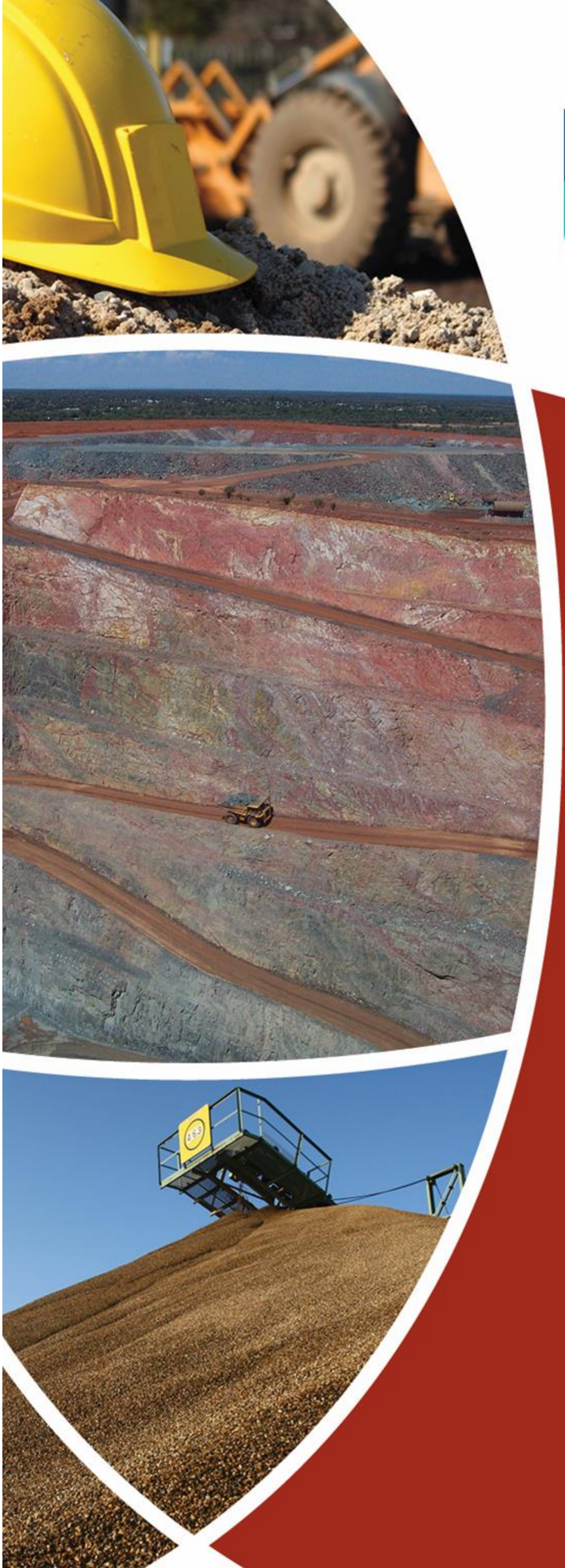

CSA Global
Mining Industry Consultants

Conceptual Mining Study of the Manbarrum Project

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Definition of the word "ore"

The word "ore" in the context of this report does not imply the technical feasibility or economic viability that is attributed to the word "ore" as used when discussing Ore Reserves. No Ore Reserves have been estimated for this study.

Executive Summary

Todd River Resources Ltd ("TRR") requested CSA Global to undertake a Conceptual Mining Study (CMS) on the Manbarrum Zinc-Lead-Silver Project ("the Project") located in the Northern Territory, Australia. The Project comprises a range of exploration targets however the key focus is the Sandy Creek and Djibitgun deposits.

Both the Sandy Creek and Djibitgun deposits are amenable to conventional open cut mining methods, with ore processing expected to follow a standard crushing and floatation process producing a zinc and a lead-silver concentrates.

A set of economic and physical parameters were agreed by TRR and CSA Global for both the Sandy Creek and Djibitgun deposits. Base case metal prices used for the study are A$4,270/t zinc, A$3,250/t lead and A$22/oz silver. Discount rate was applied at 8%, and discounted cashflow (DCF) values are calculated excluding taxes, royalties, depreciation and amortisation.

Whittle™ optimisation software was used to create the optimised pit shells. The highest value pit shell has been used to create a mining and processing schedule. A simple DCF model was built to assess the viability of various scenarios for each deposit. A summary of the cost assumptions and input parameters is provided below in Table E-1 and Table E-2 respectively.

Table E-1: Cost assumptions used for the CMS

Item	Units	Cost/Parameter
Selling Costs (zinc)	A$/t	Zinc product (Zn.P) x 15%
Selling Costs (lead)	A$/t	Lead product (Pb.P) x 15%
Selling Costs (silver)	A$/t	Included in zinc concentrate
Mining Cost	A$/tonne rock	3.00
Mining Cost Adjustment Factor	A$/tonne/metre depth	0.08
Processing Costs	A$/tonne ore	25.00
Transport to Port	A$/tonne concentrate	10.00
General and Administration	A$/tonne ore	5.00
Ore Differential (over waste)	A$/tonne ore	0.50
Sustaining Capital Costs	A$/tonne ore	1.50
Grade Control	A$/tonne ore	1.00
Rehabilitation	A$/tonne waste	0.10
Road Transport Cost	A$/tkm	0.08

Table E-2: Input parameters for the CMS

Item	Units	Cost/Parameter
Exchange Rate	A$:US$	0.78
Government Royalties	%	6
Resource Classifications		Indicated and Inferred
Mining Recovery	%	95.0
Mining Dilution	%	10.0
Minimum Mining Width	metres	15
Overall Slope Angle – Oxide/Trans	Degrees	35^{O}
Overall Slope Angle – Fresh	Degrees	45^{O}
Processing throughput	Ktpa	500
Metallurgical Recovery (zinc)	%	89.0
Metallurgical Recovery (lead)	%	70.0
Metallurgical Recovery (silver)	%	60.0
Density (oxide/trans)	t/bcm	2.55
Density (fresh)	t/bcm	2.70
Smelter Payability (zinc)	%	85.0
Smelter Payability (lead)	%	95.0
Smelter Payability (Silver)	%	70.0

Base Case

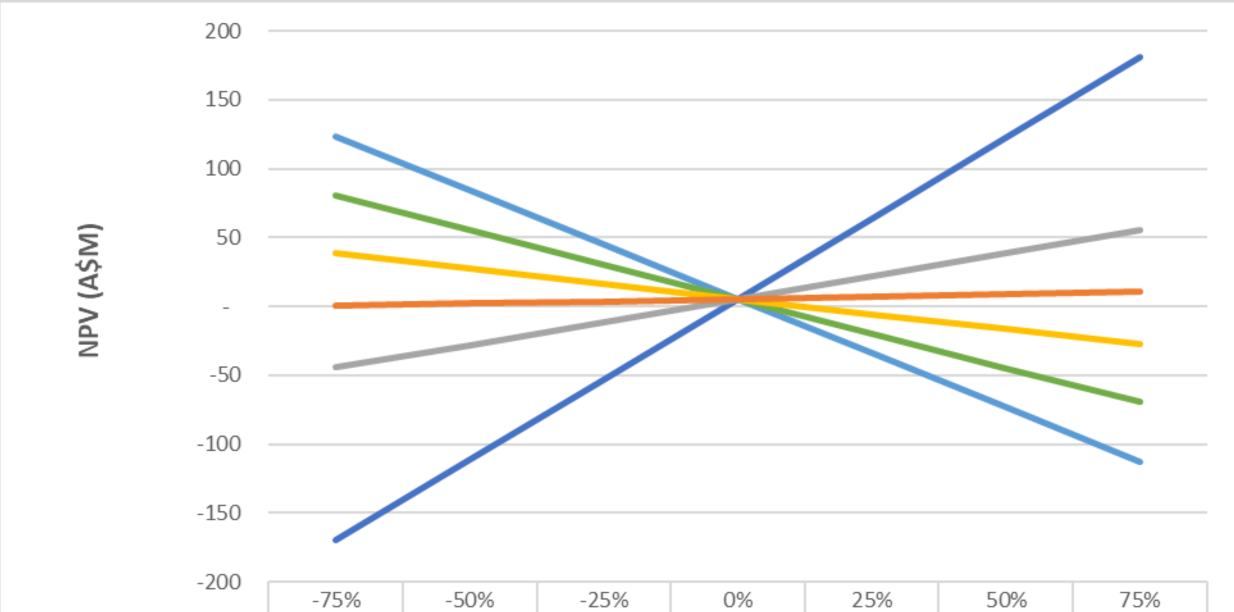
The results of the Whittle™ optimisations are summarised for the Sandy Creek and Djibitgun deposits in Table E-3. Additional scenarios for increased processing throughput rates were assessed to determine if additional project value could be realised for the Sandy Creek deposit, however these scenarios were found to erode value. Capital costs were adjusted applying the sixth-tenths rule from the A$100M base case for 500 Ktpa.

Table E-3: CMS Base Case summaries for Sandy Creek and Djibitgun deposits

Scenario No.	Rate (Ktpa)	Pit Shell No.	Ore (t)	Waste (t)	Zn%	Pb%	Ag (g/t)	Capex A$M	NPV A$M	Mine Life (yr)	IRR
Sandy Creek Base Case											
1	0.50	8	5.74	13.77	2.32%	0.99%	6.13	$100	$5	13	9%
2	0.75	10	6.31	15.15	2.29%	0.95%	5.94	$130	-$9	10	6%

Scenario No.	Rate (Ktpa)	Pit Shell No.	Ore (t)	Waste (t)	Zn%	Pb%	Ag (g/t)	Capex A$M	NPV A$M	Mine Life (yr)	IRR
3	1.00	10	6.31	15.15	2.29%	0.95%	5.94	$160	-$30	8	2%
Djibitgun Base Case											
4	0.50	1	0.15	2.53	2.72%	1.20%	21.3	$-	-$0.4	2	2%

A sensitivity graph for the Sandy Creek deposit is provided below in Figure E-1. The Sandy Creek project is most sensitive to zinc revenue (be it grade or price). The project is also sensitive to processing costs (estimated at A$43/t) and capital costs, which a largely made up from processing infrastructure.



	-75%	-50%	-25%	0%	25%	50%	75%
Zn Revenue	-170	-111	-53	5	64	122	181
Processing Cost	124	84	45	5	-34	-73	-113
Capital	80	55	30	5	-20	-45	-70
Pb Revenue	-44	-28	-11	5	22	39	55
Mining Cost	38	27	16	5	-6	-17	-27
Ag Revenue	0	2	4	5	7	9	10

Figure E-1: Sensitivity on key inputs for Sandy Creek deposit

Based on the optimal pit shell (no.8) for Sandy Creek, another assessment of processing throughput rates was undertaken, specifically on the same pit shell (fixed tonnes and grade). In this assessment the G&A costs were also adjusted using the sixth-tenths rule. The results in Table E-4 show that reducing the throughput rate may improve NPV marginally for the Sandy Creek deposit.

Table E-4: Sandy Creek sensitivity to processing throughput rate

Processing Rate	Project Life	Construction Capital	G&A	Pre-tax NPV 8%
Ktpa	**Years**	**A$M**	**A$/t**	**A$M**
300	20.1	76	6.79	7
400	15.4	88	5.72	8
500	12.5	100	5.00	5
750	8.6	130	3.92	-10
1,000	6.7	160	3.30	-32

Note: NPV in Table E-3 are based on different Whittle™ optimisations (pit shells) for throughput rates, whereas the NPV above is based on a single pit shell (pit shell 8) with changes made in the financial model only.

A detailed sensitivity analysis of Djibitgun has not been undertaken due to the low project value and low prospect of eventual economic viability. A high-level assessment is provided in section 6.4.

The key findings for the CMS base case assessment are summarised below:

- Based on the agreed input parameters, a positive cashflow was generated for the base case scenario for Sandy Creek (500 Ktpa) which assumes processing facilities on site (A$100M total capital costs). The NPV for the base case is A$5.5M, IRR of 9%, and a mine life of 12.5 years (excludes taxes, royalties, depreciation and amortisation).
- Should a toll treatment option be feasible for Sandy Creek, estimated capital costs would reduce to A$20M and A$30M and result in a project NPV in the range of A$75 to A$85M, with an IRR of 40 to 60%.
- Increasing the processing throughput rate at Sandy Creek does not offset the increased capital costs associated with the upgrades to processing infrastructure required. Reducing the throughput rate to 300 to 400 Ktpa may improve project value marginally.
- Sensitivity analysis carried out on the Sandy Creek cashflow model shows the project is most sensitive to zinc revenue (be it zinc grade or price). Including A$100M in capital costs, the project breaks even at a zinc price of A$4,170/t.
- For the Djibitgun deposit, the agreed input parameters resulted in a very small pit (< 150 kt ore) a project NPV of A$-0.4M, excluding capital costs, taxes, royalties, depreciation and amortisation.
- Larger pit sizes are achieved in Whittle™ for the Djibitgun deposit for higher revenue factors however these result in lower NPV due to the high stripping ratio's (in the range of 13 to 17 waste tonnes per ore tonne for different scenarios). The high stripping ratios are due to the flat lying ore body at 50 to 150 metres depth from surface.
- Based on the metallurgical data made available to CSA Global, it is unclear how a saleable concentrate will be produced for these deposits. No assessment of preferred treatment methods and associated metallurgical recoveries and processing costs appear in the information provided to CSA Global. This area of further work may have considerable impact on the project economics (in particular Sandy Creek).

Success Criteria for Manbarrum Project

Based on the assumed metal prices in this study, zinc metal represents more than 80% and 75% of the value for the Sandy Creek and Djibitgun deposits respectively. Zinc price has therefore been used to measure the success criteria for each project (for simplicity), which are summarised in Table E-5 and Table E-6. Secondly, the deposits are sensitive to capital expenditure, and given the numerous possible processing scenarios, for simplicity, three cases are provided below for each deposit. If considering building a processing facility at Sandy Creek, the figures far right (CapEx of A$100M) in Table E-5 would be applicable; and, if opting to toll treat at Sorby Hills, the figures far left (CapEx of A$20M) would be more applicable.

Table E-5: Sandy Creek breakeven and sensitivity to zinc price at various capital cost estimates (500 Ktpa)

Pre-tax NPV (A$M)	CapEx at A$20M (toll-treatment option)		CapEx at A$60M (mid-point CapEx)		CapEx at A$100M (on-site processing option)	
	Zinc Price (A$/t)	Zinc Price (US$/t)	Zinc Price (A$/t)	Zinc Price (US$/t)	Zinc Price (A$/t)	Zinc Price (US$/t)
0	2,709	2,113	3,439	2,682	4,170	3,253
50	3,622	2,825	4,353	3,395	5,084	3,966
100	4,536	3,538	5,266	4,107	5,997	4,678
150	5,449	4,250	6,180	4,820	6,911	5,391

Table E-6: Djibitgun breakeven and sensitivity to zinc price at various capital cost estimates (500 Ktpa)

Pre-tax NPV (A$M)	CapEx at A$1M		CapEx at A$10M		CapEx at A$20M	
	Zinc Price (A$/t)	Zinc Price (US$/t)	Zinc Price (A$/t)	Zinc Price (US$/t)	Zinc Price (A$/t)	Zinc Price (US$/t)
0	4,864	3,794	8,610	6,716	12,771	9,961
10	9,026	7,040	12,771	9,961	16,933	13,208
20	13,187	10,286	16,933	13,208	21,094	16,453

Hypothetical Grade Enhancements

The following section related to grade enhancements (grade factors) is hypothetical, and not based on any verifiable process. Therefore, this section does not comply with the JORC code, and shall be used for internal reporting purposes only.

TRR requested CSA Global to assess upside to the zinc grade by applying enhancements to grade in the resource block models. The "grade factor" is motivated by the occurrence of zinc metal accumulation in diamond drill sumps. The supposition is; fines within the diamond core are lost into the drill return water, thus not included in the assay samples; and, that assay results may be penalised (lower grade) due to the removal of the fines. CSA Global has not carried out any quantitative or qualitative investigations of this theory and thus cannot comment on potential material change to the zinc grades until further work is undertaken.

The methods of calculating and applying grade factors can be found in section 7. The results of the DCF modelling for each scenario are provided in Table E-7 and Table E-8 below, for the Sandy Creek and Djibitgun deposits respectively. Note NPV's below are inclusive of capital costs and exclusive of taxes, royalties, amortisation and depreciation (i.e. EBITDA). The discount rate applied is 8%.

Table E-7: Sandy Creek NPV summary for grade enhancement scenario's

Scenario No.	Rate (Ktpa)	Pit Shell No.	Ore (t)	Waste (t)	Zn%	Pb%	Ag (g/t)	Capex A$M	NPV A$M	Mine Life (yr)	IRR
CMS Fixed Grade Improvement +0.5% Zn											
5	0.50	18	7.86	13.68	2.51%	0.83%	5.43	$100	$41	16	14%
6	0.75	20	8.32	15.06	2.49%	0.82%	5.39	$130	$42	13	14%
7	1.00	24	9.36	17.59	2.43%	0.78%	5.30	$160	$30	11	12%
CMS Fixed Grade Improvement +1.0% Zn											
8	0.50	15	10.14	11.46	2.67%	0.68%	4.85	$100	$80	21	16%
9	0.75	19	12.21	14.77	2.59%	0.64%	4.72	$130	$95	18	18%
10	1.00	21	13.76	16.65	2.54%	0.59%	4.53	$160	$94	15	17%
11	2.00	25	20.55	31.65	2.38%	0.52%	4.33	$250	$78	12	14%
CMS Scaled Grade Improvement +0.5% Zn											
12	0.50	18	6.97	14.50	2.66%	0.88%	5.67	$100	$52	15	16%
13	0.75	21	7.64	16.65	2.61%	0.86%	5.58	$130	$47	12	15%
14	1.00	21	7.64	16.65	2.61%	0.86%	5.58	$160	$33	9	13%
CMS Scaled Grade Improvement +1.0% Zn											
15	0.50	15	7.98	14.84	2.96%	0.8%	5.33	$100	$97	17	21%
16	0.75	18	8.68	16.83	2.90%	0.79%	5.32	$130	$105	13	21%
17	1.00	22	9.82	20.91	2.83%	0.76%	5.18	$160	$98	11	20%
18	2.00	26	10.91	25.41	2.76%	0.72%	5.20	$250	$55	7	15%

Table E-8: Djibitgun NPV summary for CMS base case and grade upside scenario's

Scenario No.	Rate (Mtpa)	Pit Shell No.	Ore (t)	Waste (t)	Zn%	Pb%	Ag (g/t)	Capex A$M	NPV A$M	Mine Life (yr)	IRR
CMS Fixed Grade Improvement +0.5% Zn											
19	0.50	3	0.49	6.53	2.58%	1.21%	17.94	$-	$1.9	2	18%
CMS Fixed Grade Improvement +1.0% Zn											
20	0.50	2	0.54	6.98	2.91%	1.23%	17.72	$-	$7.9	3	46%
21 (RF=1)	0.50	4	6.37	56.23	2.48%	0.55%	14.08	$-	$12.6	14	19%
CMS Scaled Grade Improvement +0.5% Zn											

Scenario No.	Rate (Mtpa)	Pit Shell No.	Ore (t)	Waste (t)	Zn%	Pb%	Ag (g/t)	Capex A$M	NPV A$M	Mine Life (yr)	IRR
22	0.50	6	0.26	3.96	3.10%	1.17%	20.02	$-	$2.8	2	32%
CMS Scaled Grade Improvement +1.0% Zn											
23	0.50	8	0.53	7.45	3.13%	1.21%	17.93	$-	$8.6	3	47%
24 (RF=1)	0.50	10	2.58	29.65	2.82%	0.54%	16.03	$-	$8.9	7	20%

The findings of the assessment of grade factors are as follows:

- Scaled grade factors (c and d) typically have more positive impact on NPV than fixed grade factors (a and b), i.e. grade factor bias to higher grades adds more value than bias towards lower grades.
- There are cases for Sandy Creek where increasing the processing throughput rate to between 750 Ktpa and 1.0 Mtpa improves project value (i.e. the faster mining rate more than offsets additional capital costs for processing plant upgrade).
- Overall, the grade factors improve the Sandy Creek economics (assuming processing facilities on site), with the optimal scenario No.16 achieving an NPV of A$105M, with an IRR of 21% (inclusive of capital costs). Grade factors of 0.5% (“factor a” and “factor c”) result in NPV’s ranging from A$30M to A$52M and IRR’s from 12% to 16%. Grade factors of 1.0% (“factor b” and “factor d”) result in NPV’s ranging from A$78M to A$105M and IRR’s from 14% to 21% (Table E-7).
- For Djibitgun, the grade factors improve the economics, with the optimal Scenario No.21 achieving an NPV of A$12.6M, with an IRR of 19%. Grade factors of 0.5% (“factor a” and “factor c”) result in NPV’s ranging from A$1.9M to A$2.8M and IRR’s from 18% to 32% (exclusive of capital costs). Grade factors of 1.0% (“factor b” and “factor d”) result in NPV’s ranging from A$7.9M to A$12.6M and IRR’s from 19% to 47% (exclusive of capital costs) (Table E-8).

Conclusions

Based on the inputs and parameters used in this study, assuming a processing plant on site, the NPV for Sandy Creek is A$5M with an IRR of 9%. Further work to enhance grade, mining inventory, recoveries, and/or reduce costs and find synergies with other opportunities (e.g. Sorby Hills, sales agreements) may find a path to market attractiveness in the short to medium-term.

The main conclusions of the study are presented below:

- The base case Sandy Creek scenario (1) produces a positive NPV, however would not likely to be sufficiently attractive to develop a stand-alone project (i.e. processing facilities on site). The project may be economically viable, and have market appeal, should a toll treatment or ore sale agreement option become feasible (e.g. Sorby Hills). Note Sandy Creek, assuming capital costs of A$20M, results in an NPV of A$85M with an IRR of 61% (exclusive of taxes, royalties, depreciation and amortisation).
- Sandy Creek is most sensitive (after zinc price) to process operating and capital costs, and further work determining process options, recoveries and processing costs (capital and operating) is prudent before or during Scoping Studies. Based on the metallurgical data made available to CSA Global, it is unclear how a saleable concentrate will be produced for these deposits.
- The base case Djibitgun scenario (4) results in an NPV of A$-0.4M excluding capital costs, taxes, royalties, depreciation and amortisation. The Djibitgun deposit may present some value as a satellite

operation, however any option for Djibitgun will feature high stripping ratio's and mining costs. There is limited scope to reduce mining costs to improve project value.

- Applying grade factors to the Sandy Creek block model results in marked improvements to the project economics as expected. Should work be undertaken to verify the inclusion of additional grade be successful, the Sandy Creek project could become viable as a stand-alone operation with processing facilities on site, particularly if grade factors of +1.0% zinc be realised.
- The Djibitgun deposit, when applying grade factors, results in an increase in project value, however this value is limited due to the smaller scale of the mine and high stripping ratio. The deposit would most likely be exploited as a satellite operation.

Recommendations

CSA Global provides the following recommendations for the Manbarrum Project:

- An investigation be undertaken into suitable processing strategies for both the Sandy Creek and Djibitgun deposits. This work would result in more accurate estimates for metallurgical recoveries and processing costs (capital and operating). It is important that geo-metallurgical models are created, and that bench-scale and ultimately pilot-scale test work is completed on the various mineral domains and material types.
- It is recommended that an investigation into the potential pre-concentration processes is undertaken to identify opportunities to improve plant feed grades, thereby reducing total plant throughput requirements resulting in capital and operating cost reductions.
- An opportunity to improve the Project's value may exist via other parties purchasing ore from the Project. Entering an ore sale agreement will reduce the construction capital required and may improve viability of the Project.
- It is a recommendation that further drilling activities, if possible, aim to improve base metal grades. Review of the potential for grade bias (under-calling grade in diamond drilling or over-calling of grade in RC drilling) should be completed and the impact to the resource grade assessed.
- Similarly, should metal prices continue to improve (particularly zinc), further work progressing the Sandy Creek project to scoping/prefeasibility level studies may be warranted.
- Increasing the tonnes available for processing (at current grades) has a minor improvement on NPV and alone would not produce a viable operation (based on inputs used in the CMS). Increasing the size of the mineable resource however, concurrently to other recommendations made here, would add further value to the Project, but should not be the priority.
- It is recommended that, should the Sandy Creek deposit advance to scoping studies, a geotechnical assessment to determine suitable pit slope angles be undertaken, and to be used in early stage pit optimisation. Likewise, an assessment of the hydrogeological and surface hydrology features will need to be completed for further refinement of any development plans.
- Given the growing interest from local communities in mining projects, the likelihood of encountering oxidised lead mineralisation and the proximity to the Keep River National Park, Project Sea Dragon (large-scale, land-based prawn aquaculture project) and the Ord River Irrigation Scheme (agriculture); early investigations in to environmental and permitting aspects of various development options should be undertaken.
- The Djibitgun project as a standalone project would require significant uplift in revenue factors and/or cost reductions to become viable. Initial mineralogical and processing test work has not defined a cost-effective method to extract the zinc or silver. Further work here may only be warranted should the Sandy Creek project become viable.

Contents

Figures

Tables

Appendices

1 Introduction

Todd River Resources Ltd retained CSA Global Pty Ltd to undertake a Conceptual Mining Study on the Manbarrum Zinc-Lead-Silver Project in the Northern Territory. The Project comprises a range of exploration targets however, the key focus areas of this study are the Sandy Creek and Djibitgun base metal deposits.

The purpose of the study is to establish the success criteria for the Manbarrum project, exploring a range of key project parameters to identify the circumstances required to support the project development and to inform TRR strategic planning.

The Sandy Creek Mineral Resource is 22.5Mt @ 1.8% Zn, 0.5% Pb, and 4.6g/t Ag (reported in accordance with JORC 2012), while Djibitgun has a Mineral Resource of 6.7Mt @ 1.8% Zn, 0.6% Pb and 14g/t Ag (reported in accordance with JORC 2004).

The Manbarrum Project is located 40 km ENE of the Sorby Hills Project, situated across the Western Australia and Northern Territory border. The Quintana Resources Capital owned Sorby Hills Project is a lead, zinc, silver deposit having a reported Mineral Resource of 16.5Mt @ 4.7% Pb, 52.8g/t Ag and 0.7% Zn (KBL, 2015).

2 Project Location

The Manbarrum project is located in the Northern Territory, approximately 20 km east of the WA/NT border on Legune Station as shown in Figure 2-1. The Project is approximately 70 km northeast of the Western Australian town of Kununurra and covers a total area of 238 km^2.

Figure 2-1: Location of the Manbarrum Project

The relative locations of the Sandy Creek and Djibitgun deposits, and proximity to the Sorby Hills project (100% owned by Quintana Resources Capital) are shown in Figure 2-2 below.

Figure 2-2: Location of the Manbarrum deposits in relation to the Sorby Hills Project

3 Data Review and Initial Considerations

The files uploaded into the data room were reviewed to obtain an understanding of the project status and strategies considered, assisting the preparation of suitable input parameters for the CMS.

One area of concern that will require addressing as the Project proceeds is the processing strategy. Based on the metallurgical test work and reports reviewed, it is unclear how a suitable, or saleable, concentrate will be produced. No preferred treatment process, nor expected recoveries, have been proposed for the beneficiation of the run of mine ore.

Mining is expected to be completed using conventional open pit mining techniques. A simple cash flow model was created for the Sandy Creek deposit to model the two processing strategies (conventional crushing with floatation, and heap leaching). The cashflow model resulting in the highest value has been used to determine the processing strategy to be used for the CMS pit optimisation work.

A preliminary assessment was undertaken by CSA Global to determine whether the baseline processing method for this study would be crushing/floatation, or heap leach, both assuming respective facilities would be based at the Sandy Creek Project. Although, in CSA Global's opinion, heap leach is an unlikely processing option for Sandy Creek, and probably Djibitgun, the exercise was undertaken in any case.

The data used for this assessment were taken from the Whittle Optimisation study completed by Snowden in 2015. The optimum pit shell selected included 3.2Mt at 2.8% Zn, 6.3 g/t Ag and 1.0% Pb with a strip ratio of 2.9. Price assumptions were zinc A$3,846/t, lead A$2,949/t and silver A$21.80/oz (September 2017). The differences in the cash flow model inputs for the two processing strategies are shown below:

1. The Crushing and Floatation Strategy
   - Crushing and floatation at 500Ktpa with recoveries of 89% Zn, 60% Ag and 70% Pb;
   - Cost and revenue inputs as per Section 4; and
   - Initial capital estimate of A$100M.
2. Heap Leach Strategy
   - Heap leach at 500Ktpa with recoveries reducing to 60% Zn, 40% Ag and 40% Pb;
   - Ore treatment costs reduced from A$25/t to $8/t; and
   - Initial capital estimate reduced to A$70M.

Neither model generated a positive cashflow for the Sandy Creek project. The crushing and floatation strategy generated the better outcome (least negative), confirming that the higher cost and recoveries more than offset the cost savings and lower recoveries from the heap leach strategy (which will likely have other technical issues e.g. high acid consumption or recovery issues due to the ore and gangue mineralogy and high annual rainfall).

Construction of a floatation plant near the Sandy Creek pit would provide the following advantages:

- Lowest total distance, and cost, to transport ore between the open pits and the plant.
- More likely to be cashflow positive than a heap leach process.
- Sandy Creek is closer to Sorby Hills (compared to Djibitgun), should a decision be made to process Sorby Hills material at the Manbarrum Project.
- Sandy Creek is closer to the port of Wyndham, minimising the cost of transporting concentrate between the plant and port.

Should a processing facility be available at Sorby Hills, it may prove beneficial to the Manbarrum Project to use this facility for processing. The following are some of the key items requiring consideration in determining any benefit:

- The level of capital saving achievable.
- The additional capacity of the plant available to be filled with Manbarrum material.
- The processing costs and recoveries and their impact on cut-off grades.
- The increased haulage cost of transporting material to the plant for treatment. This increase is likely to be in the order of A$0.08/t km equating to an additional operating cost of A$2.16/t for Sandy Creek and A$3.92/t for Djibitgun.
- Reduce road transport cost of the concentrate produced, from the plant to the port of Wyndham.
- Other commercial arrangements regarding any ore sale agreements.
- The treatment of royalties would need to be confirmed as two state government jurisdictions would be involved (although it is thought that the NT profit-based royalty system would apply regardless where Manbarrum ore is treated).

Adjusting the crush and float scenario cashflow model for a simple cost and revenue share type agreement for off-site processing revealed that this approach could be preferable as a positive NPV was achieved. The changes to the cashflow model are as follows:

- G&A costs increased to A$10 per ore tonne;
- Concentrate transport cost reduced by A$1.00 per ore tonne;
- Ore transport costs (ROM to plant) increased to A$2.16 per ore tonne;
- Initial capital cost reduced to A$20M; and
- It was assumed that all costs and revenues be equally shared between the owners of Manbarrum project and owners of Sorby Hills.

The results of this assessment found that the crush and floatation processing method based on site at Sandy Creek was preferred, and thus forms the baseline assumption for the CMS.

4 Open Cut Optimisation Inputs

Prior to optimisation, the resource block models were modified for import into Whittle™ optimisation software. The following processes were applied to prepare the models for the mining costs, processing costs and various cut-offs applied:

- The model extents were increased to ensure that the largest pit shell generated would remain within the model.
- Waste blocks were added into the model.
- Any absent or negative geological or physical values were removed and resolved.
- Unnecessary geological flags or attributes were removed (to reduce the model size and expedite the optimisation process).
- Attributes of "mcaf" and "pcaf" were added which allow mining and processing costs to be adjusted based on blocks within Whittle™. Note: mcaf and pcaf are adjustment factors used for mining and processing costs within Whittle™.
- Different rock type codes ("rtype") were created to distinguish potential plant feed from waste within the optimisation.

Unless differentiated below, all the parameters discussed in this section apply to both Sandy Creek and Djibitgun deposits.

4.1 Rock Codes

To add a degree of flexibility to the process, a set of rock codes were developed for a matrix of process recovery inputs as well as material tracking purposes, as listed in Table 4-1. All resource material (Indicated and Inferred) was considered for processing, as there was no requirement by TRR for an Ore Reserve estimate under the JORC Code (2012).

Table 4-1: Rock codes for Whittle™

Rock type	Rock code
Indicated Oxide	IDOX
Indicated Fresh	IDFR
Inferred Oxide	IFOX
Inferred Fresh	IFFR

4.2 Initial Capital

Project capital costs were not included in the optimisation, as capital costs do not influence the selection of the optimal pit shell. There is no requirement for capital within Whittle™ due to the cash flow nature (net value) of the Lerch's Grossman algorithm.

The Project's capital costs need to be considered when determining the overall economics. This is best done in a financial model following completion of the mine planning work.

4.3 Plant Capacity

The pit optimisations and mine scheduling focussed on a fixed process plant throughput limit of 500 kilo-tonnes per annum (Ktpa). Where appropriate, increases in the processing rate are applied to assess whether reducing mine life offsets increase in capital costs.

4.4 Processing Recovery

Table 4-2 below shows the processing recoveries agreed by TRR and CSA Global for each metal that have been used in the both the pit optimisation and financial modelling. These recoveries have not been taken from a detailed metallurgical test work program but are considered reasonable estimates for a metallurgically simple carbonate-hosted base metal deposit that is amenable to floatation processing. Further investigation on the mineralogy, ore types and geo-metallurgical model and impact on processing costs and performance is required.

Table 4-2: Processing recoveries

Metal	Plant Recovery (%)
Zinc	89
Lead	70
Silver	60

4.5 Mining Dilution

A mining dilution of 10% was applied to both deposits. This has been based on the orebody geometry, similar mining operations, as well as the size of the excavator to be used. A more detailed mining dilution study will be required before the commencement of mining. This would entail a geometric dilution study for both deposits based on mineable widths.

4.6 Mining Recovery

An ore loss of 5% was allowed for in the optimisation due to the size and geometry of the orebodies being considered.

4.7 Metal Prices

The metal prices in Table 4-3 were discussed and agreed by TRR and CSA Global. The prices fit within a suitable range that is applicable for a CMS. The exchange rate used for this study is 0.78 (US$/A$).

Table 4-3: Metal prices

Metal	Units	US$	A$
Zinc	$/t	3,330	4,270
Lead	$/t	2,535	3,250
Silver	$/oz	17.16	22.00

4.8 Selling Costs and Royalties

The selling costs have been estimated at 15% of the zinc metal price for the zinc concentrate and as 15% of the lead price for the Pb-Ag concentrate. The smelter payability is estimated at 85% for zinc, 95% for lead and 70% for silver. Although a royalty of 6% of the metal price, net of selling costs, has been estimated based on the complex calculation required for Northern Territory royalties, which follows a profit-based royalty regime with capital offset allowances, this has not been used in the following analysis.

4.9 Units of Currency

Australian dollars (A$) are used throughout the study.

4.10 Discount Rate

A nominal discount rate of 8% was applied for the purposes of discounted cashflow.

4.11 Mining Costs

A bench-by-bench mining cost was applied for this study. A base mining cost of A$3.00/t has been used with the cost of mining increasing by A$0.04 for every 5 metres increase in mining depth. The mining is inclusive of:

- All load and haul activity (including all ancillary equipment and consumables)
- All drill and blast activity (including all magazines, drill rigs and consumables)
- Fuel usage costs relating to the above mining equipment
- All service and maintenance relating to the above plant
- All fixed costs relating to contractor workshops, offices, staffing, vehicles and overheads
- Clearing and grubbing and topsoil removal
- Pit dewatering activities
- Rehabilitation of the waste dump and associated mining areas
- Owner fixed costs for mining staff and software

The above mining costs are for waste movement only. There is an average of A$0.50/t that is apportioned to "ore specific" costs. These costs are for the extra treatment and handling of ore within the pit. They are transferred to total processing costs for the purposes of the pit optimisation and in estimating the cut-off grade. However, they are a mining cost for the purposes of accounting treatment.

4.12 Processing Cost

A processing cost of A$25/t was used for all material types. This cost includes all costs associated with the plant, including all reagents, tailings treatment, plant maintenance, power, consumables and labour costs. Other costs that are generally considered part of "total processing costs" include:

- General and Administration (G&A) costs of A$5.00/t
- A concentrate transport cost A$10.00/t
- A sustaining capital cost of A$1.50/t
- An ore specific handling cost, over those of handling waste, of A$0.50/t
- A grade control cost of A$1.00/t.

The total processing cost used in the Sandy Creek optimisation is A$43.00/t.

The Djibitgun total processing was slightly higher at A$44.76/t. The increase is due to an additional cost applied to haul the ore from the Djibitgun pit to the mill, calculated at a rate of A$0.08/tkm for 22km.

4.13 Geotechnical

The overall slope angles, as entered in Whittle™, have been based on the rock type and are shown in Table 4-4. These values are may be considered conservative and could possibly be improved following a more detailed geotechnical study.

Table 4-4: Overall slope angles

Material Type	Slope Angle
Cover	35°
Fresh	45°

5 Open Cut Optimisation Results

The pit optimisations are based on a set of revenue factors (RF) above and below 1.00 (namely 0.50 to 3.00), with a step size of 0.05 between each scenario. A RF of 1.00 means the pit shell results are the optimal discounted cashflow based on the input price multiplied by 1.00. Effectively, lower RF values assume prices may lower in the future (pit shell optimised for lower price in design), with higher RF prices being more optimistic regarding price movements. Tonnage and value graphs were produced for each scenario including ore tonnages, waste tonnages, undiscounted cash flow ("cashflow") and discounted cash flows ("Ideal DCF") for each of the pit shells generated from the pit optimisation scenarios. The ideal DCF is a mixture of 60% worst case and 40% best case cash flows to demonstrate a likely DCF outcome. This 60/40 mixture is taken from experience when estimating cash flows within pit shells.

All material of Inferred and greater geological confidence is included in the assessment.

5.1 Summary of Pit Optimisations – Sandy Creek

The optimal undiscounted cash flow for Sandy Creek occurred in pit shell number 8, with an RF of 0.80 as shown in Figure 5-1 below. The physicals for pit shell 8 include 5.7 Mt at 2.32% zinc, 0.99% lead and 6.13 g/t silver, with a stripping ratio of 2.40. A full summary of the optimal pit shell and the RF of 1.00 pit shell are summarised in Table 5-1. Effectively the RF of 0.80 scenario is a high grade (more selective) version compared to the RF of 1.00 scenario, featuring higher grades and lower tonnes (ore and waste).

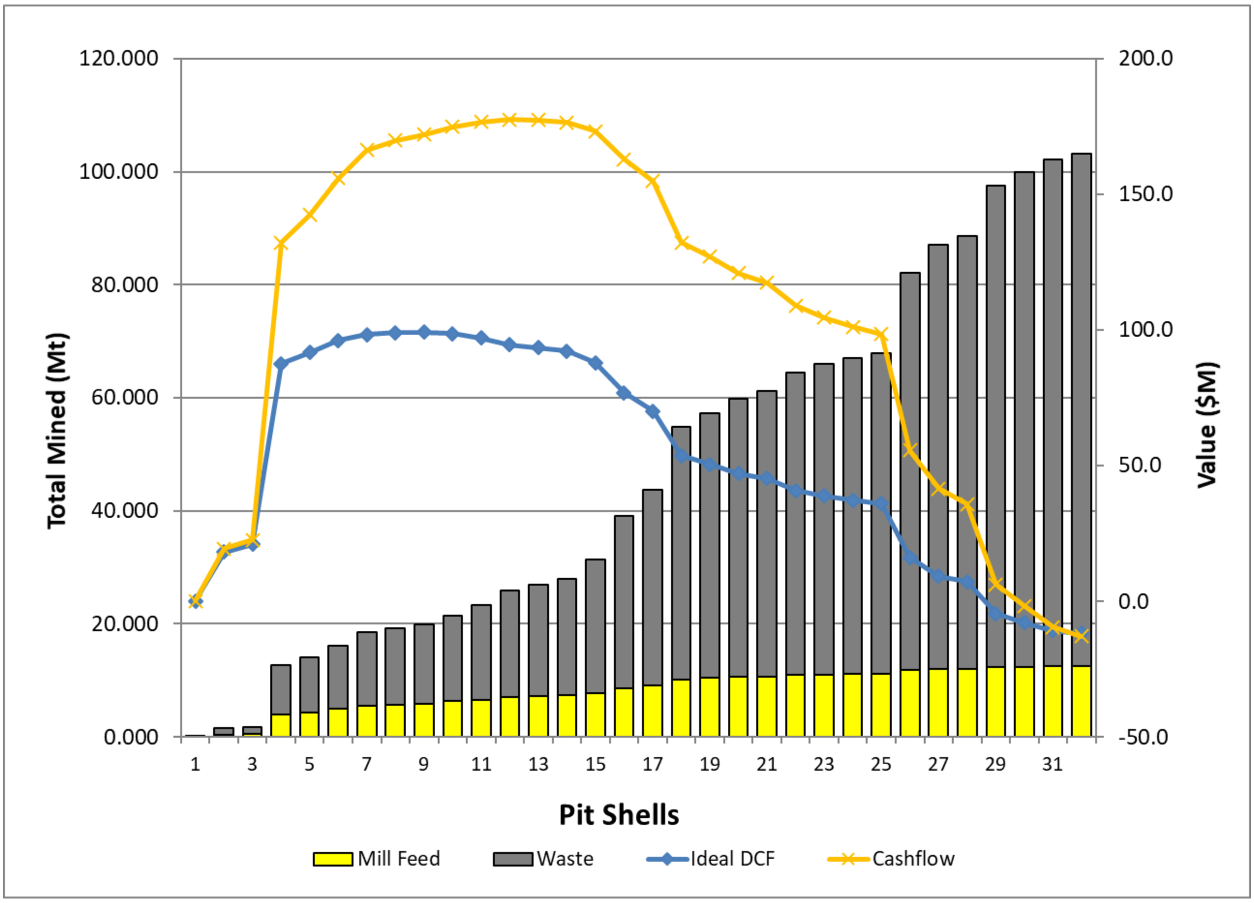


Figure 5-1: Sandy Creek pit optimisation results for 500 Ktpa base case

Table 5-1: Sandy Creek optimal pit shell and RF = 1 pit shell comparison

Scenario	Unit	Value	Value
Pit shell	#	12	8
Revenue factor	RF	1.00	0.80
Total mined – Rock	Mt	25.9	19.5
Total mined – Waste	Mt	18.8	13.8
Strip ratio (S/R)	t:t	2.7	2.4
Process feed	Mt	7.07	5.74
Process feed grade – Zn	%	2.24	2.32
Process feed grade – Pb	%	0.94	0.99
Process feed grade – Ag	g/t	5.92	6.13
Metal produced – Zn	t	119,726	100,831
Metal produced – Pb	t	44,127	37,709
Metal produced – Ag	koz	565	475
Mining unit rate	A$/t	3.37	3.34
Processing unit rate	A$/t ore	43.00	43.00
Selling costs	A$/t ore	13.89	14.46
Operating cash cost	A$/t ore	69.2	68.7

Note: reflects adjustments for ore losses and diluted grade. Differences may occur due to rounding.

5.2 Pit Shell Outlines – Sandy Creek

The optimal pit shell for Sandy Creek, pit shell 8, has a length of 480m, width of 440m and a depth of 166 m. Figure 5-2 and Figure 5-3 show the pit shell 8 (in oblique looking east) and plan view respectively, with the block model filtered to show blocks of Zn grades >= 0.5%.

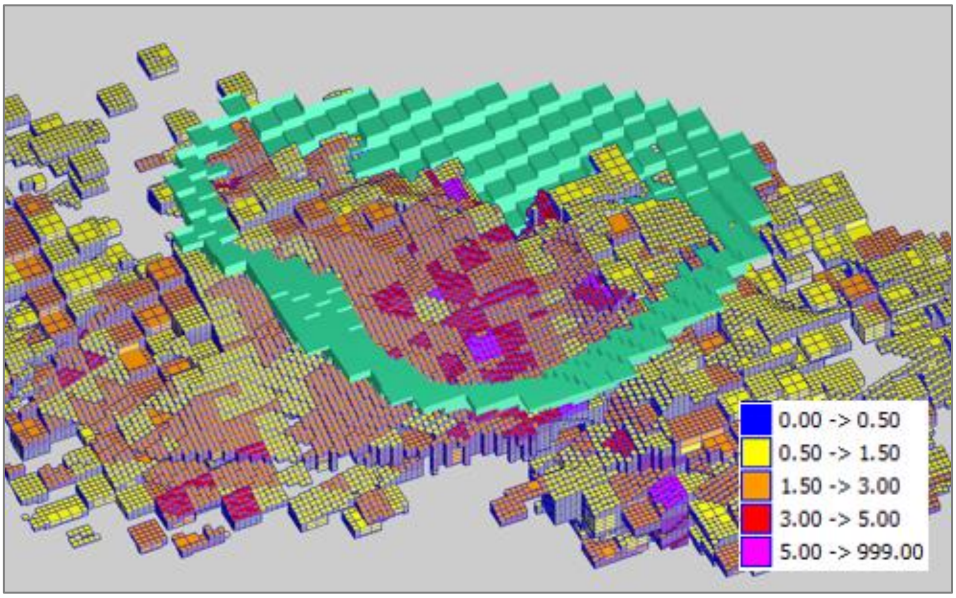


Figure 5-2: Sandy Creek pit shell no.8 oblique with Zn blocks >= 0.5% (coloured)

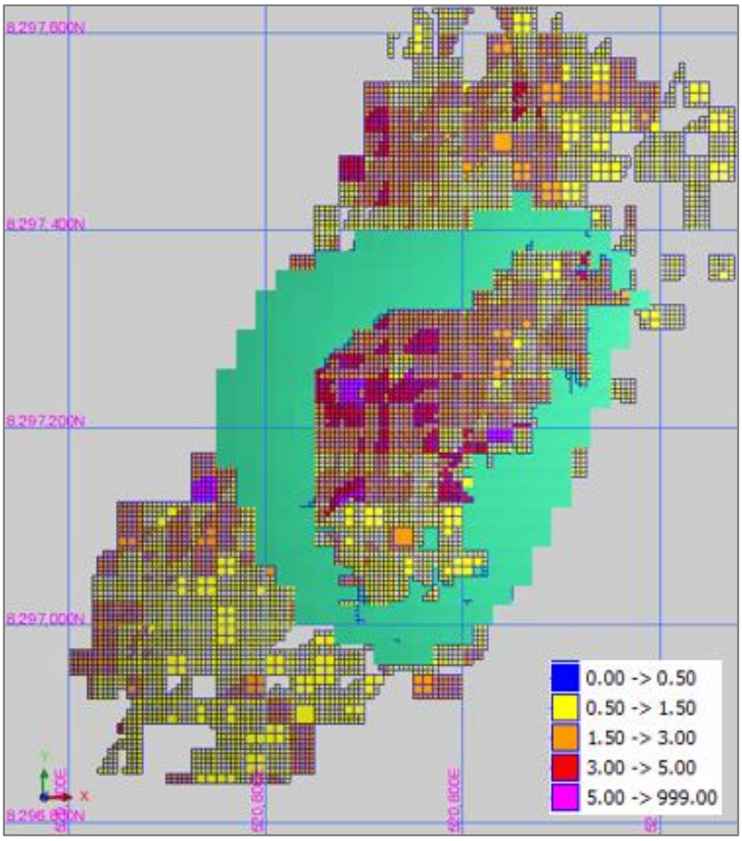


Figure 5-3: Sandy Creek pit shell no.8 plan view with 200 m x 200 m grid

5.3 Summary of Pit Optimisations – Djibitgun

The optimal undiscounted cash flow for Djibitgun occurred in pit shell number 1, with an RF of 1.00 as shown in Figure 5-4 below. The physicals for pit shell 1 include 0.15 Mt at 2.72% zinc, 1.20% lead and 21.32 g/t silver, with a stripping ratio of 17.0. A full summary of the optimal pit shell is summarised in Table 5-2.

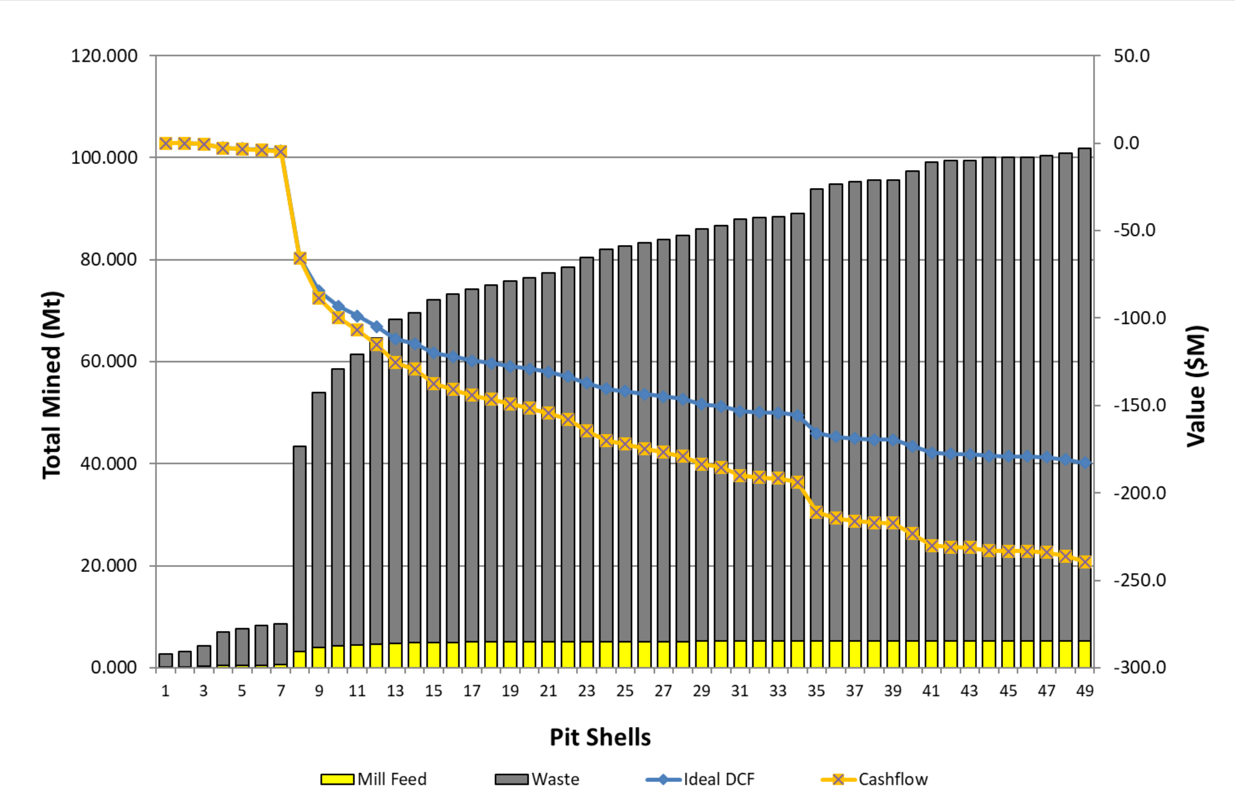


Figure 5-4: Djibitgun pit shell summary

Table 5-2: Djibitgun pit optimisation results for valid scenarios

Scenario	Unit	Value
Pit shell	#	1
Revenue factor	RF	1.00
Total mined – Rock	Mt	2.7
Total mined – Waste	Mt	2.5
Strip ratio (S/R)	t:t	17
Process feed	Mt	0.15
Process feed grade – Zn	%	2.72
Process feed grade – Pb	%	1.20
Process feed grade – Ag	g/t	21.32
Metal produced – Zn	t	3,053
Metal produced – Pb	t	1,184
Metal produced – Ag	koz	42,734
Mining unit rate	A$/t	3.16
Processing unit rate	A$/t ore	44.76
Selling costs	A$/t ore	17.07
Operating cash cost	A$/t ore	118.9

Note: reflects adjustments for ore losses and diluted grade. Differences may occur due to rounding.

5.4 Pit Shell Outlines – Djibitgun

The optimal pit shell for Djibitgun, pit shell 1, has a length of 220m, width of 240m and a depth of 65 m. Figure 5-5 and Figure 5-6 show the pit shell 8 (in oblique looking north-west) and in plan-view respectively with the block model filtered to show blocks of Zn grades >= 0.5%.

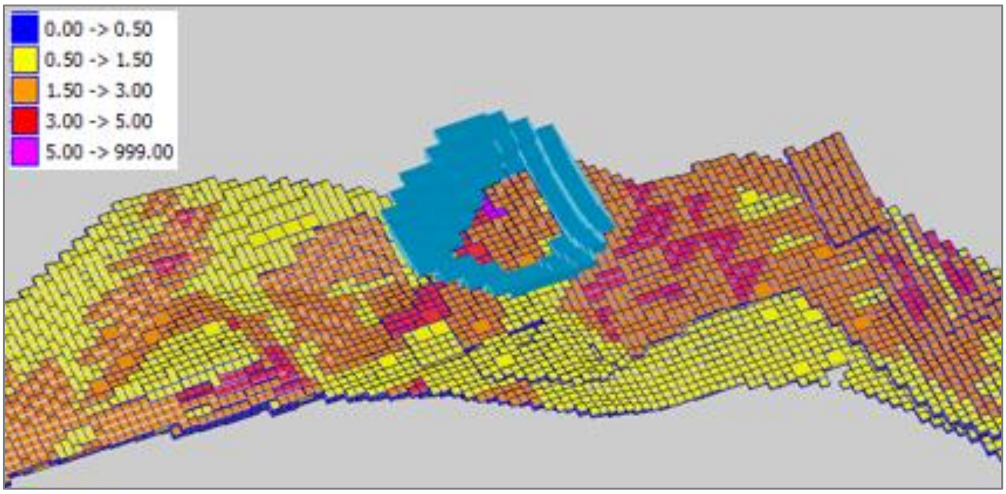


Figure 5-5: Djibitgun pit shell no.1 oblique with Zn blocks >= 0.5% (coloured)

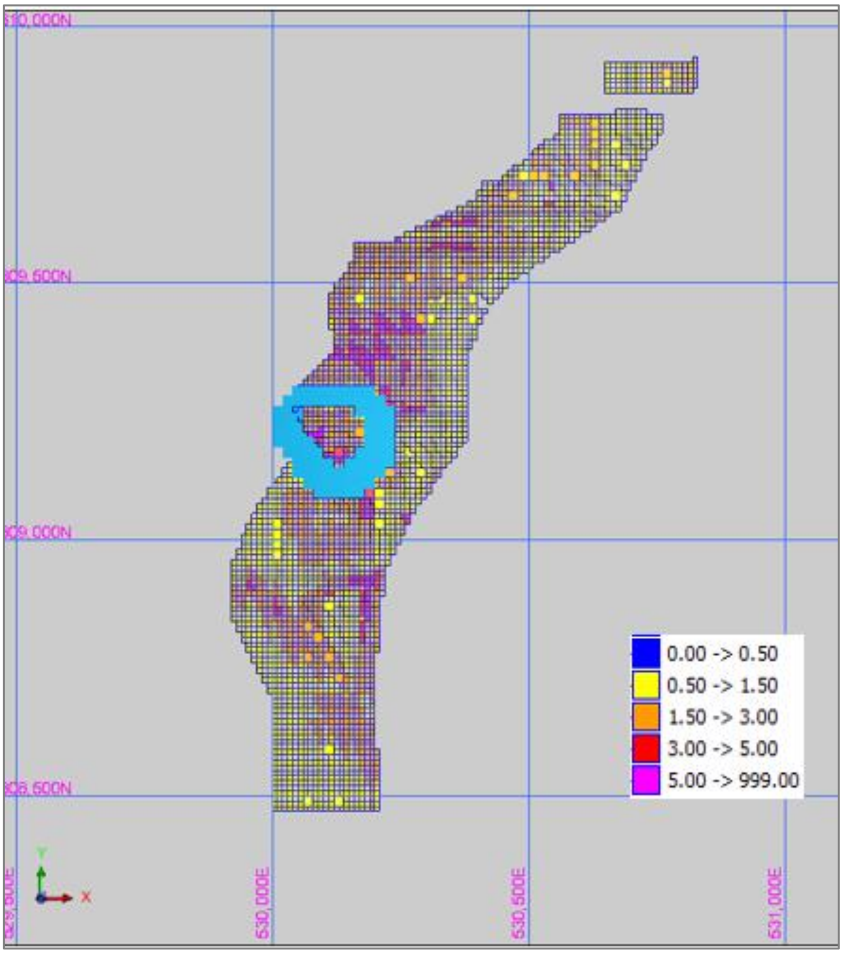


Figure 5-6: Djibitgun pit shell no.1 plan view with 500 m x 500 m grid

6 Mine Schedule and Cost Model

The cash flow model that was used to initially confirm the most beneficial mining and processing strategy (section 3) was updated with the results of optimal pit scenarios from Whittle™ to determine the project value for each case. The model includes a simplified mining schedule based on the processing throughput and the inputs as described in section 4.

6.1 Summary of Mine Schedules

A Microsoft Excel spreadsheet was used to create each mine schedule. The base case schedule assumes a processing throughput rate of 500Ktpa. Flexing of the throughput rate in subsequent schedules was completed to gain insight into the Project's sensitivity to processing throughput rate. The schedule was created based on:

- Construction capital and pre-production late in year 0.
- Processing starts in year 1.
- Waste mining, based on strip ratio, occurs in the year prior to ore mining.

A summary of the mine schedule and their tonnes and grades (in years) can be seen below in Table 6-1 and Table 6-2.

Table 6-1: Summary of Sandy Creek schedule for pit shell 8

Year	Waste mined (t)	Ore Mined/Milled (t)	Zinc (metal t)	Silver (metal t)	Lead (metal t)
0	1,200,000	0	0	0	0
1	1,200,000	500,000	8,789	41,387	3,287
2	1,200,000	500,000	8,789	41,387	3,287
3	1,200,000	500,000	8,789	41,387	3,287
4	1,200,000	500,000	8,789	41,387	3,287
5	1,200,000	500,000	8,789	41,387	3,287
6	1,200,000	500,000	8,789	41,387	3,287
7	1,200,000	500,000	8,789	41,387	3,287
8	1,200,000	500,000	8,789	41,387	3,287
9	1,200,000	500,000	8,789	41,387	3,287
10	1,200,000	500,000	8,789	41,387	3,287
11	566,213	500,000	8,789	41,387	3,287
12	0	235,922	4,147	19,528	1,551
Total	13,766,213	5,735,922	100,831	474,785	37,709

Table 6-2: Summary of Djibitgun schedule for pit shell 1

Year	Waste mined (t)	Ore Mined/Milled (t)	Zinc (metal t)	Silver (metal t)	Lead (metal t)
0	2,529,281	0	0	0	0
1	0	148,432	3,053	42,734	1,184

Year	Waste mined (t)	Ore Mined/Milled (t)	Zinc (metal t)	Silver (metal t)	Lead (metal t)
Total	2,529,281	148,432	3,053	42,734	1,184

6.2 Summary of Financial Analysis

The cashflow models for the Sandy Creek and Djibitgun deposits are provided in Table 6-3 and Table 6-4. The initial capital expenditure for all infrastructure and mobile plant at Sandy creek is estimated at A$100M. Djibitgun assumes no capital costs. All cashflows are exclusive of taxes, royalties, depreciation and amortisation (i.e. EBITDA).

Table 6-3: Summary of Sandy Creek cashflow for pit shell 8 (500 Ktpa)

Year	Revenue Zinc (A$M)	Revenue Silver (A$M)	Revenue Lead (A$M)	Selling Cost Zinc (A$M)	Selling Cost Silver (A$M)	Selling Cost Lead (A$M)	Royalty (A$M)	Mining Cost (A$M)	Processing Cost (A$M)	Capital (A$M)	Surplus after Capital (A$M)
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.0	0.0	100.0	-104.0
1	37.5	0.9	10.7	5.6	0.0	1.6	0.0	5.7	21.5	0.0	14.7
2	37.5	0.9	10.7	5.6	0.0	1.6	0.0	5.7	21.5	0.0	14.7
3	37.5	0.9	10.7	5.6	0.0	1.6	0.0	5.7	21.5	0.0	14.7
4	37.5	0.9	10.7	5.6	0.0	1.6	0.0	5.7	21.5	0.0	14.7
5	37.5	0.9	10.7	5.6	0.0	1.6	0.0	5.7	21.5	0.0	14.7
6	37.5	0.9	10.7	5.6	0.0	1.6	0.0	5.7	21.5	0.0	14.7
7	37.5	0.9	10.7	5.6	0.0	1.6	0.0	5.7	21.5	0.0	14.7
8	37.5	0.9	10.7	5.6	0.0	1.6	0.0	5.7	21.5	0.0	14.7
9	37.5	0.9	10.7	5.6	0.0	1.6	0.0	5.7	21.5	0.0	14.7
10	37.5	0.9	10.7	5.6	0.0	1.6	0.0	5.7	21.5	0.0	14.7
11	37.5	0.9	10.7	5.6	0.0	1.6	0.0	3.6	21.5	0.0	16.8
12	17.7	0.4	5.0	2.7	0.0	0.8	0.0	0.8	10.1	0.0	8.8
Total	430.5	10.4	122.6	64.6	0.0	18.4	0.0	65.1	246.6	100.0	68.8

Table 6-4: Summary of Djibitgun cashflow for pit shell 1 (500 Ktpa)

Year	Revenue Zinc (A$M)	Revenue Silver (A$M)	Revenue Lead (A$M)	Selling Cost Zinc (A$M)	Selling Cost Silver (A$M)	Selling Cost Lead (A$M)	Royalty (A$M)	Mining Cost (A$M)	Processing Cost (A$M)	Capital (A$M)	Surplus after Capital (A$M)
0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	0.0	0.0	-8.0
1	13.0	0.9	3.8	2.0	0.0	0.6	0.0	0.5	6.6	0.0	8.2
Total	13.0	0.9	3.8	2.0	0.0	0.6	0.0	8.5	6.6	0.0	0.2

The results of the Whittle™ optimisations are summarised for the Sandy Creek and Djibitgun deposits in Table 6-5. Additional scenarios for increased processing throughput rates were assessed to determine if additional project value could be realised for the Sandy Creek deposit, however increasing processing throughput rates was found to erode value. Capital costs were adjusted applying the sixth-tenths rule from the A$100M base case for 500 Ktpa.

Table 6-5: Base Case project financials for Sandy Creek and Djibitgun

Scenario No.	Rate (Ktpa)	Pit Shell No.	Ore (t)	Waste (t)	Zn%	Pb%	Ag (g/t)	Capex A$M	NPV A$M	Mine Life (yr)	IRR
Sandy Creek Base Case											
1	0.50	8	5.74	13.77	2.32%	0.99%	6.13	$100	$5	13	9%
2	0.75	10	6.31	15.15	2.29%	0.95%	5.94	$130	-$9	10	6%
3	1.00	10	6.31	15.15	2.29%	0.95%	5.94	$160	-$30	8	2%
Djibitgun Base Case											
4	0.50	1	0.15	2.53	2.72%	1.20%	21.3	$-	-$0.4	2	2%

6.3 Sandy Creek Sensitivity Analysis

A sensitivity graph for the Sandy Creek deposit is provided below in Figure 6-1. The sensitivity analysis was completed using the financial model for the base case scenario (500 Ktpa, pit shell 8). The Sandy Creek project is most sensitive to zinc revenue (be it grade or price). The project is also sensitive to processing costs (estimated at A$43/t) and capital costs.

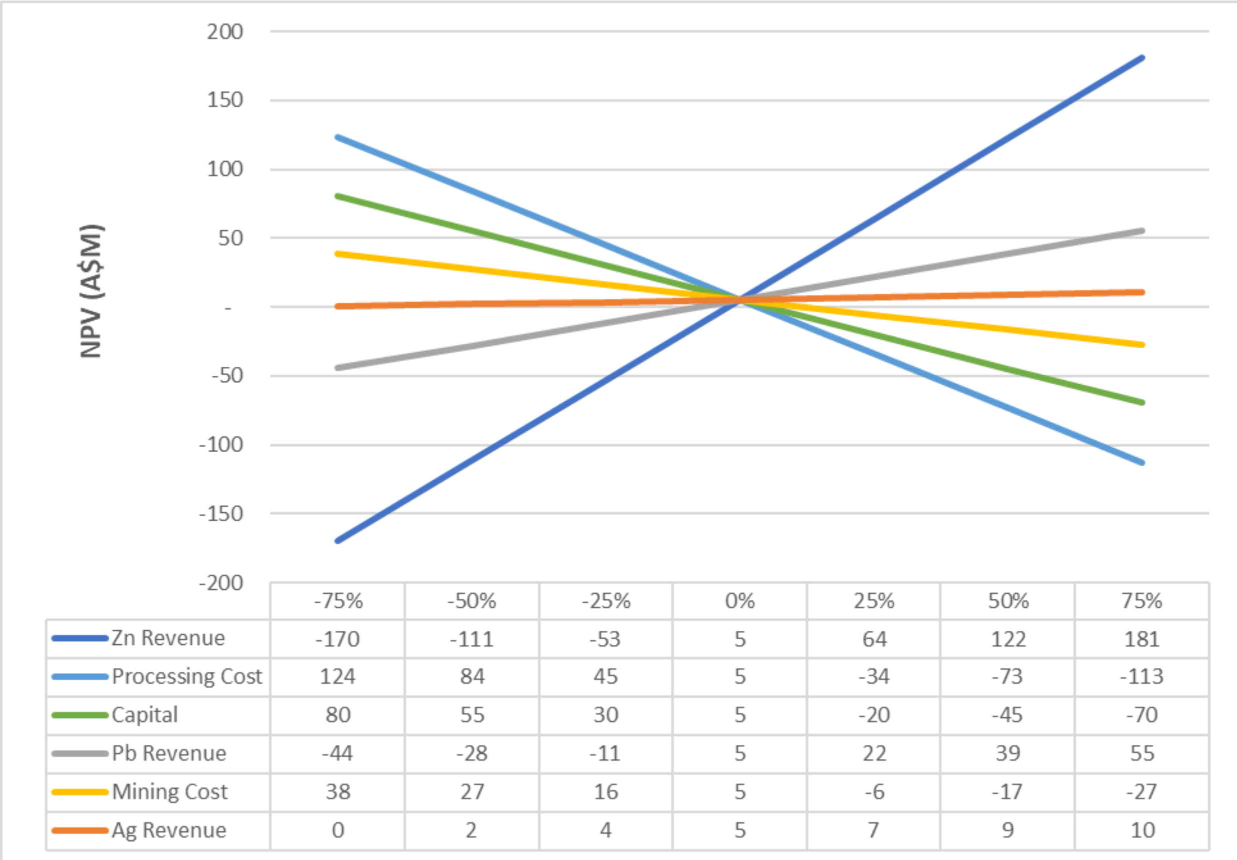


Figure 6-1: Sensitivity on key inputs for Sandy Creek base case scenario (pit shell 8)

A further assessment of project sensitivity was undertaken on processing throughput rates for Sandy Creek. The six-tenths rule was used to modify the construction capital estimate and the G&A unit cost included in the processing costs. Note the processing rates are based on the 500 Ktpa pit shell (no.8) from Whittle™ by adjusting the G&A and capital costs as shown in Table 6-6. The results show that reducing the throughput rate may improve NPV marginally at Sandy Creek.

Table 6-6: Processing throughput rate sensitivity for Sandy Creek

Processing Rate	Project Life	Construction Capital	G&A	Pre-tax NPV 8%
Ktpa	Years	A$M	A$/t	A$M
300	20.1	76	6.79	7
400	15.4	88	5.72	8
500	12.5	100	5.00	5
750	8.6	130	3.92	-10
1,000	6.7	160	3.30	-32

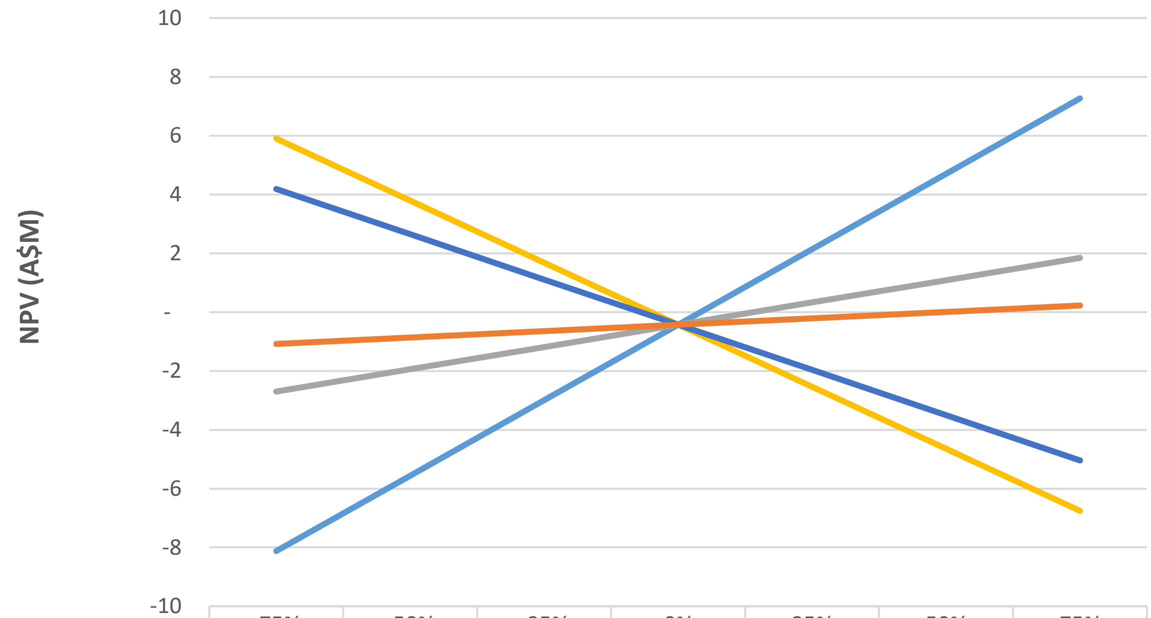
Increasing the quantity of material available for processing, while maintaining all other inputs into the 500 Ktpa model, improves the NPV as shown in Table 6-7.

Table 6-7: Increase in tonnes available for processing

	0	25%	50%	75%	100%
Tonnes Processed	5,735,922	7,169,903	8,603,883	10,037,864	11,471,844
$NPV_{8\%}$	5	20	32	42	49

6.4 Djibitgun Sensitivity Analysis

A sensitivity graph for the Djibitgun deposit is provided below in Figure 6-2. The sensitivity analysis was completed using the financial model for the base case scenario (500 Ktpa, pit shell 1). The Djibitgun project is most sensitive to zinc revenue (be it grade or price), and mining costs due to the high waste stripping ratio.



	-75%	-50%	-25%	0%	25%	50%	75%
Zn Revenue	-8	-6	-3	-0	2	5	7
Mining Cost	6	4	2	-0	-3	-5	-7
Processing Cost	4	3	1	-0	-2	-4	-5
Pb Revenue	-3	-2	-1	-0	0	1	2
Ag Revenue	-1	-1	-1	-0	-0	0	0

Figure 6-2: Sensitivity on key inputs for Djibitgun deposit

6.5 Findings

The key findings for the CMS base case assessment are summarised below:

- Based on the agreed input parameters, a positive cashflow was generated for the base case scenario for Sandy Creek (500 Ktpa) which assumes processing facilities on site (A$100M total capital costs). The NPV for the base case is A$5M, IRR of 9%, and a mine life of 12.5 years (excludes taxes, royalties, depreciation and amortisation).

- Should a toll treatment option be feasible for Sandy Creek, estimated capital costs would reduce to A$20M and A$30M and result in a project NPV in the range of A$75 to A$85M, with an IRR of 40 to 60%.
- Increasing the processing throughput rate at Sandy Creek does not offset the increased capital costs associated with the upgrades to processing infrastructure required. Reducing the throughput rate to 300 to 400 Ktpa may improve project value marginally.
- Sensitivity analysis carried out on the Sandy Creek cashflow model shows the project is most sensitive to zinc revenue (be it zinc grade or price). Including A$100M in capital costs, the project breaks even at a zinc price of A$4,170/t.
- For the Djibitgun deposit, the agreed input parameters resulted in a very small pit (< 150 kt ore) a project NPV of A$-0.4M, excluding capital costs, taxes, royalties, depreciation and amortisation.
- Larger pit sizes are achieved in Whittle™ for the Djibitgun deposit for higher revenue factors however these result in lower NPV due to the high stripping ratio's (in the range of 13 to 17 waste tonnes per ore tonne for different scenarios). The high stripping ratios are due to the flat lying ore body at 50 to 150 metres depth from surface.
- Based on the metallurgical data made available to CSA Global, it is unclear how a saleable concentrate will be produced for these deposits. No assessment of preferred treatment methods and associated metallurgical recoveries and processing costs appear in the information provided to CSA Global. This area of further work may have considerable impact on the project economics (in particular Sandy Creek).

6.6 Success Criteria for Manbarrum Project

Based on today's metal prices, zinc metal represents more than 80% and 75% of the value for the Sandy Creek and Djibitgun deposits respectively. Zinc price is therefore used to measure the success criteria for each project, which are summarised in Table 6-8 and Table 6-9 below. Secondly, both projects are sensitive to capital expenditure, and given the numerous processing scenarios possible, for simplicity, three cases are provided below for each deposit. If considering building a processing facility at Sandy Creek, the figures far right (CapEx of A$100M) in Table 6-8 would be applicable; and, if opting to toll treat at Sorby Hills, the figures far left (CapEx of A$20M) would be more applicable.

Table 6-8: Sandy Creek breakeven and sensitivity to zinc price at various capital cost estimates (500 Ktpa)

Pre-tax NPV (A$M)	CapEx at A$20M (toll-treatment option)		CapEx at A$60M (mid-point CapEx)		CapEx at A$100M (on-site processing option)	
	Zinc Price (A$/t)	Zinc Price (US$/t)	Zinc Price (A$/t)	Zinc Price (US$/t)	Zinc Price (A$/t)	Zinc Price (US$/t)
0	2,709	2,113	3,439	2,682	4,170	3,253
50	3,622	2,825	4,353	3,395	5,084	3,966
100	4,536	3,538	5,266	4,107	5,997	4,678
150	5,449	4,250	6,180	4,820	6,911	5,391

Table 6-9: Djibitgun breakeven and sensitivity to zinc price at various capital cost estimates (500 Ktpa)

Pre-tax NPV (A$M)	CapEx at A$1M		CapEx at A$10M		CapEx at A$20M	
	Zinc Price (A$/t)	Zinc Price (US$/t)	Zinc Price (A$/t)	Zinc Price (US$/t)	Zinc Price (A$/t)	Zinc Price (US$/t)
0	4,864	3,794	8,610	6,716	12,771	9,961
10	9,026	7,040	12,771	9,961	16,933	13,208
20	13,187	10,286	16,933	13,208	21,094	16,453

7 Hypothetical Grade Enhancements

The following section related to grade enhancements (grade factors) is hypothetical, and is does not comply with the JORC code, and the results of which shall be used for internal reporting purposes only.

TRR requested CSA Global to assess upside to the zinc grade by applying enhancements to grade in the resource block models. The "grade factor" is motivated by the occurrence of zinc metal accumulation in diamond drill sumps. The supposition is; fines within the diamond core are lost into the drill return water, thus not included in the assay samples; and, that assay results may be penalised (lower grade) due to the removal of the fines. CSA Global has not carried out any quantitative or qualitative investigations of this theory and thus cannot comment on potential material change to the zinc grades until further work is undertaken. The grade factors applied to the block models are therefore arbitrary and are not based on any verifiable process.

Notwithstanding this, for the purposes of assessing project potential should zinc grades improve, CSA Global has undertaken further assessments of the Sandy Creek and Djibitgun deposits based on grade factors to determine the impact on project economics. The findings of this work are provided in the work that follows.

7.1 Methodology

Grade factors were developed via two separate methods:

- Fixed grade improvement; where, if (Zn > 0, Zn + 0.5, 0); and, if (Zn > 0, Zn + 1.0, 0)
- Scaled grade improvement; where if (Zn > 0, Zn * "factor c", 0); and, if (Zn > 0, Zn * "factor d", 0)

Fixed grade factors assume that for any block in the resource model containing zinc, the grade is given an additional value of 0.5% ("factor a") and 1.0% ("factor b"). This method may be considered bias towards lower grades, e.g. assuming factor b, blocks of 0.6% zinc become 1.6%, a 167% increase in grade. More modest improvements are made to higher zinc grade blocks.

For the scaled grade improvement method, break-even cut-off grade (BCOG) was determined for each deposit. The total operating unit cost (mining, processing, transport and G&A) is A$46.0 and A$47.8 per tonne of ore for Sandy Creek and Djibitgun respectively. The cut-off grade was highly comparable for the two deposits thus a value of 1.5% zinc BCOG was applied to both.

For each deposit, a block model report was constrained above 1.5% zinc grade. The average block model grade for each deposit (above BCOG) was then used to determine the scaled grade factor as follows:

- Average grade (above BCOG) * (scaled grade "factor c") = Average grade (above BCOG) + 0.5% zinc
- Average grade (above BCOG) * (scaled grade "factor d") = Average grade (above BCOG) + 1.0% zinc

Thus, for Sandy Creek, the average block model grade (above BCOG) is 2.37% zinc. The grade factor "c" is then calculated as 1.2113, which when multiplied by 2.37% gives 2.87%, exactly 0.5% increase in grade. This approach, converse to the fixed grade improvement, applies more bias to higher grades.

Based on CSA Global's understanding of the fines losses, it cannot be determined which of the two grade factor calculation methods would, in theory, be more representative of any realised upside, should any upside exist.

Numerous scenarios based on the above metal price increases and grade factors have been completed using Whittle^{TM}. Unless otherwise stated, the pit shell selected for the analysis in each scenario is the pit shell generating the highest DCF. Each scenario includes an independent mining schedule and DCF analysis. Most scenarios warranted an assessment of increased processing throughput (particularly Sandy

Creek) due to the increase in economic mining inventory. The general approach taken was to increase annual processing throughput rates until NPV's began reducing. A summary of the scenario's included are shown in Table 7-1 below. "Yes" denotes the scenario has been assessed.

Table 7-1: Scenarios assessed including schedules and DCF analysis

Scenarios	Grade Factor	500 Ktpa	750 Ktpa	1.0 Mtpa	2.0 Mtpa
Sandy Creek	Base Case	Yes	Yes	Yes	No
	a	Yes	Yes	Yes	No
	b	Yes	Yes	Yes	Yes
	c	Yes	Yes	Yes	No
	d	Yes	Yes	Yes	Yes
Djibitgun	Base Case	Yes	No	No	No
	a	Yes	No	No	No
	b	Yes	No	No	No
	b (RF=1 pit shell)	Yes	No	No	No
	c	Yes	No	No	No
	d	Yes	No	No	No
	d (RF=1 pit shell)	Yes	No	No	No

Revenue factor equal to 1.00 pit shells were also included in the assessment for the Djibitgun deposit for fixed and scaled grade improvement values of 1.0% Zn (grade factors b and d). The inclusion was warranted for comparative purposes, given the optimal pit shells were small scale (< 1-year mine life). Pit shells based on revenue factor equal to 1.00 were between 5 and 10-year mine life.

7.2 Findings

The results of the DCF modelling for each scenario are provided in Table 7-2 and Table 7-3 below, for the Sandy Creek and Djibitgun deposits respectively. Scaled grade factors (c and d) typically have more positive impact on NPV than fixed grade factors (a and b). Note NPV's for Sandy Creek below are inclusive of capital costs and exclusive of taxes, royalties, amortisation and depreciation (i.e. EBITDA). The discount rate applied is 8%. Djibitgun capital costs are assumed to be zero.

Table 7-2: Sandy Creek NPV summary for grade enhancement scenario's

Scenario No.	Rate (Ktpa)	Pit Shell No.	Ore (t)	Waste (t)	Zn%	Pb%	Ag (g/t)	Capex A$M	NPV A$M	Mine Life (yr)	IRR
CMS Fixed Grade Improvement 0.5% Zn											
5	0.50	18	7.86	13.68	2.51%	0.83%	5.43	$100	$41	16	14%

Scenario No.	Rate (Ktpa)	Pit Shell No.	Ore (t)	Waste (t)	Zn%	Pb%	Ag (g/t)	Capex A$M	NPV A$M	Mine Life (yr)	IRR
6	0.75	20	8.32	15.06	2.49%	0.82%	5.39	$130	$42	13	14%
7	1.00	24	9.36	17.59	2.43%	0.78%	5.30	$160	$30	11	12%
CMS Fixed Grade Improvement 1.0% Zn											
8	0.50	15	10.14	11.46	2.67%	0.68%	4.85	$100	$80	21	16%
9	0.75	19	12.21	14.77	2.59%	0.64%	4.72	$130	$95	18	18%
10	1.00	21	13.76	16.65	2.54%	0.59%	4.53	$160	$94	15	17%
11	2.00	25	20.55	31.65	2.38%	0.52%	4.33	$250	$78	12	14%
CMS Scaled Grade Improvement 0.5% Zn											
12	0.50	18	6.97	14.50	2.66%	0.88%	5.67	$100	$52	15	16%
13	0.75	21	7.64	16.65	2.61%	0.86%	5.58	$130	$47	12	15%
14	1.00	21	7.64	16.65	2.61%	0.86%	5.58	$160	$33	9	13%
CMS Scaled Grade Improvement 1.0% Zn											
15	0.50	15	7.98	14.84	2.96%	0.8%	5.33	$100	$97	17	21%
16	0.75	18	8.68	16.83	2.90%	0.79%	5.32	$130	$105	13	21%
17	1.00	22	9.82	20.91	2.83%	0.76%	5.18	$160	$98	11	20%
18	2.00	26	10.91	25.41	2.76%	0.72%	5.20	$250	$55	7	15%

Scaled grade factors are found to impact Sandy Creek economics more positively than fixed grade factors. Optimal scenarios for grade factors of 0.5%, “factor a” and “factor c”, show a range of positive project values between A$30M (Scenario No.7) and A$52M (Scenario No.12) respectively, inclusive of capital costs. Optimal scenarios for grade factors of 1.0%, “factor b” and “factor d”, show positive project value between A$78M (Scenario No.11) to A$105M (Scenario No.16) respectively, inclusive of capital costs.

Although more work is required to determine reasonable accuracy around the processing plant specifications and costs, based on the estimates of this study increasing the processing throughput to 750 Ktpa improves project value in some cases (i.e. the faster mining rate more than offsets additional capital costs for process plant upgrades).

Table 7-3: Djibitgun NPV summary for grade enhancement scenario's

Scenario No.	Rate (Mtpa)	Pit Shell No.	Ore (t)	Waste (t)	Zn%	Pb%	Ag (g/t)	Capex A$M	NPV A$M	Mine Life (yr)	IRR
CMS Fixed Grade Improvement 0.5% Zn											
19	0.50	3	0.49	6.53	2.58%	1.21%	17.94	$-	$1.9	2	18%
CMS Fixed Grade Improvement 1.0% Zn											
20	0.50	2	0.54	6.98	2.91%	1.23%	17.72	$-	$7.9	3	46%
21 (RF=1)	0.50	4	6.37	56.23	2.48%	0.55%	14.08	$-	$12.6	14	19%
CMS Scaled Grade Improvement 0.5% Zn											
22	0.50	6	0.26	3.96	3.10%	1.17%	20.02	$-	$2.8	2	32%
CMS Scaled Grade Improvement 1.0% Zn											
23	0.50	8	0.53	7.45	3.13%	1.21%	17.93	$-	$8.6	3	47%
24 (RF=1)	0.50	10	2.58	29.65	2.82%	0.54%	16.03	$-	$8.9	7	20%

The mining inventory of the optimal pit shell for Djibitgun tends to be small size pits between 0.26 and 0.54 Mt. These values are significantly less than the material above cut-off grade (1.5% zinc) in the block model (approximately 4.0 Mt at 2.22% Zn, 0.54% Pb and 15.3 g/t Ag). This is due to narrow and flat dipping orebody geometry and depth between 50 to 100 metres from surface, and consequently the high stripping ratios (ranging from 14 to 21) required to access mining inventory.

As with Sandy Creek, the scaled grade factors for the Djibitgun deposit are generally found to impact economics more positively than fixed grade factors. Optimal scenarios for grade factors of 0.5%, "factor a" and "factor c", show project value between A$1.9M (Scenario No.19) and A$2.8M (Scenario No.22). Optimal scenarios for grade factors of 1.0%, "factor b" and "factor d", show positive value between A$7.9M (Scenario No.20) and A$12.6M (Scenario No.21). Capital costs are excluded in all Djibitgun cases.

8 Conclusions and Recommendations

8.1 Conclusions

The Manbarrum Project, owned by TRR, consists of the Sandy Creek and Djibitgun deposits. Based on the inputs and parameters used in this study, assuming a processing plant on site (all in capital costs of A$100M), the NPV for Sandy Creek is A$5M with an IRR of 9%. The Djibitgun deposit results in an NPV of A$-0.4M assuming no capital costs. Further work to enhance grade, mining inventory, recoveries, and/or reduce costs and find synergies with other opportunities (e.g. Sorby Hills, sales agreements) may find a path to market attractiveness in the short to medium-term.

The main conclusions of the study are presented below:

- The base case Sandy Creek scenario (1) produces a positive NPV, however would not likely to be sufficiently attractive to develop a stand-alone project (i.e. processing facilities on site). The project may be economically viable, and have market appeal, should a toll treatment or ore sale agreement option become feasible (e.g. Sorby Hills). Note Sandy Creek, assuming capital costs of A$20M, results in an NPV of A$85M with an IRR of 61% (exclusive of taxes, royalties, depreciation and amortisation).
- Sandy Creek is most sensitive (after zinc price) to process operating and capital costs, and further work determining process options, recoveries and processing costs (capital and operating) is prudent before or during Scoping Studies. Based on the metallurgical data made available to CSA Global, it is unclear how a saleable concentrate will be produced for these deposits.
- The base case Djibitgun scenario (4) results in an NPV of A$-0.4M excluding capital costs, taxes, royalties, depreciation and amortisation. The Djibitgun deposit may present some value as a satellite operation, however any option for Djibitgun will feature high stripping ratio's and mining costs. There is limited scope to reduce mining costs to improve project value.
- Applying grade factors to the Sandy Creek block model results in marked improvements to the project economics as expected. Should work be undertaken to verify the inclusion of additional grade be successful, the Sandy Creek project could become viable as a stand-alone operation with processing facilities on site, particularly if grade factors of +1.0% zinc be realised.
- The Djibitgun deposit, when applying grade factors, results in an increase in project value, however this value is limited due to the smaller scale of the mine and high stripping ratio. The deposit would most likely be exploited as a satellite operation.

8.2 Recommendations

CSA Global provides the following recommendations for the Manbarrum Project:

- An investigation be undertaken into suitable processing strategies for both the Sandy Creek and Djibitgun deposits. This work would result in more accurate estimates for metallurgical recoveries and processing costs (capital and operating). It is important that geo-metallurgical models are created, and that bench-scale and ultimately pilot-scale test work is completed on the various mineral domains and material types.
- It is recommended that an investigation into the potential pre-concentration processes is undertaken to identify opportunities to improve plant feed grades, thereby reducing total plant throughput requirements resulting in capital and operating cost reductions.
- An opportunity to improve the Project's value may exist via other parties purchasing ore from the Project. Entering an ore sale agreement will reduce the construction capital required and may improve viability of the Project.

- It is a recommendation that further drilling activities, if possible, aim to improve base metal grades. Review of the potential for grade bias (under-calling grade in diamond drilling or over-calling of grade in RC drilling) should be completed and the impact to resource grade assessed.
- Similarly, should metal prices continue to improve (particularly zinc), further work progressing the Sandy Creek project to scoping/prefeasibility level studies may be warranted.
- Increasing the tonnes available for processing (at current grades) has a minor improvement on NPV and alone would not produce a viable operation (based on inputs used in the CMS). Increasing the size of the mineable resource however, concurrently to other recommendations made here, would add further value to the Project, but should not be the priority.
- It is recommended that, should the Sandy Creek deposit advance to scoping studies, a geotechnical assessment to determine suitable pit slope angles be undertaken, and to be used in early stage pit optimisation. Likewise, an assessment of the hydrogeological and surface hydrology features will need to be completed for further refinement of any development plans.
- Given the growing interest from local communities in mining projects, the likelihood of encountering oxidised lead mineralisation and the proximity to the Keep River National Park, Project Sea Dragon (large-scale, land-based prawn aquaculture project) and the Ord River Irrigation Scheme (agriculture); early investigations in to environmental and permitting aspects of various development options should be undertaken.
- The Djibitgun project as a standalone project would require significant uplift in revenue factors and/or cost reductions to become viable. Initial mineralogical and processing test work has not defined a cost-effective method to extract the zinc or silver. Further work here may only be warranted should the Sandy Creek project become viable.

9 References

Snowden 2015, “Memorandum: Pit Optimisation”, Elkington, June 2015.

CSA Global 2008, “Whittle Optimisation, TNG LTD, Sandy Creek Deposit, Northern Territory”, Denton September 2008.

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Appendix 1: Optimisation Results for Sandy Creek Base Case (500 Ktpa)

Final	Revenue	Pit Shell	Total	Waste	Strip	ROM	Grade			Produced			Revenue			Operating	Operating	Operating	Disc.	Disc.	Disc.	Operating	Incrementa	Unit Costs				Mine Life
Pit Shell	Factor	Depth	Mined	Mined	Ratio	Feed	Zn	Pb	Ag	Zn	Pb	Ag	Zn	Pb	Ag	Costs	Revenue	Cash Flow	Cash Flow	Cash Flow	Cash Flow	Cash Cost	l Cash Cost	Mining	Process	OpEx	Sell	
#		RL	Mt	Mt	t:t	Mt	%	%	g/t	t	t	oz	$M	$M	$M	$M	$M	$M	$M	$M	$M	$/Zn t	incr $/Zn t	$/ mined t	$/plant t	$/plant t	$/plant t	Years
1	0.45	8.0	0.0	0.0	4.8	0.002	0.35	6.74	35.06	7	109	1,156	0.0	0.4	0.0	0.2	0.4	0.2	0.2	0.2	0.2	31,469	31,469	3.01	43.00	84.0	23.56	0.0
2	0.50	48.0	1.5	1.1	2.6	0.416	1.10	3.59	15.79	3,449	9,911	88,656	14.7	32.2	2.0	29.5	49.1	19.4	18.2	18.2	18.2	8,563	8,520	3.09	43.00	71.1	16.94	0.8
3	0.55	48.0	1.7	1.2	2.5	0.500	1.17	3.40	14.69	4,420	11,311	99,165	18.9	36.8	2.2	35.2	58.0	22.7	21.0	21.0	21.0	7,975	5,884	3.10	43.00	70.5	16.69	1.0
4	0.60	140.0	12.7	8.8	2.2	3.962	2.38	1.06	6.62	71,469	28,004	354,043	305.2	91.0	7.8	271.9	404.7	132.2	86.9	88.5	87.6	3,804	3,529	3.30	43.00	68.6	15.00	7.9
5	0.65	140.0	14.0	9.7	2.2	4.344	2.38	1.04	6.47	78,243	30,110	379,464	334.1	97.9	8.3	298.0	441.1	142.4	90.4	93.7	91.7	3,808	3,852	3.31	43.00	68.6	14.92	8.7
6	0.70	148.0	16.1	11.2	2.3	4.924	2.36	1.03	6.37	87,906	33,631	423,669	375.4	109.3	9.3	338.1	494.9	156.0	93.7	99.9	96.2	3,846	4,148	3.32	43.00	68.7	14.76	9.8
7	0.75	152.0	18.5	13.0	2.4	5.480	2.34	1.01	6.22	97,009	36,640	460,438	414.2	119.1	10.1	377.2	544.4	166.2	94.5	104.2	98.4	3,889	4,303	3.34	43.00	68.8	14.60	11.0
8	0.80	156.0	19.2	13.5	2.4	5.736	2.32	0.99	6.13	100,831	37,709	474,785	430.5	122.6	10.4	393.8	564.6	169.8	94.7	105.6	99.1	3,905	4,328	3.34	43.00	68.7	14.46	11.5
9	0.85	156.0	20.0	14.1	2.4	5.915	2.32	0.98	6.07	103,712	38,403	484,904	442.8	124.8	10.7	406.3	579.4	172.0	94.2	106.5	99.1	3,918	4,347	3.35	43.00	68.7	14.40	11.8
10	0.90	160.0	21.4	15.1	2.4	6.310	2.29	0.95	5.94	109,330	39,937	505,816	466.8	129.8	11.1	432.9	608.8	174.9	92.7	107.5	98.6	3,959	4,730	3.36	43.00	68.6	14.18	12.6
11	0.95	164.0	23.3	16.7	2.5	6.628	2.27	0.95	5.94	113,643	41,925	531,428	485.3	136.3	11.7	456.5	634.3	176.6	89.8	108.1	97.1	4,017	5,487	3.36	43.00	68.9	14.07	13.3
12	1.00	172.0	25.9	18.8	2.7	7.070	2.24	0.94	5.92	119,726	44,127	565,063	511.2	143.4	12.4	489.4	668.3	177.5	85.5	108.3	94.6	4,088	5,407	3.37	43.00	69.2	13.89	14.1
13	1.05	172.0	27.0	19.8	2.7	7.248	2.23	0.93	5.90	122,254	44,843	577,071	522.0	145.7	12.7	502.9	681.7	177.3	83.7	108.2	93.5	4,114	5,344	3.37	43.00	69.4	13.82	14.5
14	1.10	172.0	28.0	20.6	2.8	7.407	2.22	0.92	5.86	124,404	45,352	586,527	531.2	147.4	12.9	514.8	692.8	176.5	81.8	108.0	92.2	4,138	5,503	3.38	43.00	69.5	13.74	14.8
15	1.15	172.0	31.4	23.6	3.0	7.798	2.20	0.91	5.85	129,842	47,190	616,234	554.4	153.4	13.6	547.7	722.7	173.2	75.3	106.9	88.0	4,218	6,061	3.38	43.00	70.2	13.61	15.6
16	1.20	172.0	39.1	30.6	3.6	8.577	2.15	0.92	5.92	139,326	52,265	685,458	594.9	169.9	15.1	616.2	781.3	162.9	58.9	103.6	76.8	4,423	7,219	3.39	43.00	71.8	13.37	17.2
17	1.25	176.0	43.8	34.7	3.8	9.081	2.12	0.90	5.99	145,665	54,406	733,963	622.0	176.8	16.1	659.1	816.5	154.9	49.1	101.6	70.1	4,525	6,772	3.40	43.00	72.6	13.19	18.2
18	1.30	176.0	54.8	44.7	4.4	10.191	2.09	0.83	5.83	161,434	56,377	802,375	689.3	183.2	17.7	756.4	891.9	132.3	25.4	96.3	53.8	4,686	6,169	3.42	43.00	74.2	12.84	20.4
19	1.35	176.0	57.3	46.9	4.5	10.403	2.08	0.83	5.85	163,893	57,563	821,066	699.8	187.1	18.1	776.3	906.7	127.1	20.7	95.2	50.5	4,736	8,077	3.42	43.00	74.6	12.79	20.8
20	1.40	176.0	59.9	49.2	4.6	10.626	2.07	0.83	5.85	166,584	58,537	840,100	711.3	190.2	18.5	797.3	921.8	120.9	15.8	94.0	47.1	4,786	7,834	3.43	43.00	75.0	12.73	21.3
21	1.45	176.0	61.2	50.5	4.7	10.735	2.07	0.82	5.85	168,057	58,824	848,081	717.6	191.2	18.7	808.2	929.3	117.5	13.3	93.3	45.3	4,809	7,350	3.43	43.00	75.3	12.70	21.5
22	1.50	176.0	64.5	53.6	4.9	10.919	2.07	0.81	5.84	170,799	59,165	861,298	729.3	192.3	18.9	829.5	942.4	109.0	6.9	91.8	40.9	4,857	7,794	3.44	43.00	76.0	12.66	21.8
23	1.55	176.0	65.9	54.9	5.0	11.017	2.06	0.81	5.83	172,005	59,365	867,726	734.5	192.9	19.1	839.9	948.4	104.5	4.1	91.0	38.9	4,883	8,616	3.44	43.00	76.2	12.63	22.0
24	1.60	176.0	67.1	56.0	5.1	11.085	2.06	0.81	5.84	172,824	59,673	873,530	738.0	193.9	19.2	847.7	953.0	101.2	2.0	90.4	37.3	4,905	9,552	3.45	43.00	76.5	12.61	22.2
25	1.65	176.0	68.0	56.9	5.1	11.101	2.06	0.81	5.83	173,015	59,712	874,603	738.8	194.1	19.2	851.5	954.0	98.4	0.1	89.9	36.0	4,922	19,621	3.45	43.00	76.7	12.61	22.2
26	1.70	184.0	82.0	70.2	6.0	11.814	2.05	0.77	5.78	182,832	60,640	922,450	780.7	197.1	20.3	939.4	1,000.1	55.6	-28.0	82.7	16.3	5,138	8,953	3.47	43.00	79.5	12.42	23.6
27	1.75	184.0	87.0	75.0	6.2	12.029	2.04	0.76	5.77	186,006	61,129	936,388	794.2	198.7	20.6	968.5	1,015.5	41.6	-38.1	80.5	9.3	5,207	9,173	3.47	43.00	80.5	12.38	24.1
28	1.80	184.0	88.6	76.6	6.3	12.073	2.04	0.76	5.76	186,507	61,252	939,403	796.4	199.1	20.7	976.8	1,018.1	35.8	-40.9	79.6	7.3	5,237	16,550	3.48	43.00	80.9	12.37	24.1
29	1.85	192.0	97.5	85.1	6.9	12.397	2.03	0.75	5.74	190,812	61,690	961,081	814.8	200.5	21.1	1,026.2	1,038.5	6.3	-57.8	75.2	-4.6	5,378	11,472	3.49	43.00	82.8	12.28	24.8
30	1.90	192.0	99.9	87.5	7.0	12.443	2.04	0.75	5.74	191,552	61,710	964,955	817.9	200.6	21.2	1,037.3	1,041.8	-1.6	-62.5	74.1	-7.8	5,415	14,987	3.50	43.00	83.4	12.28	24.9
31	1.95	192.0	102.2	89.7	7.2	12.494	2.03	0.74	5.74	192,268	61,799	967,896	821.0	200.8	21.3	1,048.4	1,045.2	-9.4	-66.6	73.0	-10.7	5,453	15,542	3.50	43.00	83.9	12.27	25.0
32	2.00	192.0	103.2	90.7	7.3	12.513	2.03	0.74	5.73	192,535	61,828	968,895	822.1	200.9	21.3	1,053.2	1,046.5	-13.0	-68.1	72.5	-11.9	5,470	17,777	3.50	43.00	84.2	12.26	25.0

Appendix 2: Optimisation Results for Djibitgun Base Case (500 Ktpa)

Final	Revenue	Pit Shell	Total	Waste	Strip	ROM	Grade			Produced			Revenue			Operating	Operating	Operating	Disc.	Disc.	Disc.	Operating	Incremental	Unit Costs				Mine Life
Pit Shell	Factor	Depth	Mined	Mined	Ratio	Feed	Zn	Pb	Ag	Zn	Pb	Ag	Zn	Pb	Ag	Costs	Revenue	Cash Flow	Cash Flow	Cash Flow	Cash Flow	Cash Cost	l Cash Cost	Mining	Process	OpEx	Sell	
#		RL	Mt	Mt	t:t	Mt	%	%	g/t	t	t	oz	$M	$M	$M	$M	$M	$M	$M	$M	$M	$/Zn t	incr $/Zn t	$/ mined t	$/plant t	$/plant t	$/plant t	Years
1	1.00	144.0	2.7	2.5	17.0	0.148	2.72	1.20	21.32	3,053	1,184	42,734	13.0	3.8	0.9	17.6	17.9	0.0	0.0	0.0	0.0	5,781	5,781	3.16	44.76	118.9	17.07	0.3
2	1.05	144.0	3.1	2.9	15.5	0.189	2.53	1.19	20.73	3,620	1,495	52,870	15.5	4.9	1.2	21.4	21.6	-0.1	-0.1	-0.1	-0.1	5,907	6,584	3.17	44.76	113.2	16.14	0.4
3	1.10	144.0	4.3	4.1	15.5	0.263	2.50	1.19	19.85	4,979	2,075	70,512	21.3	6.7	1.6	29.8	29.7	-0.5	-0.5	-0.5	-0.5	5,982	6,182	3.18	44.76	113.2	15.97	0.5
4	1.15	144.0	7.1	6.6	14.3	0.462	2.22	1.20	18.06	7,763	3,703	112,769	33.1	12.0	2.5	50.1	47.9	-2.8	-2.6	-2.6	-2.6	6,450	7,287	3.19	44.76	108.3	14.66	0.9
5	1.20	144.0	7.7	7.2	14.6	0.492	2.23	1.20	18.00	8,291	3,942	119,669	35.4	12.8	2.6	53.7	51.1	-3.3	-3.1	-3.1	-3.1	6,481	6,944	3.19	44.76	109.1	14.69	1.0
6	1.25	144.0	8.3	7.8	14.6	0.534	2.19	1.21	17.95	8,837	4,310	129,412	37.7	14.0	2.8	58.3	54.9	-4.2	-3.9	-3.9	-3.9	6,594	8,298	3.19	44.76	109.1	14.54	1.1
7	1.30	148.0	8.7	8.1	14.5	0.559	2.15	1.22	17.85	9,106	4,526	134,660	38.9	14.7	3.0	60.7	56.8	-4.7	-4.3	-4.3	-4.3	6,669	9,166	3.20	44.76	108.7	14.39	1.1
8	1.35	172.0	43.5	40.4	13.0	3.115	1.93	0.66	14.77	45,392	13,632	621,138	193.8	44.3	13.7	315.5	253.1	-66.0	-68.3	-61.2	-65.5	6,950	7,021	3.23	44.76	101.3	11.47	6.2
9	1.40	176.0	54.0	50.0	12.6	3.961	1.90	0.60	14.32	56,786	15,779	765,847	242.5	51.3	16.8	396.6	312.2	-88.8	-91.0	-74.6	-84.5	6,984	7,119	3.25	44.76	100.1	11.12	7.9
10	1.45	176.0	58.6	54.3	12.6	4.293	1.89	0.58	14.10	61,249	16,472	817,410	261.5	53.5	18.0	429.8	334.8	-99.6	-101.6	-80.5	-93.1	7,017	7,429	3.25	44.76	100.1	11.01	8.6
11	1.50	176.0	61.5	57.0	12.7	4.490	1.87	0.58	14.07	63,545	17,346	853,150	271.3	56.4	18.8	450.3	348.3	-106.8	-108.6	-84.1	-98.8	7,086	8,929	3.25	44.76	100.3	10.95	9.0
12	1.55	176.0	64.7	60.0	12.8	4.672	1.86	0.58	14.10	65,806	17,957	889,670	281.0	58.4	19.6	470.8	360.9	-115.0	-115.8	-88.1	-104.7	7,154	9,075	3.26	44.76	100.8	10.90	9.3
13	1.60	180.0	68.3	63.4	13.1	4.860	1.85	0.58	14.09	67,981	18,584	924,678	290.3	60.4	20.3	493.2	373.0	-125.5	-124.6	-93.1	-112.0	7,255	10,308	3.27	44.76	101.5	10.82	9.7
14	1.65	180.0	69.6	64.7	13.2	4.917	1.85	0.58	14.07	68,659	18,832	934,297	293.2	61.2	20.6	500.8	376.9	-129.3	-127.9	-94.8	-114.6	7,293	11,150	3.27	44.76	101.9	10.81	9.8
15	1.70	184.0	72.2	67.2	13.5	4.995	1.84	0.58	14.03	69,485	19,231	946,507	296.7	62.5	20.8	513.8	382.0	-137.4	-134.4	-98.5	-120.0	7,395	15,840	3.27	44.76	102.9	10.79	10.0
16	1.75	184.0	73.2	68.2	13.6	5.009	1.84	0.58	14.02	69,610	19,286	948,357	297.2	62.7	20.9	518.1	382.8	-140.8	-136.8	-100.0	-122.1	7,442	33,825	3.28	44.76	103.4	10.78	10.0
17	1.80	184.0	74.3	69.2	13.7	5.039	1.83	0.58	14.05	69,911	19,402	955,720	298.5	63.1	21.0	523.4	384.7	-144.3	-139.4	-101.6	-124.3	7,486	17,589	3.28	44.76	103.9	10.77	10.1
18	1.85	184.0	74.9	69.9	13.8	5.059	1.83	0.58	14.08	70,157	19,481	961,725	299.6	63.3	21.2	526.7	386.0	-146.4	-141.1	-102.6	-125.7	7,508	13,668	3.28	44.76	104.1	10.76	10.1
19	1.90	184.0	75.8	70.7	13.9	5.075	1.83	0.58	14.07	70,303	19,509	964,572	300.2	63.4	21.2	530.3	387.0	-149.1	-143.4	-103.8	-127.6	7,543	24,622	3.28	44.76	104.5	10.75	10.2
20	1.95	184.0	76.5	71.4	14.1	5.079	1.83	0.58	14.07	70,395	19,524	965,172	300.6	63.5	21.2	533.1	387.4	-151.5	-145.2	-104.9	-129.1	7,573	30,221	3.28	44.76	105.0	10.75	10.2
21	2.00	184.0	77.5	72.4	14.2	5.111	1.83	0.58	14.12	70,763	19,647	974,313	302.2	63.9	21.4	538.1	389.5	-154.5	-147.5	-106.2	-131.0	7,604	13,588	3.28	44.76	105.3	10.74	10.2
22	2.05	184.0	78.6	73.4	14.3	5.144	1.83	0.58	14.09	71,099	19,807	978,388	303.6	64.4	21.5	543.5	391.6	-157.8	-150.4	-107.7	-133.4	7,645	16,174	3.28	44.76	105.7	10.73	10.3
23	2.10	200.0	80.5	75.3	14.6	5.152	1.83	0.58	14.08	71,167	19,871	979,376	303.9	64.6	21.5	550.7	392.1	-164.7	-154.8	-110.8	-137.2	7,738	105,433	3.29	44.76	106.9	10.73	10.3
24	2.15	200.0	82.0	76.8	14.9	5.155	1.83	0.58	14.08	71,213	19,849	979,799	304.1	64.5	21.6	556.1	392.3	-169.9	-158.5	-113.2	-140.4	7,808	116,241	3.29	44.76	107.9	10.73	10.3
25	2.20	200.0	82.6	77.5	15.0	5.163	1.83	0.58	14.08	71,281	19,914	981,830	304.4	64.7	21.6	558.7	392.8	-172.2	-160.3	-114.2	-141.9	7,839	39,634	3.29	44.76	108.2	10.72	10.3
26	2.25	200.0	83.4	78.2	15.1	5.166	1.83	0.58	14.08	71,327	19,892	982,532	304.6	64.6	21.6	561.4	393.0	-174.7	-162.4	-115.3	-143.6	7,871	58,532	3.30	44.76	108.7	10.72	10.3
27	2.30	204.0	84.0	78.8	15.3	5.169	1.83	0.58	14.08	71,365	19,903	983,059	304.7	64.7	21.6	563.7	393.2	-176.8	-163.9	-116.3	-144.8	7,898	58,416	3.30	44.76	109.0	10.72	10.3
28	2.35	204.0	84.7	79.5	15.4	5.176	1.82	0.58	14.08	71,418	19,963	984,183	305.0	64.9	21.7	566.3	393.6	-179.1	-165.8	-117.3	-146.4	7,930	50,787	3.30	44.76	109.4	10.72	10.4
29	2.40	204.0	86.1	80.9	15.6	5.191	1.83	0.58	14.08	71,663	20,020	986,956	306.0	65.1	21.7	572.0	394.9	-183.6	-169.5	-119.3	-149.4	7,981	22,951	3.30	44.76	110.2	10.72	10.4
30	2.45	204.0	86.6	81.4	15.7	5.200	1.82	0.58	14.08	71,754	20,057	988,817	306.4	65.2	21.8	574.2	395.5	-185.3	-170.7	-120.0	-150.4	8,002	24,328	3.30	44.76	110.4	10.72	10.4
31	2.50	208.0	87.9	82.7	15.9	5.202	1.82	0.58	14.08	71,784	20,065	989,168	306.5	65.2	21.8	579.1	395.6	-190.1	-174.0	-122.2	-153.2	8,067	159,566	3.30	44.76	111.3	10.72	10.4
32	2.55	212.0	88.2	83.0	16.0	5.205	1.82	0.58	14.08	71,815	20,074	989,519	306.7	65.2	21.8	580.2	395.8	-191.1	-174.7	-122.6	-153.8	8,078	35,831	3.30	44.76	111.5	10.72	10.4
33	2.60	212.0	88.4	83.2	16.0	5.206	1.82	0.58	14.08	71,830	20,078	989,729	306.7	65.3	21.8	580.8	395.8	-191.7	-175.2	-122.8	-154.3	8,086	41,543	3.30	44.76	111.6	10.72	10.4
34	2.65	212.0	89.0	83.8	16.1	5.211	1.82	0.58	14.08	71,907	20,100	990,853	307.0	65.3	21.8	583.2	396.2	-193.7	-177.0	-123.8	-155.7	8,110	31,468	3.30	44.76	111.9	10.72	10.4
35	2.70	224.0	93.8	88.6	17.0	5.227	1.82	0.58	14.07	72,089	20,161	992,777	307.8	65.5	21.8	601.1	397.3	-210.9	-188.8	-131.4	-165.8	8,338	98,208	3.31	44.76	115.0	10.71	10.5
36	2.75	228.0	94.8	89.6	17.1	5.228	1.82	0.58	14.06	72,096	20,164	992,812	307.9	65.5	21.8	604.5	397.4	-214.4	-191.1	-132.9	-167.8	8,385	450,733	3.32	44.76	115.6	10.71	10.5
37	2.80	228.0	95.3	90.0	17.2	5.228	1.82	0.58	14.06	72,096	20,164	992,812	307.9	65.5	21.8	606.1	397.4	-216.1	-192.3	-133.7	-168.8	8,407	0	3.32	44.76	115.9	10.71	10.5
38	2.85	228.0	95.5	90.3	17.3	5.230	1.82	0.58	14.06	72,127	20,172	993,233	308.0	65.6	21.9	607.2	397.6	-216.9	-193.0	-134.1	-169.4	8,418	34,770	3.32	44.76	116.1	10.72	10.5
39	2.90	228.0	95.6	90.4	17.3	5.231	1.82	0.58	14.06	72,142	20,176	993,372	308.0	65.6	21.9	607.5	397.7	-217.2	-193.3	-134.2	-169.6	8,421	24,049	3.32	44.76	116.1	10.71	10.5
40	2.95	232.0	97.3	92.1	17.6	5.232	1.82	0.58	14.06	72,158	20,181	993,583	308.1	65.6	21.9	613.5	397.7	-223.3	-197.4	-136.9	-173.2	8,502	390,909	3.32	44.76	117.3	10.71	10.5
41	3.00	232.0	99.2	93.9	17.9	5.241	1.82	0.58	14.05	72,280	20,215	994,346	308.6	65.7	21.9	620.6	398.3	-230.0	-201.9	-139.8	-177.1	8,587	58,469	3.33	44.76	118.4	10.71	10.5
42	3.05	232.0	99.4	94.2	18.0	5.241	1.82	0.58	14.05	72,280	20,215	994,346	308.6	65.7	21.9	621.6	398.3	-230.9	-202.6	-140.2	-177.7	8,599	0	3.33	44.76	118.6	10.71	10.5
43	3.10	232.0	99.5	94.3	18.0	5.241	1.82	0.58	14.05	72,280	20,215	994,346	308.6	65.7	21.9	621.8	398.3	-231.2	-202.8	-140.3	-177.8	8,603	0	3.33	44.76	118.6	10.71	10.5
44	3.15	232.0	100.0	94.8	18.1	5.243	1.82	0.58	14.05	72,310	20,223	994,412	308.8	65.7	21.9	623.8	398.4	-233.1	-204.0	-141.2	-178.9	8,627	65,568	3.33	44.76	119.0	10.71	10.5
45	3.20	232.0	100.1	94.9	18.1	5.243	1.82	0.58	14.05	72,310	20,223	994,412	308.8	65.7	21.9	624.0	398.4	-233.3	-204.1	-141.3	-179.0	8,630	0	3.33	44.76	119.0	10.71	10.5
46	3.25	232.0	100.1	94.9	18.1	5.243	1.82	0.58	14.05	72,310	20,223	994,412	308.8	65.7	21.9	624.1	398.4	-233.4	-204.2	-141.3	-179.1	8,631	0	3.33	44.76	119.0	10.71	10.5
47	3.30	232.0	100.3	95.1	18.1	5.244	1.82	0.58	14.04	72,318	20,226	994,446	308.8	65.7	21.9	624.8	398.5	-234.1	-204.8	-141.6	-179.5	8,640	92,400	3.33	44.76	119.2	10.71	10.5
48	3.35	232.0	100.9	95.7	18.3	5.244	1.82	0.58	14.04	72,318	20,226	994,446	308.8	65.7	21.9	626.8	398.5	-236.1	-206.5	-142.5	-180.9	8,667	0	3.33	44.76	119.5	10.71	10.5
49	3.40	236.0	101.8	96.6	18.4	5.245	1.82	0.58	14.04	72,294	20,230	994,515	308.7	65.7	21.9	630.0	398.5	-239.3	-208.7	-144.0	-182.8	8,714	-130,410	3.33	44.76	120.1	10.71	10.5
50	3.45	236.0	102.7	97.4	18.6	5.245	1.82	0.58	14.04	72,294	20,230	994,515	308.7	65.7	21.9	633.0	398.5	-242.5	-211.1	-145.4	-184.8	8,756	0	3.33	44.76	120.7	10.71	10.5
51	3.50	236.0	102.9	97.6	18.6	5.245	1.82	0.58	14.04	72,294	20,230	994,515	308.7	65.7	21.9	633.6	398.5	-243.1	-211.5	-145.6	-185.1	8,764	0	3.33	44.76	120.8	10.71	10.5

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