RESOURCES

MT CARBINE BANKABLE FEASIBILITY STUDY

CHAPTER 12: CAPITAL COST ESTIMATE

DECEMBER 2021

Document History

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1. Introduction

1.1. Context

This Chapter 10: Capital Cost Estimate shall be read in conjunction with Chapter 1: Executive Summary and additional references as listed in Section 5.

1.2. Purpose

The purpose of Chapter 12: Capital Cost Estimate is to summarise the basis of the capital cost estimate developed for the feasibility study and summarise the overall estimated cost to deliver the Project.

2. Basis of Estimate

2.1. Accuracy of Estimate

The capital cost estimate has been developed in accordance with a Class 3 Budget / Authorisation Estimate as defined by AACE 47R-11 Standard: Cost Estimate Classification System –As Applied in Engineering, Procurement, and Construction for the Mining and Mineral Processing Industries.

2.2. Estimate Basis

2.2.1. Direct Costs

Consultants were engaged to provide engineering and estimating services for their relevant scopes in accordance with a AACE 47R-11 Class 3 estimate.

The consultants engaged to provide input into the estimate are listed in Table 1.

Table 1: Estimate Contributors

Estimate Scope	Consultant
Crushing and Screening Plant Sorting Plant Tailings Dewatering Plant	Mincore
Processing Plant	Ausenco
High Voltage Power Upgrade	Woodburn Electrical
Site Infrastructure Project Management	JukesTodd
Approvals and Rehabilitation	NRA Environmental Consultants

The basis of the estimating methodologies for the various scope components are summarised below in Table 2.

Table 2: Direct Cost Estimate Methodology

Description	Base Case
Earthworks	Consultant in-house database of costs for recently completed projects.
Buildings	Recent historic equivalent purchases by EQR.
Concrete Works	Priced from consultant in-house database and compared to previous Mt Carbine project actual costs.
Major Mechanical Equipment (packages over $10k).	Budget quotes from OEMs based on equipment datasheets.
Minor Mechanical Equipment (packages under $10k).	Consultant in-house database of costs for recently completed projects.
Structural Steel Supply	Consultant in-house database of costs for recently completed projects.
Platework	Consultant in-house database of costs for recently completed projects.

Description	Base Case
Structural, Mechanical and Plate Work Installation Costs	Unit man-hours per tonne of steel and equipment.
Piping	Consultant in-house database of costs for recently completed projects.
Electrical Control and Instrumentation supply	Factored from historic projects and checked using reference projects.
First Fills and Spares	Factored from historic projects and checked using reference projects.
HV Upgrade	Firm quote from local contractor familiar with the site and project.
SCADA Replacement	Firm quote from local contractor familiar with the site and project.
Container Workshops	Consultant in-house database of costs for recently completed projects.
Engineering	Budget estimates provided by engineering consultants delivering the relevant study scope.
Mobile Equipment	Firm pricing from OEM suppliers or advertised available secondhand prices.

2.2.2. Indirect Costs

The basis of the estimating methodologies for the indirect cost components are summarised below in Table 3.

Table 3: Indirect Cost Estimate Methodology

Description	Base Case
Approvals	Known government fees and budget pricing for consultant activities.
Project Management	First principles manhour build-up against the execution schedule.
Contingency	Risk ranging was performed on the capex items and a Monte Carlo simulation was performed to develop a P90 contingency estimate.
Escalation	Given the short duration of the Project, escalation was not included in the capital estimate.

2.2.3. Foreign Exchange

All cost items included in the capital cost estimate were sourced and provided in Australian Dollars. All equipment, materials and services were sourced in Australia.

3. Capital Cost Estimate

3.1. Estimate Summary

Estimate summaries at WBS level 1 are provided in Table 4.

Table 4: Estimate Summary

WBS Code	WBS Descriptions	Cost (AUD)
10000	Mining	2,431,000
20000	Processing	14,527,258
30000	On-site Infrastructure	1,235,188
70000	Project Indirects	1,443,460
80000	Owner's Costs	1,804,123
90000	Contingency	1,516,591
	Total	**22,957,620**

A detailed estimate is provided in Table 5.

Table 5: Detailed Capital Cost Summary

WBS	Phase	WBS Description	Item Description	UOM	Qty	Unit Rate (AUD)	Total Cost (AUD)
17000	1	Mobile Equipment	Komatsu WA500 6.4m3 Front End Loader	ea	1	250,000	250,000
17000	1	Mobile Equipment	Bobcat	ea	1	30,000	30,000
21000	1	Crushing Plant	Phase 1 Crushing and Screening Plant Direct Costs	lot	1	3,212,057	3,212,057
23000	1	Wet Processing	Process Plant Phase 1 Upgrades	lot	1	43,679	43,679
30000	1	On-site Infrastructure	Phase 1 On-site Infrastructure Upgrades	lot	1	275,004	275,004
72500	1	First Fills and Spares	Crushing and Screening Plant Phase 1 Spares and First Fills	lot	1	44,335	44,335
76100	1	Project Home Office Labour (Off-site)	Crushing Plant Detailed Design - Phase 1	lot	1	160,000	160,000
81100	1	Project Management	Phase 1 Project	lot	1	124,141	124,141

WBS	Phase	WBS Description	Item Description	UOM	Qty	Unit Rate (AUD)	Total Cost (AUD)
			Management - Owner's Team				
81800	1	Consultants and 3rd Parties	Environment Approvals Consultant	lot	1	44,000	44,000
81800	1	Consultants and 3rd Parties	Site Mass and Water Balance Consultant (Phase 1)	lot	1	48,495	48,495
82000	1	Project Expenses	EA Amendment Application	lot	1	51,000	51,000
83100	1	Insurance	Contract Works Insurance	lot	1	17,875	17,875
83300	1	Permits	Environmental Rehabiliation Cost (ERC) Fee to DES	lot	1	247,984	247,984
10000	2	Mining	Capitalised Mining Operations	lot	1	2,151,000	2,151,000
21000	2	Crushing Plant	Phase 2 Crushing and Screening Plant Direct Costs	lot	1	5,909,040	5,909,040
23000	2	Wet Processing	Phase 2 Processing Plant Upgrade	lot	1	5,362,482	5,362,482
30000	2	On-site Infrastructure	Phase 2 On-site Infrastructure	lot	1	805,184	805,184
72500	2	First Fills and Spares	Crushing and Screening Plant Phase 2 Spares and First Fills	lot	1	137,743	137,743
76100	2	Project Home Office Labour (Off-site)	Crushing Plant Detailed Design - Phase 2	lot	1	413,633	413,633
72500	2	First Fills and Spares	Processing Plant Phase 2 Spares and First Fills	lot	1	151,501	151,501
76100	2	Project Home Office Labour (Off-site)	Processing Plant and Site Infrastructure Detailed Design - Phase 2	lot	1	536,248	536,248

WBS	Phase	WBS Description	Item Description	UOM	Qty	Unit Rate (AUD)	Total Cost (AUD)
81100	2	Project Management	Phase 2 Project Management - Owner's Team	lot	1	808,714	808,714
81800	2	Consultants and 3rd Parties	Groundwater Consultant	lot	1	100,000	100,000
81800	2	Consultants and 3rd Parties	Geochemistry Consultant	lot	1	50,000	50,000
81800	2	Consultants and 3rd Parties	Noise, Dust and Vibration Consultant	lot	1	40,000	40,000
81900	2	Operations Support	Mining Software (Leapfrog and Deswick License)	lot	1	50,000	50,000
83100	2	Insurance	Contract Works Insurance	lot	1	71,139	71,139
83300	2	Permits	EA Amendment Application (Major)	lot	1	150,000	150,000
92000	2	Contingency	Contingency	lot	1	1,516,591	1,516,591
Phase 1 Subtotal (excluding contingency)							**4,548,570**
Phase 2 Subtotal (excluding contingency)							**16,892,459**
Total (excluding contingency)							**21,441,029**
Total (including contingency)							**22,957,620**

Detailed cost estimates from the study consultants are provided for reference in the relevant study chapters, with the significant proportion of the total capital cost detailed in the following:

- Chapter 4: Mining
- Chapter 5: Processing
- Chapter 6: Infrastructure

4. Contingency Analysis

4.1. Inputs

A risk based, probabilistic analysis of the capital costs was undertaken in order to develop the Project contingency. Table 6 summarises the risk ranging applied to the capital cost estimate used to determine the contingency.

Table 6: Capital Estimate Risk Inputs

Item	Description	Distribution	Likely Cost (AUD)	Max Cost Range +%	Max Cost Range -%
1	Komatsu WA500 6.4m3 Front End Loader	Triangular	250,000	1%	1%
2	Bobcat	Triangular	30,000	30%	10%
3	Phase 1 Crushing and Screening Plant Direct Costs	Triangular	3,212,057	15%	10%
4	Process Plant Phase 1 Upgrades	Triangular	43,679	20%	5%
5	Phase 1 On-site Infrastructure Upgrades	Triangular	275,004	20%	5%
6	Crushing and Screening Plant Phase 1 Spares and First Fills	Triangular	44,335	20%	5%
7	Crushing Plant Detailed Design - Phase 1	Triangular	160,000	20%	10%
8	Phase 1 Project Management - Owner's Team	Triangular	124,141	20%	10%
9	Environment Approvals Consultant	Triangular	44,000	15%	15%
10	Site Mass and Water Balance Consultant (Phase 1)	Triangular	48,495	10%	5%
11	EA Amendment Application	Triangular	51,000	1%	1%
12	Contract Works Insurance	Triangular	17,875	15%	15%
13	Environmental Rehabiliation Cost (ERC) Fee to DES	Triangular	247,984	20%	5%
14	Capitalised Mining Operations	Triangular	2,151,000	20%	10%
15	Phase 2 Crushing and Screening Plant Direct Costs	Triangular	5,909,040	25%	5%
16	Phase 2 Processing Plant Upgrade	Triangular	5,362,482	20%	10%
17	Phase 2 On-site Infrastructure	Triangular	805,184	20%	20%
18	Crushing and Screening Plant Phase 2 Spares and First Fills	Triangular	137,743	20%	15%
19	Crushing Plant Detailed Design - Phase 2	Triangular	413,633	20%	10%
20	Processing Plant Phase 2 Spares and First Fills	Triangular	151,501	20%	20%

Item	Description	Distribution	Likely Cost (AUD)	Max Cost Range +%	Max Cost Range -%
21	Processing Plant and Site Infrastructure Detailed Design - Phase 2	Triangular	536,248	15%	15%
22	Phase 2 Project Management - Owner's Team	Triangular	808,714	15%	15%
23	Groundwater Consultant	Triangular	100,000	15%	10%
24	Geochemistry Consultant	Triangular	50,000	20%	10%
25	Noise, Dust and Vibration Consultant	Triangular	40,000	20%	5%
26	Mining Software (Leapfrog and Deswick License)	Triangular	50,000	10%	10%
27	Contract Works Insurance	Triangular	71,139	15%	5%
28	EA Amendment Application (Major)	Triangular	150,000	15%	10%

4.2. Outputs

The variance analysis provided the outputs summarised in Table 7 and Figure 1.

The Project has adopted a the P90 case as the estimate position with a contingency value of AUD1,532,427.

Table 7: Probabilistic Project Costs

Probability	Project Cost (AUD)
10%	21,339,992
20%	21,555,765
30%	21,724,010
40%	21,874,697
50%	22,024,637
60%	22,175,941
70%	22,378,255
80%	22,572,588
90%	**22,957,620**
95%	23,061,873
99%	23,461,593

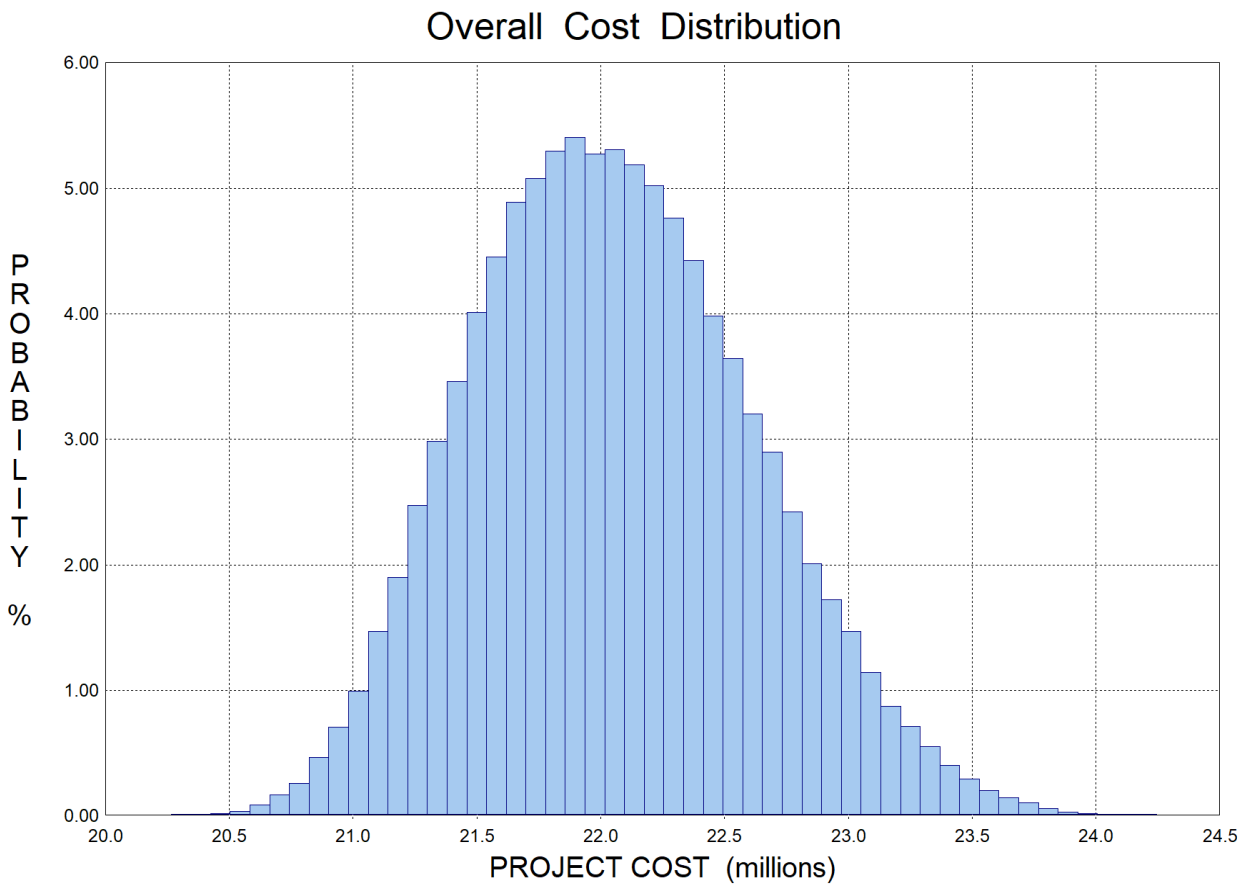

Figure 1: Project Cost Distribution

5. References

- Chapter 4: Mining
- Chapter 5: Processing
- Chapter 6: Infrastructure

6. List of Abbreviations

Abbreviation	Description
AACE	Association for the Advancement of Cost Engineering
EQR	EQ Resources Limited
LGS	Low grade ore stockpile

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