

# XANADU MINES

## Scoping Study - Kharmagtai Copper-Gold Project

6 April 2022

Xanadu Mines Ltd (**ASX: XAM, TSX: XAM**) (**Xanadu, XAM** or the **Company**) is pleased to announce the release of the Scoping Study (**Study**) for its flagship Kharmagtai Copper-Gold Project, based on an updated 2021 Mineral Resource Estimate, located in the South Gobi region of Mongolia. The Xanadu Board has endorsed this Study, and subject to funding, has approved progression to the Pre-Feasibility (**PFS**) Stage.

This Study confirms the potential of Kharmagtai as a globally significant, long life, low cost, low risk future copper-gold mine. It is based on conventional, low risk open pit mining and sulphide flotation, with low environmental, social and governance (**ESG**) risk, and supported by nearby rail, road and power links providing the potential for rapid development. Kharmagtai is well positioned to help fill the looming copper global supply gap driven by growing demand for an increasingly electrified economy.

### Highlights

#### Presented in 100% Terms (Xanadu share 76.5%)

- Confirms Kharmagtai as a potential world class, low cost, long life mine
- Estimated 20% IRR (range 16-25%), US\$630 million NPV @ 8% (range US\$ 405-850 million) and 4 year payback (range 4-7 years) over 30 year mine life
- Projected production ranges from 30-50ktpa copper and 5-110kozpa gold production during the first five years
- First quartile all-in sustaining (C1) costs of US\$1.02/lb Cu for first five years, net of by-product credits
- Conventional, low technical complexity open pit and process plant with low 0.9:1 strip ratio for first five years
- Located in sparsely populated, flat terrain, with nearby established rail, power and water links
- Pre-Feasibility Study expected to commence in Q3 CY2022 and complete in Q4 of CY2023
- Robust study outcomes, led by high quality advisory team

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**Xanadu's Executive Chairman and Managing Director, Mr Colin Moorhead, said** *"This Scoping Study is the result of years of hard work by the Xanadu team lead by Andrew Stewart, and confirms Kharmagtai as a world class copper asset, located in a region of the South Gobi which hosts several significant deposits, including those at Rio Tinto's Oyu Tolgoi mine. The future development of Kharmagtai into a long life, low cost, mine will provide significant value to our shareholders and multi-generation employment and economic opportunity for our stakeholders in Mongolia. The plain truth is that as the global economy decarbonises, the supply of copper cannot meet forecast demand. Development of large scale porphyry copper deposits will be urgently required, and with its competitive time to production and relatively low ESG risk, Kharmagtai is well positioned to move forward quickly. We are proud to demonstrate such a strong Project at Kharmagtai and are excited to move forward with its next stage of development."*

## Scoping Study

The Scoping Study is attached to this Announcement.

## Cautionary Statement

The Study attached to this Announcement has been undertaken to assess viability of developing the Kharmagtai Copper-Gold Project by constructing an open cut mine and processing facility to produce copper concentrate for export. It is a preliminary technical and economic study of the potential viability of the Kharmagtai Project. It is based on low level technical and economic assessments that are not sufficient to support the estimation of ore reserves. Further exploration and evaluation work and appropriate studies are required before Xanadu will be in a position to estimate any ore reserves or to provide any assurance of an economic development case.

The Study is based on the material assumptions set out in the attached Scoping Study. These include assumptions about the availability of funding. While Xanadu considers all of the material assumptions to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated by the Study will be achieved.

To achieve the range of outcomes indicated in the Study, funding of in the order of US\$700 million will likely be required. Investors should note that there is no certainty that Xanadu will be able to raise that amount of funding when needed. It is also possible that such funding may only be available on terms that may be dilutive to or otherwise affect the value of Xanadu's existing shares. It is also possible that Xanadu could pursue other 'value realisation' strategies such as a sale, partial sale or joint venture of the Project. If it does, this could materially reduce Xanadu's proportionate ownership of the Project.

Given the uncertainties involved, investors should not make any investment decisions based solely on the results of the Study.

There is a low level of geological confidence associated with inferred mineral resources and there is no certainty that further exploration work will result in the determination of indicated mineral resources or that the production target itself will be realised.

The Study attached to this Announcement is based on the December 2021 Mineral Resource Estimate<sup>1</sup>, is based on low-level technical and economic assessments, and is insufficient to support estimation of Ore Reserves or to provide assurance of an economic development case at this stage, or to provide certainty that the conclusions of the Study will be realised.

The Study has been completed to a level of accuracy of +/-35% in line with industry standard accuracy for this stage of development.

The Company has reasonable grounds for disclosing a Production Target, given that in the first seven years of production, 100% of the mill feed is scheduled from the Indicated Resource category, which exceeds the economic payback period for the Project by three years. Approximately 58% of the Life of Mine Production Target is in the Indicated Mineral Resource category, and 42% is in the Inferred Mineral Resource category. There is a lower level of geological confidence associated with Inferred Mineral Resources, and while the Company considers all the material assumptions in this Study to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated will be achieved.

The Mineral Resources underpinning the production target in the Study have been prepared by a Competent Person in accordance with the requirements of *Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (JORC Code (2012))*. The Competent Person's Statement is found in the Geology and Resources section of the Study. For full details of the Mineral Resource Estimate, please refer to Xanadu's ASX/TSX Announcement dated 25 February 2022. Xanadu confirms that it is not aware of any new information or data that materially affects the information included in that release. All material assumptions and technical parameters underpinning the estimates in that Announcement continue to apply and have not materially changed.

Note that unless otherwise stated, all currency in this Announcement is US dollars.

<sup>1</sup> ASX/TSX Announcement 28 February 2022 – Kharmagtai Technical Report

## Forward Looking Statements

Certain statements contained in this Announcement, including information as to the future financial or operating performance of Xanadu and its projects may also include statements which are 'forward-looking statements' that may include, amongst other things, statements regarding targets, estimates and assumptions in respect of mineral reserves and mineral resources and anticipated grades and recovery rates, production and prices, recovery costs and results, capital expenditures and are or may be based on assumptions and estimates related to future technical, economic, market, political, social and other conditions. These 'forward-looking statements' are necessarily based upon a number of estimates and assumptions that, while considered reasonable by Xanadu, are inherently subject to significant technical, business, economic, competitive, political and social uncertainties and contingencies and involve known and unknown risks and uncertainties that could cause actual events or results to differ materially from estimated or anticipated events or results reflected in such forward-looking statements.

Xanadu disclaims any intent or obligation to update publicly or release any revisions to any forward-looking statements, whether as a result of new information, future events, circumstances or results or otherwise after the date of this Announcement or to reflect the occurrence of unanticipated events, other than required by the *Corporations Act 2001* (Cth) and the Listing Rules of the Australian Securities Exchange (**ASX**) and Toronto Stock Exchange (**TSX**). The words 'believe', 'expect', 'anticipate', 'indicate', 'contemplate', 'target', 'plan', 'intends', 'continue', 'budget', 'estimate', 'may', 'will', 'schedule' and similar expressions identify forward-looking statements.

All 'forward-looking statements' made in this Announcement are qualified by the foregoing cautionary statements. Investors are cautioned that 'forward-looking statements' are not a guarantee of future performance and accordingly investors are cautioned not to put undue reliance on 'forward-looking statements' due to the inherent uncertainty therein.

Xanadu has concluded that it has a reasonable basis for providing these forward-looking statements and the forecast financial information included in this Announcement.

To achieve the range of Kharmagtai Copper-Gold Project outcomes indicated in the 2022 Study, funding of in the order of an approximately US\$700 million will likely be required by the Company.

Based on current market conditions and the results of studies undertaken, there are reasonable grounds to believe the Project can be financed via a combination of equity and debt, as has been done for numerous comparable projects in Mongolia and other jurisdictions in Asia in recent years. Debt may be secured from several sources including Australian banks, international banks, the high yield bond market, resource credit funds, and in conjunction with product sales of offtake agreements. It is also possible the Company may pursue alternative funding options, including undertaking a corporate transaction, seeking a joint venture partner or partial asset sale. There is, however, no certainty that Xanadu will be able to source funding as and when required.

Whilst no formal funding discussions have concluded, the Company has engaged with several potential financiers of the Kharmagtai Copper-Gold Project and these financial institutions and corporations have expressed an interest in being involved in funding of the Project.

This ASX Announcement has been prepared in compliance with the current JORC Code (2012) and the ASX Listing Rules. All material assumptions, including sufficient progression of all JORC modifying factors, on which the production target and forecast financial information are based have been included in this ASX Announcement.

## About Xanadu Mines

Xanadu is an ASX and TSX listed Exploration company operating in Mongolia. We give investors exposure to globally significant, large-scale copper-gold discoveries and low-cost inventory growth. Xanadu maintains a portfolio of exploration projects and remains one of the few junior explorers on the ASX or TSX who control a globally significant copper-gold deposit in our flagship Kharmagtai Project. For information on Xanadu visit: [www.xanadumines.com](http://www.xanadumines.com).

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This Announcement was authorised for release by Xanadu's Board of Directors.

XANADU MINES

Kharmagtai Copper-Gold Project

# Scoping Study **2022**



## CAUTIONARY STATEMENTS

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The Company has reasonable grounds for disclosing a Production Target, given that in the first seven years of production, 100% of the mill feed is scheduled from the Indicated Resource category, which exceeds the economic payback period for the project by 3 years. Approximately 55% of the Life of Mine Production Target is in the Indicated Mineral Resource category, and 45% is in the Inferred Mineral Resource category. There is a lower level of geological confidence associated with Inferred Mineral Resources, and while the Company considers all the material assumptions in this Study to be based on reasonable grounds, there is no certainty that they will prove to be correct or that the range of outcomes indicated will be achieved.

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Xanadu disclaims any intent or obligation to update publicly or release any revisions to any forward-looking statements, whether as a result of new information, future events, circumstances or results or otherwise after the date of this Study or to reflect the occurrence of unanticipated events, other than required by the Corporations Act 2001 (Cth) and the Listing Rules of the Australian Securities Exchange (ASX) and Toronto Stock Exchange (TSX). The words 'believe', 'expect', 'anticipate', 'indicate', 'contemplate', 'target', 'plan', 'intends', 'continue', 'budget', 'estimate', 'may', 'will', 'schedule' and similar expressions identify forward-looking statements.

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This ASX Study has been prepared in compliance with the current JORC Code (2012) and the ASX Listing Rules. All material assumptions, including sufficient progression of all JORC modifying factors, on which the production target and forecast financial information are based have been included in this ASX Study.



# Summary of Findings

Presented in 100% Terms (Xanadu share 76.5%)

Xanadu Mines Ltd (ASX:XAM, TSX:XAM) (**Xanadu, XAM** or the **Company**) is pleased to provide the Scoping Study (**Study**) for its flagship Kharmagtai Copper-Gold Project, based on an updated 2021 Mineral Resource Estimate, located in the South Gobi region of Mongolia.

## LARGE SCALE, LOW-COST COPPER AND GOLD PRODUCTION, IN AN ESTABLISHED MINING JURISDICTION

- Total ore processed of 760Mt, producing 1.5Mt of copper and 3.3Moz of gold
- Average annual production of 50kt copper and 110koz gold over the Life of Mine (**LOM**)
- Average annual production of 37kt copper and 110koz of gold for first five years
- First quartile all-in sustaining (C1) cost of US\$1.02/lb Cu for the first five years

## STRONG INVESTMENT RETURNS

- Estimated initial capital expenditure of approximately US\$690 million for pit development, process plant and infrastructure
- Internal Rate of Return (**IRR**) of 20%, after tax (range 16% to 25%)
- Payback of 4 years (range 4 to 7 years)
- 30 year mine life at an initial mill throughput of 15Mtpa, expanding to 30Mtpa
- Net Present Value (**NPV**) of US\$630 million (range US\$405 million to US\$850 million)

## LOW TECHNICAL COMPLEXITY

- Open pit mine, with low 0.9:1 strip ratio for first 5 years and 1.1:1 over LOM
- Limited (25-30Mt) pre-strip of oxidised material required
- Conventional gravity and flotation process plant
- Flat terrain enabling low risk tailings solution
- Grid power and rail links already in place near the tenement

## GLOBALLY COMPETITIVE TIME TO PRODUCTION

- Relatively low ESG risk due to sparse population and flat terrain permitting and approvals process established and achievable
- Established road, rail, power and water infrastructure
- Mining is an important part of the Mongolian economy, with well-educated population and access to required skills

## SIGNIFICANT UPSIDE OPPORTUNITIES

- Processing oxide ore types using glycine leach technology has potential to reduce stripping and generate early cash
- Application of new technologies such as in pit crush and convey, beneficiation, ore sorting, coarse particle separation and flotation, and electric mining equipment to increase size of pits and extend mine life
- Exploration Upside with mineralisation open in all directions, potential to grow the resource and extend higher-grade zones
- Potential for future mass underground mining to access deeper higher grade zones

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The Study underpins Xanadu's Board decision to gate the project to Pre-Feasibility Study (**PFS**). Parallel studies are underway to assess further upside at depth, considering high grade found in deeper drill holes, and for new discoveries across the district. Similar to other large porphyry copper districts, Xanadu expects there to be significant opportunity for future growth and value creation over the mine life.

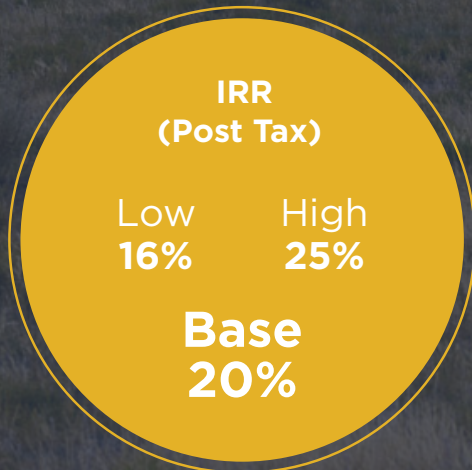
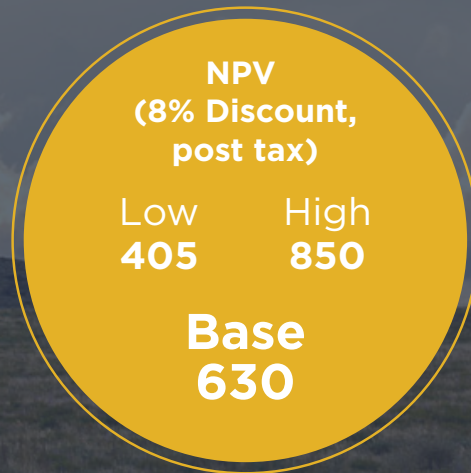
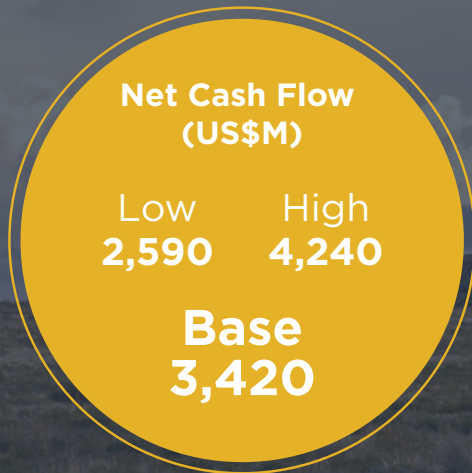
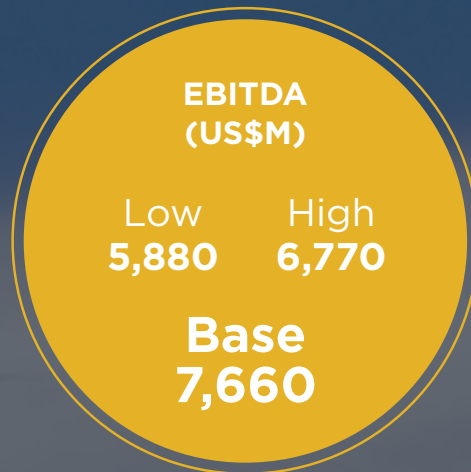
The next major project milestone will be the Kharmagtai PFS, planned to commence in Q2 2022 and expected to complete in Q4 of 2023, subject to funding.



# Key Study Findings

Presented in 100% Terms (Xanadu share 76.5%)

\* Ranges are based on flexing copper price, gold price, and capital expenditure (capex). The low case scenario assumes gold by-products are a weak natural hedge of gold against copper, with copper price -10%, capex +10%, and gold price +5%. The high case represents the inverse of these assumptions.



Area	Measure	Unit	Stage 1 Initial	Stage 2 Expansion	LOM
Production	Period	Years	5	25	30
	Ore process rate	Mtpa	15	30	15-30
	Feed from Indicated Resource	%	100%	50%	55%
	Ore processed	Mt	70	690	760
	Average copper grade	%	0.29	0.21	0.21
	Average gold grade	g/t	0.30	0.16	0.18
	Copper produced	Mt	0.2	1.3	1.5
	Gold produced	Moz	0.5	2.8	3.3
Capital	Project Capital	US\$M	690	620	1,310
	Sustaining Capital	US\$M	40	530	570
Operating Cost	All In Sustaining Costs	US\$/lb	1.02	1.99	1.87
Economic Assumptions	Copper Price	US\$/lb	4.00	4.00	4.00
	Gold Price	US\$/oz	1,700	1,700	1,700
Financials (after tax)	Net Present Value (NPV) @ 8%	US\$M			630
	Internal Rate of Return (IRR)	% (real)			20
	Capital Payback	Years	4	1	4
	Free Cash Flow (after tax)	US\$M (real)	155	3,260	3,420

The 2022 Scoping Study (versus 2018 Scoping Study) is based on a more tightly defined Mineral Resource with an approximate doubling of the higher-grade core under Stockwork Hill and by a much higher gold to copper ratio.

This enabled a mine schedule to be developed to process only indicated material in the first seven years of operation.

Copper and gold recoveries increased based on additional metallurgical testwork and refinement of the plant design. Processing rate was reduced to 15Mtpa to optimise capital efficiency, and total capital increased to enable future expansion in both the plant and mine operations, facilitating a faster payback of initial capital.

## PRIOR STUDIES

Presented in 100% Terms (Xanadu share 76.5%)

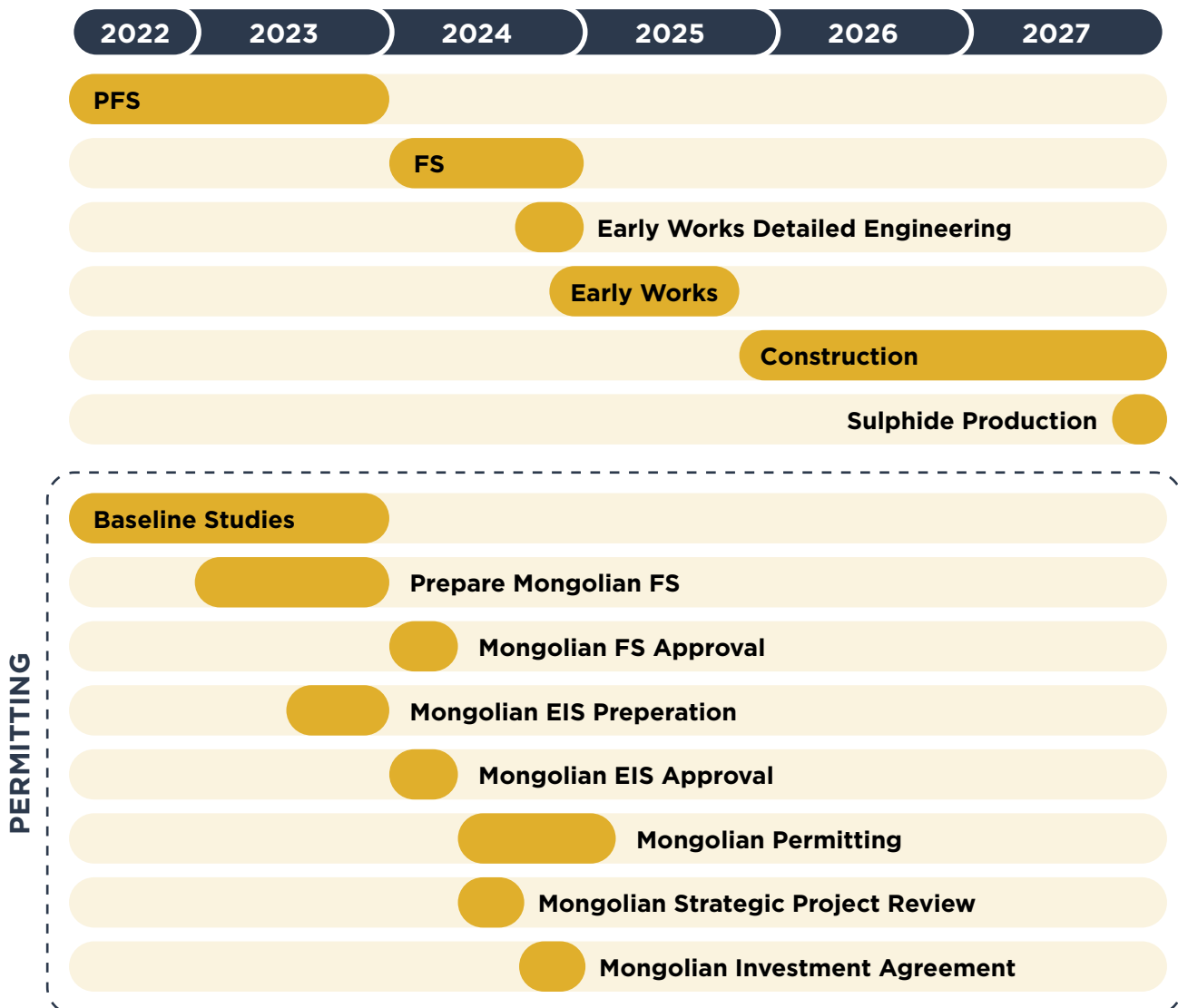
Comparison to Prior Studies	2022 Scoping Study	2018 Scoping Study <sup>2</sup>
Establishment Capex (US\$M)	<b>690</b>	484
Copper Recovery (%)	<b>90</b>	85
Gold Recovery (%)	<b>77.5</b>	70
Processing Rate (Mtpa)	<b>15 - 30</b>	20
NPV (8% discount, post tax)	<b>630</b>	NR*
IRR (post tax)	<b>20%</b>	NR*
Capital Payback Period	<b>4 years</b>	NR*

\* Production target and economics not reported in 2018 Scoping Study due to relatively lower % Indicated material in the schedule

*2 ASX/TSX Announcement 11 April 2019 - Kharmagtai Open Pit Scoping Study Completed*

## PROJECT TIMELINE

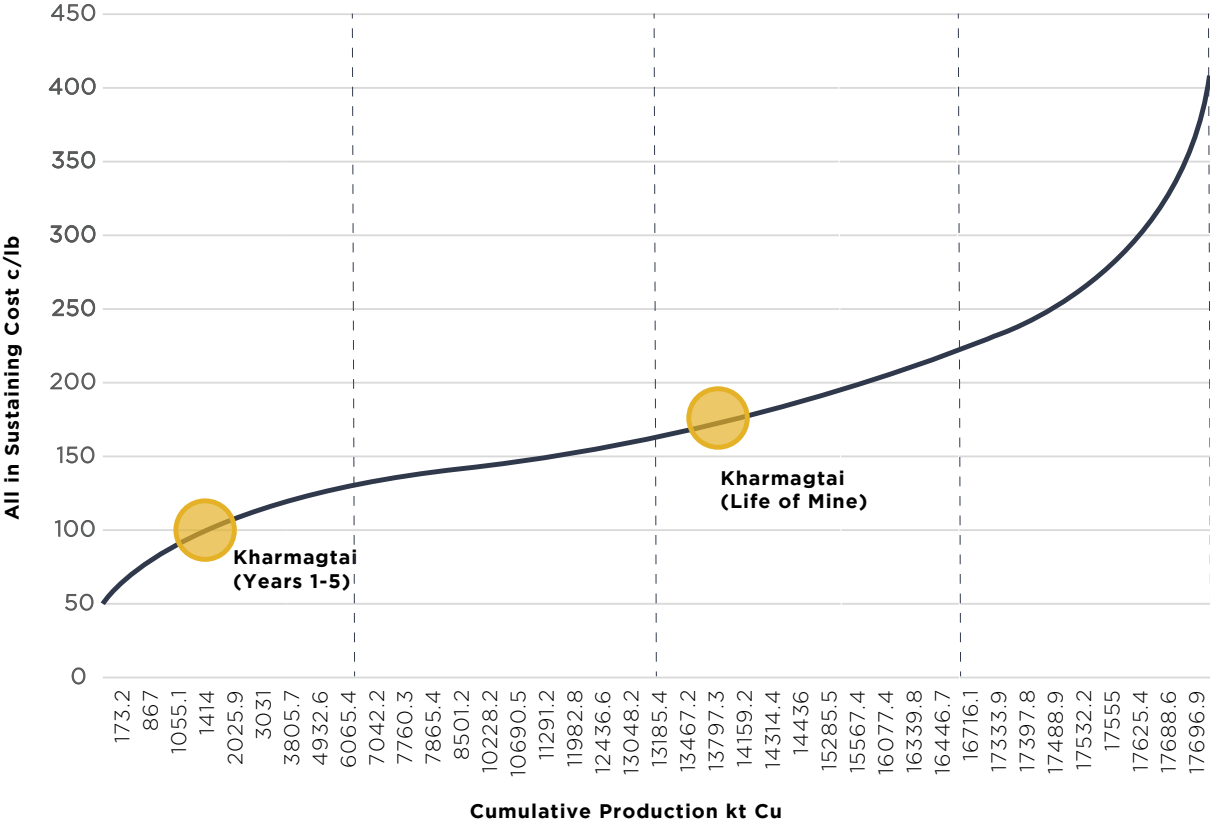
An indicative summary of key expected milestones is summarised as follows:



# LOW COST PRODUCER

The Kharmagtai project will operate in the first quartile of industry copper producers for the first five years, after which it will operate in the lower part of the third quartile for the next 25 years. This low cost ensures its viability as a long-life project.

## XANADU POSITION ON THE COST CURVE



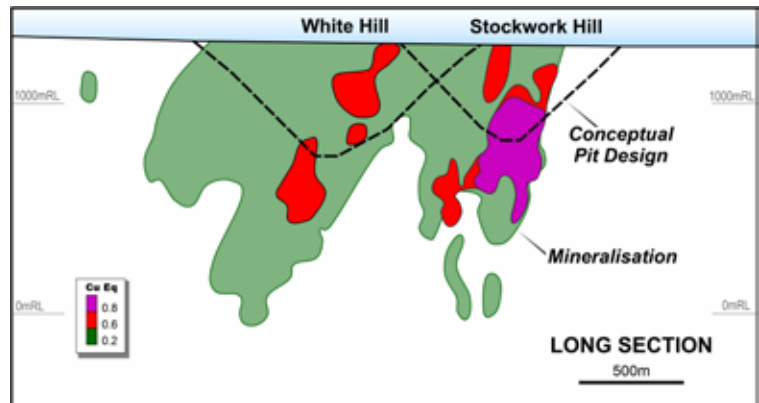
# Upside Opportunities

## OXIDE PROCESSING

This Scoping Study was based on mining and processing the sulphide resource only. However, there is outcropping oxide mineralisation above the sulphide resource, ranging from 20 to 30 metres, which could be processed to generate early cash and effectively remove some pre-stripping cost from the project. During the first year, 25-30Mt of pre-stripping is required, which includes this oxide material. Metallurgy test work is underway to assess the opportunity using glycine leach technology. This will be fully evaluated in Pre-Feasibility.

## TECHNOLOGY

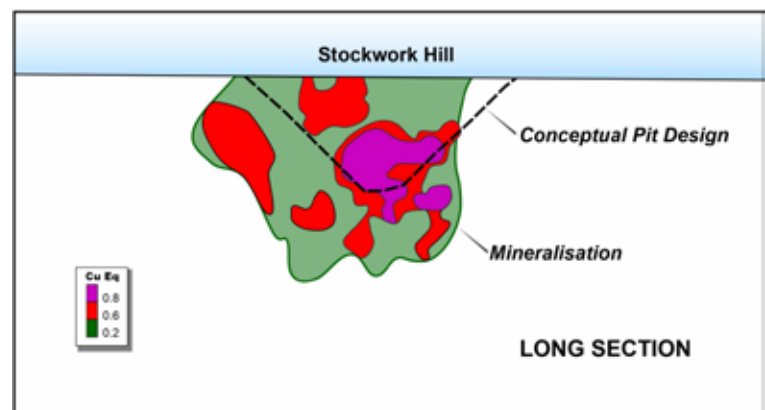
This Scoping Study was developed based on an operation that uses low risk, conventional and proven technology. However, there is real potential to utilise technology such as electrified mining equipment, in pit crush and convey to reduce haulage costs, beneficiation, ore sorting, coarse particle separation and flotation, and to reduce milling costs, and advanced multi-spectral imagery to improve Resource to Reserve conversion. The opportunity is to enable lower cost, deeper pits that capture a greater proportion of the higher-grade bornite zones at depth. These options will be evaluated during the PFS.



*Kharmagtai Resource within Open Pit in Long Section*

## EXPLORATION UPSIDE

The Kharmagtai Mineral Resource remains open in all directions. Deeper drilling at Stockwork Hill, after the Mineral Resource Estimate was completed, confirms the continuation of higher-grade bornite mineralisation at depth. There is significant potential to grow the scale of the White Hill Resource, and there are many untested targets across the Tenement.



*Stockwork Hill Long Section Showing current resource, proposed open pit and high-grade blocks below pit outline which are open along strike and at depth.*

# Risks & Mitigating Actions

## **TECHNICAL**

The Scoping Study assessed the project based on conventional well proven equipment and technology to minimise the technical risk.

## **INFRASTRUCTURE**

Rail, water, communications and power infrastructure are all proximate to the Kharmagtai project. Much of this was established by the Government of Mongolia to facilitate development of the mining industry in the South Gobi region with Kharmagtai and other projects in mind. With flat terrain and low population, expanding this infrastructure to support Kharmagtai will be relatively low cost and risk.

## **PERMITTING AND ESG**

The South Gobi is the least populated region in the least populated country in the world, and the Government of Mongolia is developing infrastructure to support the mining industry. Xanadu has established strong relationships with regional communities near Kharmagtai which are well described in our Sustainability Report, available on Xanadu's website, [www.xanadumines.com](http://www.xanadumines.com).

## **FUNDING**

The project will require significant funds to be raised to complete the studies to construct the project. Xanadu is seeking a global mining partner to assist in funding the project and will also engage with equity and debt markets as required to progress the project. Engagement with these parties is ongoing and, many have already expressed interest in funding the project.



# Copper Market

## MARKET AND METALS PRICING ASSUMPTIONS

The 12-month price range for copper reached a low of US\$4.04/lb and a high of US\$4.94/lb. A price assumption of US\$4.00/lb has been applied to the calculations for the 2022 Scoping Study, viewed as conservative when balanced against higher market forecasts and exceptionally strong pricing conditions, low inventories, momentum shifts following the COVID-19 pandemic and subsequent stimulus packages, and expectations for continuing increase in medium to long term demand due to carbon reduction energy policies.

The 12-month price range for gold reached a low of US\$1,814/oz and a high of US\$2,008/oz. Gold is a key by-product for Kharmagtai, and a price assumption of US\$1,700/oz has been applied to the calculations of the 2022 Scoping Study. This is considered conservative based on long term gold demand growth, market pricing forecasts, and noting the last time gold was below US\$1,700/oz was December 2019.

## COPPER PRICE FUNDAMENTALS

- Global electrification to enable advanced technology and meet low carbon regulation, with key demands for smart buildings and electric vehicles (EV).
- Declining global production and increasing production costs.
- Copper prices are near 10 year highs at US\$4.70/lb.
- S&P Global Market Intelligence compiles consensus price forecast to remain above US\$4.08 beyond 2026<sup>3</sup>

## SUPPLY FACTORS

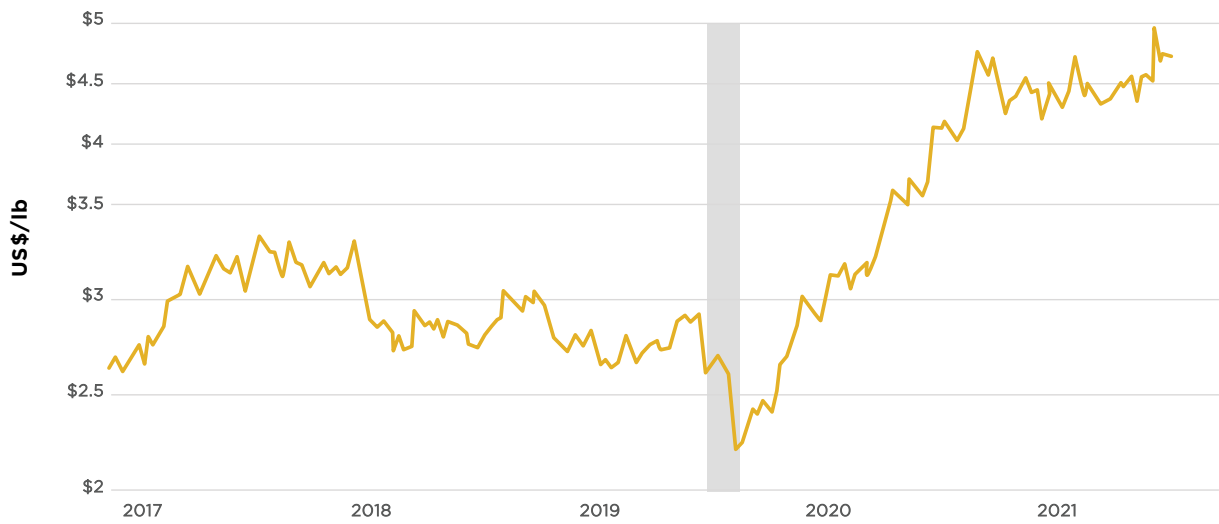
- Copper supply-side experiencing grade reduction and resource depletion.
- Well reported shortage of high-quality copper concentrate projects ready for development.
- RFC Ambrian highlights 75 new mines must come online in the next 8 years to balance the market, with supply deficit valued at 10 times the total forecast value of the global lithium market in 2028<sup>4</sup>
- Lack of new, large scale, long life discoveries
- Reduced exploration by Copper Majors, and increased reliance on acquisitions
- Key global sources are considered less stable, notably Chile

## DEMAND FACTORS

- Increasing copper demand in response to industrialisation and rising living standards globally
- Environmental policies (carbon reduction) drive 'green' technology megatrends of electrification and displacing fossil fuel use
- Urbanisation of developing nations populations including China and India
- Cities moving to smart, green infrastructure, requiring increased IT systems, energy efficiency, and high copper intensity design
- Electrification of transport including electric vehicles which require 2.6x the copper of internal combustion engines
- Growth in renewable energy technology 30-40% annually, requiring up to 60% more copper than traditional generation

<sup>3</sup> S&P Global Market Intelligence, January 2022 - [spglobal.com/marketintelligence/en/news-insights/research/consensus-price-forecasts-base-metals-buoyant-precious-dip-on-hawkish-fed](https://spglobal.com/marketintelligence/en/news-insights/research/consensus-price-forecasts-base-metals-buoyant-precious-dip-on-hawkish-fed)

<sup>4</sup> ASX/TSX Announcement 28 February 2022 - Kharmagtai Technical Report

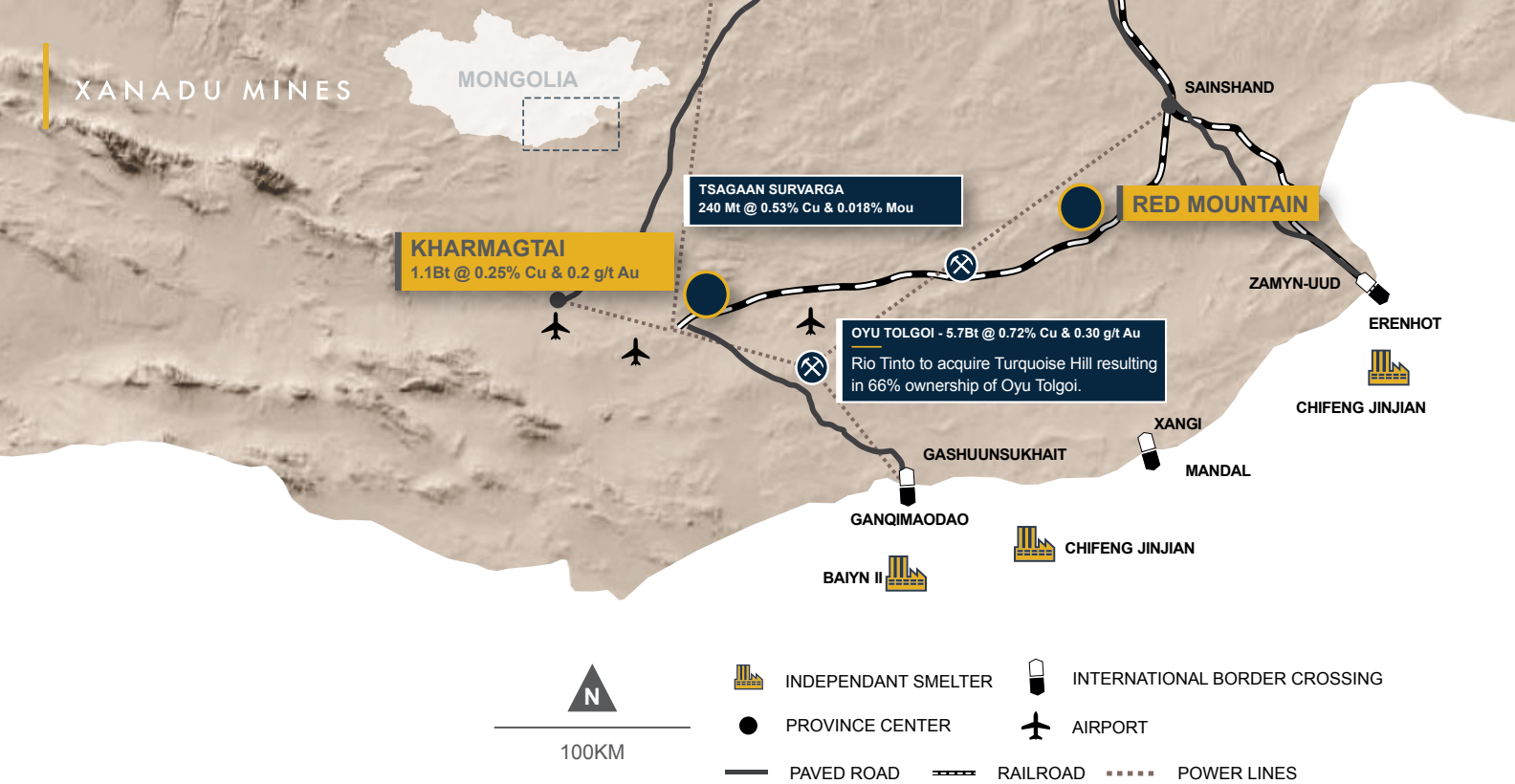


Five Year Copper Price Trend - source Macrotrends.net



Five year Gold Price Trend - Macrotrends.net





# Project Description

**Xanadu is the operator of the Kharmagtai Copper-Gold Project (Project) which is owned 76.5% by Xanadu, 13.5% by Xanadu Executive Director Ganbayar Lkagvasuren, and 10% by QGX Ltd. The Project is in the South Gobi region of Mongolia and is in the exploration and evaluation stage of development.**

## LOCATION OF KHARMAGTAI IN MONGOLIA AND THE SOUTH GOBI

Xanadu's 2018 Scoping Study, published April 2019<sup>5</sup> demonstrated the Kharmagtai project was amenable to open pit mining with a conventional copper-gold concentrator. Potential upsides in the 2018 Study included resource extensions, underground mining of higher grade mineralisation and processing of surficial oxide mineralisation. Xanadu then

completed an additional 61.5km of diamond drilling and updated the JORC Mineral Resource Estimate (**MRE**) in December 2021<sup>6</sup>. The new MRE doubled the higher grade zones to 100Mt @ 0.8%CuEq and increased the total resource to >1.1Bt. Xanadu also initiated testwork on processing the oxide mineralisation to recover copper and gold.

This 2022 Scoping Study is based on the December 2021 JORC MRE and demonstrated that Kharmagtai is amenable to larger scale open pit mining with conventional ore processing and improved project economics.

The mine would include open pits at the Stockwork Hill, White Hill, Copper Hill, Zephyr and Golden Eagle deposits. Most of the resource is in the White Hill and Stockwork Hill deposits and these two pits eventually merge into a super pit.

<sup>5</sup> ASX/TSX Announcement 11 April 2019 - Kharmagtai Open Pit Scoping Study Completed

<sup>6</sup> ASX/TSX Announcement 8 December 2021 - Kharmagtai Resource Grows to 1.1 Billion Tonnes

The sulphide mineralisation to be processed in the concentrator is overlain by oxide mineralisation. Processing this material could further enhance the project economics with early cash flow and effectively pre-stripping the sulphide mineralisation. Testwork has been commissioned on the glycine leach process to recover copper and gold from the oxide mineralisation.

For simplicity the Scoping Study assumed a conventional diesel powered mining fleet. The PFS will investigate electrification and opportunities for in-pit crushing and conveying to reduce the mining operating cost and enable the open pits to access deeper mineralisation.

The process plant will use a conventional design comprising a stockpile, primary crusher, semi-autogenous grinding (**SAG**) mill, gravity gold recovery and flotation to produce a copper-gold concentrate for sale. Assessment of the preliminary metallurgical testwork suggests the largest throughput achievable with a conventional single train comminution circuit is 15Mtpa.

The Scoping Study base case commences processing at 15Mtpa and, following payback and net cash generation, adds a second train to expand throughput to 30Mtpa. Processing and mining rate trade-offs will be further evaluated during Pre-Feasibility.

Power could initially be sourced from an existing 35kV transmission line that pass within 15km of the site and then upgraded with a 40Km 110kV line from the existing line between the proposed Tavan Tolgoi power plant and Ulaanbaatar. Concentrate transport will be via rail, using the line that also passes within 15km of the site. Water is expected to be supplied from a well field to the north of the project.

A range of engagement and consultation will be undertaken with regional communities and the Government of Mongolia, including negotiation of a Kharmagtai Investment Agreement, using the Oyu Tolgoi agreement as a model.

Xanadu has identified a pathway to obtain the required regulatory approvals for the Project and through PFS will actively engage with government agencies in relation to approvals required to execute the project.

Open pit mining is envisioned to start in Q1 2027 with ore processing in Q4 2027. The mine life of approximately 30 years would provide significant employment, revenue and other opportunities for South Gobi regional communities and for Mongolia.



# Geology and Resources

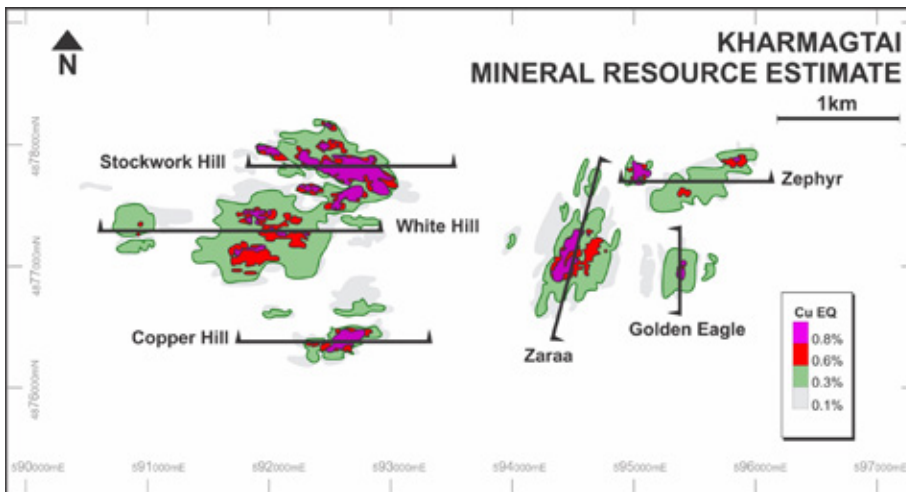
Presented in 100% Terms (Xanadu share 76.5%)

Kharmagtai consists of multiple co-genetic gold-rich porphyry copper centres and tourmaline breccia pipes occurring within the Carboniferous Kharmagtai Igneous Complex. The Kharmagtai Igneous Complex consists of a series of intrusive bodies ranging between diorite through monzodiorite, quartz-monzodiorite to monzonite and granodiorite compositions.

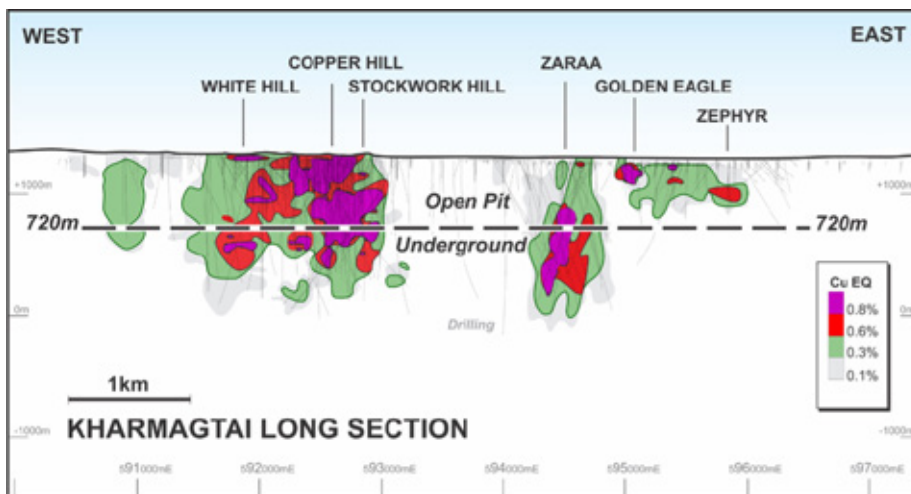
There are three styles of mineralisation at Kharmagtai; porphyry style stock work Cu-Au mineralisation, tourmaline breccia style Cu-Au mineralisation and epithermal gold associated with carbonate base metal veins.

The Resource models are well understood and there is substantial upside potential to be realised by better understanding the economics of the deposit. As demonstrated in the images below, significant volumes of mineralisation have been modelled that fall outside of the constraining wire frames on figures.

These parts of the model will be targeted for further investigation through economic studies to assess if more of this material can be brought into the Mineral Resource.



Plan view of the Kharmagtai district, displaying the Mineral Resource Estimate.



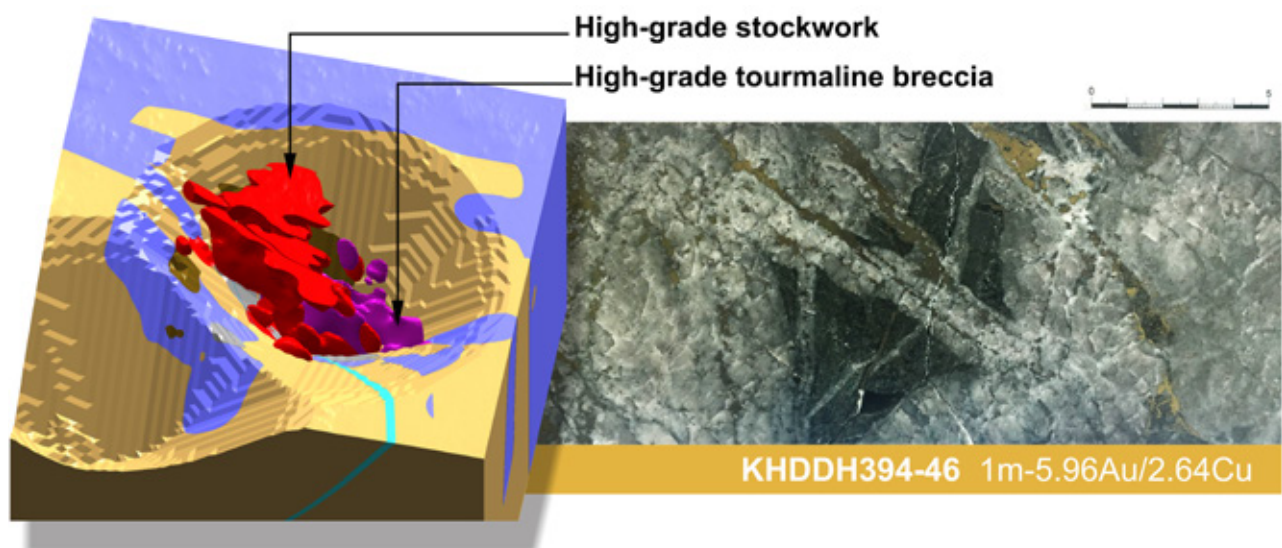
Long-section of the Kharmagtai district, displaying the Mineral Resource Estimate extents in relation to drilling, showing notional 720mRL split between potential open pit and underground.

# KHARMAGTAI MINERAL RESOURCE ESTIMATE

Deposit	Classification	Tonnes (Mt)	Grades			Contained Metal			
			CuEqRec (%)	Cu (%)	Au (g/t)	CuEqRec (Mlbs)	CuEqRec (Kt)	Cu (Kt)	Au (Koz)
Open Pit	Indicated	379	0.4	0.3	0.2	3,260	1,480	1,000	3,000
	Inferred	374	0.3	0.2	0.2	2,450	1,110	760	2,300
Underground	Indicated	76	0.5	0.3	0.3	818	370	250	700
	Inferred	290	0.4	0.3	0.2	2,690	1,220	920	1,800

- CuEq accounts for Au value and CuEq kt must not be totalled to Au ounces
- Figures may not sum due to rounding
- Significant figures do not imply an added level of precision
- Resource constrained by 0.1%CuEqRec reporting solid in line with geological analysis by XAM
- Resource constrained by open cut above nominated mRL level by deposit as follows SH>=720mRL, WH>=915mRL, CH>=1100mRL, ZA>=920mRL, ZE>=945mRL and GE>=845mRL
- Resource constrained by underground below nominated mRL level by deposit as follows SH<720mRL, WH<915mRL, CH<1100mRL, ZA<920mRL, ZE<945mRL and GE<845mRL
- CuEq equation  $(CuEq=Cu+Au*0.60049*0.86667)$  where Au at USD\$1400/oz and Cu at USD\$3.4/lb was employed according to the Clients' (XAM) direction.
- Au recovery is relative with Cu rec=90% and Au rec=78% (rel Au rec=78/90=86.667% with number according to the Clients' (XM) direction

Higher-grade zones at Kharmagtai are generally in tourmaline breccia and stockwork zones, as shown in the figure below. Increasing bornite and higher gold to copper ratios are observed at depth.



High grade mineralisation at Stockwork Hill

## COMPETENT PERSON STATEMENT

The information in this Study that relates to Mineral Resources is based on information compiled by Mr Robert Spiers, who is responsible for the Mineral Resource estimate. Mr Spiers is a full time Principal Geologist employed by Spiers Geological Consultants (SGC) and is a Member of the Australian Institute of Geoscientists. He has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity he is undertaking to qualify as the Qualified Person as defined in the CIM Guidelines and National Instrument 43-101 and as a Competent Person under JORC Code 2012. Mr Spiers consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

The information in this Study that relates to exploration results is based on information compiled by Dr Andrew Stewart, who is

responsible for the exploration data, comments on exploration target sizes, QA/QC and geological interpretation and information. Dr Stewart, who is an employee of Xanadu and is a Member of the Australasian Institute of Geoscientists, has sufficient experience relevant to the style of mineralisation and type of deposit under consideration and to the activity he is undertaking to qualify as the Competent Person as defined in the 2012 Edition of the Australasian Code for Reporting Exploration Results, Mineral Resources and Ore Reserves and the National Instrument 43-101. Dr Stewart consents to the inclusion in the report of the matters based on this information in the form and context in which it appears.

## MINERAL RESOURCES AND ORE RESERVES REPORTING REQUIREMENTS

The 2012 Edition of the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (the JORC Code 2012) sets out minimum standards, recommendations and guidelines for Public Reporting in Australasia of Exploration Results, Mineral Resources and Ore Reserves. The information contained in this Study has been presented in accordance with the JORC Code 2012.

The information in this Study relates to the exploration results previously reported in ASX Announcements which are available on the Xanadu website at:

<https://www.xanadumines.com/site/investor-centre/asx-announcements>

The Company is not aware of any new, material information or data that is not included in those market announcements.



# Mining Operations

Presented in 100% Terms  
(Xanadu share 76.5%)

The operation is configured as an open pit mine to achieve the highest value, lowest cost, lowest complexity, and most rapid development option. The Scoping Study assumes an owner-operator model for mining operations.

## MINING PARAMETERS

Mine planning is based on 10m benches consistent with the current resource model. Optimisation of the Selective Mining Unit including bench height will be addressed in the PFS. Grade control will be undertaken from sampling of blasthole cuttings assayed in the on-site laboratory.

The Scoping Study assumed mining will be a conventional drill, blast, load and haul operation. The primary mining fleet comprises 550t diesel hydraulic shovels loading 220t capacity haul trucks as a well-proven, flexible and efficient match suited to the planned scale of operations. Supplemental primary loading capacity and stockpile reclaim will be provided by 20m<sup>3</sup> capacity wheel loaders.

For this Scoping Study assessment, no additional estimate was made for mining dilution and loss due to the gradational nature of the deposit. It was also assumed that with this style of mineralisation the geological model incorporates some level of dilution

## GEOTECHNICAL INVESTIGATION

Xanadu engaged Red Rock Geotechnical Pty Ltd (**RRG**) to undertake geotechnical analysis of the drilling data for the project. RRG compiled the logging data from some 187km of diamond drilling across the six deposits to develop an understanding of the rock mass character and recommend indicative slope angles for the pit optimisation study. Slopes recommended by deposit ranged from 30 to 44 degrees in the oxide zone, 46 degrees in the transition zone and 47 to 50 degrees in the fresh zone.

## **PIT OPTIMISATION**

Xanadu engaged Whittle Consulting Pty Ltd to perform pit optimisations, which were undertaken with Dassault Systèmes Geovia Whittle™ software to determine the inventories to be mined, and to develop pit phasing strategies.

The process generates a set of nested pit shells by varying the “Revenue Factor”: (i.e. metal price assumption). Selected shells are used for the intermediate phases and the ultimate pits.

The six resource models were merged because the pit shells for several of the deposits overlapped.

The sub-block model was re-blocked into a 20m x 20m x 10m framework retaining the sub-block data as individual parcels.

Allowance for haul roads was made by using overall slope angles that were flatter than the prescribed maximum slope angle for each domain.

A minimum mining width of 80m was respected, and the intermediate pit shells adjusted where required.

Mining variable costs differed by deposit, depth and destination. Processing variable cost and recovery were applied equally to all material processed. All fixed/period costs were applied to processing tonnes as the ore processing plant is the primary bottleneck in the operation.

Phase selection and skin analysis were performed on the deposits both individually and in combination.

Stockwork Hill and White Hill phases overlapped considerably. The common areas were treated as a set of wedges to be mined when either of the deposits’ phases required, depending in which phase was scheduled first.

The result was a total of 16 phases plus 13 wedges across the 5 deposits. An economic pit could not be defined for the Zara deposit based on the assumed costs and metal prices.

## **MINE SCHEDULING, CUT-OFF AND STOCKPILING**

The resulting phases (or cutbacks) were scheduled by year over the life-of-mine using Whittle Consulting’s proprietary Prober-ETM software for a variety of scenarios.

Blocks on each bench of each pit phase were consolidated into “bins” by Resource Category (Indicated, Inferred), rock type (oxide, sulphide) and by a range of copper equivalent grades in steps of 0.1% up to 1.5%.

Each Prober-E run determines the multi-mine mining sequence and rate, elevated cut-off to the plant by “bin” varying over time, and stockpiling of lower grade material for processing later, to maximise NPV using the Study assumptions and constraints.

## **RESULTS**

The selected case for valuation used mining capacity staged from 38Mtpa to 76Mtpa with a vertical rate of advance limited to 100Mtpa, and a processing capacity staged from 15Mtpa to 30Mtpa.

Only sulphide ore is processed, oxide is treated as waste.

Only Indicated resource was permitted to be processed in the first seven years of production to ensure project viability is not dependent on processing Inferred resource.

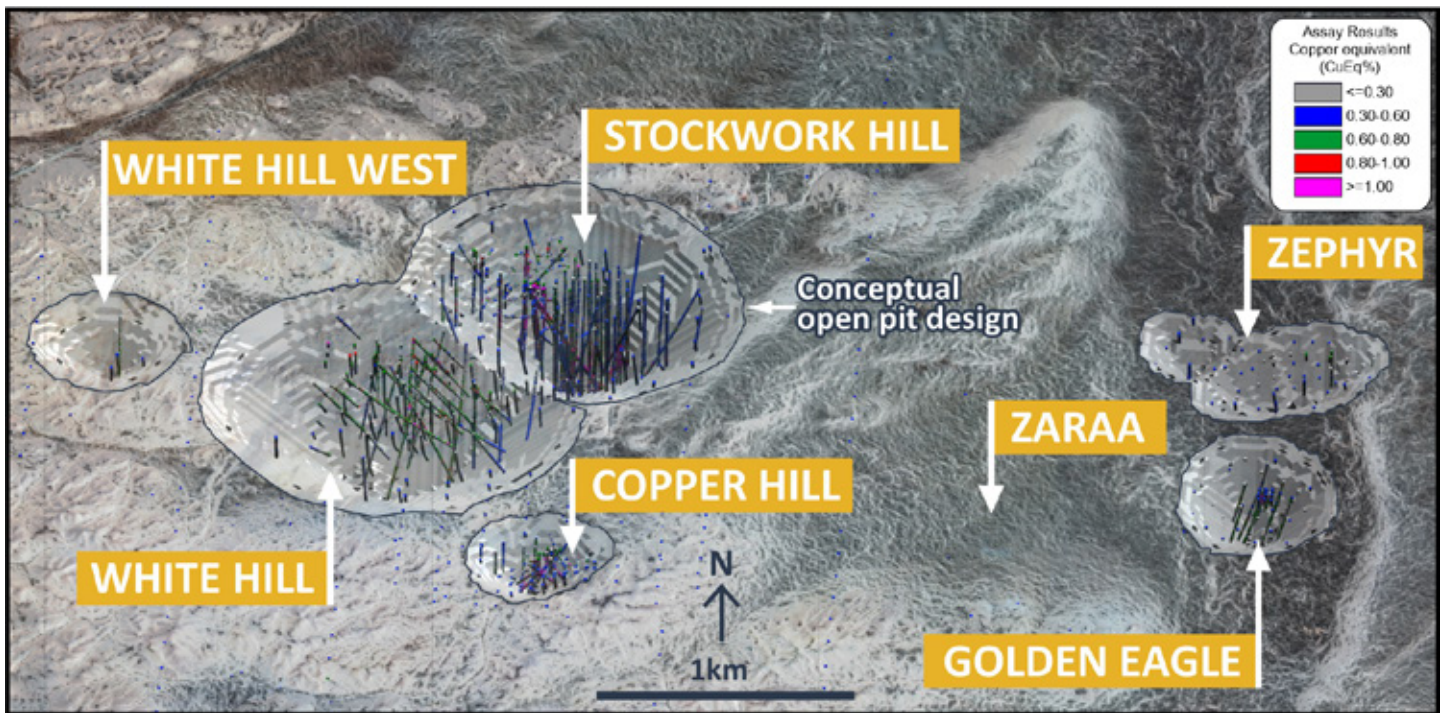
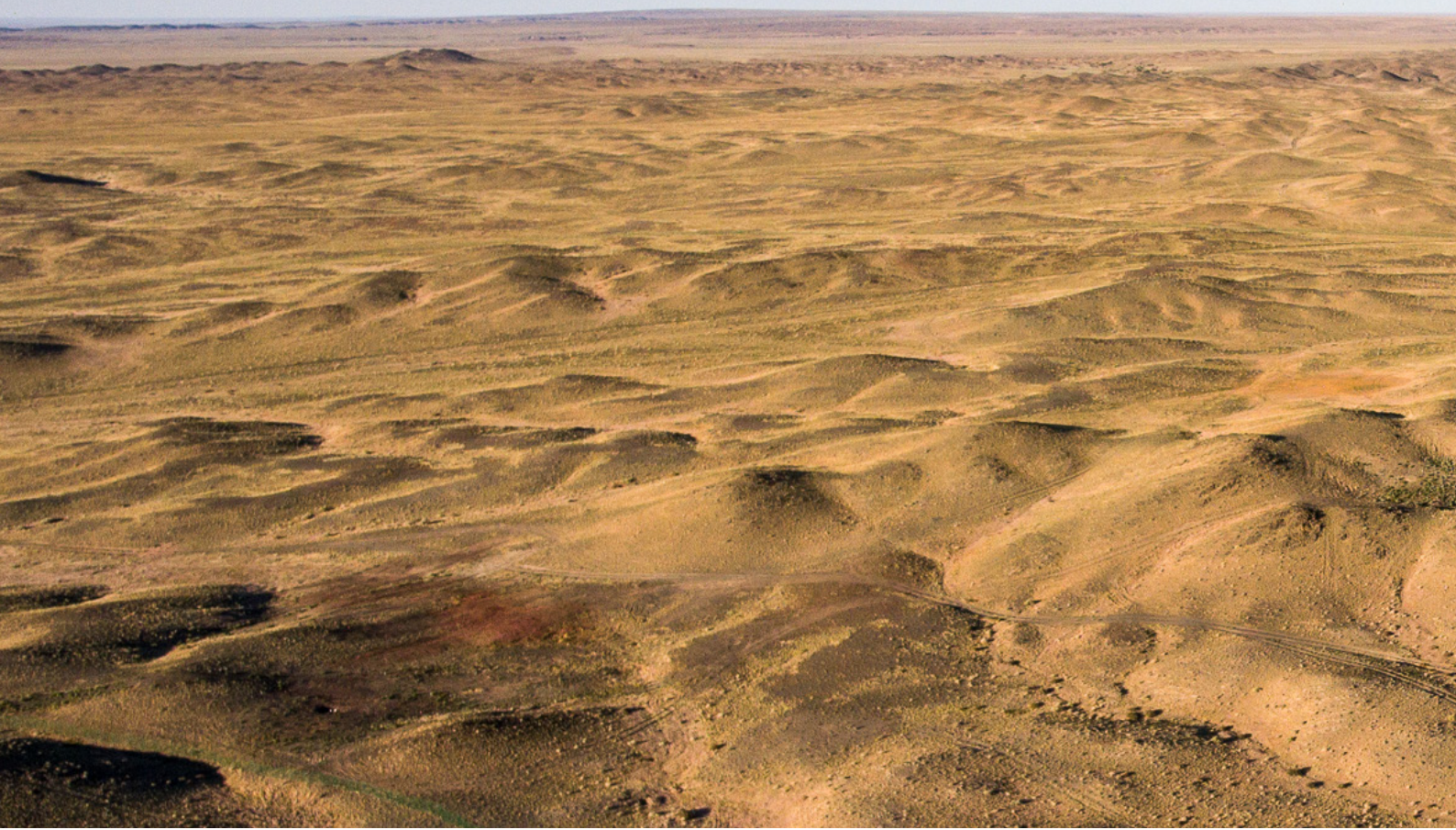
The outcome for the selected case is a multi-mine schedule mining 840M tonnes of waste, processing 760M tonnes of ore over 30 years of production to produce 1.5Mt of copper in concentrate and 3.3Moz oz of gold in concentrate and bullion.

Higher-grade ore is prioritised by using a varying elevated cut-off grade to the plant, with 155M tonnes of cash positive material stockpiled for processing in later years.

## **PRODUCTION SCHEDULES**

Mine and process plant production schedules are shown in the following table and charts. Mining is focused on delivering the highest-grade resource to the plant early in the mine life and hence stockpiling is implemented. The peak mining rate in the early phase is limited to 38Mtpa which is later expanded to 76Mtpa to match the process plant expansion. Throughout the mine life a low waste strip ratio is maintained leading to a life of mine average of 1.1:1. Total waste mined is 840Mt, total ore mined and processed is 760Mt. The first seven years of the schedule has excluded any Inferred resource while the overall ore schedule includes 45% Inferred resource.







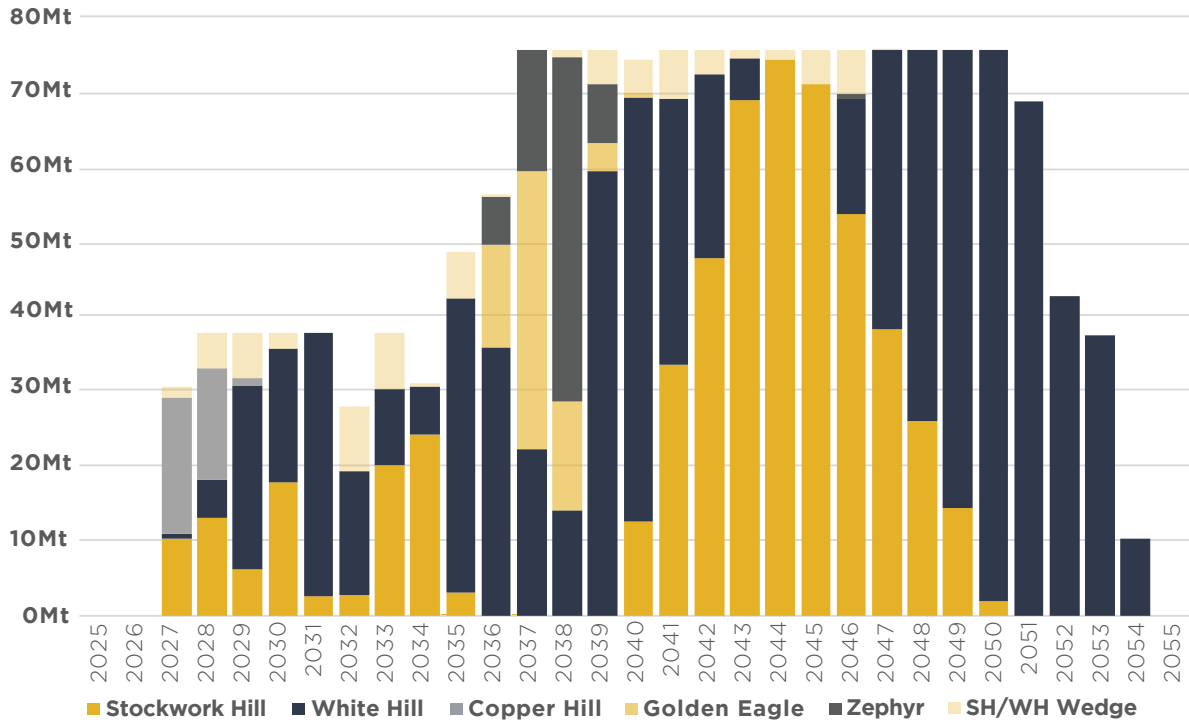
### SUMMARY MINE AND PROCESS PLANT PRODUCTION

		Initial 5 Years	Expansion 21 Years	LOM
Waste Mined (including pre-strip)	Mt	100	740	840
Ore Mined	Mt	110	650	760
Strip Ratio	waste:ore	0.9:1	1.1:1	1.1:1
Ore Processed	Mt	70	690	760
Average Cu Grade	%	0.29	0.21	0.21
Average Au Grade	g/t	0.30	0.16	0.18
Copper Produced	Mt	0.2	1.3	1.5
Gold Produced	Moz	0.5	2.8	3.3

Annual mine production by pit is shown in the following figure, highlighting the first phase and second phase to match the process plant expansion.

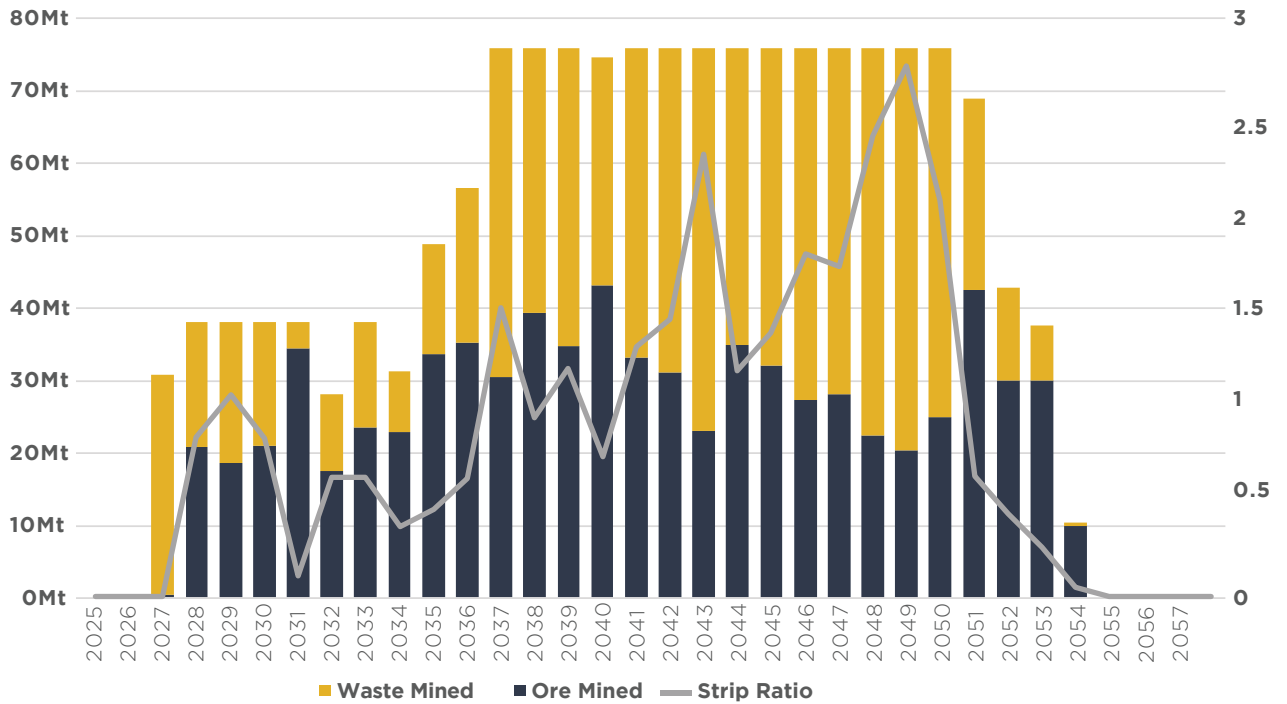
During most years, mining activities are occurring in two or three pits concurrently. Only one pre-strip year is required (2027) due to the shallow nature of the sulphide mineralisation.

**ANNUAL MINING SCHEDULE BY PIT**



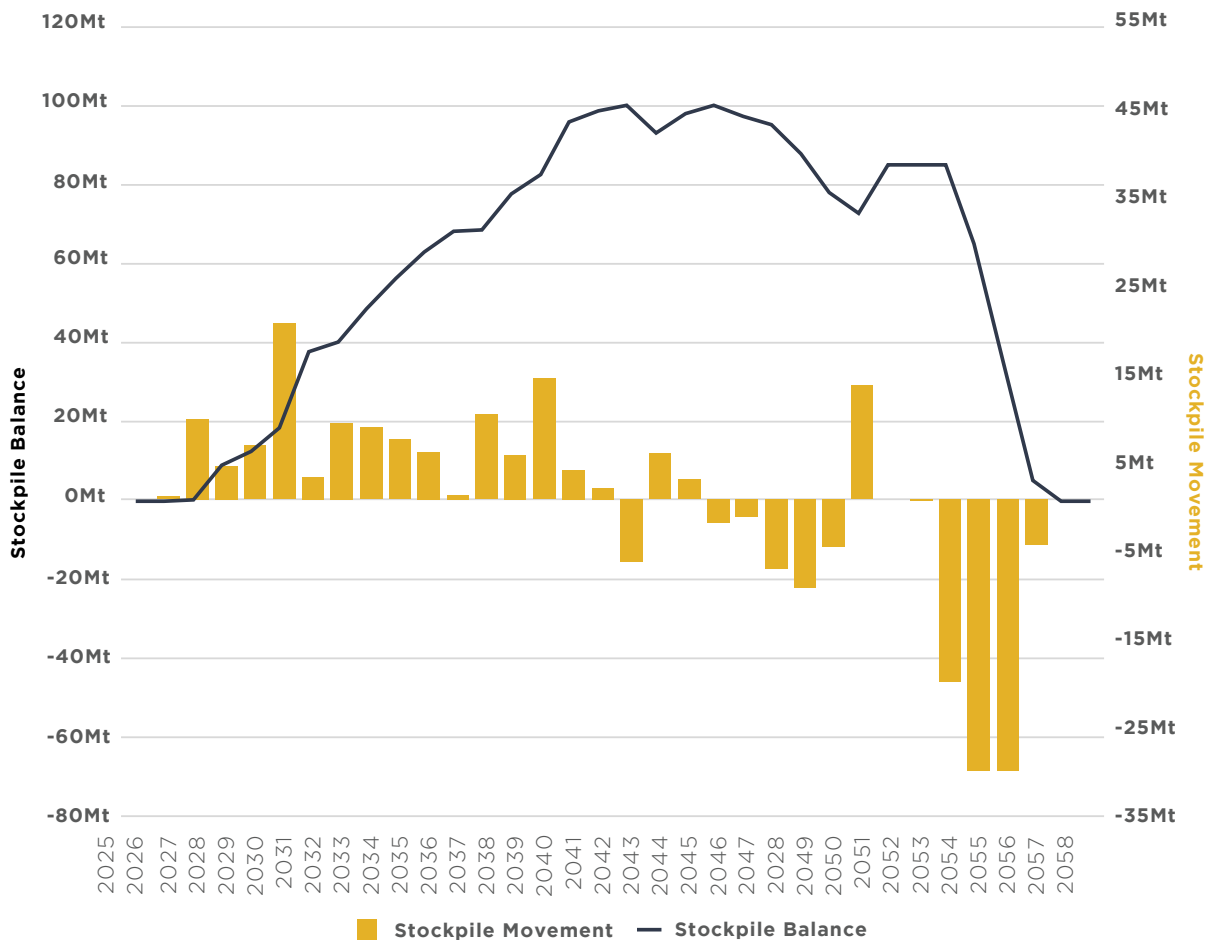
The following figure shows the mine production by waste and ore before stockpiling. Noting that the ore mined is often above or below the annual plant processing rate with the balance achieved by adding or drawing from stockpiles.

### ANNUAL MINING SCHEDULE BY MATERIAL TYPE

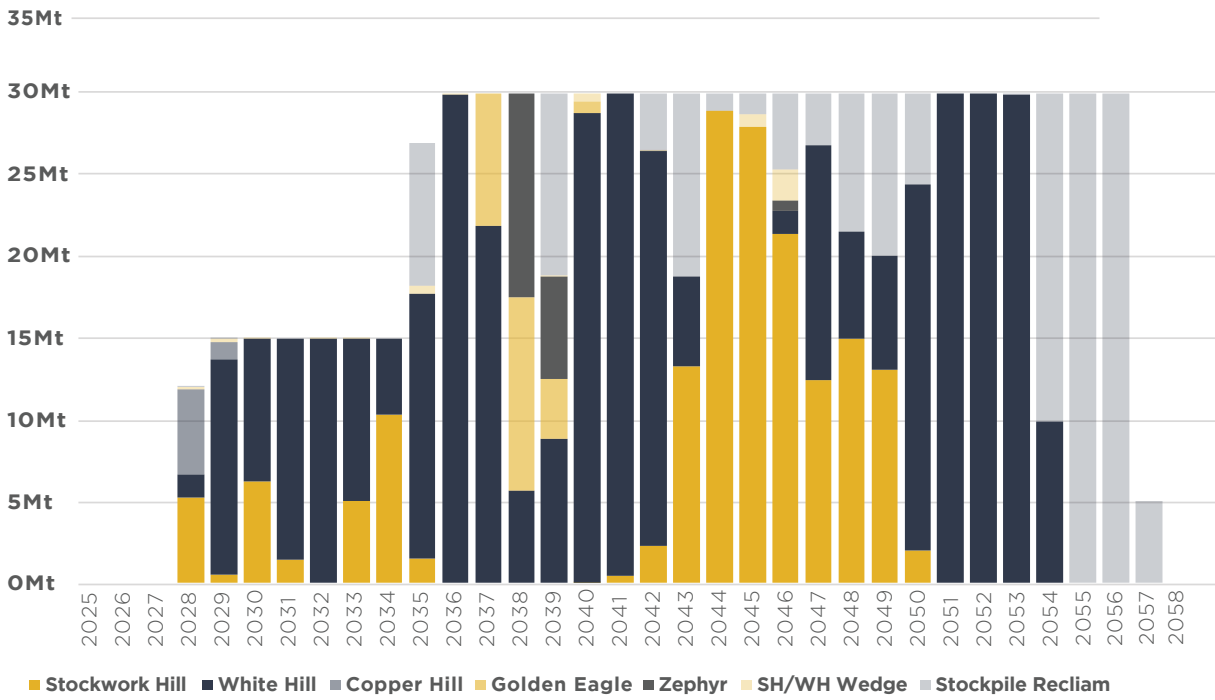


The following figure illustrates the movement of ore to and from the stockpile and the overall stockpile balance over time, which peaks at 100Mt.

### LOW GRADE STOCKPILE MOVEMENT & BALANCE

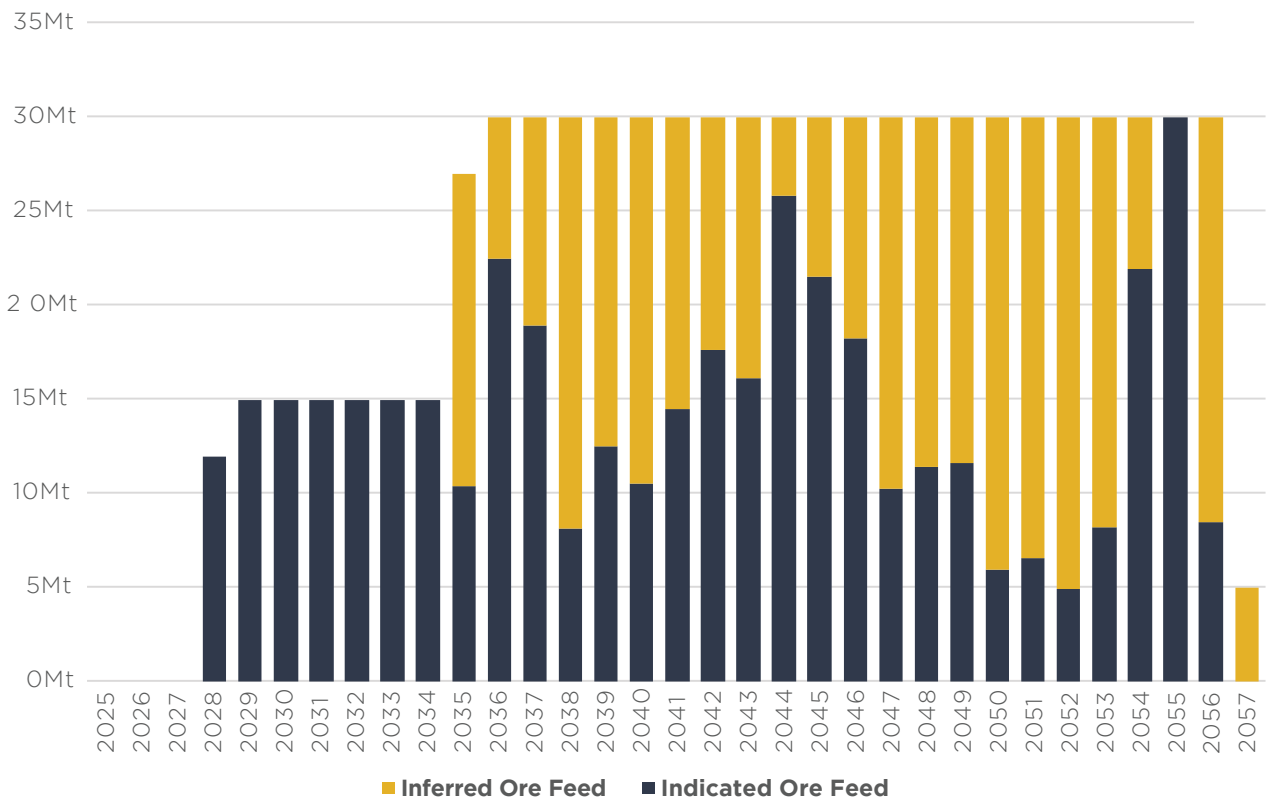


**ANNUAL PROCESSING BY PIT**



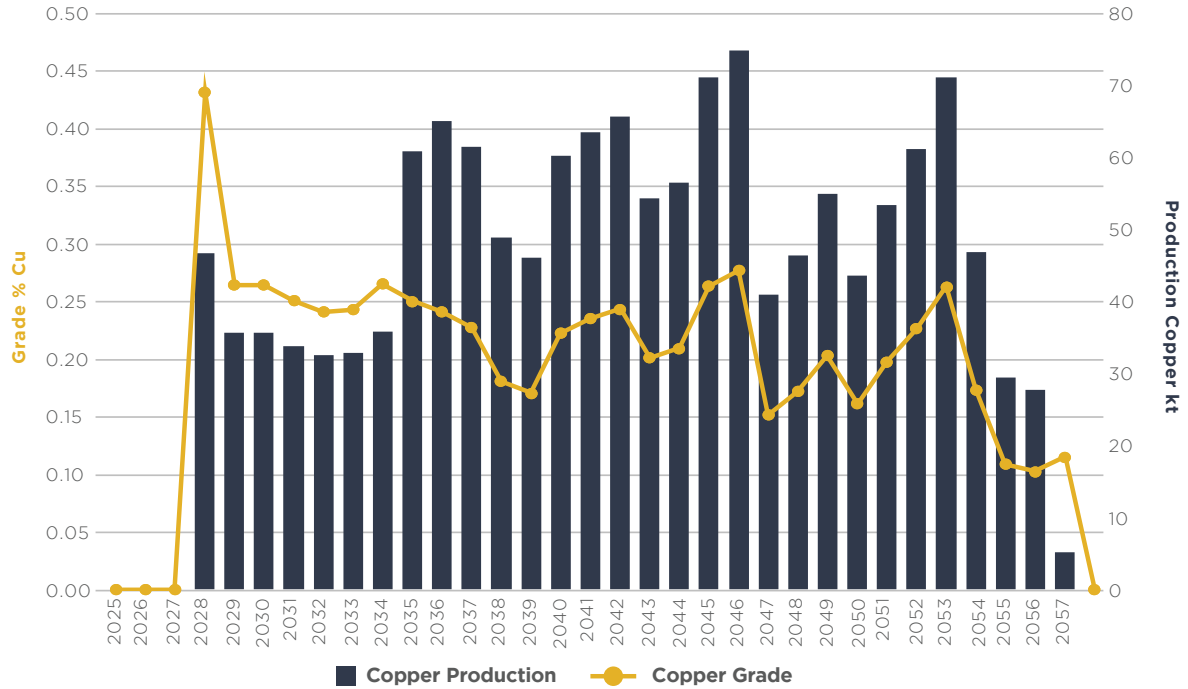
The following figure illustrates the sequencing of Indicated and Inferred Mineral Resources.

**ANNUAL MATERIAL PROCESSED BY RESOURCE CATEGORY**

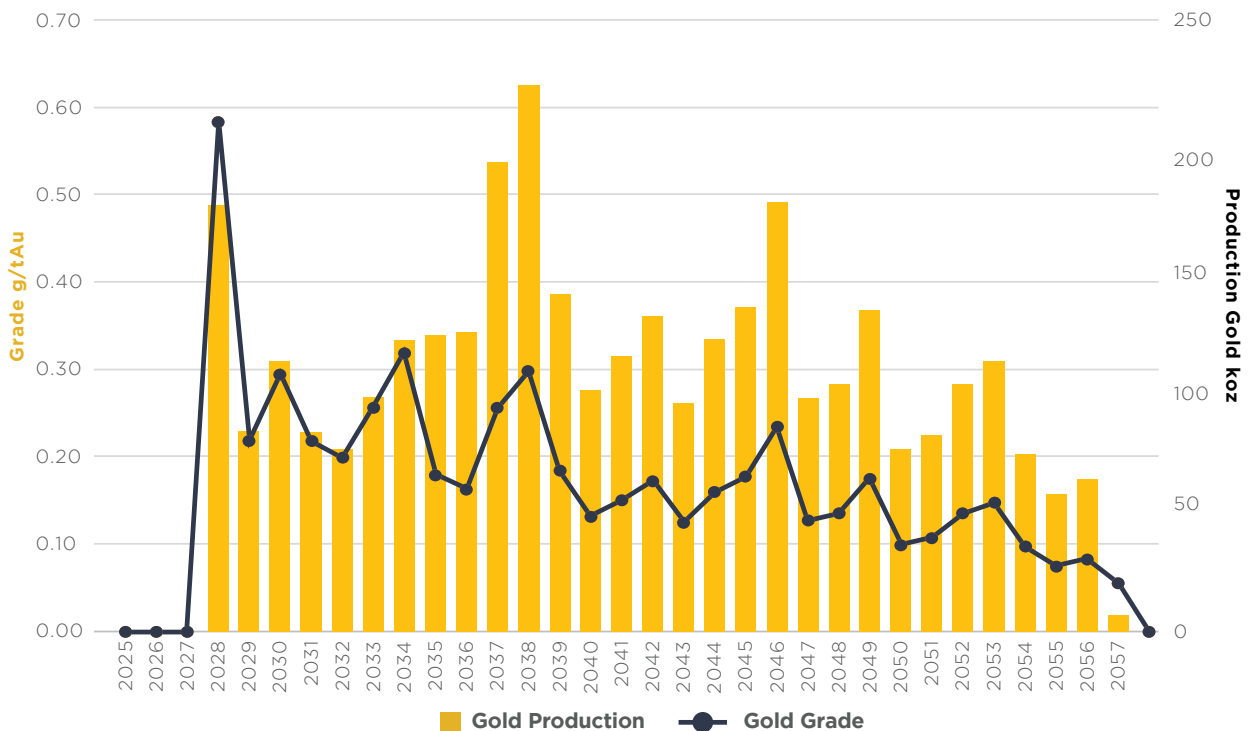


Annual plant production is shown in the following figures for copper grade and copper produced and a second figure for gold grade and gold produced. Gold product is the combination of gold in copper concentrate and gold bullion produced from the gravity circuit. The split of these two gold streams is 60% gold recovered in concentrate and 40% recovered with the gravity circuit and produced as gold bullion.

### ANNUAL PRODUCTION SCHEDULE - COPPER



### ANNUAL PRODUCTION SCHEDULE - GOLD





# | Metallurgy

## **MINERALOGY**

The primary ore at Kharmagtai consists of typical copper/gold porphyry mineralisation with chalcopyrite and pyrite associated with quartz veins. There are also tourmaline breccia zones containing bornite. Gold occurs as discrete particles and in close association with sulphides. The minerals are relatively coarse-grained and easily liberated, resulting in high metal recovery to a clean concentrate.

There is a layer of oxide resource above the sulphide mineralisation containing gold and fully/partially oxidised copper minerals.

This resource has not been considered in the Scoping Study but will be the subject of testwork in the PFS.

## **COMMINATION AND FLOTATION TESTWORK**

Several testwork programs have been conducted, aimed at evaluating comminution and flotation performance.

Comminution testwork has shown that the hardness of the ore is of medium to hard. This is typical of porphyry deposits and it is expected that the ore will respond well to a typical SABC grinding circuit. The grind size tested was 150 micrometers (**um**) but the opportunity to utilise a coarser grind size will be explored in the PFS testwork program.

Flotation testing has been completed on composite and variability samples, using a conventional copper porphyry flowsheet consisting of rougher flotation at 150µm followed by a regrind to 25µm with single stage cleaning. This simple flowsheet produced good metal recoveries to a typical copper concentrate.

Testwork has shown that the copper and gold recoveries should be increased by the addition of a gravity recovery step, along with rougher scavengers, an additional cleaning stage and cleaner scavengers. This circuit is more typical for the treatment of a high-gold copper porphyry deposit. This circuit will be evaluated in the PFS testwork program.

## **FUTURE TESTWORK**

Further testwork is planned to be completed during the PFS. The testwork will be carried out at Australian laboratories and will include:

- Variability comminution testwork to determine the range of ore hardness expected so that the crushing and grinding equipment can be sized
- Gravity and flotation testing to optimise the flowsheet, determine the grind size and the reagent suite and develop predictive recovery models for all material ore types
- Mineralogy to inform the flowsheet optimisation
- Generate samples for sizing equipment such as thickeners and pumps
- Generate samples for tailings and environmental testwork; and
- Generate concentrate samples for marketing studies



# Copper Concentrate

The copper concentrate produced from Kharmagtai is good quality with high levels of payable metals and low impurity levels, making it ideal smelter feed.

Element	Unit	Typical	Range
Cu	%	25.0	17.0-31.0
Au	g/t	48	10-100
Ag	g/t	60	30-100
Al <sub>2</sub> O <sub>3</sub>	%	2.00	0.6-4.0
Sb	ppm	190	100-400
As	ppm	110	20-250
Bi	ppm	430	350-470
Cd	ppm	10	0-20
CaO	%	0.70	0.20-1.40
Co	ppm	60	40-100
F	ppm	470	50-1400
Pb	%	0.15	0.04-0.55
MgO	%	0.45	0.20-1.20
MnO	ppm	0.02	0.01-0.05
Hg	ppm	0.9	0-4.5
Mo	%	0.8	0-2.0
Ni	pm	130	60-400
P	ppm	130	50-400
Se	ppm	150	90-250
Si	%	7.8	2.20-15.0
S	%	33.0	28-40
Zn	%	0.15	0.05-0.50

# Mineral Processing

A Conceptual Engineering Study has been completed by Ausenco Limited, based on an operating reference plant as the project template. The design is based on a standard copper/gold porphyry flowsheet and uses industry standard, well-proven technology.

The site is generally flat and will require minimal earthworks.

The throughput rate for the first module is 15Mtpa, with a duplicate, parallel module to be built in 2033 to take the total throughput rate to 30Mtpa.

No attempt has been made in this Scoping Study to optimise the use of common facilities. The modules are exact duplicates. Trade-off studies to optimise the use of common facilities between the two modules will be completed in the PFS.

## PRIMARY CRUSHING

The primary crusher is a 60 x 110 gyratory crusher with a 750kW motor capable of taking direct tipped feed. The primary crusher discharges onto a crushed ore stockpile with 20 hours live capacity.

Both the primary crusher and the crushed ore stockpile will be covered to protect them from the weather.

## GRINDING

The grinding circuit will comprise a 40'x20' SAG mill with a 20MW motor, two MP1000 recycle crushers and one 27'x46' 20MW ball mills operating in closed circuit.

The grinding circuit will be housed in an insulated, heated shed.

## FLOTATION

The grinding circuit will contain two stages of flash flotation. Coarse gold will be recovered from the flash flotation concentrate and smelted to produce gold doré. The remainder of the flash float concentrate will report to the final concentrate.

The flotation circuit will consist of roughers and rougher scavengers, regrind mills, cleaners and cleaner scavengers.

The flotation circuit will be housed in an insulated, heated shed.

The final tails will be thickened and pumped to the tailings storage facility

## CONCENTRATE HANDLING

The flotation concentrate will be thickened, filtered and placed into containers.

The containers will be trucked to a rail-siding located nearby and transported to smelters by rail.

## TAILINGS DISPOSAL

The tailings disposal facility will be located approximately 4.6km away from the concentrator and will consist of a number of saddle dams between hills, making use of the local topography to maximise storage space. The starter embankments and subsequent downstream lifts will be constructed from mine waste using a dedicated fleet of equipment.

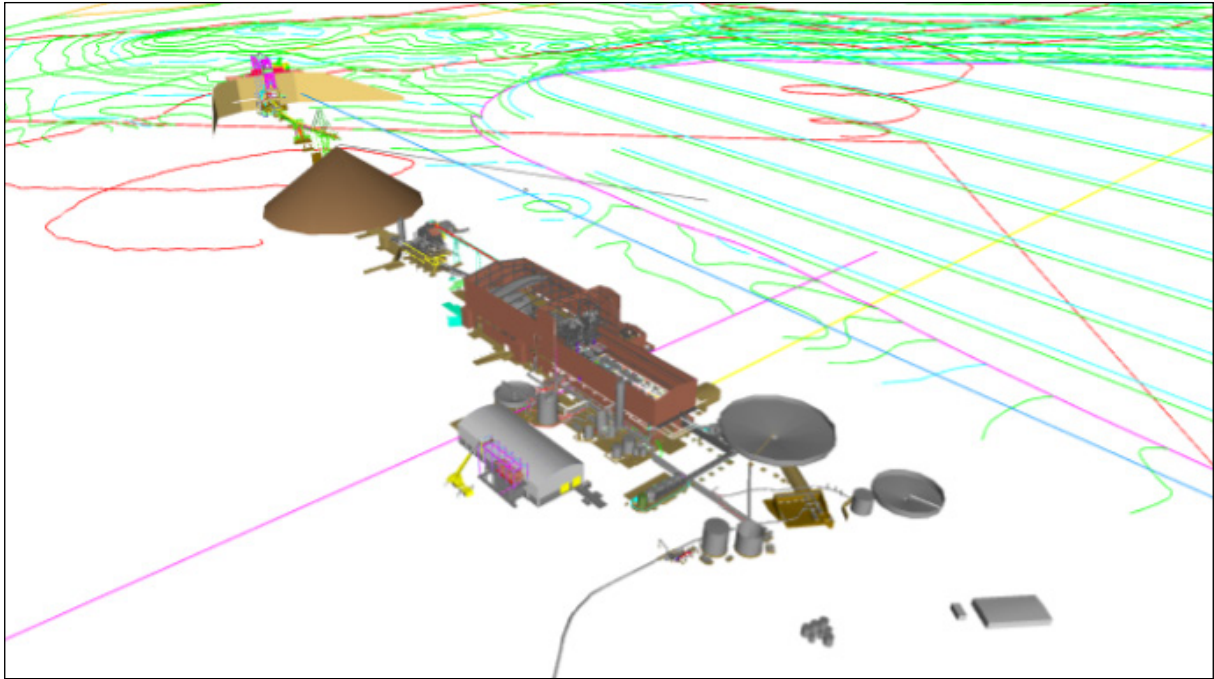
The tailings storage facility will be constructed and operated in a manner to comply with international standards. This Study added an additional \$25M capital allowance for a redesigned lined Tailings Storage Facility (**TSF**) and the final tailings storage solution for the life of mine will be addressed in the PFS.

## OPPORTUNITIES

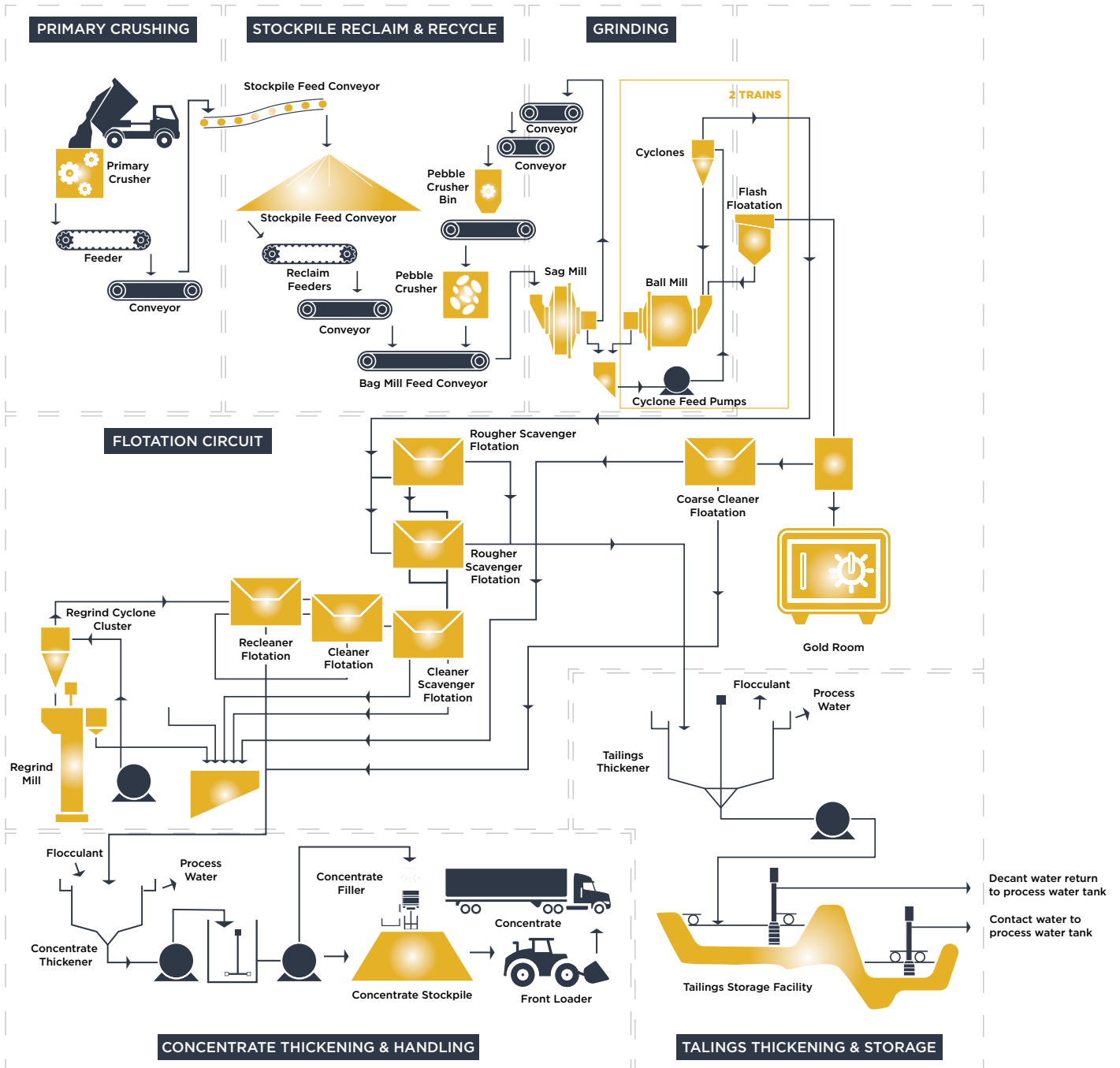
Opportunities to be considered during the PFS include:

- Flowsheet optimisation to improve recovery and concentrate grade
- Equipment rationalisation between the two parallel treatment modules
- Coarse ore flotation to reduce the comminution power required
- Ore sorting to increase the grade of the material treated; and
- Treatment options for the oxidised portions of the orebody aimed at recovering gold and copper

## PROCESS PLANT LAYOUT



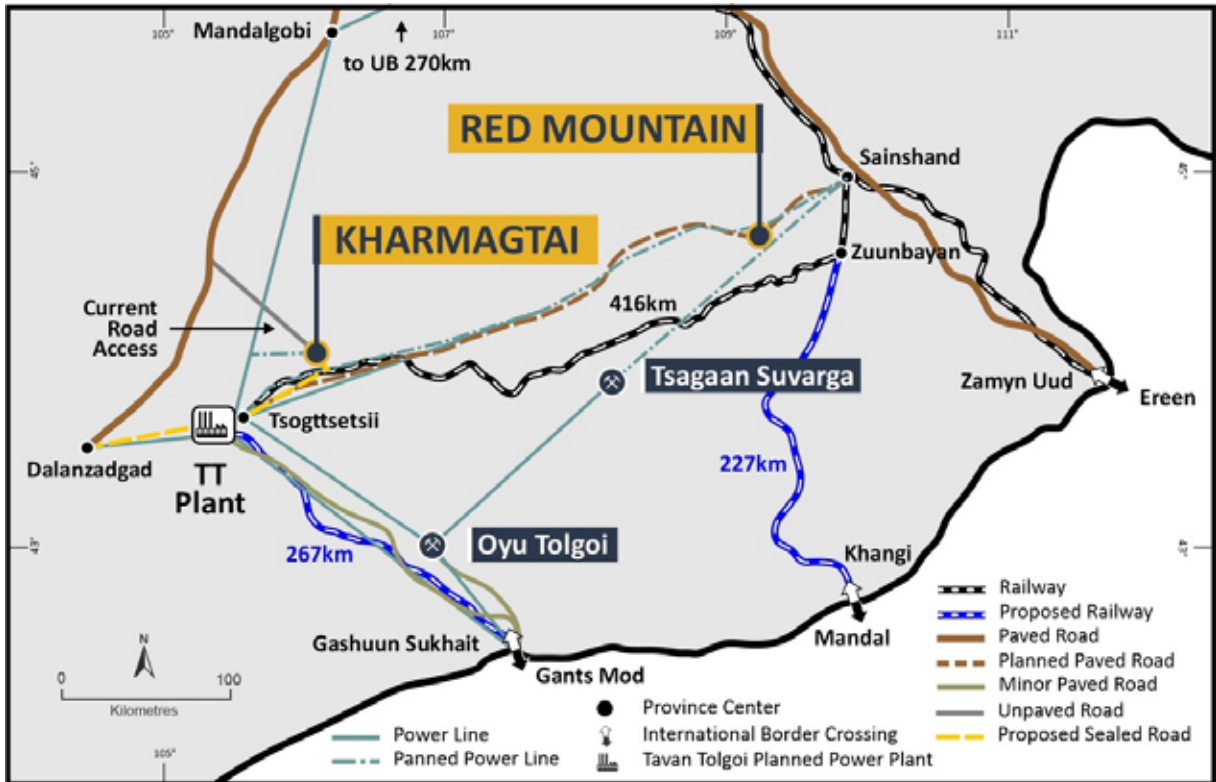
# PROCESS FLOW DIAGRAM



# Infrastructure and Services

Kharmagtai is located 420km southeast of Ulaanbaatar (UB), the capital of Mongolia, and 60km from the regional centre of Tsogtsetsii that is serviced by daily flights from the capital. Currently road access to site entails a six hour drive from UB on a sealed road followed by a 1.5-hour drive for the last 60km on an unsealed road. Within the region there

are already two major mining projects: a) the Tavan Tolgoi coal mine 65km to the southwest and b) the Oyu Tolgoi copper gold mine 125km south. The Mongolian Government is facilitating construction of the 450MW Tavan Tolgoi power station immediately southwest of Tsogtsetsii to power Oyu Tolgoi and other regional development opportunities.



South Gobi regional infrastructure

## RAIL AND ROADS

The site is located 10km north of a sealed road from Tsog Tsettsii and the recently completed 416km rail line that connects Tavan Tolgoi to the Trans-Siberian rail line at Sainshand. The site access road is planned to connect to this road and the railway that will be used to ship the copper-gold concentrate from an existing rail siding located within 15km of site. The project envisages establishing administrative centres in Tsog Tsettsii and the regional capital of Dalanzadgad. Most of the workforce will be engaged locally and will be accommodation provided for all employees on site. Commutes would be largely by bus from the regional centres, supplemented with limited specialist expertise from UB.



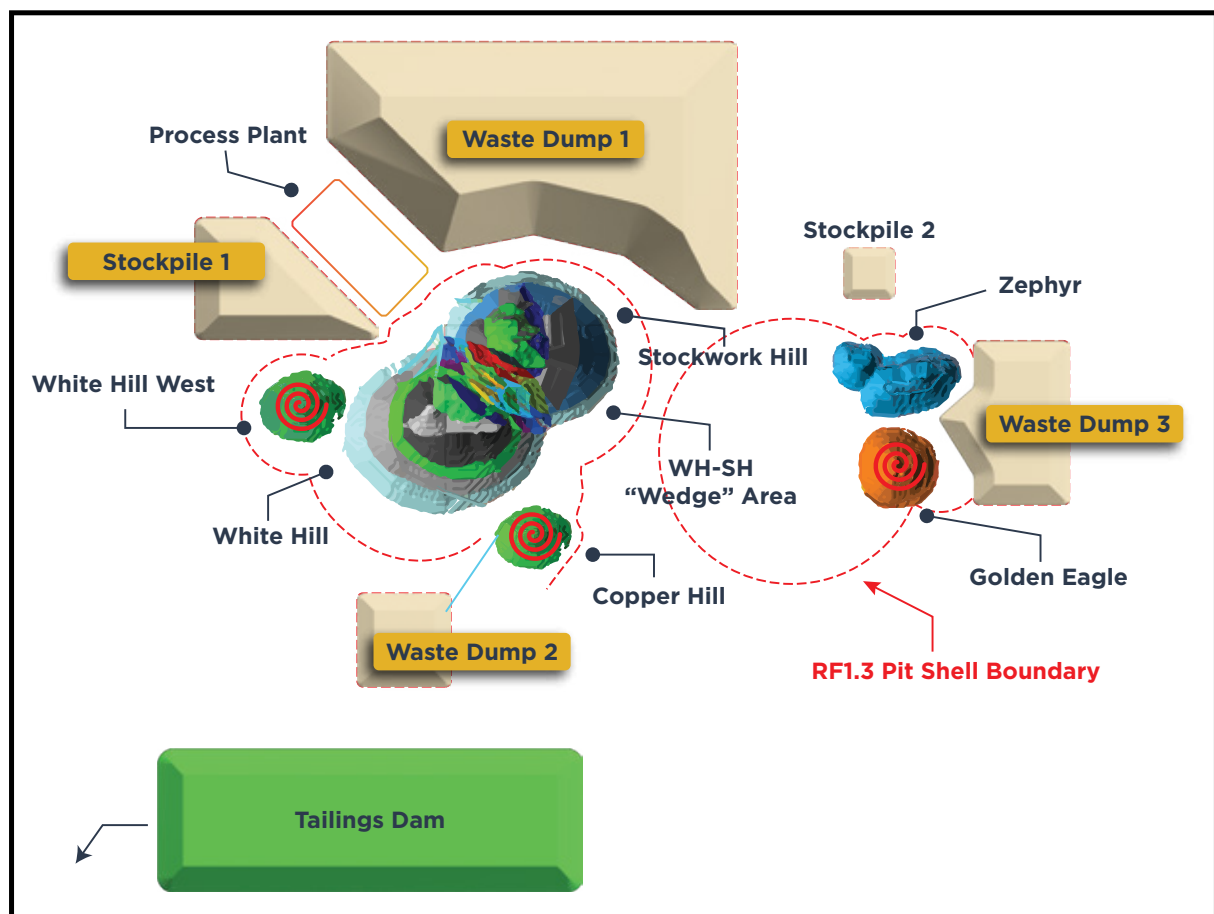
## POWER

The site power requirements are estimated to be 55MW for the initial 15Mtpa operation and 110MW for the expanded 30Mtpa operation. Power would initially be provided by connection to the existing Manlai 32kV followed by connection with a new line 110kV from Tavan Tolgoi. The Study assumed a wholesale power price of \$47/MWh.

## WATER

The water supply is planned to be sourced from a water resource 8km from Kharmagtai, established by Rio Tinto as part of Kharmagtai mining license application. The water would be pumped to site via a pipeline with raw water used for ore processing and a water purification plant to provide potable water.

An alternative water supply is a fully developed but underutilised borefield 40km from site developed for the Tavan Tolgoi. Both borefields access deep aquifers of non-potable water designated for industrial use. Alternative water sources will be assessed in the PFS based on their environmental, social, sustainability and technical performance.



Project Layout

# Approvals and Sustainability

**Xanadu maintains strong relationships with its stakeholders, including local communities and local, regional and national government and regulators. Please refer to Xanadu's annual Sustainability Report available on our website at [www.xanadumines.com](http://www.xanadumines.com)**

## ENVIRONMENTAL ASSESSMENT

Environmental assessments and baseline surveys have been completed as required to obtain the Kharmagtai mining license, with a key focus on water and biodiversity. Upon completion of the Pre-Feasibility Study, a full Environmental Impact Study will be conducted, building on the existing studies, as part of the permitting process for the subsequent stage of engineering and construction.

## MINING TENURE

The Kharmagtai Mining license was granted in September 2013. This license remains valid for 30 years and is extendable twice for 20 years at a time. This includes the right to conduct mining activities and construct structures related to those activities.

## HERITAGE AND ARCHAEOLOGICAL SITES

The Kharmagtai project is located in a remote area of the South Gobi Desert with very low population density and as a result has limited exposure to heritage and archaeological challenges. Surveys have identified two, small burial sites which will require university assessment and subsequent movement prior to mining operations. This process will commence during the Pre-Feasibility Stage of the project.

## COMMUNITY

While located in a sparsely populated area, Xanadu aims to be a positive influence on local communities and neighbours. Our Sustainability Report outlines efforts to support community groundwater access, economic development, schools and hospitals. Xanadu provides a university scholarship program each year for local students as well as an internship program for students who want to gain experience in exploration and mining.

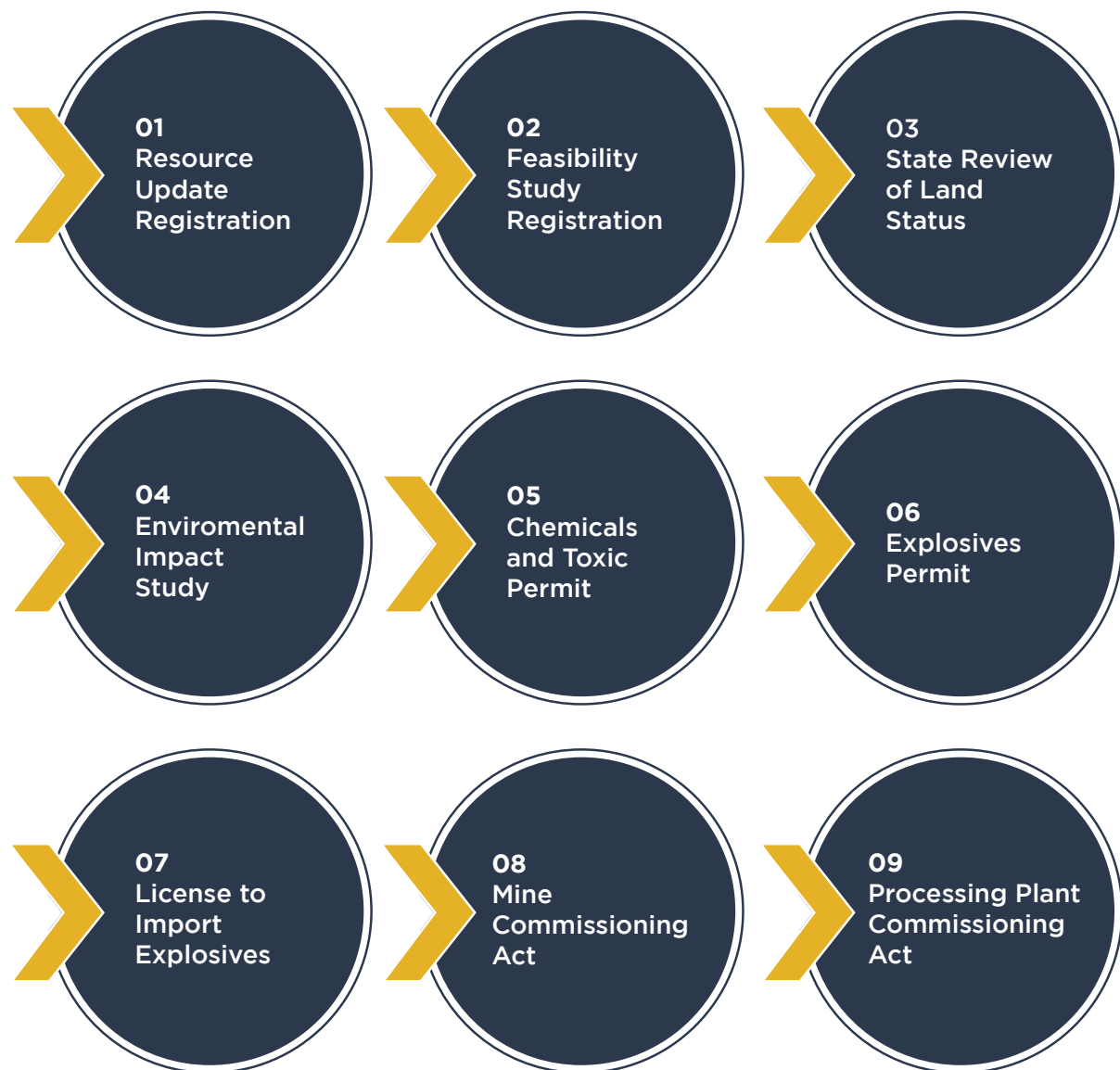


*Kindergarten classroom refurbish project 2021*

## PERMITTING

The permitting process for Kharmagtai can be broken down into nine key steps, as shown on the figure below. The permitting process commences at the same time as the updated Environmental Impact Study (EIS), upon completion of the PFS. The steps are well understood and are anticipated to require nine months from commencement to completion.

## OPERATIONAL PERMITTING STEPS





# Project Schedule and Funding

## SCHEDULE

Xanadu plan to commence an 18-month PFS commencing in Q3 2022. The initial PFS phase will entail drilling programmes to upgrade the MRE to a least Indicated confidence, collect geotechnical and hydrogeological data for the mine designs and infrastructure studies and metallurgical testwork. Environmental and social baselines will also be enhanced. The data collection phase will be followed by optimisation studies to select the preferred mining, processing and infrastructure configurations, preliminary engineering designs and then cost estimates to select the single option to take forward to Feasibility. Assessments will be undertaken on the potential environmental, social and closure impacts of the options as they are developed to inform the final option selection.

A one-year Feasibility Study (**FS**) is planned to inform the final decision to implement the project. Detailed environmental and social impact assessments and permitting will be undertaken in parallel with the FS including detailed design for the early works scheduled to commence once the requisite permits are in place. The construction plan envisages an initial year of early works to establish the site infrastructure sufficient to support full scale construction and ordering long lead items. This will be followed by a two-year period to build the remaining infrastructure, the ore processing facility and establish the open pits ready for production in Q4 2027.

In parallel with the PFS, the Mongolian FS will be prepared to facilitate the Mongolian Government's assessment of the Project's strategic status and then initiate negotiation of the Investment Agreement and Stability Terms prior to commencing construction.

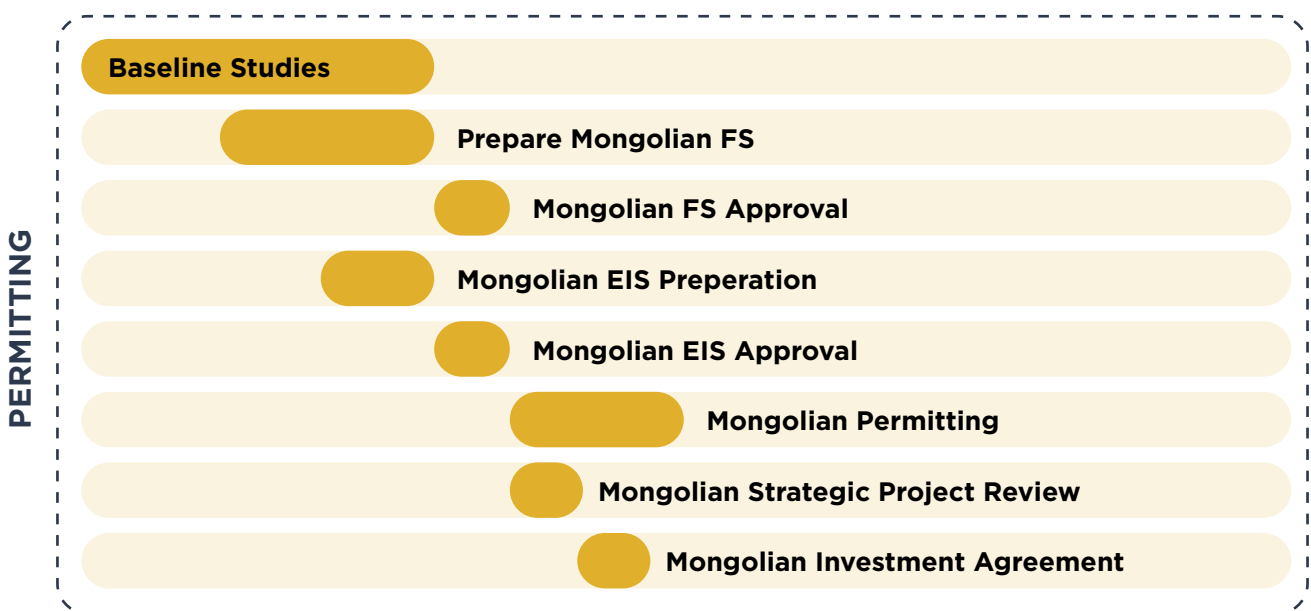
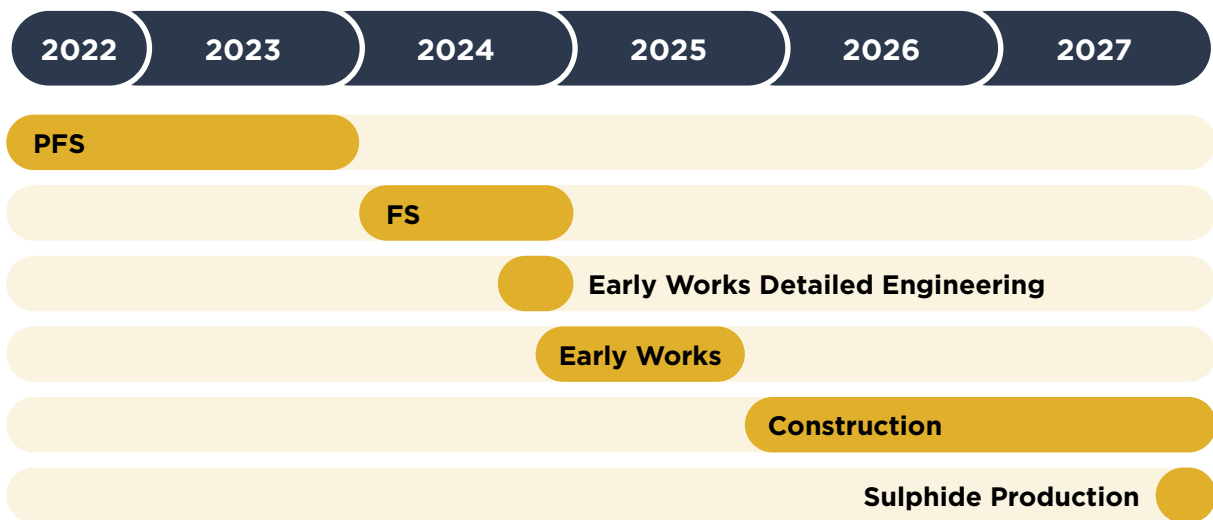
## FUNDING

The Kharmagtai Project (in 100% terms) is expected to require approximately US\$20M for studies and evaluation and approximately US\$690M to construct and commence operations. Due to a carried interest loan with 10% minority holder QGX Ltd. up to commercial production and partial free carry loan with 13.5% minority holder Ganbayar Lkhagvasuren, an Executive Director at Xanadu, over that same period, Xanadu is responsible for 90.4% of all expenditure up to commercial production. Ganbayar Lkhagvasuren is responsible for the

remaining 9.6% of expenditure. As previously disclosed, Xanadu is actively seeking a mining major as a funding partner to earn into the project for the next stage of development.

Xanadu's Board of Directors and Management are experienced and have a successful track record in Finance and Equity Markets, Exploration, Development and Operation in the mining industry. This combined with strong project economics, significant scale, and a looming global supply deficit, makes Xanadu confident in its ability to attract appropriate funding to progress this project to the next stage.

## PRODUCTION TIMELINE





# Financials

Presented in 100% Terms (Xanadu share 76.5%)

Summary project financial performance results for base, high and low cases are shown in the following tables.

Project Financial Summary	Low	Base	High
Net Revenue (US\$M)	15,200	<b>16,100</b>	17,100
EBITDA (US\$M)	5,880	<b>6,770</b>	7,660
Net Cash Flow (US\$M)	2,590	<b>3,420</b>	4,240
NPV (8% discount)	405	<b>630</b>	850
IRR	16%	<b>20%</b>	25%
Capital Payback Period	7 years	<b>4 years</b>	4 years

Ranges are shown in the table below, based on flexing copper price, gold price, and capex. The low case scenario assumes gold by-products are a weak natural hedge of gold against copper, with copper price -10%, capex +10%, and gold price +5%. The high case represents the inverse of these assumptions. Capital payback is within the 4th year of operation in both base and high scenarios, however high scenario payback is earlier in that year.

High, Low, Base Scenarios	Low	Base	High
Cu price (\$/lb) (+/- 10%)	3.60	4.00	4.40
Au price (\$/oz) (+/- 5%)	1785	1700	1615
Capex (\$M) (+/- 10%)	2,046	1860	1674

The following tables show summary results for capital expenditure, operating costs expressed as \$/tonne of ore processed and operating margins expressed as \$/lb of copper.

Capital Expenditure	US\$M
Mining	105
Process Plant	290
Tailings	40
Site Infrastructure	30
Indirects	110
Contingency	80
Owners Costs	35
<b>Total Project Capital</b>	<b>690</b>

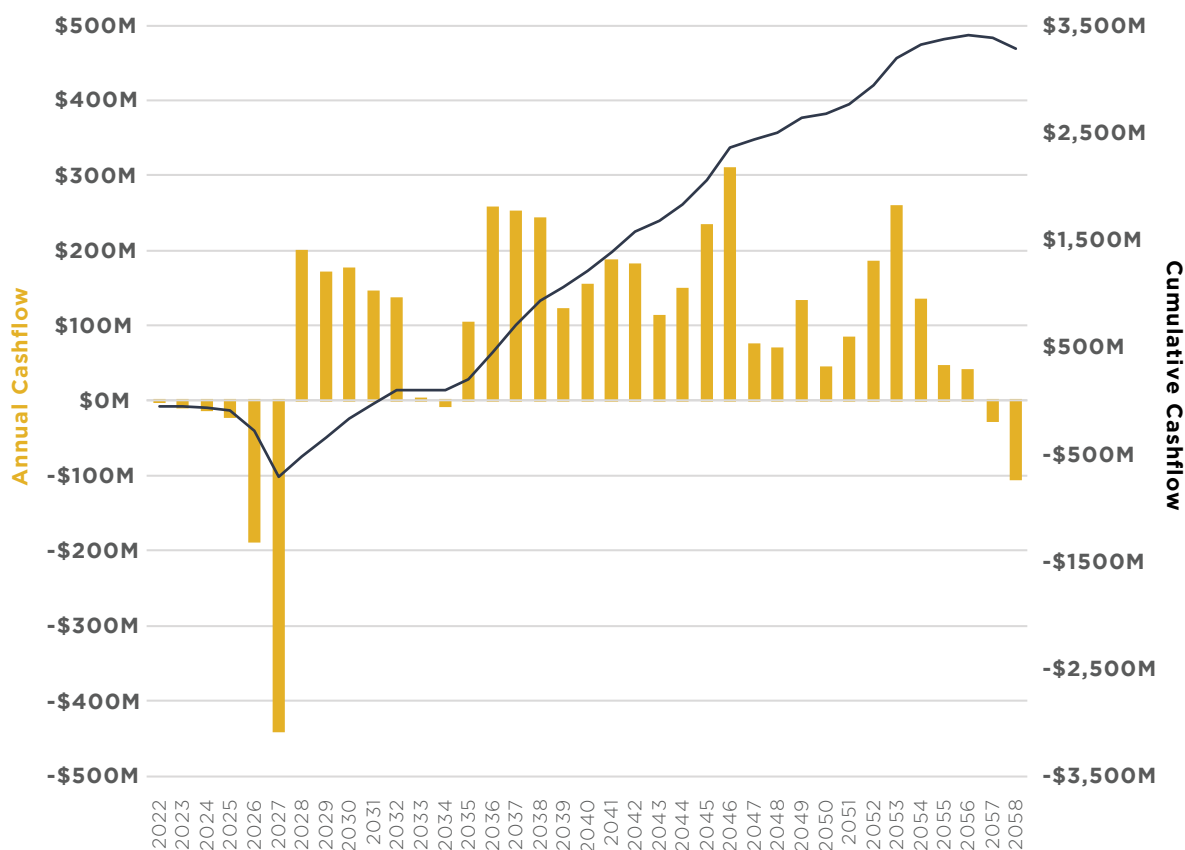
Mine Expansion	70
Plant & Infra Expansion	290
Mine Sustaining	300
Plant & Infra Sustaining	285
Indirects	70
Contingency	85
Closure	90
<b>Total Deferred/Sustaining</b>	<b>1,190</b>

<b>Total Capital Expenditure</b>	<b>1,880</b>
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Unit Operating Costs		Initial 5 Years	Expansion 21 Years	Average LOM
Mining (excl stockpile reclaim)	US\$/t mined	1.86	2.13	2.09
Mining	US\$/t ore	5.43	4.30	4.40
Processing	US\$/t ore	5.42	5.30	5.31
General & Administration	US\$/t ore	1.70	1.08	1.14
Corporate Overheads	US\$/t ore	0.75	0.35	0.39
<b>Total Operating Costs</b>	<b>US\$/t ore</b>	<b>13.30</b>	<b>11.03</b>	<b>11.24</b>

All in sustaining cost (\$/lb Cu)	Initial 5 Years	Expansion 21 years	Average LOM
Mining	1.00	1.09	1.08
Processing	0.99	1.35	1.31
General & Admin	0.31	0.28	0.28
Corporate Overhead	0.14	0.09	0.09
Sustaining Capital	0.09	0.20	0.18
<b>Site Costs</b>	<b>2.53</b>	<b>3.00</b>	<b>2.94</b>
Concentrate Transport	0.10	0.10	0.10
TC/RC	0.25	0.25	0.25
Royalties	0.27	0.24	0.25
<b>Total Unit Operating Cost</b>	<b>3.15</b>	<b>3.60</b>	<b>3.54</b>
Au Credits	-2.13	-1.61	-1.67
<b>Net Unit Costs</b>	<b>1.02</b>	<b>1.99</b>	<b>1.87</b>

#### ANNUAL CASHFLOW (US\$M)



The actual IRR of the Project will vary according to the copper and gold prices realised. Base case assumptions for the Scoping Study were a gold price of US\$1,700/oz and copper price of US\$4.00/lb.

The chart below illustrates how the estimated base case NPV of \$630M varies using 20%

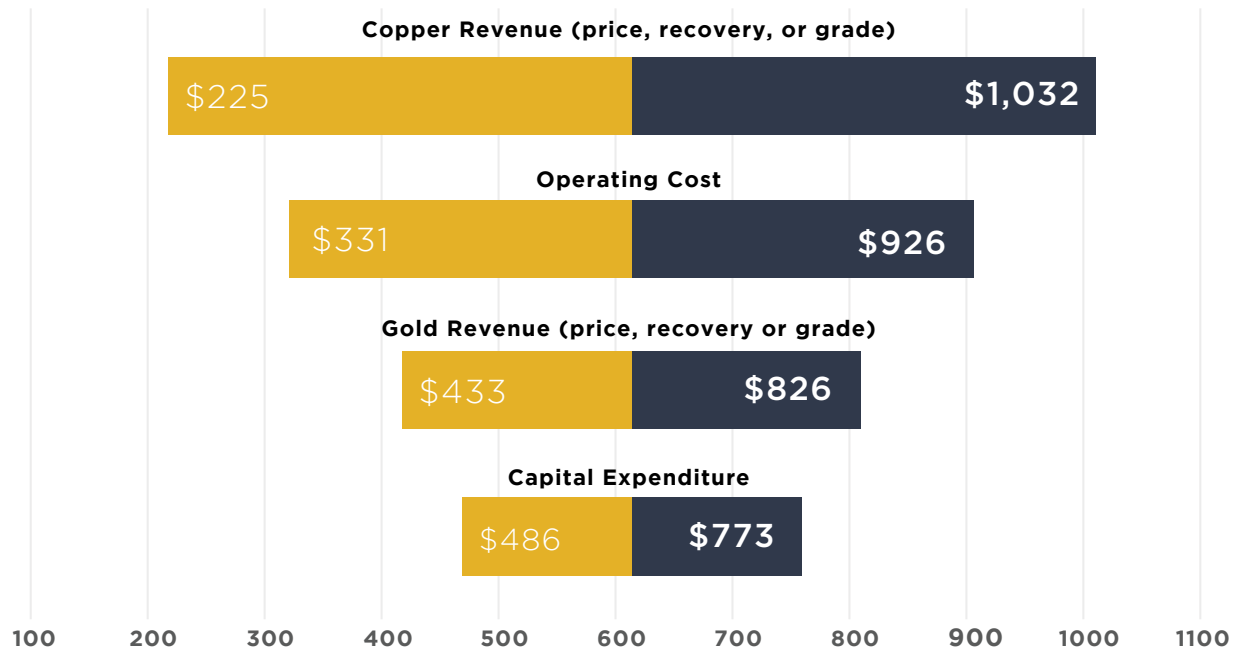
higher and 20% lower assumptions for metal prices, capital and operating costs. The project is most sensitive to copper prices, followed by operating costs, gold price and least sensitive to capital costs. However, the project NPV remains positive under any of these sensitivity conditions.

**NPV SENSITIVITY ANALYSIS (US\$M)**

The actual IRR of the Project will vary according to the copper and gold prices realised. Base case assumptions for the Study were a gold price of US\$1,700/oz and copper price of US\$4.00/lb.

The chart below illustrates how the estimated base case NPV of \$615M varies using 20%

higher and 20% lower assumptions for metal prices, capital and operating costs. The project is most sensitive to copper prices, followed by operating costs, gold price and least sensitive to capital costs. However, the project NPV remains positive under any of these sensitivity conditions.



# Estimate Methodology

Capital cost estimation for the Scoping Study has been based on inputs from Integrity Mining for the mine fleet and associated mine infrastructure, Ausenco for the process plant, O2 Mining Limited for the site infrastructure and services and mine infrastructure and tailings costs from the 2018 Scoping Study, prepared by CSA Global Pty Ltd. The capital estimates are appropriate for this level of study and would have a typical range of +/-35%. Contingency

allowances along with Engineering Procurement and Construction Management (**EPCM**) and temporary construction facility costs have been based on typical % values for a scoping study.

Operating Cost estimate has been compiled from unit rate data from the above consultants and from previous studies prepared by CSA Global Pty Ltd in 2018. These estimates also have an average accuracy of +/-35%.

# Material Modifying Factors

The Scoping Study considered modifying factors in the mining, processing, economic, marketing development schedule and economic areas to produce the optimised mine production schedules. These were further refined in the financial model to assess the project economics.

The mining modifying factors included operating costs, pit slopes, minimum mining width, maximum annual mining vertical rate of advance and haulage distances to the plant, stockpile or waste dumps. No additional estimate was made for mining dilution and loss due to the gradational nature of the porphyry mineralisation. It was also assumed that due to the style of mineralisation the geological model incorporates some level of dilution.

The ore processing assumed an annual ore processing rate, ramp up rate, recovery rate for gravity gold, recovery of copper and gold by flotation to concentrate and operating costs.

Realisation charges included concentrate freight, treatment and refining charges, payable terms and deductions.

The development schedule considered study, permitting and construction periods.

Dassault Systèmes Geovia Whittle™ software used these modifying factors to determine the inventories to be mined in a sequence of pit shells for each deposit and the optimal cutback phases in each pit.

The resource in each phase was then scheduled by year over the life-of-mine using Whittle Consulting's proprietary Prober-ETM software for a variety of scenarios. The parameters are based on deposits and operations of similar properties providing confidence in the applicability.



# Kharmagtai Pre-Feasibility Study

**The Kharmagtai Pre-Feasibility Study is expected to commence in the third quarter of calendar year 2022 and be completed in the second half of calendar year 2023, with the study scope to include:**

- Drilling and geological interpretation sufficient to define Indicated Mineral Resources to support a JORC compliant Ore Reserve
- Acid Rock Drainage (ARD) testwork on waste rock
- Geotechnical and Hydrogeological investigations to inform the mine design and dewatering requirements
- Expanded metallurgical test work to establish the ore processing performance by ore types and then identify the potential ore processes and throughput rates.
- Study to optimise the balance between throughput rate, grind size, concentrate grade and recoveries over the life of mine schedule
- Ore processing testwork on the oxide mineralisation to determine the processing options for evaluation
- Process plant design
- Haulage evaluation including electric powered mining equipment, and in-pit crush and convey options
- Pit shell optimisation and production scheduling
- Mine designs
- Tailings testwork to determine physical and chemical characteristics that could impact tailings transport, storage, dewatering and potential environmental impact
- Investigations of potential tailings storage options and locations to select the preferred option
- Tailings storage facility design
- Infrastructure required to support the operation, preliminary site layout and designs
- Site power, water and transport requirements and assessment of how they could be procured
- Complete Environmental and Social baselines and establish permitting requirements
- Contracting and procurement strategy
- Investment stability agreement negotiations

# ABOUT XANADU MINES

Xanadu is an ASX and TSX listed Exploration company operating in Mongolia. We give investors exposure to globally significant, large-scale copper-gold discoveries and low-cost inventory growth. Xanadu maintains a portfolio of exploration projects and remains one of the few junior explorers on the ASX or TSX who control a globally significant copper-gold deposit in our flagship Kharmagtai project.

For information on Xanadu visit:  
[www.xanadumines.com.au](http://www.xanadumines.com.au)

## FOR FURTHER INFORMATION, PLEASE CONTACT:

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This Study was authorised for  
publication by Xanadu's Board of Directors.

## KEY CONTRIBUTORS TO THE STUDY

This Scoping Study was completed with the assistance of well-know industry experts and advisory groups, including but not limited to the following:

**Whittle**  
Consulting



Resource Consulting Network

**Ausenco**



Corporate Technical Consulting

Integrity Mining  
Services



East Riding Mining Services



## KHARMAGTAI TABLE 1 (JORC CODE 2012)

The following Table sourced from the Australasian Code for Reporting of Exploration Results, Mineral Resources and Ore Reserves (2012 Edition) (JORC Code (2012)) presents the assumptions on which this Study is based. This table is not being used to report Ore Reserves. Instead, as per the ASX Interim Guidance: Reporting Scoping Studies dated November 2016, this table is being used as a framework to disclose underlying study assumptions.

### Section 4 Estimation and Reporting of Ore Reserves modified for a Scoping Study which includes an approximate Production Target and/or Forecast Financial Information

(Criteria listed in the preceding sections, contained in the ASX Announcement 8 December 2021, also apply to this section).

Criteria	JORC Code (2012) explanation	Commentary
Mineral Resource estimate for conversion to Ore Reserves	<ul style="list-style-type: none"> <li>Description of the Mineral Resource estimate used as a basis for the conversion to an Ore Reserve.</li> <li>Clear statement as to whether the Mineral Resources are reported additional to, or inclusive of, the Ore Reserves.</li> </ul>	<ul style="list-style-type: none"> <li>No JORC Code (2012) Ore Reserve estimate has been classified or reported.</li> <li>The preliminary production target is based on the Mineral Resource for the Kharmagtai Project comprising Open Pit resources at a cut-off grade of 0.2% CuEqRec of 379Mt at 0.3% Cu and 0.2g/t Au in the Indicated category and 374Mt at 0.2% Cu and 0.2g/t Au in the Inferred category and additional Underground resources at a 0.3% CuEqRec cut-off grade of 76Mt at 0.3% Cu and 0.3g/t Au in the Indicated category and 290Mt at 0.3% Cu and 0.2g/t Au in the Inferred category Reported in Xanadu's ASX Announcement dated 8 December 2021.</li> <li>These Mineral Resources used to underpin the production target were prepared by Mr Rob Spiers who is a Competent Person.</li> </ul>
Site visits	<ul style="list-style-type: none"> <li>Comment on any site visits undertaken by the Competent Person and the outcome of those visits.</li> <li>If no site visits have been undertaken indicate why this is the case.</li> </ul>	<ul style="list-style-type: none"> <li>No site visit was undertaken.</li> </ul>
Study status	<ul style="list-style-type: none"> <li>The type and level of study undertaken to enable Mineral Resources to be converted to Ore Reserves.</li> <li>The JORC Code (2012) requires that a study to at least Pre-Feasibility Study level has been undertaken to convert Mineral Resources to Ore Reserves. Such studies will have been carried out and will have determined a mine plan that is technically achievable and economically viable, and that material Modifying Factors have been considered.</li> </ul>	<ul style="list-style-type: none"> <li>The study presented is a Scoping Study and accordingly an Ore Reserve is not reported.</li> </ul>
Cut-off parameters	<ul style="list-style-type: none"> <li>The basis of the cut-off grade(s) or quality parameters applied.</li> </ul>	<ul style="list-style-type: none"> <li>Cut-off grades were based on copper equivalent grades that account for the relative value of the recovered copper and gold. The copper equivalent cut off grades vary over time with stockpiling of lower grade material for processing later to maximise net present value (NPV).</li> </ul>

Criteria	JORC Code (2012) explanation	Commentary
Mining factors or assumptions	<ul style="list-style-type: none"> <li>The method and assumptions used as reported in the Pre-Feasibility or Feasibility Study to convert the Mineral Resource to an Ore Reserve (i.e., either by application of appropriate factors by optimisation or by preliminary or detailed design).</li> <li>The choice, nature and appropriateness of the selected mining method(s) and other mining parameters including associated design issues such as pre-strip, access, etc.</li> <li>The assumptions made regarding geotechnical parameters (e.g., pit slopes, stope sizes, etc), grade control and pre-production drilling.</li> <li>The major assumptions made and Mineral Resource model used for pit and stope optimisation (if appropriate).</li> <li>The mining dilution factors used.</li> <li>The mining recovery factors used.</li> <li>Any minimum mining widths used.</li> <li>The manner in which Inferred Mineral Resources are utilised in mining studies and the sensitivity of the outcome to their inclusion.</li> <li>The infrastructure requirements of the selected mining methods.</li> </ul>	<ul style="list-style-type: none"> <li>No JORC Code (2012) Ore Reserve estimate has been classified or reported.</li> <li>The copper-gold mineralisation at Kharmagtai Project is relatively shallow therefore open pit mining is considered appropriate. Oxide mineralisation at Stockwork Hill, White Hill and Copper Hill is exposed at surface and sulphide mineralisation commences 25m to 45m below surface. At Golden Eagle, Zephyr and Zaraa oxide mineralisation is under 20m to 35m of cover and sulphide mineralisation commences 40m to 60m below surface.</li> <li>Geovia Whittle pit optimisation software was used to generate a series of potentially viable pit shells for the deposits based on the 2021 Mineral Resource.</li> <li>A 10m bench height was used consistent with the resource estimate block height.</li> <li>No additional estimate has been made for mining dilution and loss for the Scoping Study assessment due to the gradational nature of the mineralisation. It was also assumed that due to the style of mineralisation the geological model incorporates some level of dilution.</li> <li>The following preliminary inputs were used to select the pit shells and prepare preliminary production schedules for the six deposits: <ul style="list-style-type: none"> <li>Copper price \$3.50/lb</li> <li>Gold price \$1700/oz.</li> </ul> </li> <li>Mining operating costs were based on the costs built up from first principles in the 2018 study: \$1.12/t - \$1.40/t mined plus incremental haulage cost of \$0.04/t/bench. (Variation dependent on material source pit and destination (Plant, Stockpile or Waste Dump)).</li> <li>Processing cost \$5.31/t milled for 15Mtpa operation and \$5.22/t milled for 30Mtpa.</li> <li>General and administration cost \$1.28/t milled for 15Mtpa operation and \$0.97/t milled for 30Mtpa operation.</li> <li>Corporate overheads \$0.82/t milled for 15Mtpa operation and \$0.47/t milled for 30Mtpa operation.</li> <li>All costs are in USD.</li> <li>25% Cu concentrate grade and 8% moisture.</li> <li>Concentrate transport costs of \$50/wmt.</li> <li>Concentrate treatment of \$85/dry tonne.</li> <li>Concentrate refining charge of \$0.085/lb Cu and \$4.50/oz Au.</li> <li>Concentrate payment terms: 96.5% Cu payable, 1% Cu deduction, 96% Au payable and 1g/dry tonne Au deduction.</li> <li>A royalty of 5% is assumed.</li> <li>Cu recovery 90%.</li> <li>Au recovery 77.5%.</li> </ul>

Criteria	JORC Code (2012) explanation	Commentary
Metallurgical factors or assumptions	<ul style="list-style-type: none"> <li>The metallurgical process proposed and the appropriateness of that process to the style of mineralisation.</li> <li>Whether the metallurgical process is well-tested technology or novel in nature.</li> <li>The nature, amount and representativeness of metallurgical test work undertaken, the nature of the metallurgical domaining applied and the corresponding metallurgical recovery factors applied.</li> <li>Any assumptions or allowances made for deleterious elements.</li> <li>The existence of any bulk sample or pilot scale test work and the degree to which such samples are considered representative of the orebody as a whole.</li> <li>For minerals that are defined by a specification, has the ore reserve estimation been based on the appropriate mineralogy to meet the specifications?</li> </ul>	<ul style="list-style-type: none"> <li>The process is a simple comminution circuit comprising a primary crusher, semi-autogenous mill and recycle crusher, ball mill, a gravity circuit to recover coarse free gold and a flotation circuit to produce a copper-gold concentrate. The gravity gold will be tabled and smelted to produce bullion.</li> <li>These processing techniques are all well tested and techniques currently in use in similar operations globally.</li> <li>Conceptual level testwork has been completed on samples representing the major mineralization styles using techniques commonly applied to similar copper/gold porphyry deposits.</li> <li>Based on the testwork results and experience with similar mineralization the copper recovery has been estimated at 90% and the gold recovery at 77.5% to a 25% copper concentrate.</li> <li>Sampling and test work to date have not shown any deleterious element that would have a material detrimental effect on the selling price or project viability.</li> <li>A 2022 market assessment on concentrate assays from a preliminary metallurgical assessment of metallurgical composites in 2008 indicated that penalties on fluorine and bismuth could be expected from time to time but the penalties would not be onerous or have a material impact on the marketability of the concentrate.</li> <li>No bulk or pilot scale testwork has been carried out to date.</li> </ul>
Environmental	<ul style="list-style-type: none"> <li>The status of studies of potential environmental impacts of the mining and processing operation. Details of waste rock characterisation and the consideration of potential sites, status of design options considered and, where applicable, the status of approvals for process residue storage and waste dumps should be reported.</li> </ul>	<ul style="list-style-type: none"> <li>Mongolian certified EIA consultant Eco Trade LLC undertook a preliminary baseline environmental survey in 2003 and prepared the Mongolian Detailed Environmental Impact Assessment (DEIA) in 2011 as part of the Mining Licence application. The Mining Licence was granted in 2013. Xanadu initiated a review of the approved DEIA in 2019 that identified supplementary studies to be undertaken in the PFS.</li> <li>Waste rock characterisation will be undertaken in the PFS.</li> <li>The 2018 study identified a potential site for a tailings storage facility (TSF) in a shallow depression 4.6km southwest of the proposed plant site. A preliminary design capacity of 190Mm<sup>3</sup> was achieved with two dam walls. This design has sufficient capacity for more than the first 10 years of the proposed operation. This study added an additional \$25M capital allowance for a redesigned lined TSF. The final tailings storage solution for the life of mine will be addressed in the PFS.</li> </ul>
Infrastructure	<ul style="list-style-type: none"> <li>The existence of appropriate infrastructure: availability of land for plant development, power, water, transportation (particularly for bulk commodities), labour, accommodation; or the ease with which the infrastructure can be provided or accessed.</li> </ul>	<ul style="list-style-type: none"> <li>The mine site is located within 15km of a 32kV power line and the new railway line connecting Tavan Tolgoi to Sainshand on the Trans-Siberian railway. 110kV power could be accessed with a new 40km powerline from the transmission line between the proposed Tavan Tolgoi power station and Ulaanbaatar.</li> <li>Road access to site is currently by 60km of unsealed road from the paved road between Ulaanbaatar and the regional capital Dalanzadgad. A sealed road is being constructed along the rail/power easements within 15km of site.</li> <li>A permanent camp would be built on site to accommodate the workforce.</li> <li>The Study assumes the workforce would commute to site by bus from regional centres.</li> <li>Water supply is planned to be sourced from a remote borefield 8km NW of the site and pumped via a pipeline to be constructed by the company. An alternative water supply is a fully developed but underutilised borefield 40km from site developed for Tavan Tolgoi</li> </ul>

Criteria	JORC Code (2012) explanation	Commentary
Costs	<ul style="list-style-type: none"> <li>• The derivation of, or assumptions made, regarding projected capital costs in the Study.</li> <li>• The methodology used to estimate operating costs.</li> <li>• Allowances made for the content of deleterious elements.</li> <li>• The source of exchange rates used in the Study.</li> <li>• Derivation of transportation charges.</li> <li>• The basis for forecasting or source of treatment and refining charges, penalties for failure to meet specification, etc.</li> <li>• The allowances made for royalties payable, both Government and private.</li> </ul>	<ul style="list-style-type: none"> <li>• The capital cost estimates were based on benchmarking with similar operations, preliminary engineering and factoring appropriate for a Scoping Study with a target accuracy of +/- 35%.</li> <li>• Ausenco prepared a factored capital cost of the ore processing facility based on a mechanical equipment list from an operational reference project.</li> <li>• Xanadu estimated the EPCM rate of 20% for the ore processing plant.</li> <li>• The capital cost of the majority of the non-processing infrastructure was estimated by Mongolian based O2 Mining, and some estimates carried over from the 2018 study.</li> <li>• Preliminary operating costs were built up from first principles in the 2018 Scoping Study and additional allowances were added in this study based on benchmarking.</li> <li>• Preliminary mining operating costs were estimated by Integrity Mining in this Scoping Study based on a preliminary truck hour model, fleet selection and a database of equipment unit operating costs.</li> <li>• No contingency was applied to operating costs.</li> <li>• No allowances were made for deleterious elements as they are not considered material given the study level of accuracy.</li> <li>• Realisation charges were based on benchmarking of long-term treatment charges, refining charges and payability factors.</li> <li>• The Scoping Study assumes the Mongolian royalties can be negotiated down to 5% for copper concentrate as was achieved for the Oyu Tolgoi project. Gold bullion is assumed to attract a 2.5% royalty.</li> </ul>
Revenue factors	<ul style="list-style-type: none"> <li>• The derivation of, or assumptions made regarding revenue factors including head grade, metal or commodity price(s) exchange rates, transportation and treatment charges, penalties, net smelter returns, etc.</li> <li>• The derivation of assumptions made of metal or commodity price(s), for the principal metals, minerals and co-products.</li> </ul>	<ul style="list-style-type: none"> <li>• The Company has not established any contracts or committed any of its production pursuant to offtake agreements at this time.</li> <li>• The copper market outlook is based on research reports by Macquarie (27 January 2022), Goldman Sachs (15 March 2022) and RFC Ambrian (December 2021).</li> <li>• The sale price is derived from estimated commodity prices based on the market outlook and from benchmarking comparable copper project study prices.</li> <li>• This study assumes sale in China. Freight, handling and insurance are included in the cost of shipping.</li> </ul>

Criteria	JORC Code (2012) explanation	Commentary
Market assessment	<ul style="list-style-type: none"> <li>The demand, supply and stock situation for the particular commodity, consumption trends and factors likely to affect supply and demand into the future.</li> <li>A customer and competitor analysis along with the identification of likely market windows for the product.</li> <li>Price and volume forecasts and the basis for these forecasts.</li> <li>For industrial minerals the customer specification, testing and acceptance requirements prior to a supply contract.</li> </ul>	<ul style="list-style-type: none"> <li><b>MARKET AND PRICING ASSUMPTIONS</b></li> <li>The 12-month price range for copper reached a low of US\$4.04/lb and a high of US\$4.94/lb. A price assumption of US\$4.00 has been applied to the calculations for the 2022 Scoping Study as near the low point of the 12-month range.</li> <li>The US\$4.00/lb price assumption is conservative when balanced against higher forecasts based on exceptionally strong pricing conditions year to date (YTD), low inventories, momentum shifts in economic recovery, stimulus packages and expectations of increased medium-term demand due to carbon reduction energy policies.</li> <li>The 12-month price range for gold reached a low of US\$1,814/oz and a high of US\$2,008/oz. A price assumption of US\$1,700/oz has been applied to the calculations for the 2022 Scoping Study, noting the last time gold price was below US\$1,700/oz was December 2019.</li> <li><b>PRICE FUNDAMENTALS</b></li> <li>Growing electrification, smart buildings, electric vehicle (EV) demand, declining global production, increasing production costs</li> <li>Copper prices are at 10-year highs, currently US\$4.70/lb</li> <li>Forecast to remain above US\$4.50/lb</li> <li>S&amp;P Global Market Intelligence compiles consensus price forecast to remain above US\$4.08 beyond 2026<sup>7</sup></li> <li><b>SUPPLY FACTORS</b></li> <li>Copper industry experiencing declining grade, depleting resources</li> <li>There is an emerging shortage of high-quality copper concentrate producers</li> <li>RFC Ambrian highlights 75 new mines must come online in the next 8 years to balance the market, with supply deficit valued at 10 times the total forecast value of the global lithium market in 2028<sup>8</sup></li> <li>New projects can take 15 years from discovery to production in many jurisdictions.</li> <li>Jurisdictions previously seen as historically reliable (Chile) are now experiencing a trend towards resource nationalism</li> <li>Lack of major new, long-life discoveries</li> <li>Lack of exploration success resulting in shortage of quality assets</li> <li><b>DEMAND FACTORS</b></li> <li>Copper metal demand is in response to rising living standards globally</li> <li>Environmental policies (carbon reduction) drive electrification and displace fossil fuel use</li> <li>Urbanisation of developing nations populations including China and India</li> <li>Electrification of transport including electric vehicles</li> <li>Growth in renewable energy technology</li> </ul>

7 S&P Global Market Intelligence, January 2022 - [spglobal.com/marketintelligence/en/news-insights/research/consensus-price-forecasts-base-metals-buoyant-precious-dip-on-hawkish-fed](https://spglobal.com/marketintelligence/en/news-insights/research/consensus-price-forecasts-base-metals-buoyant-precious-dip-on-hawkish-fed)

8 RFC Ambrian Copper Note 4 April 2022 - "Houston, we have a problem"; [Proactiveinvestors.com.uk/companies/news/978691/rfc-ambrian-the-copper-problem-978691.html](https://Proactiveinvestors.com.uk/companies/news/978691/rfc-ambrian-the-copper-problem-978691.html)

Criteria	JORC Code (2012) explanation	Commentary
Economic	<ul style="list-style-type: none"> <li>The inputs to the economic analysis to produce the net present value (NPV) in the Study, the source and confidence of these economic inputs including estimated inflation, discount rate, etc.</li> <li>NPV ranges and sensitivity to variations in the significant assumptions and inputs.</li> </ul>	<ul style="list-style-type: none"> <li>The inputs to the NPV analysis are tabulated in this Study.</li> <li>The NPV was determined using the Discounted Cash Flow method of valuation using a discount rate of 8%.</li> <li>The financial model is in real terms based on yearly increments.</li> <li>No escalation was applied.</li> <li>Mongolian Corporate tax rate of 25% taxable income has been applied.</li> <li>Mongolian Customs Duty of 5% has been applied to all imported materials and equipment.</li> <li>Mongolian VAT of 10% has been applied but is assumed to be refundable to the project based on export sales.</li> <li>Inflation was not included</li> <li>NPV range is between approximately US\$405M and US\$850M, based on a 10% variation in copper price and capex and a 5% inverse variation in gold prices as a natural by-product hedge. The project is most sensitive to copper price, followed by operating costs. Further detail on sensitivity is presented in the Study.</li> </ul>
	<ul style="list-style-type: none"> <li>The status of agreements with key stakeholders and matters leading to social licence to operate.</li> </ul>	<ul style="list-style-type: none"> <li>The South Gobi Desert is the least populated region in Mongolia, the least populated country in the world.</li> <li>Xanadu has strong relationships with remote communities closest to Kharmagtai, providing support to education, health and economic development</li> <li>Xanadu's Sustainability Report is available on its website</li> <li>An initial Environmental and Social Impact Assessment (ESIA) was completed for the grant of mining license in 2012.</li> <li>An updated ESIA will be prepared at the completion of the Pre-Feasibility Study.</li> </ul>



Criteria	JORC Code (2012) explanation	Commentary
Other	<ul style="list-style-type: none"> <li>To the extent relevant, the impact of the following on the project and/or on the estimation and classification of the Ore Reserves:</li> <li>Any identified material naturally occurring risks.</li> <li>The status of material legal agreements and marketing arrangements.</li> <li>The status of governmental agreements and approvals critical to the viability of the project, such as mineral tenement status, and government and statutory approvals. There must be reasonable grounds to expect that all necessary Government approvals will be received within the timeframes anticipated in the Pre-Feasibility or Feasibility study. Highlight and discuss the materiality of any unresolved matter that is dependent on a third party on which extraction of the reserve is contingent.</li> </ul>	<ul style="list-style-type: none"> <li>No natural occurring risks have been identified.</li> <li>Xanadu has a marketing agency agreement with Tailai, a subsidiary of Noble Resource International Pte Ltd, for 30% of production for 20 years. For clarity this is not offtake.</li> <li>No other marketing agreements are currently in place.</li> <li>Xanadu holds a Mining License at Kharmagtai, granted in 2012 for 30 years, and extendable twice for an additional 20 years each</li> <li>As part of this Mining License, a registered Water Resource was established within 15km of the project</li> <li>Applications for land access and water usage are not expected to affect the timelines outlined in this Study.</li> </ul>
Classification	<ul style="list-style-type: none"> <li>The basis for the classification of the Ore Reserves into varying confidence categories.</li> <li>Whether the result appropriately reflects the Competent Person's view of the deposit.</li> <li>The proportion of Probable Ore Reserves that have been derived from Measured Mineral Resources (if any).</li> </ul>	<ul style="list-style-type: none"> <li>Ore reserves have not been classified and reported.</li> </ul>
Audits or reviews	<ul style="list-style-type: none"> <li>The results of any audits or reviews of Ore Reserve estimates.</li> </ul>	<ul style="list-style-type: none"> <li>No audits or reviews have been conducted.</li> </ul>

Criteria	JORC Code (2012) explanation	Commentary
Discussion of relative accuracy/confidence	<ul style="list-style-type: none"> <li>• Where appropriate a statement of the relative accuracy and confidence level in the Ore Reserve estimate using an approach or procedure deemed appropriate by the Competent Person. For example, the application of statistical or geostatistical procedures to quantify the relative accuracy of the reserve within stated confidence limits, or, if such an approach is not deemed appropriate, a qualitative discussion of the factors which could affect the relative accuracy and confidence of the estimate.</li> <li>• The statement should specify whether it relates to global or local estimates, and, if local, state the relevant tonnages, which should be relevant to technical and economic evaluation. Documentation should include assumptions made and the procedures used.</li> <li>• Accuracy and confidence discussions should extend to specific discussions of any applied Modifying Factors that may have a material impact on Ore Reserve viability, or for which there are remaining areas of uncertainty at the current study stage.</li> <li>• It is recognised that this may not be possible or appropriate in all circumstances. These statements of relative accuracy and confidence of the estimate should be compared with production data, where available.</li> </ul>	<ul style="list-style-type: none"> <li>• No Ore Reserve estimates have been reported.</li> <li>• The level of accuracy of the Scoping Study is +/- 35%.</li> <li>• The Life of Mine production target used in the Scoping Study comprises 58% in the Indicated and 42% in the Inferred category.</li> <li>• No Inferred material is scheduled to be processed in the first seven years.</li> <li>• A PFS is scheduled to commence in Q3 2022.</li> </ul>



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