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COPPER LIMITED

The background of the slide is a vibrant landscape photograph. It shows a lush green hillside under a bright blue sky with scattered white clouds. A tall palm tree stands prominently on the right side of the frame. In the foreground, there are dense green plants, possibly corn or similar crops. The overall scene is tropical and scenic.

**Bougainville Copper Limited
Order of Magnitude Study – 2016 Update
November 2016**



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Order of Magnitude Study – 2016 Update

Outline

- Purpose and scope
- Key Findings
- Capital and operating costs
- Resource and potential mineable inventory
- Processing
- Tailings
- Power
- Environment
- Development Schedule
- Next steps
- Summary





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Cautions

- The OMS only indicates whether an economically viable operation is possible. It doesn't provide recommendations on how BCL should develop the mine.
- To proceed to development, BCL requires completion of a Pre Feasibility Study and a bankable Feasibility Study.
- Further study is obviously reliant on site access and security of tenure.
- Acceptable financial returns are required to move to each stage along the project development path.



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Purpose

- The BCL Board commissioned the OMS to assess the potential technical and financial viability of re-developing the Panguna mine, using long term price & cost estimates.
- A wide range of options were considered.

Key Assumptions

- OMS study has an underlying accuracy $\pm 30\%$
- Base case of 60 Mt/y ore processing rate, with possible expansion to 90 Mt/y. The original mine had a 50 Mt/y processing rate
- Long term metal prices based on 2016 Industry Analyst consensus:
 - Copper Base \$2.96/lb,
 - Gold Base \$1,234/oz,
 - Current ABG & PNG fiscal regime,
 - All monetary amounts are expressed in US\$



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OMS Scope

- Develop a resource model;
- Determine mining and ore processing rates for base and expanded cases;
- Conceptual life of mine production schedules;
- Assess alternative land tailings storage options.;
- Assess power generation options;
- Social and civil infrastructure, accommodation and road/airport/port upgrades;
- Potential environmental impacts and mitigation options;
- Capital and operating costs to +/- 30%; and,
- Financial analysis carried out using a detailed financial model.



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Focusing question:

What are the financially, environmentally and technically viable Panguna development options that would be potentially be acceptable to stakeholders?



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Major options assessed:

Mining rates

- 100 and 125Mt/y

Processing rates (based on 30Mt/y modules)

- 30, 60 and 90Mt/y

Tailings Disposal

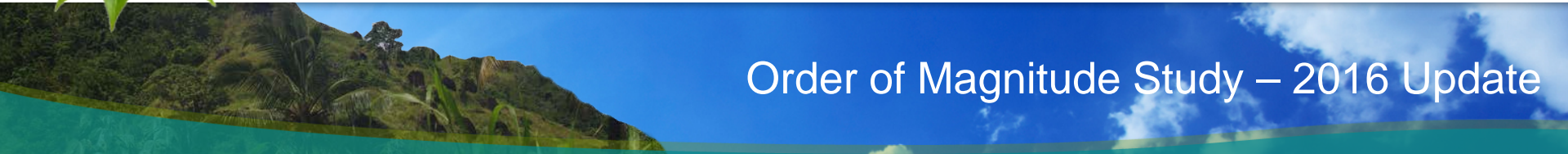
- On land conventional paddock,
- Valley fill,
- Deep sea tailings placement (east coast)

Accommodation

- Combination of a Single Persons Quarters (SPQ) and residential housing

Power generation

- Coal or Gas for base load
- Potential for incremental hydropower



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Base Case Description

Redevelopment considered:

- Conventional truck and shovel open pit mine
- Ore processing at 60Mt/y
- Produce Cu-Au concentrate
- Export from Anewa Bay port (Loloho)
- On land paddock tailings storage
- Coal fired power generation
- Accommodation in SPQ for all employees on shift and some residential housing
- Infrastructure including upgrades to the airport, roads and port.

Parameter	Base
Pit size (Bt)	2.2
Waste Rock (Mt)	760
Waste to ore ratio	0.5
Processing rate (Mt/y)	60
Life of mine (years)	24
Cu (Mt)	4.3
Au (Moz)	13.9
Power capacity (MW)	229
Employees	2487
Single person quarters	1600
Residential houses	100



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Major Assumptions

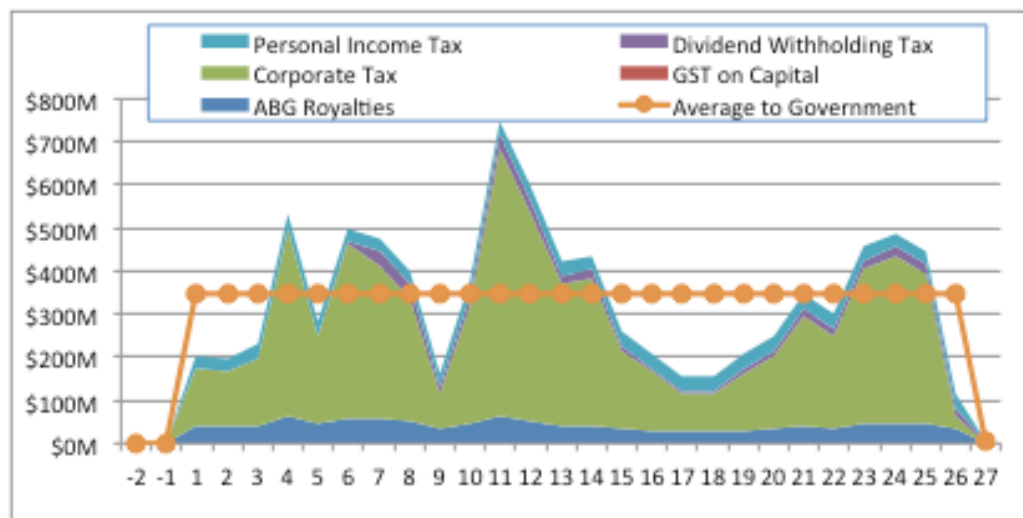
- Mine up to 100Mt/y
- Low waste to ore ratio 0.5
- Processes 1.4Bt at 60Mt/y
- Operate for 24 years
- Mining tax conditions introduced, free carry and royalties
- Assumed production start date set to align with local political landscape
- Capital cost of \$5.2B in OMS base date terms and \$6B in current terms

Item	2013	2016
Copper (\$/lb)	\$2.60	\$2.96
Gold (\$/oz)	\$860	\$1,234
Exchange rate (A\$/US\$)	\$0.92	\$0.72
Company tax (current regime)	30%	30%
Royalties	2%	3.75%
Free carry	-	5%
Cost escalation	-	2.3%
Production start	2020	2027



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Indicative payments to Governments – \$ M/y



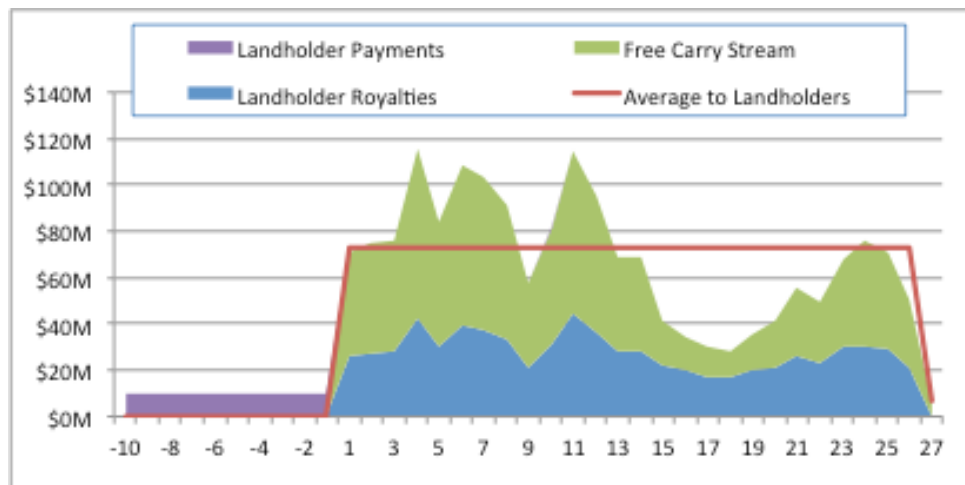
Life Of Mine annual average	2013	2016 60Mt	2016 90Mt
Personal income tax	43	33	36
Corporate tax	116	254	308
ABG Royalties	28	42	51
Dividend withholding tax	20	15	18
GST on capital	1	1	1
Total	208	344	414

Note: Payments based on current legislation.



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Indicative payments to Landholders – \$ M/y



Life of mine average	2013	2016 60Mt	2016 90Mt
Free Carry (based on possible dividends)	-	41	50
Landowner Royalties	-	28	34
Landowner Payments	59	4	4
Total	59	73	88

Note: Landholders would receive payments during the pre-operational period but shown as averaged over mine life in this table. Payments based on current legislation.



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Capital Costs

Changes since OMS:

- Escalation of 2.3%
- Environmental clean up allowance
- Waste dump acid water treatment
- River levee maintenance
- Additional items to owner's costs
- Increase in contingency allowance

Area	2013 (\$M)	2016 (\$M)
Mining	547	560
PCS plant	75	77
Processing	856	875
Infrastructure & port	489	500
Tailings & environ.	351	853
Power Supply	480	491
Accommodation & town	689	704
EPCM	715	747
Owner's costs	294	364
Contingency	691	906
Initial Project Total	5,187	6,077
Expansion to 90Mt	951	1,028



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Mineral Resource

- BCL published a revised Mineral Resource statement in February 2013 based on the results of the original 2013 OMS.
- This reflected the impact of the current outlook for metal prices, higher throughput more efficient processing plant and larger scale open-pit mining operation and resulted in a 70% increase in tonnage from the previous Mineral Resource of ~1.1Bt .

Resources	Tonnes (Mt)	Cu (%)	Au (g/t)	Cu (Mt)	Au (Moz)
Measured	0			0	0
Indicated	1,538	0.30	0.33	4.6	16.1
Inferred	300	0.3	0.4	0.7	3.2
Total	1,838	0.30	0.34	5.3	19.3



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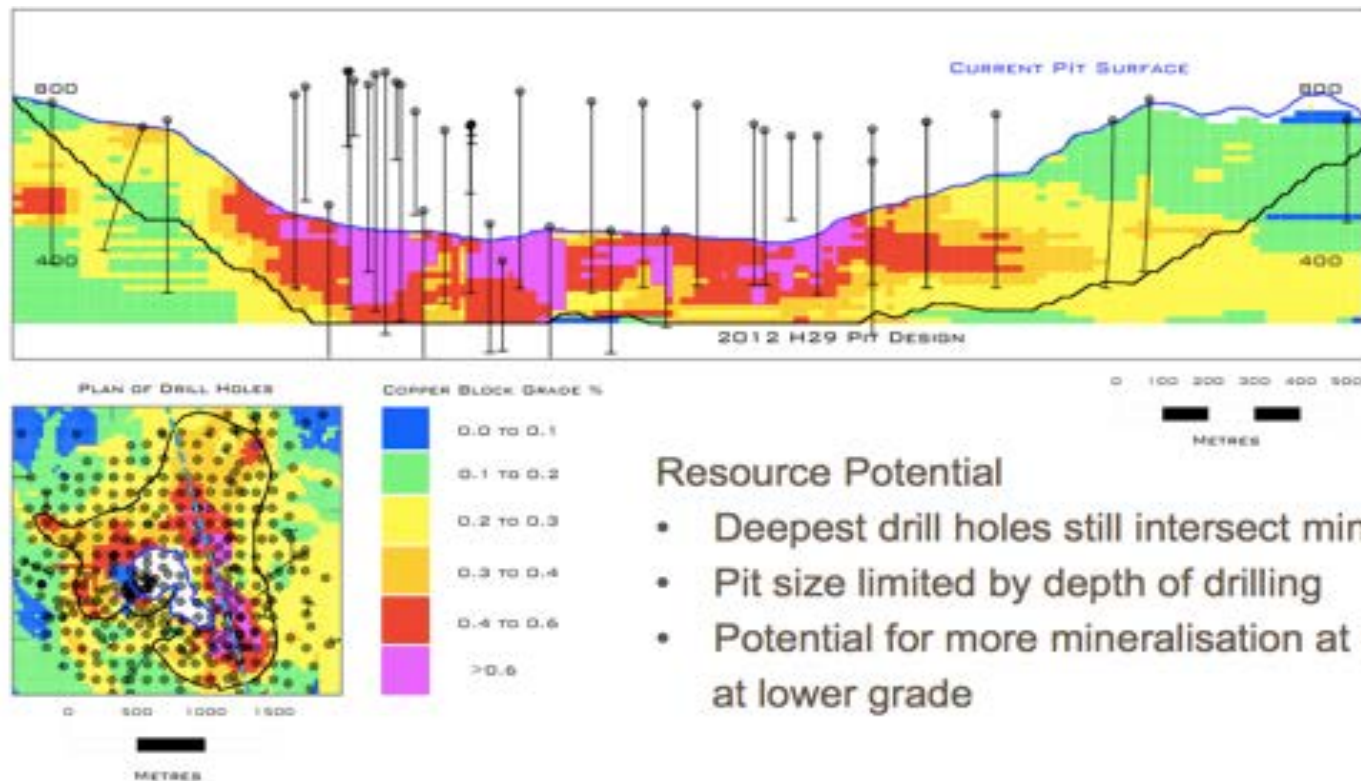
Resource Estimate

- BCL's Historic resource estimate understated the amount of ore present;
- OMS prepared a factored resource estimate to compensate for this underestimation;
- Independent review confirmed that the factored estimate was a better representation of the resource than the historic estimate, so it was used as the OMS base case.



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Resource



Resource Potential

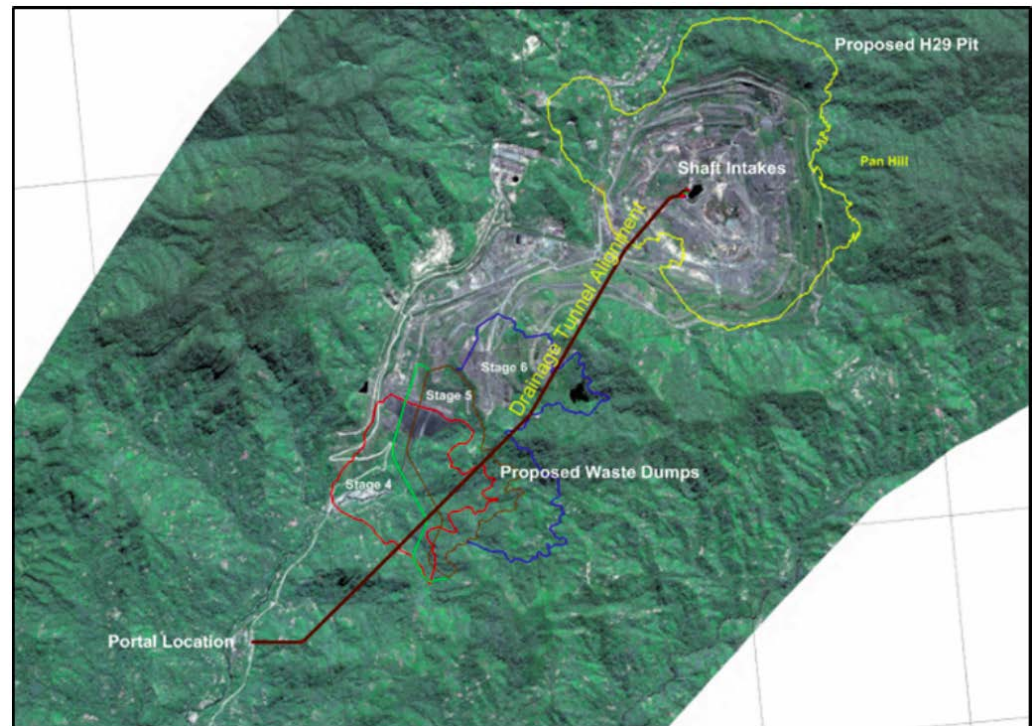
- Deepest drill holes still intersect mineralisation
- Pit size limited by depth of drilling
- Potential for more mineralisation at depth but at lower grade



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Mining

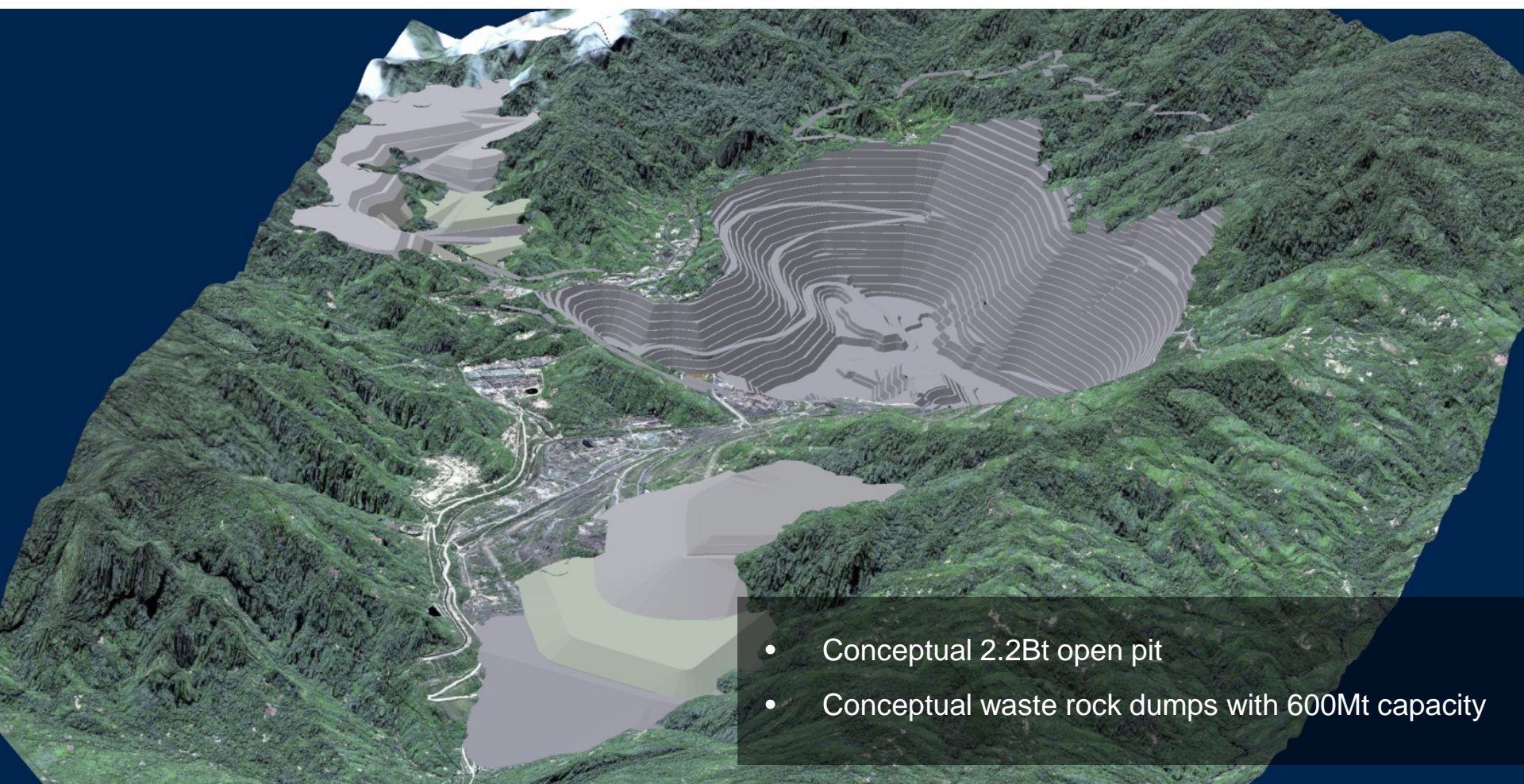
- Previous mining has left a pre-stripped open pit but remediation required.
- Drainage tunnel appears to be working
- Base case annual mining rate 100Mtpa
- Large primary load and haul fleet:
 - 2 x 30Mtpa Rope shovels
 - 2 x 15Mtpa Excavators
 - 1x 10Mtpa Wheel loader
 - 35 x 290t Trucks
- Low strip ratio of 0.5:1



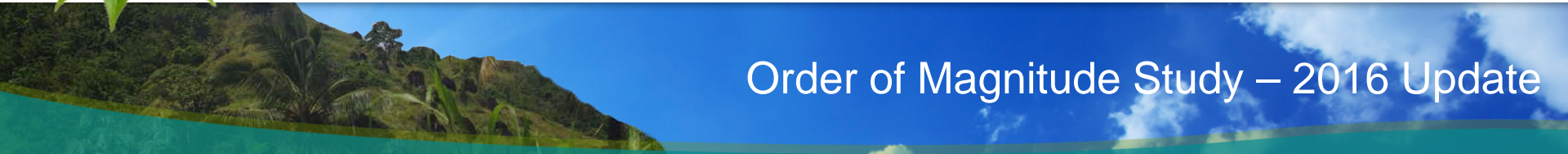


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Order of Magnitude Study – 2016 Update Pit and Waste Dumps



- Conceptual 2.2Bt open pit
- Conceptual waste rock dumps with 600Mt capacity



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Ore Processing

- Ore processing plant was considered in comminution modules comprising SAG and grinding mills to process 30Mt/y;
- Base Case plant comprised two ore processing modules to process 60Mt/y;
- Pre-concentration screening at 35Mt/y was specified to enable processing of lower grade material and reduce the amount of mine waste rock to store;
- Historic recoveries were 88.3% Cu and 71.7% Au for a 30% Cu concentrate.
- Base Case recoveries were 91% Cu and 77% Au for a 28% Cu concentrate;
- Gold recovery could be improved by adding a gravity circuit; and,
- There is potential to further improve the recoveries but test work is required to confirm.



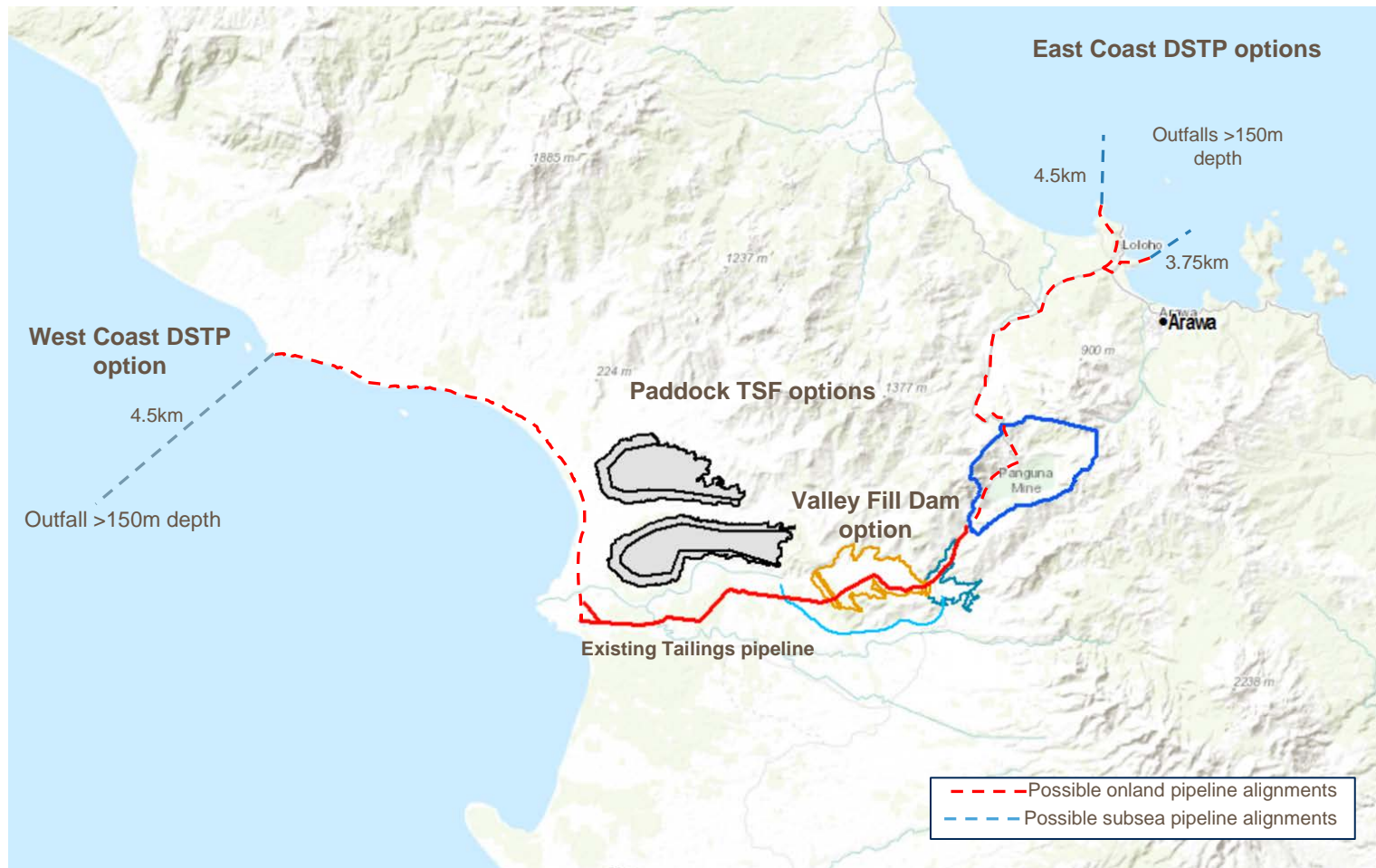
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Tailings

- Previously placed in the Jaba River flowing into Empress Augusta Bay.
- Tailings accumulated in the river. The National and Provincial governments approved BCL to construct a pipeline which was completed in 1988-89, to directly place the tailings into Empress Augusta Bay (shallow sea tailings placement).
- OMS considered Deep Sea Tailings Placement (DSTP) and on-land storage options.
- DSTP studies cannot be further advanced without site access.
- On-land alternatives considered were conventional paddock tailings dams on the west coast and a valley fill dam on the Upper Jaba River that would cover most of the historic tailings.

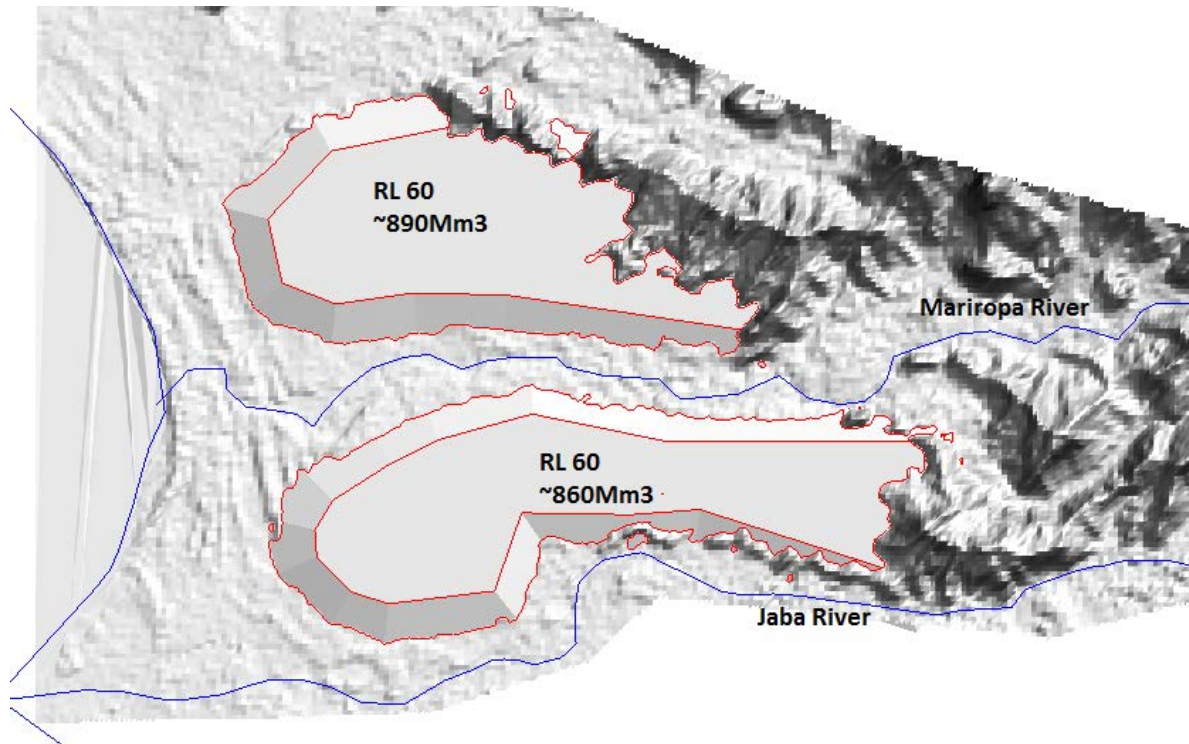


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Order of Magnitude Study – 2016 Update On land Tailings



- Two areas were identified as potentially suitable for on land paddock dams.
- Each of these areas has the capacity to store approximately 1.2Bt of tailings.
- Field investigations are required to determine viability of options.



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Environment

Matters to be assessed are:

- Potential impact of chemicals, hydrocarbons and asbestos from premature closure.
- Upon regaining access it is proposed to undertake baseline environmental and social assessments to inform future options

Management of future tailings

- On land paddock TSF – has advantage of water recycling
- DSTP and valley fill dam options for further consideration subject to feasibility of on land TSF



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Power generation options

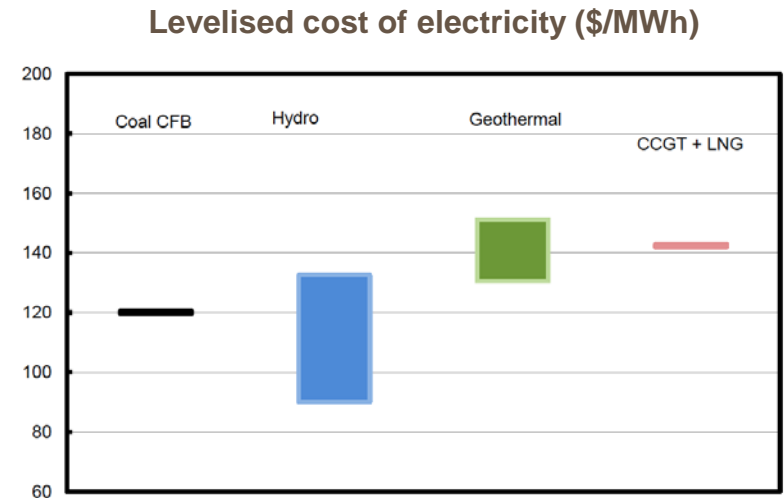
- Base case requires 229MW' including allowance for community supply;
- Coal fired power generation selected as Base Case based on the lowest net present cost;
- Gas is an option but adds significant capital cost;
- Desktop studies indicate the potential for incremental hydropower;
- Geothermal power studied but considered unlikely to be suitable.



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Power generation options

- Coal and hydropower offer the lowest cost electricity generation options.
- Insufficient hydrothermal power potential perceived to provide the total project power.
- Considerable uncertainty in the availability and time to develop a hydropower scheme.
- Supports selection of coal as the base case; hydropower could provide incremental power.
- Gas remains practical as an alternative primary power generation option but at a higher cost.

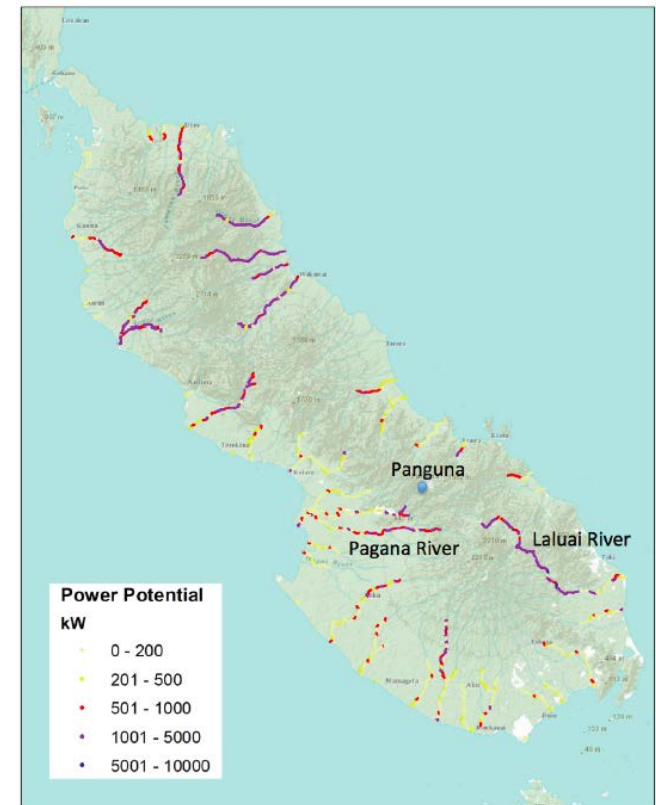




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Hydropower generation options:

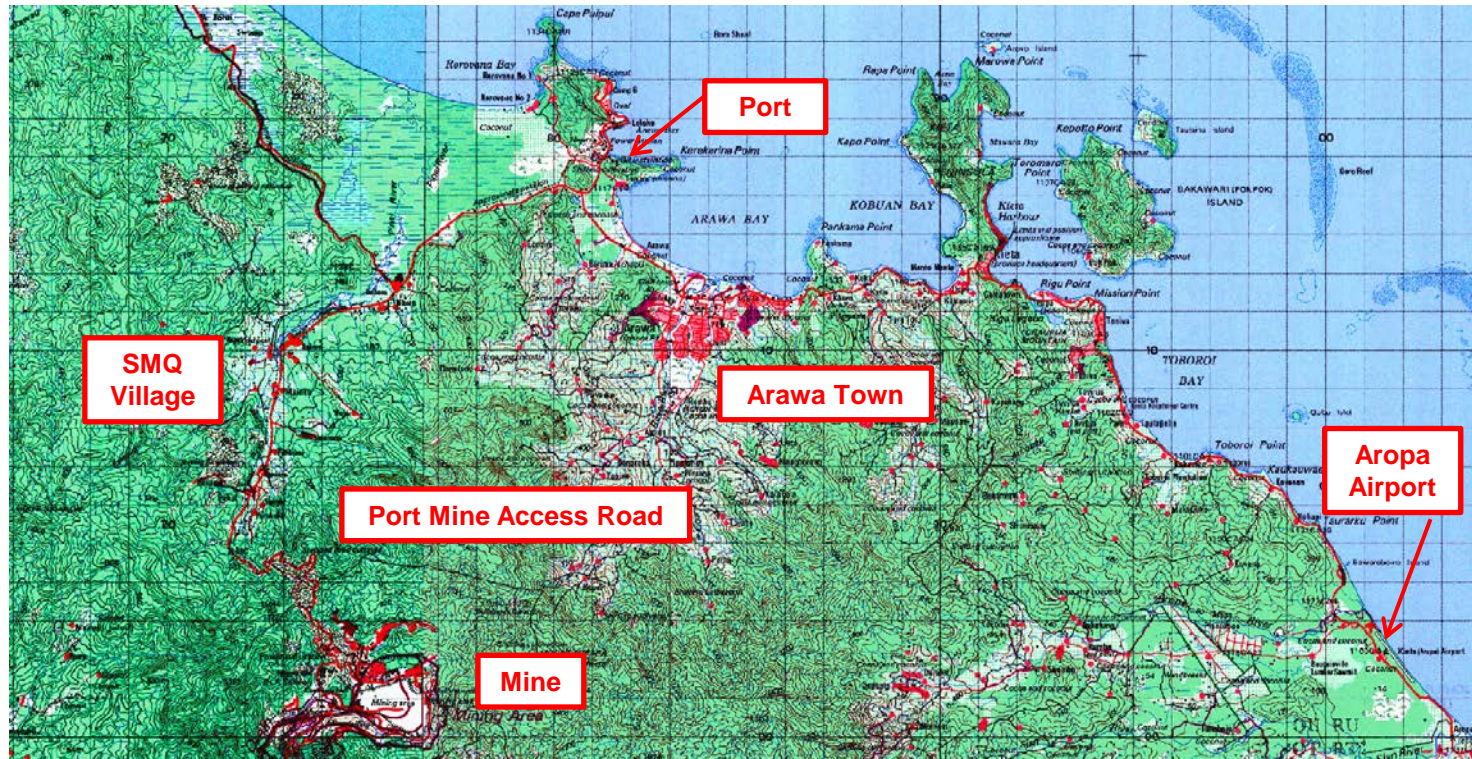
- Several potential hydropower sites identified.
- Reasonable potential to produce 50 to 60MW of hydropower from schemes on the Luluai and Pagana Rivers;
- Operating and maintenance costs relatively low but capital costs relatively high;
- Next steps include community engagement, field mapping, river flow measurements, assessment of land availability and the potential environmental impacts.





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Infrastructure to be upgraded





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Accommodation

- Comprises a SPQ village for all employees on shift and residential housing.
- SPQ Village:
 - located on the port-mine access road; and,
 - comprises a 500 bed construction camp as well as the operational accommodation;
- Village and Residential options assessed - in both cases SPQ beds are provided for all employees whilst on shift;
- Residential housing provided for a core of the leadership staff in the base case and extended to most senior management and superintendent staff and a large proportion of supervisors, professional and some skilled employees in the Residential option.
- Base case comprises 1600 bed SPQ village and 100 residential houses.



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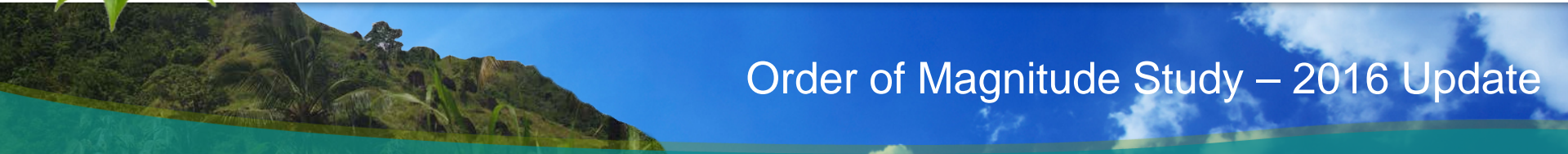
Organisation and working arrangements

- Structure would be similar to the previous operation with 2487 employees for the 60Mt/y Base case;
- Workforce is less than the 3560 employed in 1989 due to the larger mining and processing equipment and more efficient modern business systems;
- Accommodation models and rosters were based on contemporary PNG practices;
- Local workforce trained in time for the commencement of operations. Education and training strategy to be developed with high priority once access available.



Order of Magnitude Study – 2016 Update Development Schedule

	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8
Pre-feasibility (24 months)								
Approvals (3 months)								
Feasibility (12 months)								
Finance (12 months)								
Approvals (3 months)								
Construction (33 months)								
Production								



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Next Step – Establish the new BCL Re-development Context

- The Order of Magnitude Study was prepared to reflect previous major shareholder standards and expectations;
- The new BCL major shareholders may have different expectations of redevelopment. Some possible examples include:
 - Consider establishing an initial low cost, low throughput start up development option with modest or break even economics to demonstrate “harmonious” development is achievable;
 - Once the ability to operate is demonstrated this could be leveraged to finance the scaling up of the project;
 - Further lower cost development options be investigated.



Forward Plan

Next Steps

- Clarify new BCL re-development context;
- Plan appropriate work plan based on new context that could include:
 - Update order of magnitude assessment;
 - Establish Arawa office to facilitate community engagement and facilitate commencing site activities:
 - Landowner Identification Studies;
 - Social Mapping Studies; and,
 - Technical de-risking programme.
- Consider initiating a Prefeasibility Study;
- Undertake social, economic and environmental baseline assessments.



Forward Plan

Further technical de-risking work programme:

- Tailings storage facility site investigations;
- Resource evaluation drilling programme;
- Establish condition of the open pit and mine drainage tunnel;
- Assess condition of major infrastructure;
- Survey environmental impacts from previous mining operation;
- Prepare a workforce development strategy



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Summary

- Change in BCL major shareholding requires re-assessment of the re-development context.
- The OMS describes a project with potential for a long mine life but the capital cost is high.
- Once guidance is provided on the shareholders expectations and re-development vision, further technical, community and environmental studies can be planned.