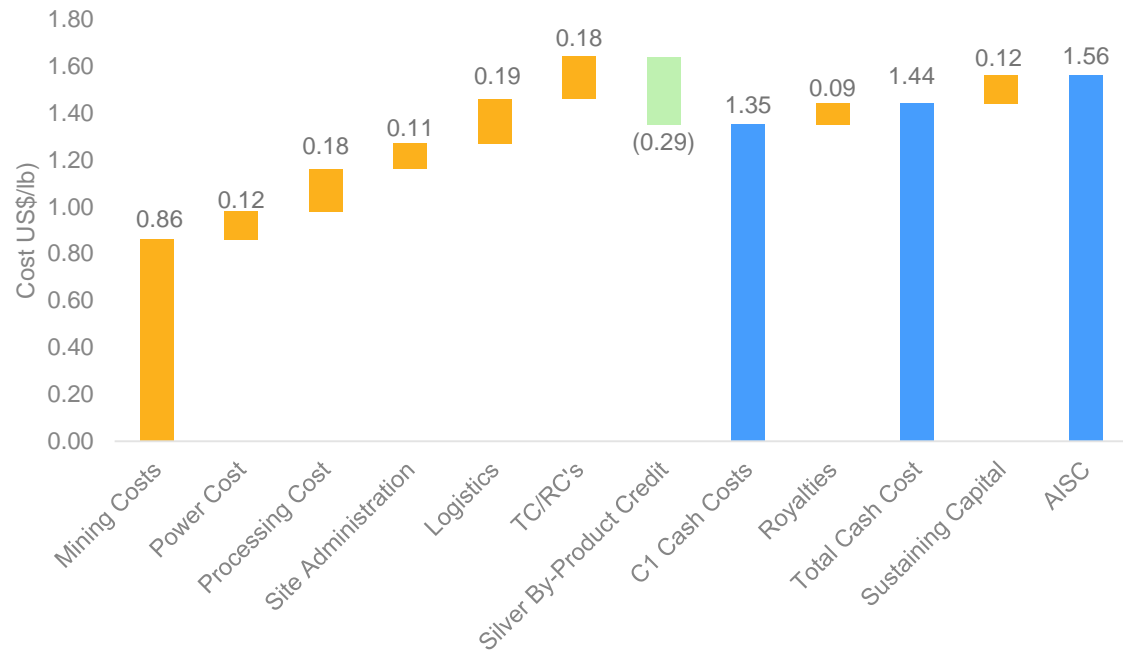
(2) No contingency applied to pre-strip costs.





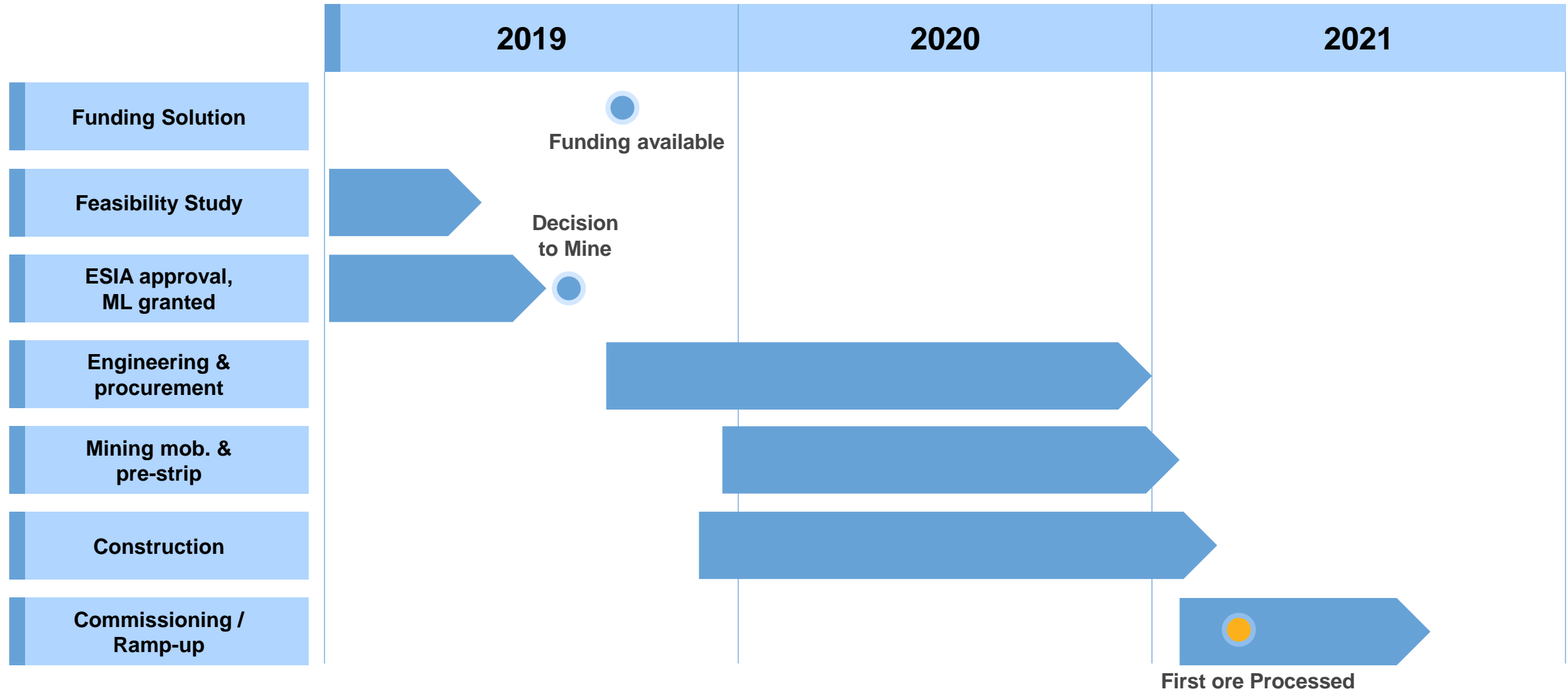
# T3 COPPER PROJECT OPERATING COSTS

## All-In Sustaining Cash Cost Breakdown (US\$/lb)



OPERATING COSTS	US\$/t milled	US\$/lb
Mining Costs	17.60	0.86
Power Cost	2.48	0.12
Processing Cost (excl. power costs)	3.61	0.18
Site Administration	2.18	0.11
Logistics	3.88	0.19
Treatment and Refining Charges	3.76	0.18
Silver By-Product Credit	(5.96)	(0.29)
<b>Operating Costs (C1 Cash Costs)</b>	<b>27.55</b>	<b>1.35</b>

# THE PATHWAY TO PRODUCING COPPER



# FUNDING PROGRESS

- › **TOTAL FUNDING:** Proposed debt to equity structure of ~60:40
- › **DEBT:** Received EOI from selected top-tier, global debt providers; many conducting preliminary due diligence (inc. site visits)
- › **PROCESS:** Post FS Request for Proposal for debt funding; targeting debt agreement finalization by Q3 2019
- › **STREAMLINED:** ITE's to be appointed after FS to support financing process
- › **EQUITY:** Advancing non-debt discussions



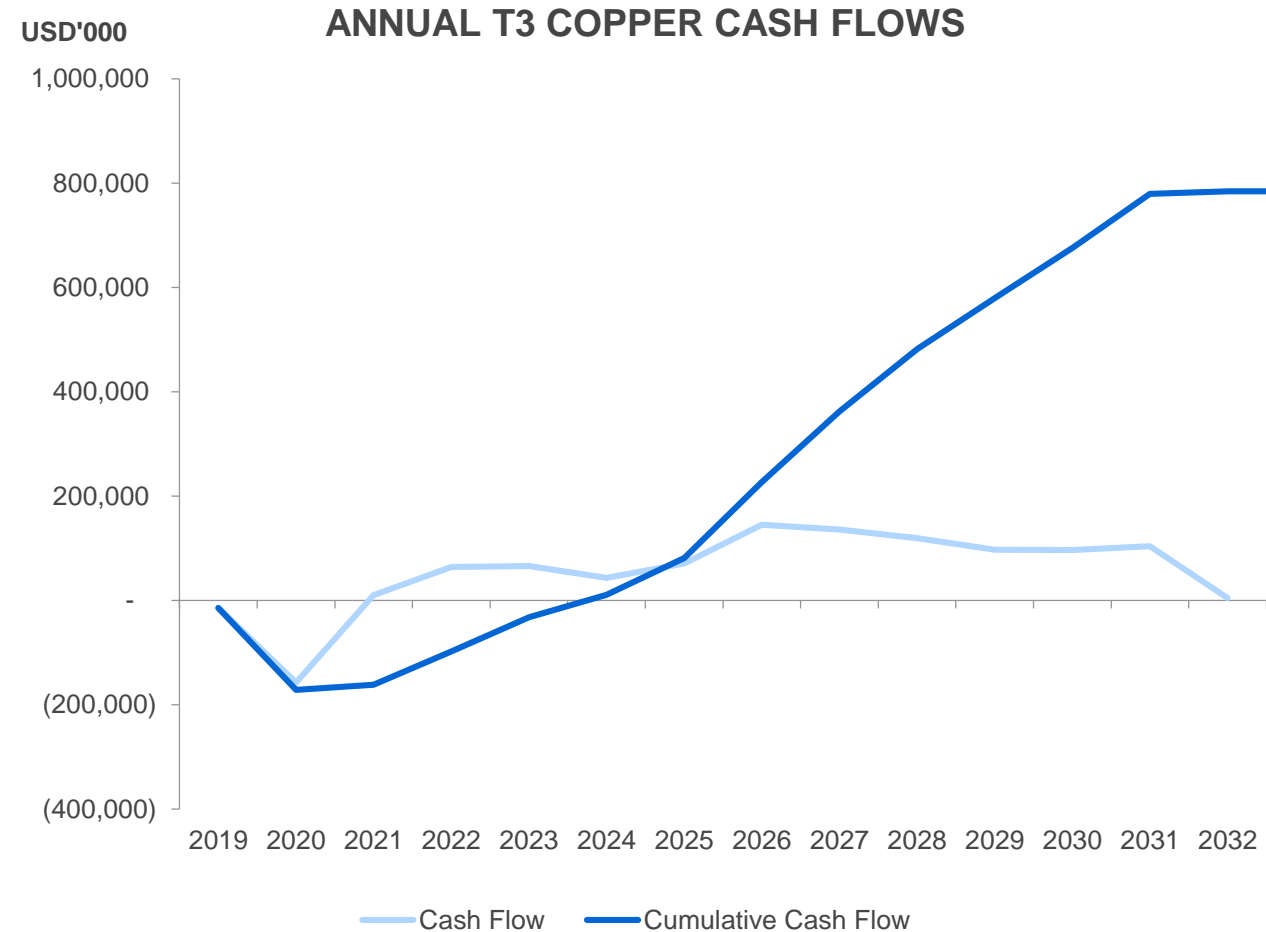
# T3 COPPER PROJECT FEASIBILITY STUDY

## Life of Mine Financial Economics (US\$)

Long term copper price (consensus average)	\$3.08lb <sup>1</sup>
Revenue (net of payability)	\$2,301m
Unit Revenue (Net of payability)	\$2.98/lb
C1 Cash Costs <sup>2</sup>	\$1.35/lb
All in Sustaining Costs <sup>3</sup>	\$1.56/lb
EBITDA	\$1,083m
Net Cash Flow (pre-tax)	\$777m
Undiscounted Cash Breakeven Copper Price	\$2.15/lb
Pre-tax NPV (8% real)	\$368m
IRR (pre-tax)	33%
Capital Payback Period (from first production)	3.7 Yr(s)

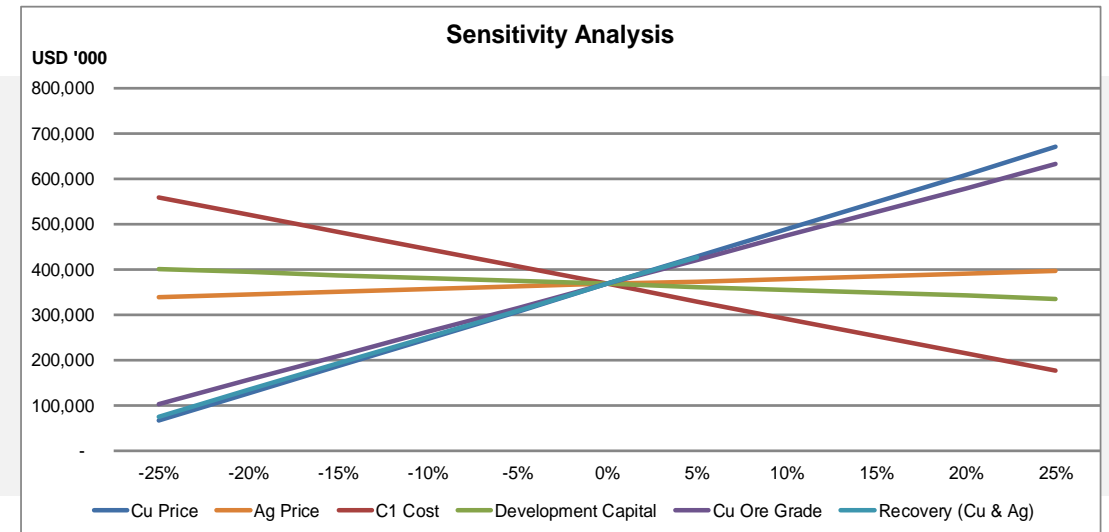
### Notes:

1. Copper prices in year 1, 2 & 3 of production averages 3.11 US\$/lb Cu (2021), 3.16 US\$/lb (2022), 3.21 US\$/lb (2023)
2. C1 cash costs means operating cash costs including mining, processing, geology, OHSE, site G&A, concentrate transport, TC and RC costs less by-product credits, divided by copper in concentrate produced (100% payable basis).
3. All-in sustaining cash costs are cash operating costs (C1 cash cost including royalties) plus sustaining capital.



# SENSITIVITY ANALYSIS

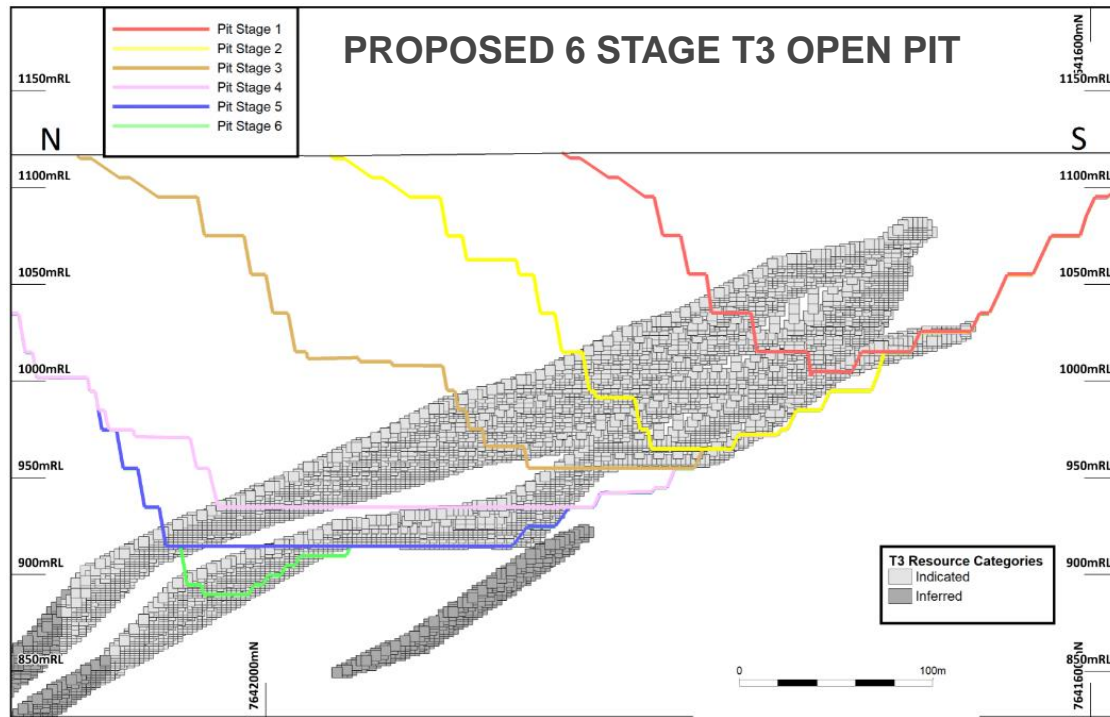
- › **SENSITIVITIES:** NPV is most sensitive to copper price, copper grade and copper recovery
- › 1c/lb change in copper price = \$4 million NPV impact
- › 1% change to recovery = \$12 million NPV impact



PARAMETERS	SENSITIVITIES										
	-25%	-20%	-15%	-10%	-5%	0%	5%	10%	15%	20%	25%
Copper Price	66	126	187	247	308	368	429	489	550	610	671
Copper Ore Grade	103	156	209	262	315	368	421	474	527	580	633
Copper and Silver Recovery	75	134	193	251	310	368	427	-	-	-	-
Silver Price	340	346	351	357	363	368	374	380	385	391	397
Development Capital	401	394	388	381	375	368	362	355	349	342	336
C1 Costs	560	522	484	445	407	368	330	291	253	215	176



# ENHANCED RESOURCE BASE



## Notes:

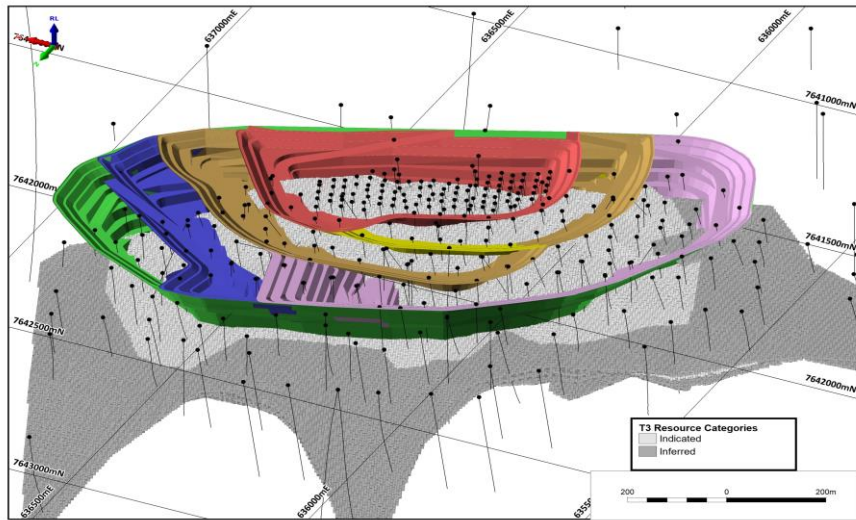
1. The Probable Ore Reserve is based on the Indicated category of the Mineral Resource. No Inferred category has been included.
2. In a scheduling period, the lowest average grade of ore added to the process plant feed was 0.22% Cu.
3. Ore Reserves are calculated based on a copper price of US\$2.91/lb and a silver price of US\$16.81/oz.
4. Ore loss and dilution were applied to the Mineral Resource model in a two-step process which resulted in an ore loss of approximately 9% and a diluted tonnage addition of approximately 8%.
5. Metallurgical testwork recoveries were applied in accordance to the recovery algorithms developed from the variability testwork program conducted during the feasibility study.
6. Appropriate modifying factors were applied.

- › **PIT DIMENSIONS:** 1,400m long, 700m wide and 250m deep
- › **GEOTECHNICAL:** Detailed structural assessment; defined 3 geotechnical zones
- › **SLOPE ZONES:** Top 20m (27°), Hanging wall (57°), Footwall (35°)
- › **STRIP RATIO:** LOM 5.7 :1

Ore Reserve Category	Tonnes (Mt)	Copper		Silver	
		Grade (%)	Kt	Grade (g/t)	Moz
Proven	-	-	-	-	-
Probable	34.4	1.0	342.7	13.2	14.6
<b>Total Ore Reserve</b>	<b>34.4</b>	<b>1.0</b>	<b>342.7</b>	<b>13.2</b>	<b>14.6</b>

# SIMPLE GEOLOGY; CONVENTIONAL MINING

PROPOSED 6 STAGE T3 OPEN PIT

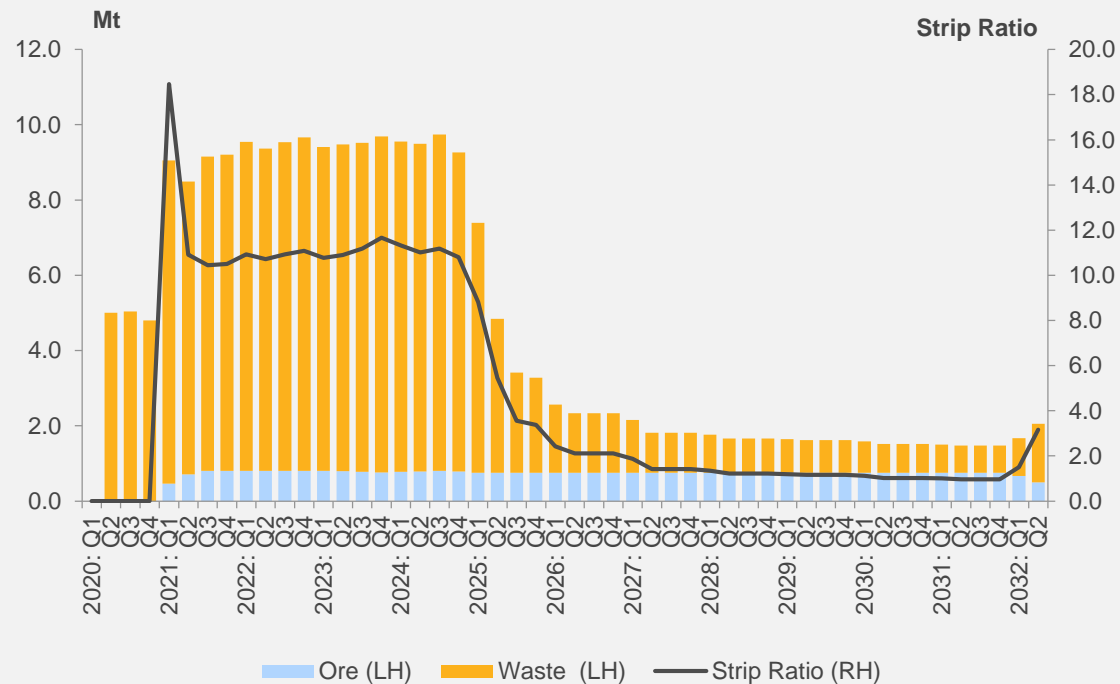


- › **OPEN PIT:** Conventional mining, load & haul, stockpiles with ROM
- › **CONTRACTOR MINING:** Reduces operational risk
- › **DRILL & BLAST:** 10m benches
- › **MINING:** Ore mined on 2.5m flitches, waste on 3.5m flitches
- › **STOCKPILES:** Waste, mineralised waste and low-grade stockpiles
- › **GRADE CONTROL:** In pit RC on 12m x 6m angled pattern
- › **6 STAGED PITS:** Enables deferment part capital

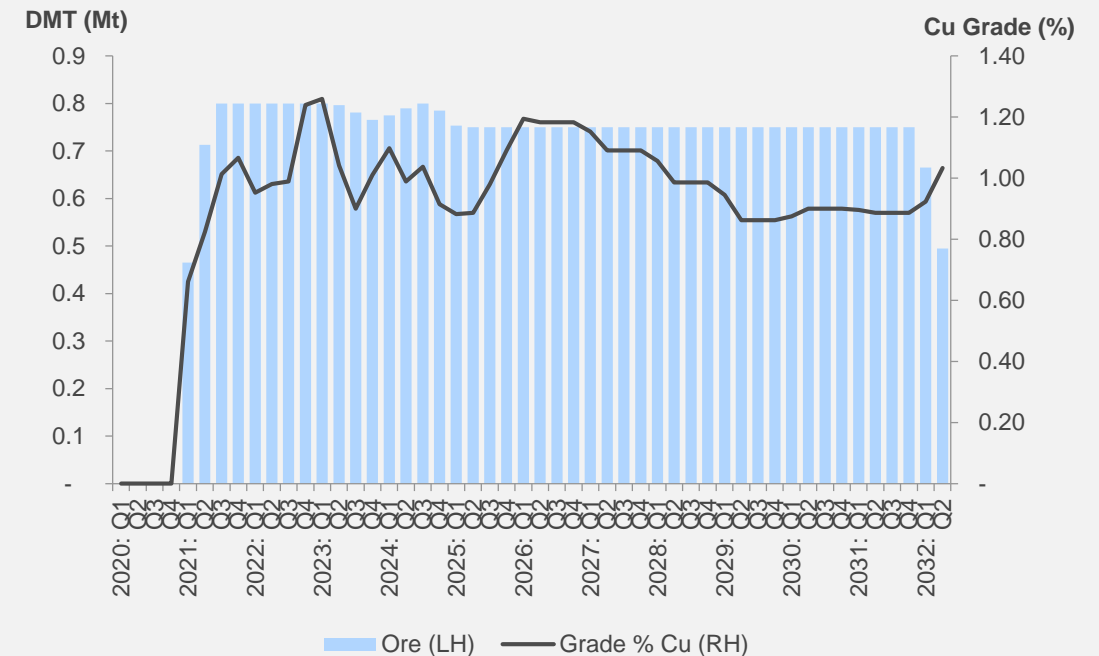
PARAMETERS	OPEN PIT MINING STAGES						
	Stage 1	Stage 2	Stage 3	Stage 4	Stage 5	Stage 6	TOTAL
Ore (Mt)	2.9	4.0	4.0	8.9	9.0	5.7	34.4
Waste (Mt)	24.2	16.9	24.4	65.3	36.0	29.1	195.9
<b>Material Mined (Mt)</b>	27.1	20.9	28.4	74.2	45.0	34.7	230.4
Stripping Ratio	8.2	4.2	6.1	7.4	4.0	5.1	5.7
Cu grade (%)	1.0	1.1	1.1	1.1	0.9	0.9	1.0
Ag grade (g/t)	9.9	14.2	12.1	16.8	11.7	12.5	13.2

# T3 COPPER PROJECT PRODUCTION

## T3 OPEN PIT MINING SCHEDULE



## T3 ORE MINED AND GRADE



- › **MINING FLEET:** up to 5 excavators (120-250t), up to 24 haul trucks (140t)
- › **TOTAL MATERIAL MINED:** Average annual movement ~38Mt Y1-Y4
- › **YEAR 5:** Average annual movement ~8Mt Y5-EOM

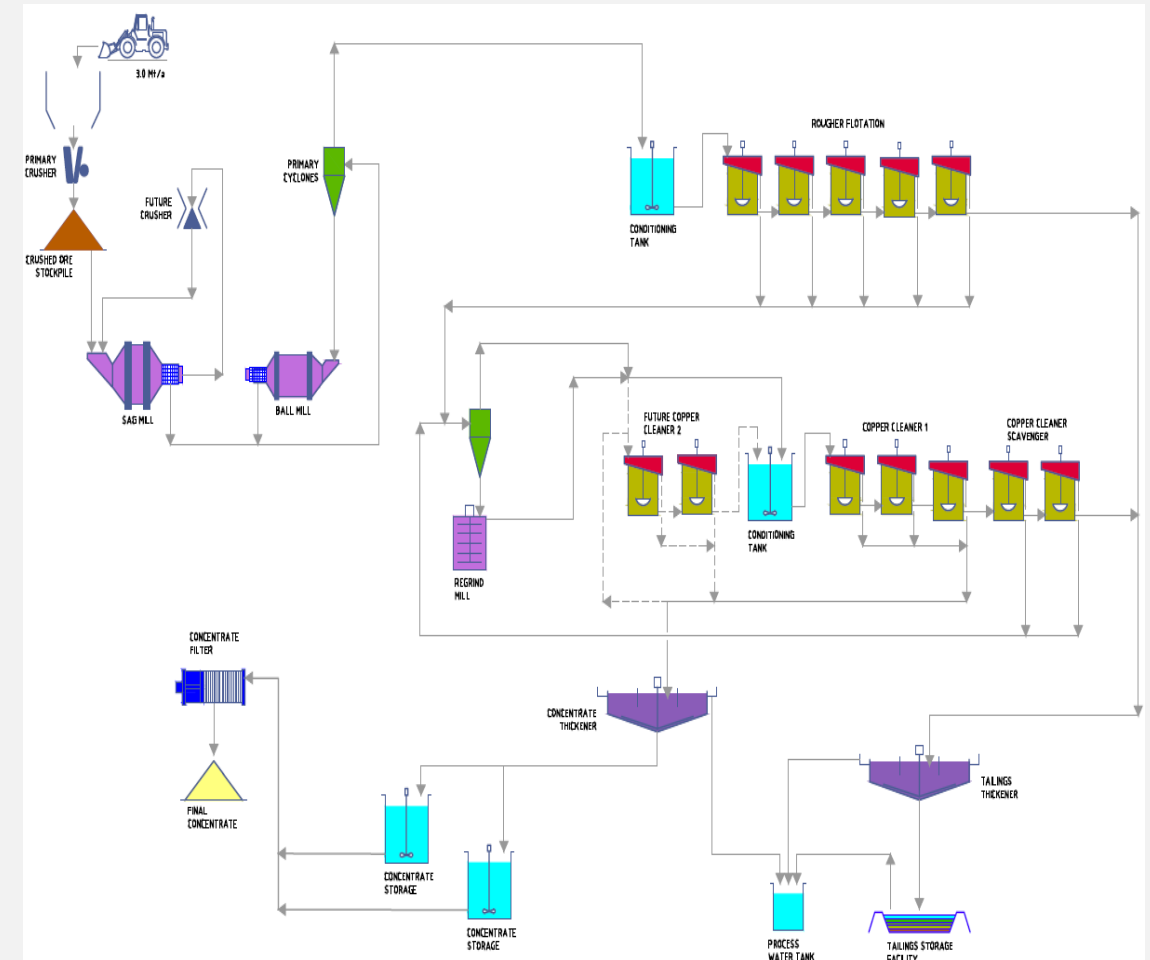
- › **ORE:** Average ore quarterly ore mined 750kt LOM
- › **GRADE:** LOM Average 1.0% Cu and 13.2 g/t Ag

- › **T3 COMPOSITION:** Chalcopyrite, bornite and chalcocite
- › **COMMINUTION:** Ore is moderately competent, abrasive and hard
- › **FLOTATION FLOWSHEET:** Rougher flotation; single stage cleaner; cleaner scavenger
- › **GRIND:** Primary grind  $P_{80}$  180 $\mu$ m; natural rougher flotation, rougher flotation regrind  $P_{80}$  90 $\mu$ m; cleaner flotation pH 11
- › **RECOVERIES:** 92.9% Cu, 88.0% Ag
- › **CONCENTRATE:** Ave. grade 30.4% Cu, peak grade 34.7% Cu



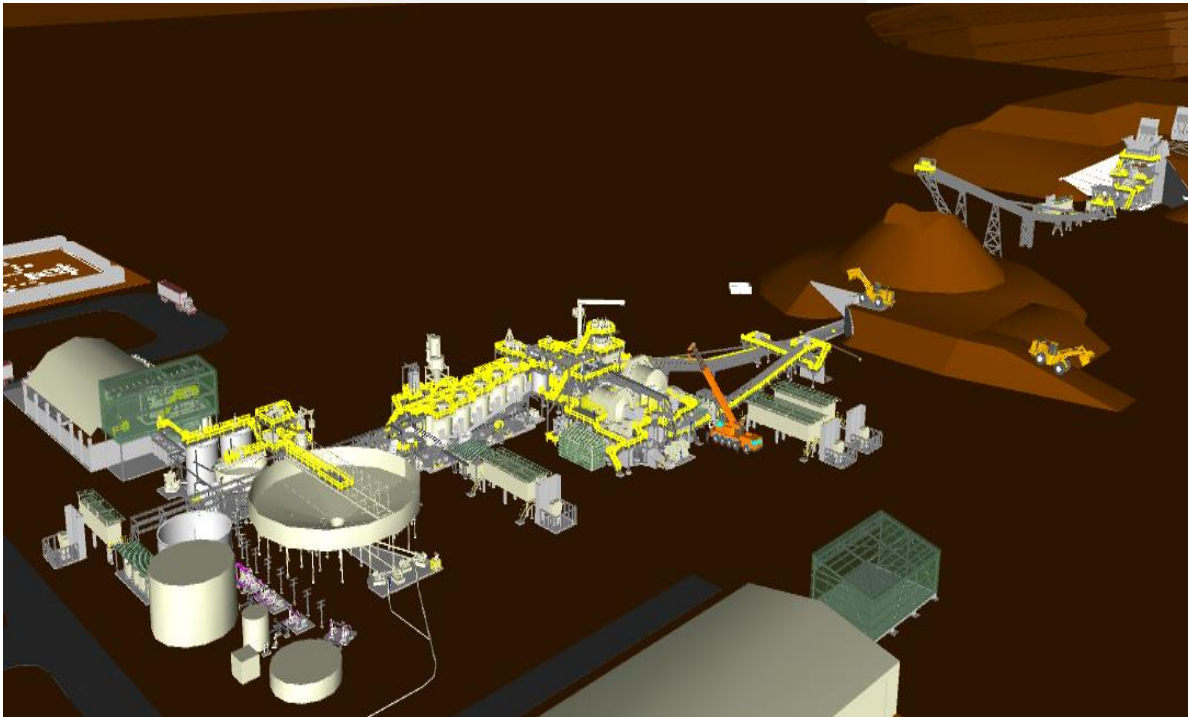
# T3 COPPER PROJECT PROCESSING

- › **PROCESSING:** Conventional circuit; 91.5% availability
- › **CRUSHING:** 3.0Mt crusher; SAG and Ball Mill
- › **GRIND:** 180 $\mu$ m then tower mill to regrind to 90 $\mu$ m
- › **FLOTATION CIRCUIT:** Rougher, regrind, cleaner/scavenger
- › **CONCENTRATE:** Thickened and filtered
- › **TAILINGS:** Thickened; discharged to TSF (34.4Mt capacity)

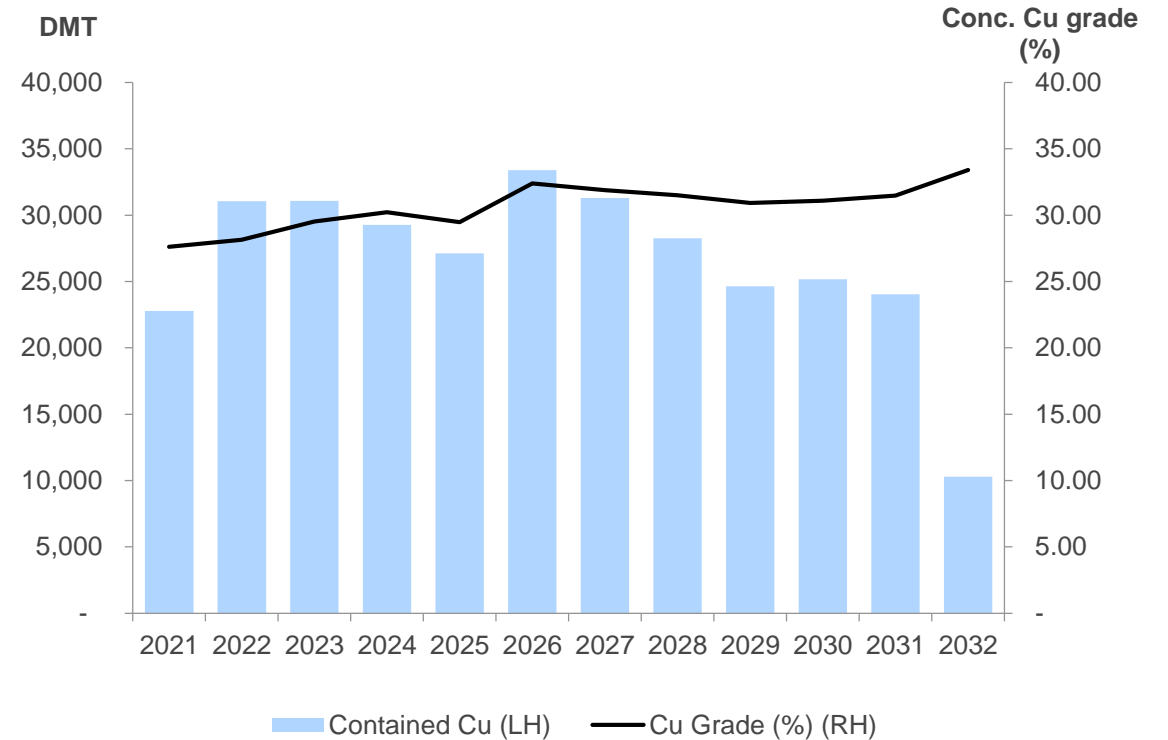




# T3 COPPER PROJECT PROCESS PLANT LAYOUT

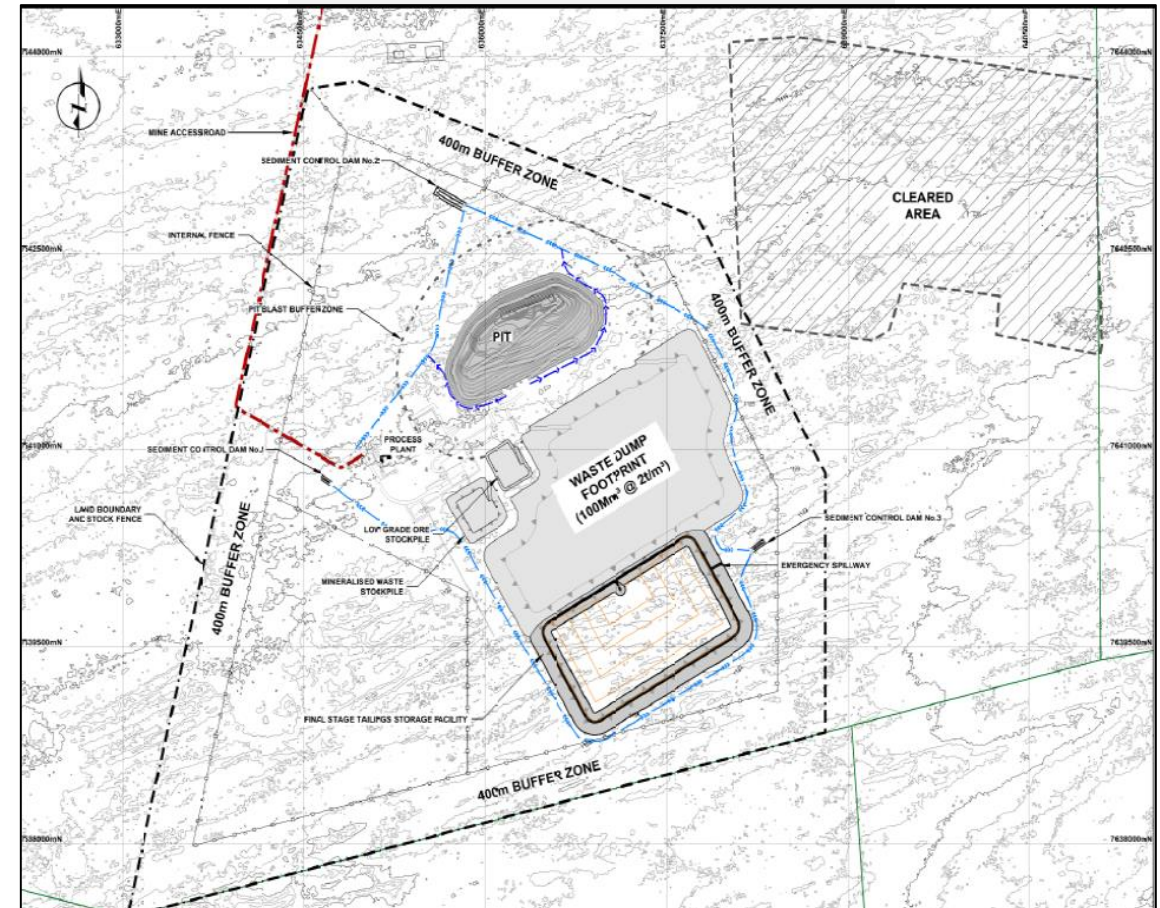


## CONTAINED COPPER vs CONC. GRADE



# T3 COPPER PROJECT INFRASTRUCTURE

- › **ACCESS ROAD:** Unsealed, all weather ~14km x 12m wide
- › **HAUL ROADS:** Unsealed, all weather, calcrete sheeted
- › **ACCOMMODATION:** 400-person camp, 80km from site
- › **POWER:** Grid power (~2020)
- › **BORE FIELD:** ~1.5km west of open pit
- › **PROCESS PLANT:** <1km from open pit
- › **WASTE DUMP:** ~192Mt capacity, expandable
- › **TSF:** Engineered; HDPE lined; 34.4Mt capacity; 68% solids



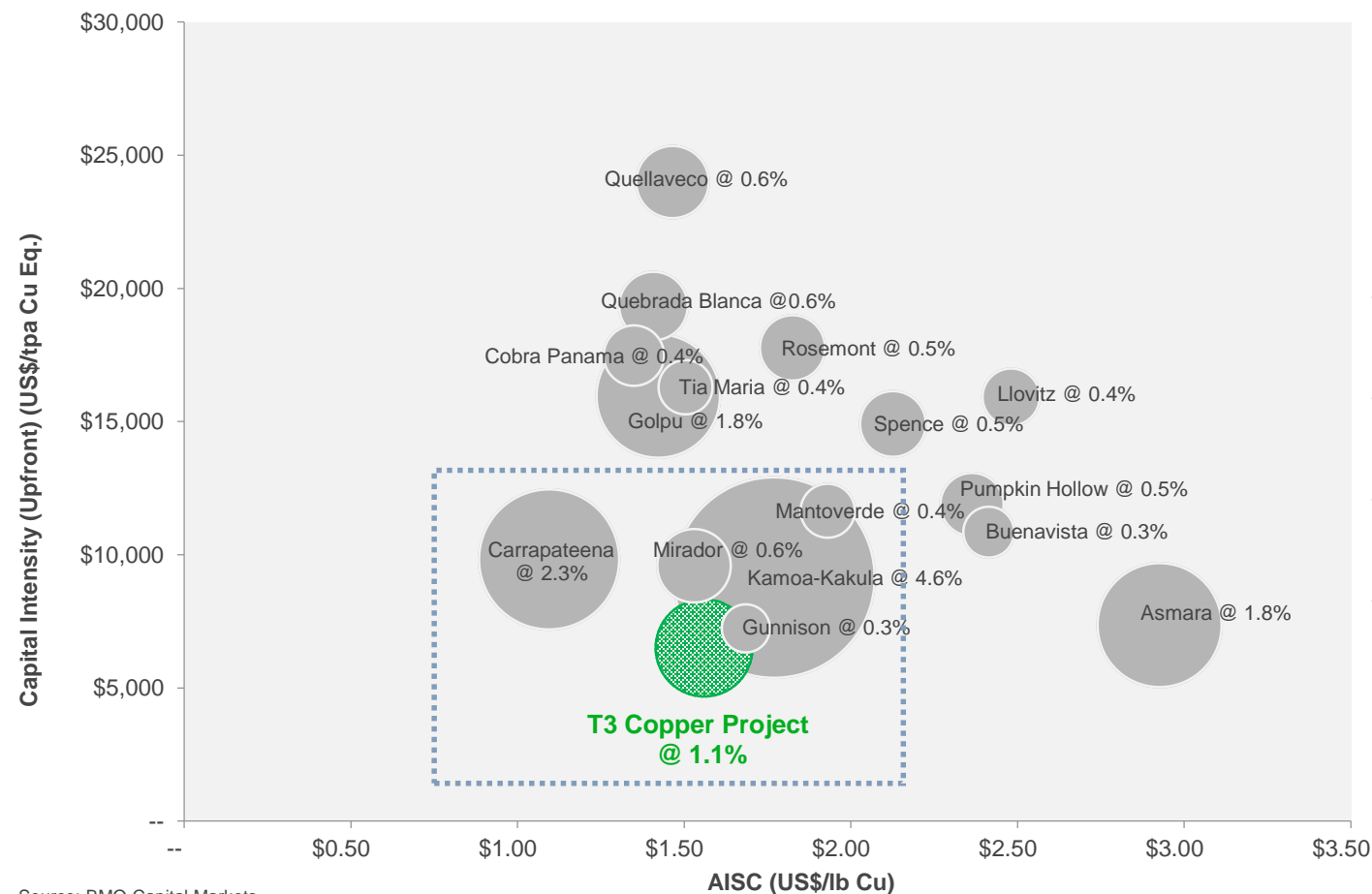
# PERMIT AND APPROVALS

- › **PROCESS:** Well defined; significant public consultation; transparent
- › **ACCESS AGREEMENTS:** Land access & landowner agreements in place
- › **ESIA:** DEA provided feedback on DRAFT ESIA 11 March; MOD preparing response to comments received; once reviewed ESIA is updated and submitted to DEA a 4-week public consultation process commences
- › **MINING LICENCE:** Upon final ESIA approval a mining licence application will be made



# DEVELOPMENT PROJECT COMPARISONS

## T3 COPPER PROJECT vs SELECTED GLOBAL DEVELOPMENT PROJECTS<sup>1</sup>



- › **FEW PEERS:** Low capital intensity, low cost, good grade
- › **BOTSWANA:** Excellent mining and Investment jurisdiction
- › **GEOLOGY:** Upgraded Reserve, strong grade
- › **METALLURGY:** 92.9% Cu recovery, 30kt production<sup>2</sup>
- › **COSTS:** Lowest quartile AISC of US\$1.56/lb

Source: BMO Capital Markets

Notes:

1. Bubble size represents Cu Eq. grade ranging from 0.3% to 4.6% Cu Eq.
2. Expected average annual copper production after ramp-up between 2021 and 2028



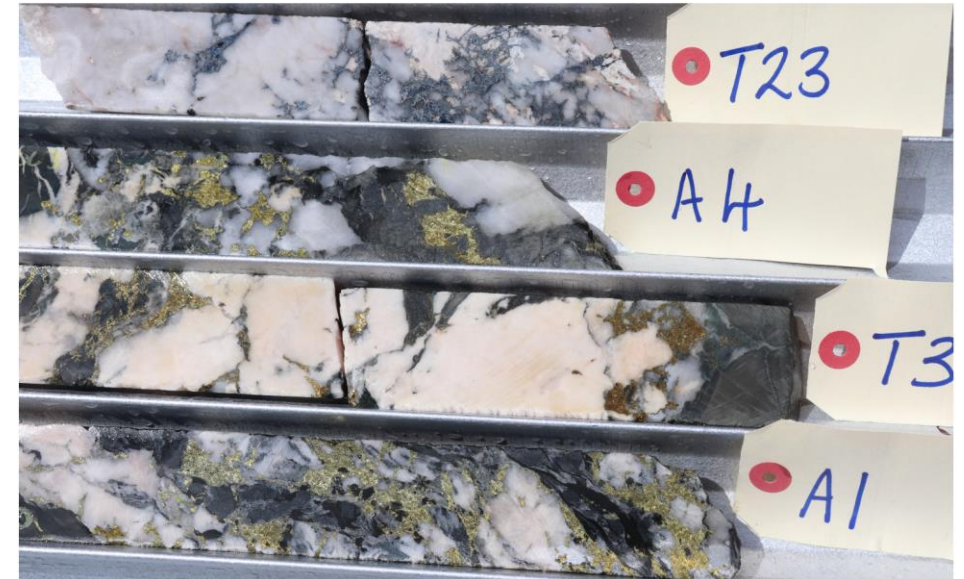
# DEVELOPMENT PROJECT COMPARISONS

	Units	T3	Gunnison	Mantoverde	Carrapateena	Mirador	Kamoa-Kakula
Owner(s)		MOD (100%)	Excelsior Mining (100%)	Audley Capital Advisors 60%, Orion Mine Finance 40%	Oz Minerals 100%	Corriente Resources 3.1%, CRCC Tongguan 96.9%	Ivanhoe (39.6%), Zijin (39.6%), DRC (20%), Other (0.8%)
Location		Botswana	USA	Chile	South Australia	Ecquador	DRC
Study Stage		FS	FS	FS	Construction	Post-FS	PFS
Mine Type		OP (UG Potential)	OP	OP	UG	OP	UG
Reserve	(kt Cu Eq.)	381	2,044	329	1,800	4,262	11,340
Reserve Grade	(% Cu Eq.)	1.1%	0.3%	0.4%	2.3%	0.6%	4.6%
LOM Avg. Production	(ktpa Cu Eq.)	28	43	73	75	118	385
LOM Avg. C1 Cash Cost	(US\$/lb Cu)	\$1.35	\$0.95	\$1.60	\$0.63	\$1.05	\$1.18
LOM Avg. AISC	(US\$/lb Cu)	\$1.56	\$1.68	\$1.93	\$1.09	\$1.53	\$1.77
Mine Life	(Years)	11.5	24.0	17.0	21.0	31.0	29.0
Development Capital Cost	(US\$ mm)	\$182	\$311	\$854	\$733	\$1,134	\$3,524
Capital Intensity	(US\$/tpa Cu Eq.)	\$6,500	\$7,238	\$11,647	\$9,827	\$9,588	\$9,145
First Production Year	(Year)	2021	2019	2022	2019	2020	2021



# T3 COPPER PROJECT NEXT STEPS

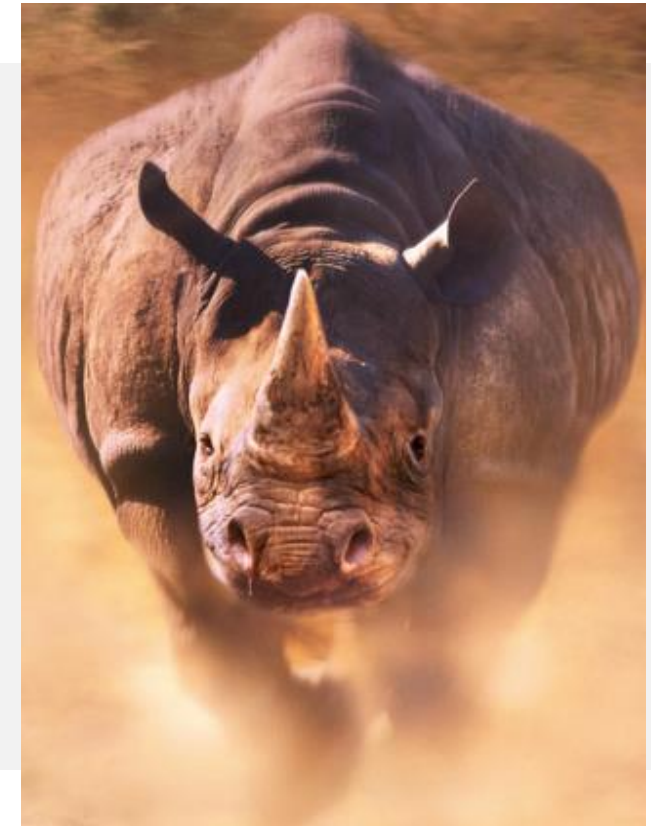
- › **ESIA:** MOD expects to submit a second DRAFT ESIA in April 2019
- › **T3 INFILL DRILLING:** Objective of upgrading early production to JORC compliant Measured category
- › **HYDROGEOLOGY:** Pumping tests of selected bores before dewatering; update hydrogeological model
- › **ACCOMMODATION:** Q2 2019 finalise design for expansion to 400-person camp; submit camp EMP to DEA
- › **IMPLEMENTATION STRATEGY:** Early contractor engagement, tender strategy; planning of infrastructure pre-works
- › **T3 UNDERGROUND STUDY:** Completed Q1 2019; very encouraging results; additional Resource drilling planned; expect study to be finalized during H2 2019

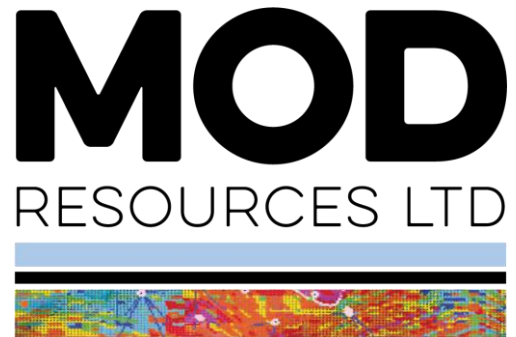


# BEGINNING OF A MUCH LARGER STORY

## COMPELLING GROWTH AND VALUE OPPORTUNITY


- › **UNIQUE POTENTIAL:** MOD has dominant holding
- › **HISTORY:** Minimal prior drilling; huge soil anomaly area;
- › **INVESTMENT DRIVERS:** Right team, right place, right commodity
- › **T3 COPPER PROJECT:** Long life, low-capital, high-margin copper project
- › **GROWTH:** T3 Mining hub targeting greater Cu production
- › **T3 EXPANSION:** Numerous satellite targets include T3 U/G, A4 and A1 domes





[www.modresources.com.au](http://www.modresources.com.au)

ASX / LSE: **MOD**

Follow us on  



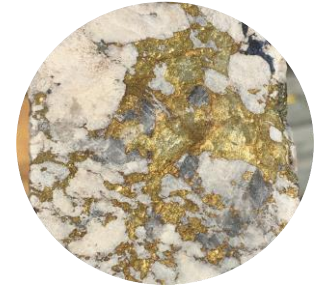
IR@modresources.com.au



Corporate office +61 8 9322 9233



First Floor, 1304 Hay Street  
West Perth WA 6005  
Australia



# MOD – RIGHT TEAM



Julian Hanna  
Director



Mark Clements  
Director



Steve McGhee  
Technical Director



Bronwyn Barnes  
Non-Executive  
Director



Simon Lee  
Non-Executive  
Director



Michael McNeilly  
Non-Executive  
Director



Gaba Chinyepi  
In-Country Manager



Kebalemogile (KB) Tau  
Exploration Manager



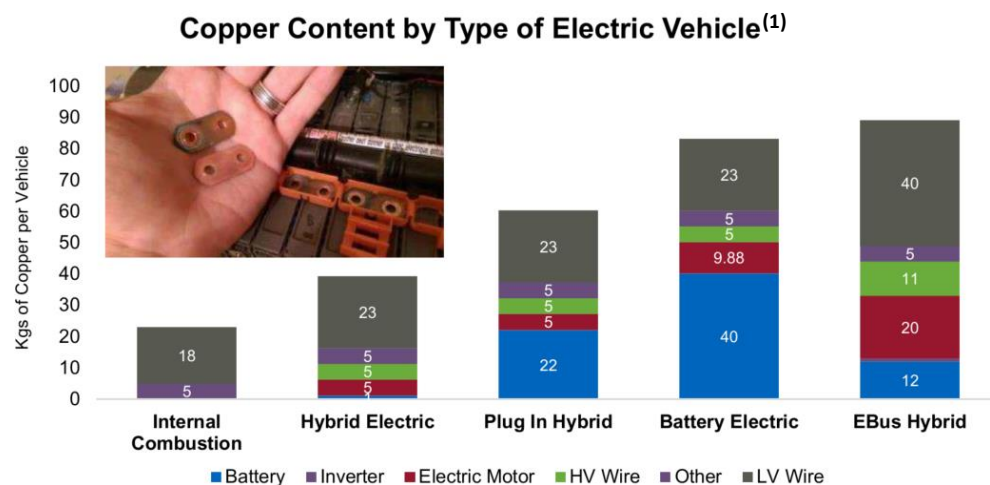
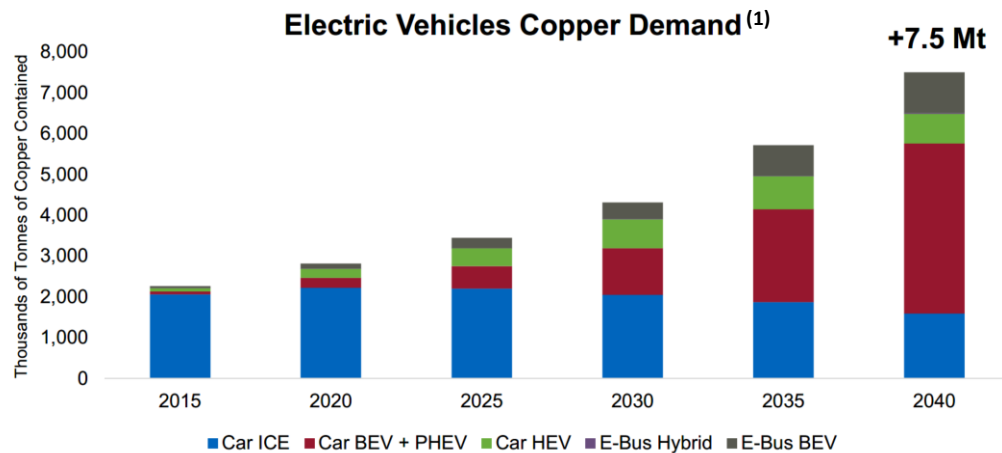
Stef Weber  
Chief Financial Officer



Jacques Janse van Rensburg  
Business Development Manager



# COPPER – RIGHT COMMODITY



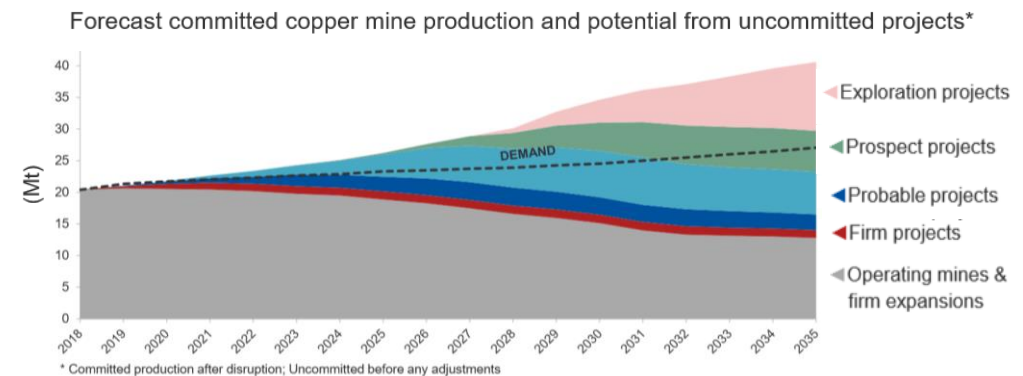
## STEADY DEMAND GROWTH

### DEMAND GROWTH

- › Chinese growth 2-3%; global growth 1-2% <sup>(1)</sup>
- › Expected growth in EV and EV infrastructure
- › Expected growth in renewable energy technology

## SUPPLY CONSTRAINED – PEAK PRODUCTION 2021<sup>(1)</sup>

- › Grade decline to continue, few new projects
- › Limited new discoveries; challenging jurisdictions



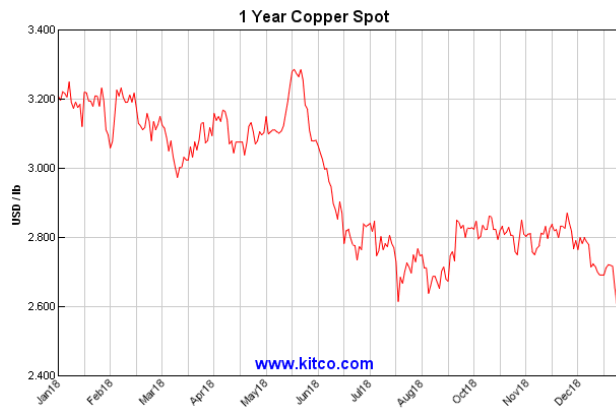
Source: CRU

Notes:

(1): Based on Teck presentations



# COPPER – RIGHT TIME



## STRENGTHENING PRICE ENVIRONMENT

**2018:** Average 2018 copper spot traded \$6,527/t

**2019:** copper spot expected at \$6,559/t <sup>(1)</sup>

**2020+:** copper spot \$7,000/t <sup>(2)</sup>

**T3 TARGET:** First production timed to take advantage of this

## Copper Supply Deficit Expected 2020 <sup>(2)</sup>



Notes:

- (1) Based on Bernstein Research
- (2) CRU projections