Pre-Feasibility Mining Study
Weld Range Iron Ore Project

Report Prepared for

Sinosteel Midwest Management Pty Ltd

Prepared by

WOR002_MIN_RP_005: Rev5

November 2008

SRK Consulting (Australasia) Pty Ltd
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Pre-Feasibility Mining Study
Weld Range Iron Ore Project

Sinosteel Midwest Management Pty Ltd

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Executive Summary

The undeveloped Weld Range Iron Ore deposits, located within the mid-west region of Western Australia some 600 km NNE of Perth, are the subject of a Pre-Feasibility Study (PFS) investigation by Sinosteel Midwest Management Pty Ltd (SMM); a joint venture between Sinosteel Ltd and Midwest Corporation Ltd.

The undeveloped Beebyn and Madoonga deposits are the two Weld Range Banded Iron Formation (BIF) orebodies considered in this study.

SMM have engaged WorleyParsons (WP) to consider the mining and transport options of iron ore from the Beebyn and Madoonga deposits. WP has engaged SRK Consulting (Australasia) Pty Ltd (SRK) to perform technical mining assessments, including the mine planning study that is the subject of this report.

Weld Range Iron Ore Project PFS Target

SMM are seeking to develop a 15 Mtpa iron ore project with a target lifespan of 15 years. The Beebyn and Madoonga deposits are considered the initial source of project production with the balance of the required mineral resources yet to be identified from ongoing exploration. This premise has been used to define the PFS operating, capital and mining philosophy.

The target product specifications for the project are determined by the regressed grade specifications of the fines product as the fines product is known to produce lower Fe grades and higher contaminant levels than the lump.

The SMM target specifications for the fines product are:

- an average Fe grade of greater than 58.0%,
- an average SiO_2 grade below 5.5%, and
- an average Al_2O_3 grade below 2.6%

Purpose of the Pre-Feasibility Mining Study

The Study is titled “Pre-Feasibility Mining Study” and is the third mining study produced by SRK for the Weld Range Project. The first study was titled “Desktop Mining Study”, and was intended to rank the deposits to improve assumptions required to locate infrastructure. The second study, Preliminary Mining Study, updated the project and provided interim project information to other technical study areas. The results assisted in setting the project direction for the current study.

The intent of the Pre-Feasibility Mining Study is to identify the best mining options to proceed on to the Bankable Feasibility Study (BFS) and identify the additional work required to deliver a quality, low-risk BFS result.

The Pre-Feasibility Mining Study is reliant on project inputs and assumptions. It was agreed between SRK and SMM to consider mineralisation from all mineral resource confidence classes, including Inferred Resources and unclassified material, hence this Report does not provide an Ore Reserve estimate and is not suitable for public reporting in accordance with the 2004 JORC Code.

Mineral resource

The mineral resource model used in this study was developed by SRK in July 2008. A summary of the mineral resource model is given in the following table.

Deposit	Volume (Mm^3)	Dry density (t/m^3)	Dry tonnes (Mt)	Fe %	SiO_2 %	Al_2O_3 %	P %	LOI %
Beebyn	19.4	3.15	61.2	60.9	4.9	1.9	0.10	5.2
Madoonga	33.6	2.81	94.4	56.1	8.4	2.0	0.08	8.1
Total/Average	**53.1**	**2.93**	**155.5**	**58.0**	**7.0**	**2.0**	**0.09**	**7.0**

Note: This summary indicates the primary mineralisation considered in the mining study and is not reported to a cut-off grade. It includes unclassified material and hence does not meet the minimum requirements for public reporting as defined by the 2004 JORC Code.

Selectivity and blending

The average in-situ contaminant grades of the SiO_2 and Al_2O_3 limit the marketability of the fines product. SRK have determined that selective mining is required to maximise the conversion of mineral resource to a mining inventory.

Careful blending between the mining areas is required to ensure that the high-grade contaminant materials are blended through the life of the project. Stockpiling of high contaminant Run of Mine (RoM) mineralisation is required to ensure delivery of on-specification product contaminant grades.

Ore loss and dilution

Dilution was identified as a key issue, as minor quantities of dilution have been demonstrated as having a large adverse impact on product grades. The effects of dilution are reduced Fe grades and increases in the SiO_2 and Al_2O_3 contaminant grades.

The approach selected by SRK for this study has been to target no dilution of the product. To achieve no dilution, an ore-loss will be incurred. SRK has estimated ore-losses in the order of 10%.

Mining systems

The mining method selected for this study is based on conventional, proven technologies that will be supplied by a mining contractor. Mid-sized mining equipment for mining both ore and waste was selected. The same mining fleet is used for the mining of ore and waste, taking advantage of standardising equipment across all aspects of the mining operation. The primary mining equipment selected consisted of 140 t class trucks matched with 250 t class excavators. Blast-hole drilling will also be undertaken by a mining contractor.

Mining operating cost estimation was supported by mining contractor input and benchmarked by SRK.

Open pit optimisation

The ultimate pit shell is the revenue factor 1.0 pit shell that maximises the economic return to the project. The inventory of the ultimate pit shell is shown below.

- Total ore : 71.2 Mt
- Grade of Fe : 59.9%
- Grade of SiO_2 : 4.58%
- Grade of Al_2O_3 : 2.11%
- Total waste : 332 Mt
- Strip Ratio : 4.8

NOTE: The mining inventory quoted above includes mineralisation from unclassified mineral resource confidence classes. The results listed above do not represent an "Ore Reserve" as defined by the 2004 JORC Code.

Mine design

Practical engineered mine designs were developed to include mining requirements such as safety catch berms, batters and haulage ramps. The addition of the mining geometry and consideration of the physical space required to operate mining equipment reduced the inventory in mine designs from that indicated in the pit optimisation results.

The combined mining inventory of both the Madoonga and the Beebyn final pit designs including allowances for ore-loss, silica upper cut to meet silica fines specifications, and pre-strip losses is:

- Total product : 69.4 Mt
- Grade of Fe : 60.0%
- Grade of SiO_2 : 4.54%
- Grade of Al_2O_3 : 2.09%
- Total waste : 394 Mt
- Strip Ratio : 5.7

NOTE: The mining inventory quoted above includes mineralisation from unclassified mineral resource confidence classes. The results listed above do not represent an "Ore Reserve" as defined by the 2004 JORC Code.

Mine production scheduling

The two deposits are some 22 km apart, with ore from Madoonga planned to be crushed and hauled via road train to Beebyn.

Early studies have demonstrated that mining the two deposits together allows a degree of blending with higher Beebyn Fe grades partially offsetting the lower Madoonga Fe grades. Moreover, mining the deposits together avoids infrastructure bottlenecks that could be experienced if each site was required to produce at peak levels independently.

The mine production scheduling was carried out using the MineSight™ linear programming scheduler. The scheduling objectives were:

- adhere to the pit cut-back design sequences,
- target 15 Mtpa of saleable product,
- smooth the waste production as far as possible,
- maximise the Fe unit production,
- mine Beebyn and Madoonga together, and
- manage the Al_2O_3 and SiO_2 grades for each period.

Additional practical constraints were applied to limit bench turnover rates and maximum material movements.

The results of production scheduling are:

- a pre-strip period in Year -1,
- a 12 month ore production and ramp-up commencing in Year 0,
- Year 1 through to Year 3 achieve 15 Mtpa of product,
- Years 4 and 5 attempts to achieve 15 Mtpa but, as the remaining mineralised inventory is low and poor quality material has been deferred till the end of mine life, the full production of 15 Mtpa cannot be met. SRK suggest that alternative production locations should be brought online to supplement production in these periods,
- a total mine life of seven years, ending in Year 5,
- a 1.7 Mt stockpile at the end of the operation that can't be blended with the remaining mineralised inventory, and
- 6.6 Mt of insitu mineralised inventory unable to be blended at the end of Year 5.

The production schedule and associated cost summary is presented in the tables below. Mining costs include both waste and ore mining expenditure. Ore costs include expenditure for load and haul, RoM related costs including grade control, ore/waste mining cost margin, stockpile maintenance, pit dewatering, drill and blast

Schedule Year	RoM (kt)	Stockpile	Waste (kt)	Fe %	SiO_2%	Al_2O_3%	Strip Ratio
-1	0	55	1,152	0.00	0.00	0.00	20.9
0	5,836	1,579	34,777	61.02	4.00	2.13	4.7
1	14,992	0	107,073	60.57	4.16	2.11	8.0
2	14,961	0	110,547	60.22	4.38	2.09	7.4
3	15,293	0	65,083	60.00	4.60	2.06	4.3
4	7,338	970	27,024	60.38	4.44	1.96	3.3
5	2,671	1,091	9,614	58.79	4.54	2.07	2.9
Total/Average	61,091	1,666	355,270	60.28	4.36	2.07	5.7

The results in the table above are insitu grades and produce a fines SiO_2 grade of 5.25% and a fines Al_2O_3 grade of 2.58%.

Limited mining capital expenditure is anticipated as the mining operation is planned to be based on a contract mining scenario.

The mining operating costs considered in the mining study are defined by period in the Table below. No account of capital costs, taxation or amortisation has been considered.

	Period Cost ($M)							Grand Total ($M)
	-1	0	1	2	3	4	5	
Total ore mining costs	0.3	40.0	78.7	92.1	98.9	55.94	21.0	387.0
Total waste mining costs	7.8	104.9	354.6	373.9	242.2	107.2	34.2	1,224.9
Total rehandle costs	-	-	3.3	-	-	-	0.8	4.1
Total mining cost	**8.1**	**144.9**	**436.6**	**466.1**	**341.2**	**163.1**	**56.0**	**1,615.9**

Recommendations

SRK identified several option studies that should be considered prior to the commencement of the mine planning components of the proposed Bankable Feasibility Study. These include consideration of:

- processing to upgrade high contaminant mineralisation to product specification,
- re-evaluate the project contaminant grade specifications,
- consider the implications of owner-operator versus mining contractor scenarios and subsequent implications of mining inventories,
- blending stockpiles to assist in maintaining product contaminant specifications on short time scales,
- the feasibility of producing a lump only product from the "off-spec" material remaining at the end of the mine life,
- review geology to ensure mineralisation contacts are understood and the internal waste is identified,
- carry out waste geology modelling for use by hydrogeology, acid drainage and metal leaching studies, waste dump management and design, and mine planning studies,
- consider waste management requirements including dump design and backfilling,
- update topography survey with higher quality information,
- re-evaluate the ore haulage options between Beebyn and Madoonga with a view to reducing operating costs, and
- as the mineralised inventory estimate contains less than the project target of 15 Mtpa of saleable product for 15 years life, SRK point to the need for continuing exploration to identify the additional mineral resources required for the Weld Range Project.

Future studies

SRK has considered the scope requirements for involvement in the Weld Range Iron Ore Project – Bankable Feasibility Study (BFS). This scope includes aspects of the recommendations outlined above as well as standard BFS mine planning requirements. The targeted outcome will be a comprehensive report supported by mine designs, production schedules, operating costs and capital expenditure schedules.

Table of Contents

List of Tables

List of Figures

List of Appendices

Disclaimer

The opinions expressed in this Report have been based on the information supplied to SRK Consulting (Australasia) Pty Ltd (SRK) by Sinosteel Midwest Management Pty Ltd (SMM). The opinions in this Report are provided in response to a specific request from SMM. SRK has exercised all due care in reviewing the supplied information. Whilst SRK has compared key supplied data with expected values, the accuracy of the results and conclusions from the review are entirely reliant on the accuracy and completeness of the supplied data. SRK does not accept responsibility for any errors or omissions in the supplied information and does not accept any consequential liability arising from commercial decisions or actions resulting from them.

List of abbreviations

Abbreviation	Meaning
BCM	bank cubic metre
BD	bulk density
BFS	Bankable Feasibility Study
BIF	Banded Ironstone Formation
dmt	dry metric tonne
dmtu	dry metric tonne unit
DoIR	Department of Industry and Resources
DSO	Direct Shipping Ore – No upgrade processing required. 100% of ore mined is sold.
Fines	Generally the product portion particle size less than 6mm.
flitch	Subset of a bench defined by excavator depth of digging.
FOB	Under the Incoterm standard, FOB stands for "Free On Board". Indicating "FOB" means that the seller pays for transportation of the goods to the port of shipment, plus loading costs. The buyer pays freight, insurance, unloading costs and transportation from the arrival (loading) port to the final destination. The passing of risks occurs when the goods pass the ship's rail at the port of shipment.
HWE	HWE Mining Pty Ltd
JORC Code	Australia Code for Reporting of Mineral Resources and Ore Reserves, prepared by the Joint Ore Reserves Committee of the Australasian Institute of Mining and Metallurgy, Australian Institute of Geoscientists and Minerals Council of Australia (JORC), December 2004. Internationally accepted.
kBCM	kilo bank cubic metre
LCM	loose cubic metre
LG	Lerchs-Grossmann
LOI	Loss on Ignition
LOM	life of mine
Lump	Generally the product portion particle size greater than 6mm but less than 32mm.
MBCM	million bank cubic metre
Mm^3	million cubic metre
m RL	metre reduced level. The height datum used is metres above mean sea level (AMSL).
Mineralised inventory	Material that may be suitable to be reclassed as “ore” if passing given hurdles.
Mlcm	million loose cubic metre
Mtpa	million tonnes per annum
NPV	net present value
OB	overburden – after topsoil and subsoil have been removed
OPEX	operating expenditure
Ore	Mineralised economic material that meets market specification. This definition does not satisfy the JORC definition of ore.
OS	oversize material in ore
PFS	Pre-Feasibility Study
Product	A combination of mineralised materials that produces a suitable blended feed acceptable as a saleable product.
RoM	Run of mine
SI	International System of Units
SMM	Sinosteel Midwest Management

All units of measure quoted in this Report conform to the International System of Units standard unless stated otherwise.

1 Weld Range Iron Ore Project

1.1 Introduction

The Weld Range Iron Ore Project is based on the proposed development of the Weld Range Banded Ironstone Formation (BIF) ridges. Weld Range is approximately 600 km NNE of Perth and 65 km SW of the town of Meekatharra in Western Australia (Figure 1-1). The undeveloped Beebyn and Madoonga deposits have been well explored and form the Weld Range deposits considered in this study.

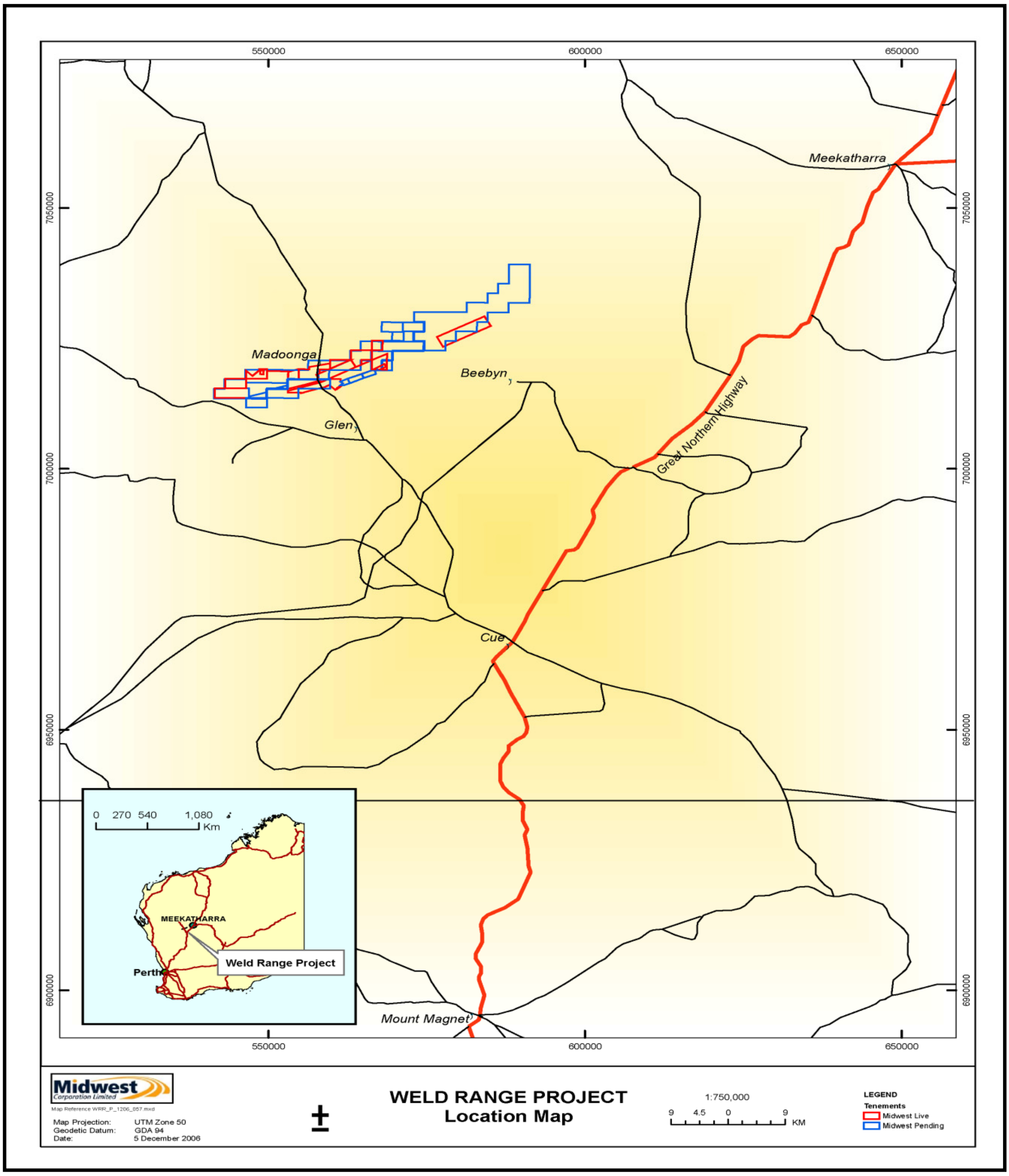


Figure 1-1: Location of the Weld Range Project

(Source: SMM, 2006)

Development of the Weld Range deposits is currently being investigated by Sinosteel Midwest Management Pty Ltd (SMM) which is a joint venture between Sinosteel Pty Ltd and Midwest Corporation Ltd.

SMM have engaged WorleyParsons (WP) to consider the mining and transport of iron ores from the Beebyn and Madoonga deposits. WP has engaged SRK Consulting (Australasia) Pty Ltd (SRK) to perform technical mining assessments, including the mine planning study that is the subject of this Report.

1.2 Weld Range Iron Ore Project PFS Study target

SMM is seeking to develop a 15 Mtpa iron ore project with a target lifespan of 15 years. The Beebyn and Madoonga deposits are considered the initial source of project production with the balance of the required mineral resources to be identified from ongoing exploration. This premise has been used to define the PFS operating, capital and mining philosophy.

The target product specifications for the project are determined by the regressed grade specifications of the fines product as the fines product is known to produce lower Fe grades and higher contaminant levels than the lump.

The target grades for the fines product are:

- an average Fe grade of greater than 58.0%,
- an average Al_2O_3 grade below 2.6%, and
- an average SiO_2 grade below 5.5%.

1.3 Project Basis of Design

The project Basis of Design (BoD) considers a main infrastructure facility located adjacent to the Beebyn deposit. This facility is proposed to include the main project administration, workshops, crushing and screening facilities, stockyards and rail loop and rail load out.

It is proposed that ore mined from Madoonga will undergo primary crushing at Madoonga prior to being transported to the Beebyn facility via road trains for further treatment. While the Beebyn site will be the location of the main project facilities, the Madoonga site is proposed to be relatively self-sufficient but will still rely on the Beebyn facilities for major works and technical support. Madoonga will have its own office, workshops, fuel farm and other support services.

The ore from both deposits is classed as a Direct Shipping Ore (DSO) with no upgrading required. Crushing and screening of the Madoonga ore to lump and fines will occur at Beebyn prior to rail transport to port. Lump rescreening will occur at the port operations.

Prior work has identified that the Madoonga ore is lower grade, but can be blended with the higher grade Beebyn ore to maximise product tonnes and potentially improve the project value.

The Basis of Design assumptions used in this project are as recorded in the accompanying Basis of Design document attached as Appendix 1.

1.4 Prior mining studies

This Report is titled "Pre-Feasibility Mining Study of the Weld Range Iron Ore Project" and is the third mining study undertaken by SRK. The first study, "Desktop Mining Study of the Weld Range Iron Ore Project" (SRK, 2007) was intended to assist in locating the project infrastructure.

The second mining study was titled "Preliminary Mining Study of the Weld Range Iron Ore Project". The Preliminary Mining Study was reliant on interim project inputs and assumptions including the SRK preliminary mineral resource estimation (SRK, 2007).

The Preliminary Mining Study defined a six-year mine life with an inventory of 80 Mt of product.

The Preliminary Mining Study was used to create a tender document that was subsequently issued to HWE Mining Ltd Pty (HWE), a large mining contracting company. HWE responded with information including unit rates, equipment selection and recommendations.

1.5 Battery limits

The battery limits of the current Pre-Feasibility Mining Study are based on the two SMM Weld Range deposits, Beebyn and Madoonga, and are as follows:

- mining and transportation of ore to a nearby crusher or RoM stockpile, and
- mining of waste and transportation to external waste rock landforms.

Infrastructure selection and estimation was carried out by WP. Materials handling downstream of the RoM pad, including transportation of crushed ore from Madoonga to Beebyn, falls within the WP scope of work.

As the Pre-Feasibility Mining Study considers unclassified mineral resources, the output of the study is not intended to provide an ore reserve estimate suitable for public reporting in accordance with the 2004 JORC Code.

1.6 Targeted outcome of PFS mining study

The study is intended to produce outcomes including:

- pre-strip and production build-up logic,
- equipment selection,
- operating cost estimation,
- engineered mine designs,
- mine production schedules,
- mining cost reporting, and
- detailed reporting including opportunities, recommendations and project execution plan.

1.7 Programme objectives and work programme

The study objective is to provide an updated view of the Weld Range Iron Ore Project. The outputs of the study will provide direction to SMM for the impending Bankable Feasibility Study.

1.8 Purpose of the Report

This Report is for internal reporting only and is not intended for public distribution. Mining inventory estimates within this report have not been classified in accordance with the 2004 JORC Code.

1.9 Reporting standard

The Report has been developed following the Enthalpy standard.

Estimates within this Report have not been classified in accordance to the JORC Code. It should not be assumed that these resources and reserves are necessarily JORC Code compliant, at least until further documentation on the estimates can be obtained and they have been formally endorsed by Competent Persons in accordance with the JORC Code.

1.10 Software

The following mine planning software has been used in this project:

- Whittle™: Open pit optimisation
- MineSight®: Mine design and mine scheduling package
- AutoCAD®: Drafting software

1.11 Project team

The project team has been managed by Scott McEwing of SRK.

The team members were:

- **Sjoerd Duim**, Principal Consultant (Mining), Peer Review, Quality Assurance and Quality Control.
- **Carl Murray**, Principal Consultant (Mining), mining engineering, cost estimation, report writing and compilation.
- **Scott McEwing**, Principal Consultant (Mining), SRK Weld Range Project Manager, mine design, report writing and compilation.
- **Jeffrey Ngai**, Consultant, Mine Production Scheduling.
- **Jemini Bhargava,** Consultant, Open Pit Optimisation
- **Jennifer Watkins**, Consultant, Drafting
- **Michael Pendlebury**, Consultant, Drafting.

1.12 Statement of SRK independence

Neither SRK nor any of the authors of this Report have any material present or contingent interest in the outcome of this Report; nor do they have any pecuniary or other interest that could be reasonably regarded as being capable of affecting their independence or that of SRK.

SRK has no beneficial interest in the outcome of the technical assessment capable of affecting its independence.

SRK's fee for completing this Report is based on its normal professional daily rates plus reimbursement of incidental expenses. The payment of that professional fee is not contingent upon the outcome of the Report.

2 Geology

The Weld Range deposits considered in this study comprise the undeveloped Beebyn and Madoonga deposits. SMM have identified other exploration targets in the Weld Range area and are actively exploring to define additional mineral resources for consideration in future studies.

Beebyn and Madoonga are found on independent BIF horizons with different geochemistry. Both orebodies comprise a mixture of goethite and hematite mineralisation within replaced BIF of near-vertical dip. Both orebodies are narrow and long, with strike lengths in the order of 3 km and locally open at depth.

Compared with some of the large-scale Pilbara operations, the deposits are narrower and of lower grade.

The mineral resource model used in this study was developed by SRK in July 2008. The summary of the mineral resource model is given in the following table.

Table 2-1: Summary of Weld Range mineral resource estimate by deposit

Deposit	Volume (Mm^3)	Dry density ($t/m^{3)}$	Dry tonnes (Mt)	Fe %	SiO_2 %	Al_2O_3 %	P %	LOI %
Beebyn	19.4	3.15	61.2	60.9	4.9	1.9	0.10	5.2
Madoonga	33.6	2.81	94.4	56.1	8.4	2.0	0.08	8.1
Total/Average	**53.1**	**2.93**	**155.5**	**58.0**	**7.0**	**2.0**	**0.09**	**7.0**

Note: The mineral resource estimate includes the modelled primary mineralisation boundary considered in the mining study and is not reported to a cut-off grade. It includes unclassified material and hence does not meet the minimum requirements for public reporting as defined by the 2004 JORC Code.

2.1 Beebyn

The Beebyn deposit is the eastern higher grade orebody, approximately 22 km NE of Madoonga. The complete width of the BIF has not always consistently altered to goethite-hematite mineralisation and in these regions BIF occurs as the footwall and hangingwall and also as internal waste zones. Where mineralisation does extend to the contact of the BIF, dolerite forms the boundary to the mineralisation. Chemically, the hangingwall contact at Beebyn is gradational, with Fe grades decreasing and Al_2O_3 grades increasing away from the mineralisation. The footwall contact is thought to be a sharp change from ore to waste. Typically, the dolerite adjacent to the BIF is weathered within a zone up to several metres wide but remains relatively hard. The Beebyn deposit contains millimetres to tens of centimetres wide high Al_2O_3 shale bands that cannot be mined selectively and hence must be mined with the ore. Most mineralisation is laminated but variations exist in the variability of laminae hardness and friability from the W9 lens in the east to the W11 lens in the west. The W7 and W8 lenses were not examined in detail in this study. Mineralisation is most variable at W9, which contains soft, highly broken goethite-hematite and laminated hematite-goethite with variable hardness between laminations. The W10 lens contains laminated hematite-goethite that has regions of limited and also significant variability of hardness between laminations. The W11 lens mostly contains hard, laminated hematite-(goethite). Additionally, the lenses contain minor randomly distributed zones of compact, hard materials that are goethitic at W9 and W10 and hematitic at W11.

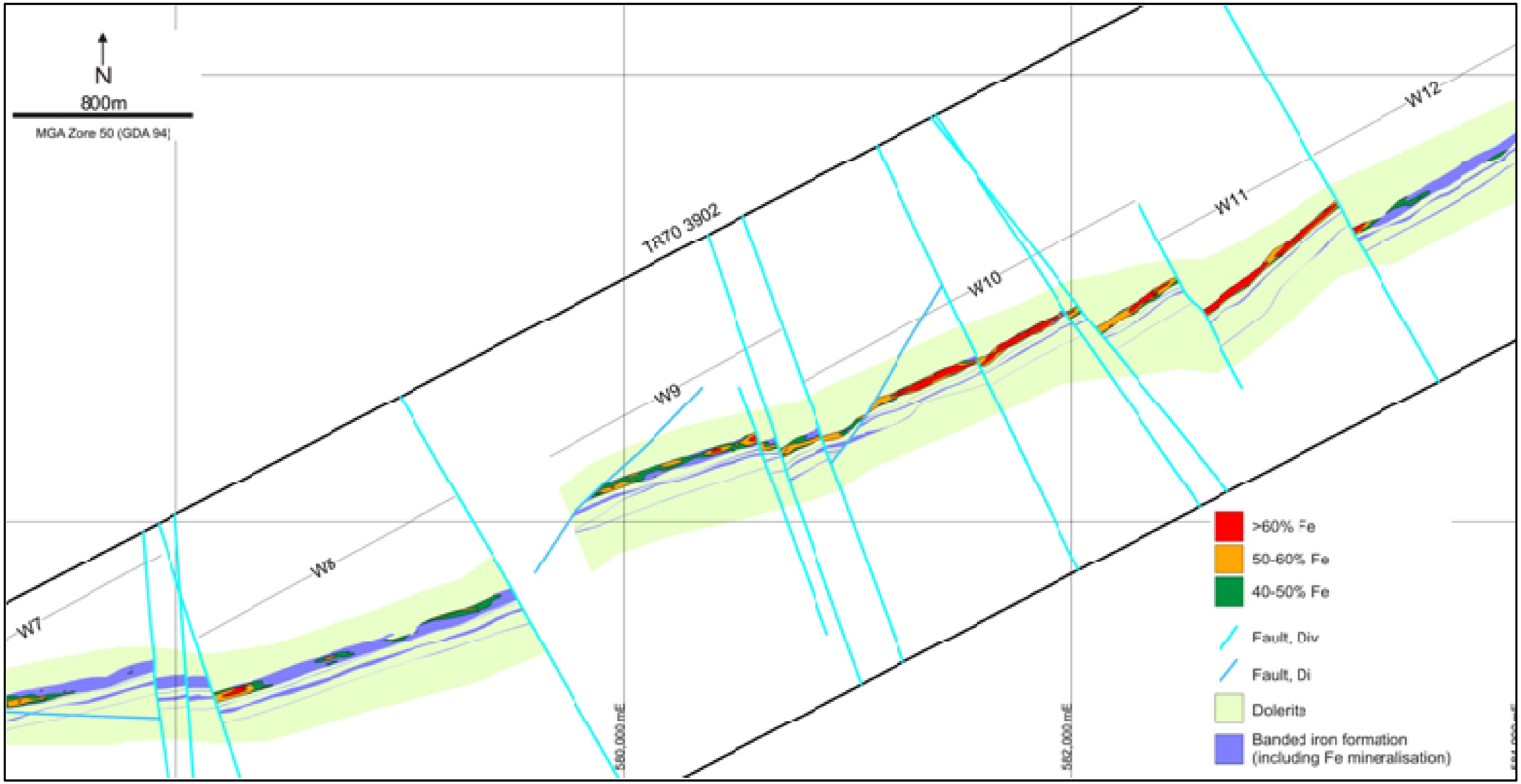


Figure 2-1: Beebyn lenses and BIF units

2.2 Madoonga

The Madoonga deposit is a larger and lower grade orebody. The mineralised zone at Madoonga contains a heterogeneous suite of materials within which there is a marked lateral and vertical variation in the continuity of hardness, friability, texture and porosity. Most mineralised materials are of moderate hardness and can be easily broken by hammer, although randomly scattered, massive goethitic materials occur. Internal waste zones contain both soft clays after dolerite and shale and harder less weathered equivalents. The hangingwall of the mineralised zone is mostly bounded by saprolitic clays after dolerite but at depth some areas have hard siliceous BIF. BIF forms the footwall to mineralisation except around the widest segment of the mineralised zone at the east, which has hard competent dolerite. The mineralised zone pinches out at depth into a number of discrete finger-like lenses of between 10 and 20 m thicknesses which are surrounded by hard siliceous BIF. This region remains poorly understood but may be somewhat gradational, reflecting a process whereby silica is removed and iron is enriched in the BIF. This may account for elevated silica occurring within some mineralised zones, particularly at depth. The Madoonga orebody also appears to contain high Al_2O_3 dolerites within mineralised zones. The mineralisation contacts at Madoonga offer relatively sharp changes in the grades of the deleterious elements of SiO_2, Al_2O_3 and TiO_2 either side of the mineralisation boundary. The very sharp changes in the grades of the deleterious species will have an impact on the diluted mining grades, thus careful consideration of the mining equipment and dilution and ore-loss parameters will be required.

2.3 Improvements in geological understanding since prior mineral resource model

The mineral resource model developed by SRK in July 2008 is an update of the previous November 2007 mineral resource model.

Improvements in geological understanding have occurred between the development of the two models, based on additional drilling and geological studies. The July 2008 updated mineral resource model differs from the previous model in several key aspects:

- The July 2008 mineral resource model was limited to data coded as W14 (Madoonga), and W7, W8, W9, W10, W11 and W12 (Beebyn), whereas the November 2007 mineral resource model included only W14, W9, W10 and W11.
- Unlike the earlier mineral resource model, the July 2008 mineral resource has been classified into mineral resource confidence classes. The mining study, however, considers all confidence classes, including 18.4 Mt of mineralisation that has not been classified.
- The July 2008 mineral resource model has increased the total tonnage significantly. Changes result from increased volumes associated with increases in the interpreted mineralisation, including W7 and W8, and significant increases in the density values used.
- Significant extensions along strike of the Madoonga deposits were included in the July 2008 model. Unfortunately these zones appear to be very high in silica grade.
- Further deep drilling at Madoonga has improved the grade estimate at depth at Madoonga, identifying high SiO_2 zones at depth.
- The average grade of silica in Beebyn is largely unchanged between models, but an increase of 2.3% SiO_2 is noted at Madoonga.
- The high alumina zone identified on the hangingwall of the Beebyn deposit has been domained and estimated separately from the low alumina domain. The high alumina domain has not been considered in the mining study. This has led to the Madoonga Al_2O_3 grades being largely unchanged, but the average Beebyn Al_2O_3 dropping 0.7%.
- Parallel BIF units have been domained and considered in the July 2008 mineral resource model. These were not considered directly in the mining study.

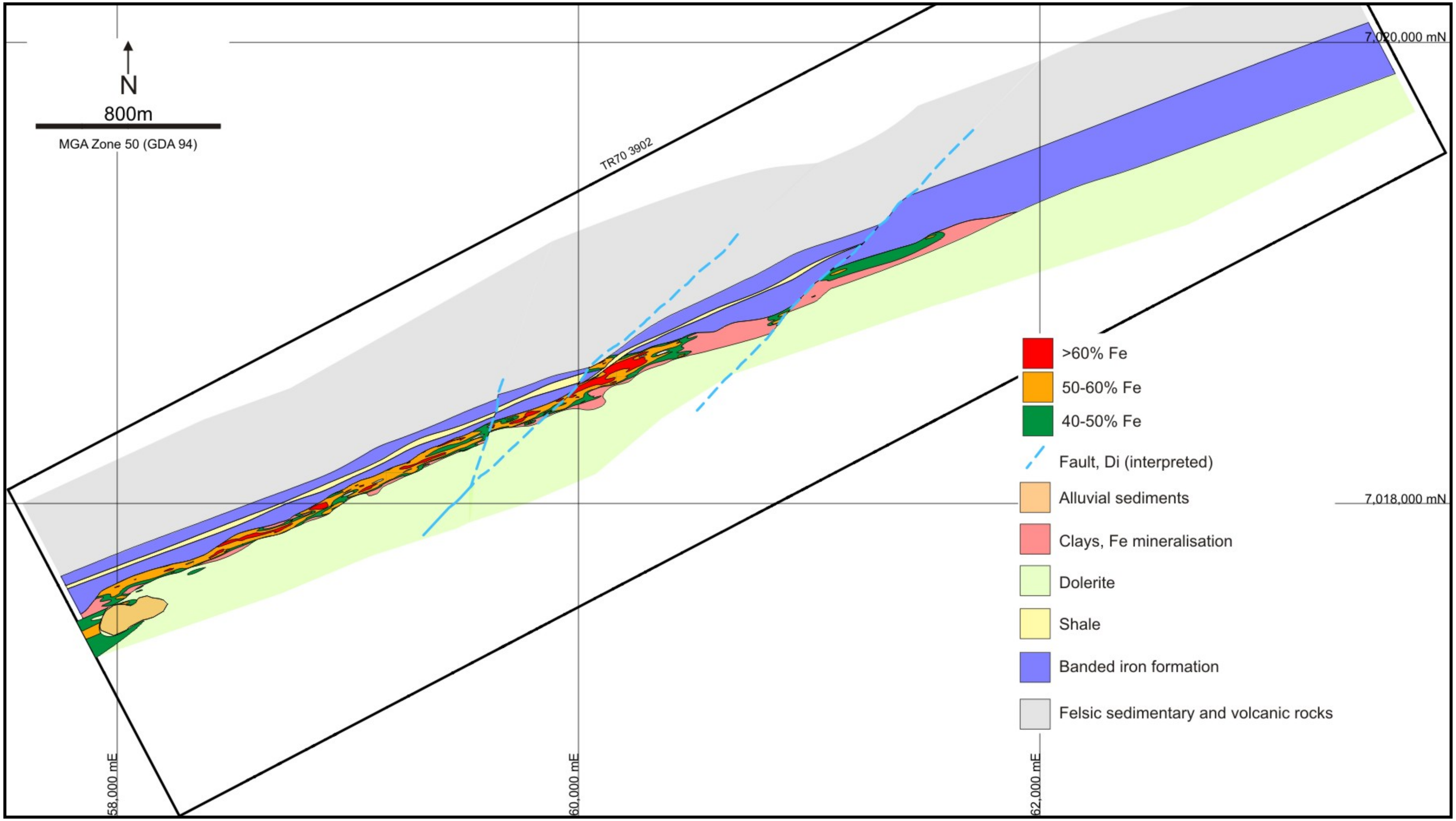


Figure 2-2: Madoonga lenses and BIF units

3 Mining

3.1 Introduction

The basis for the mining study is contract mining using conventional mining equipment for both Beebyn and Madoonga. However, SMM also commissioned SRK to carry out a Surface Miner Pre -Feasibility Study to evaluate the viability of using Surface Mining equipment at Weld Range. This study was stopped prior to completion at SMM request due to issues in obtaining permission to carry out site equipment trials preventing full evaluation of this mining method within the Pre-Feasibility Study timeframe. A summary of the work completed to date is in a separate document titled “Review of the Potential for Surface Mining for the Weld Range Iron Ore Project”. Surface Mining equipment has not been considered further in this study.

SMM approached HWE Mining Limit Pty (HWE) to submit a non-binding ‘tender’ style document (see Appendix 2) based on conventional mining equipment and SRK’s Preliminary Mining Study. HWE have supplied a schedule of rates and mining philosophy aligned to a bulk mining operation. Subsequent to HWE’s submission, additional study work has indicated that both Beebyn and Madoonga are expected to be more selective mining operations than originally envisaged. The outputs from HWE’s submission have been adjusted where appropriate to reflect the current understanding of the project. This output was then benchmarked against similar projects that SRK has worked on.

Figure 3-1 shows the general arrangement of Beebyn and Madoonga pit and waste dumps.

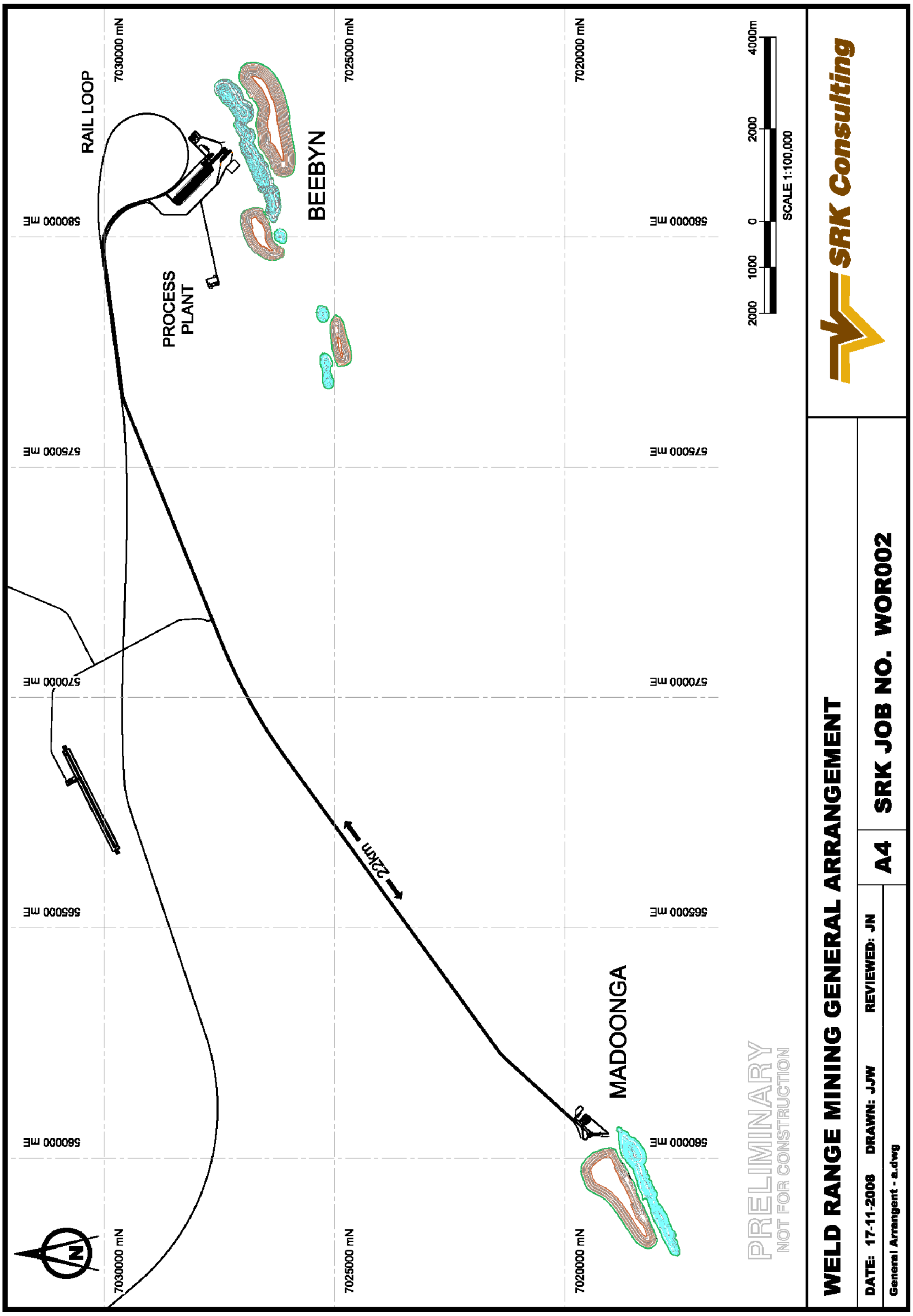


Figure 3-1: Beebyn and Madoonga general arrangement

A pre-stripping campaign is required at Beebyn to start removing the top 10 m of the ridges that are inside the pit designs. This will expose a 30 m-wide working surface for the production mining operation. SRK have assumed that a specialist pre-strip contractor will be required for this task, using a pre-strip mining fleet. The pre-strip operation will be initiated at Beebyn commencing approximately three months prior to the first ore being mined. The timing for the start of pre-strip at Madoonga is expected to commence simultaneously with the Beebyn pre-strip.

The Madoonga ore outcrops down-slope from the crest of the Madoonga ridge. The top of the Madoonga ridge is relatively wide and flat, enabling rapid development. SRK therefore assume that specialised pre-strip requirements at Madoonga will be minimal and that the main mining fleet can be used for the initial waste removal.

The primary mining contractor is expected to mobilise and commence mining after the pre-strip contractor has commenced. The primary mining contractor is expected to utilise 250 t class excavators and 140 t class trucks to mine both ore and waste. The contractor will supply, manage, operate and maintain all equipment require to drill, blast, load, haul and dump the ore and waste as directed by SMM.

3.2 Ore mining

Before ore production at Madoonga can start, the 22 km of haul road between Beebyn and Madoonga, the Madoonga crusher and support infrastructure will need to be constructed and commissioned.

The ore and surrounding waste at both Beebyn and Madoonga needs to be mined using selective mining techniques. The ore/waste boundary in both deposits is relatively irregular but more so at Madoonga. A small amount of dilution has been demonstrated to increase Al_2O_3 and SiO_2 to levels higher than the product specifications and therefore an ore-loss is the preferred option (refer to Section 5.3 and 5.4 for a more detailed explanation of dilution and ore-loss).

When blasting the orebody, a buffer of waste will also be blasted using the same blast specifications as that utilised on the ore. Ore blasting techniques should result in minimal and uniform ground movement along the ore/waste contact. Alternatively, the waste material can be blasted and excavated prior to blasting the ore. Both blasting methods may need to be utilised depending on how irregular the ore/waste contact is.

Both HWE and SRK propose that ore will be mined using 250 t class hydraulic excavators. This class of machine offers a good compromise between productivity and selectivity. Utilising the same class of excavator for waste mining also ensures maximum opportunity with present and future blending requirements.

The grades in both deposits vary along strike and down dip. The utilisation of multiple ore mining units from both deposits will be required.

Blending was scheduled on an annual basis. When in production, the project will need to blend to a market specification over a considerably shorter period. Having multiple ore excavation units will help the project to meet this requirement.

The appropriate flitch height for productive operation of the 250 t class excavator, while maintaining a focus on extracting the orebody cleanly, is in the order of 3.5 to 4.5 m depending on material type. The excavator has a maximum reach below its tracks of approximately 8 m but productivity is substantially reduced at depths greater than 5 m.

The minimum mining width for the excavator to work productively is approximately 20 m The excavator can operate at reduced productivity rates within 20 m when retreat mining the bench of ore at the base of the pits.

3.3 Waste mining

As the waste volume significantly exceeds the ore volume, it is important to recognise that the mining operation may need to be optimised for the operating cost of the waste mining fleet over that of the ore mining fleet. There is a direct correlation to larger mining equipment and lower operating costs. In determining how large the equipment can be in a specific mining operation, a number of considerations and compromises are assessed:

- impact on dilution and ore-loss,
- minimum working bench widths,
- bench heights,
- effective life of the machine utilised,
- capital cost of the machine utilised,
- equipment interaction within the mining cycle, and
- standardising equipment for training and maintenance considerations.

Using the 250 t class excavator, the waste should be removed in 4 to 5 m benches. The 10 m blasted benches should be split into three flitches, depending on the degree of blast heave encountered in practice.

Prior study work had indicated that the waste areas were amenable to bulk mining systems. This decision was based predominantly on the volume of waste reported. The current assessment of the area available to operate large mining equipment indicates that the use of a bulk mining unit is very limited and unlikely to be cost effective. Compared with the Preliminary Mining Study production schedule utilised by HWE, the volume of waste suitable for a larger bulk waste mining operation has been significantly reduced at both Beebyn and Madoonga in the new pit designs. This has predominantly been driven by higher SiO_2 levels reducing the size of the operation and a need to maintain a buffer of waste on the footwall and hangingwall of the orebody. This waste buffer will need to be mined using selective mining techniques and will be approximately three to four rows of blast holes or 15 to 20 m wide. The waste buffer results in approximately 110 Mt of waste being drilled, blasted and mined utilising the same techniques as that used for the ore.

3.4 Bulk waste

Bulk waste mining has been defined as any area with a bench height greater than 5 metres and a bench width greater than 60 metres. There is approximately 30 Mt at Beebyn and 20 Mt at Madoonga that meet this requirement. At Beebyn, benches between the 492 m RL and 516 m RL may contain suitable areas to utilise larger bulk mining equipment. Figure 3-2 indicates where the bulk waste is located with respect to the main BIF unit. At Madoonga (Figure 3-3), there is a similar situation between the 504 m RL and 516 m RL.

The production schedule is likely to require the potential bulk mining areas be mined simultaneously. If a 350 t class excavator is used at each deposit, there is approximately one year's worth of production for each machine. Given that the life of a large excavator is seven to ten years, alternative work would need to be found for this machine to justify the additional capital expenditure and costs to bring the excavator and associated trucks to site.

Both Beebyn and Madoonga deposits have additional BIF units (not shown in the figures) on the hangingwall that (after further investigation) may prove to be viable ore units. The inclusion of these BIF units would likely remove the majority of the identified areas as being suitable for bulk mining.

Currently, 50 Mt of bulk material is not adequate to utilise a large bulk mining fleet given the present understanding of the Beebyn and Madoonga orebodies, and the orebodies potentially available that may constitute the 15 year life of mine. If significant volumes of bulk waste are identified in the new deposits found by current exploration, equipment larger than the 250 t class machine should be reconsidered.

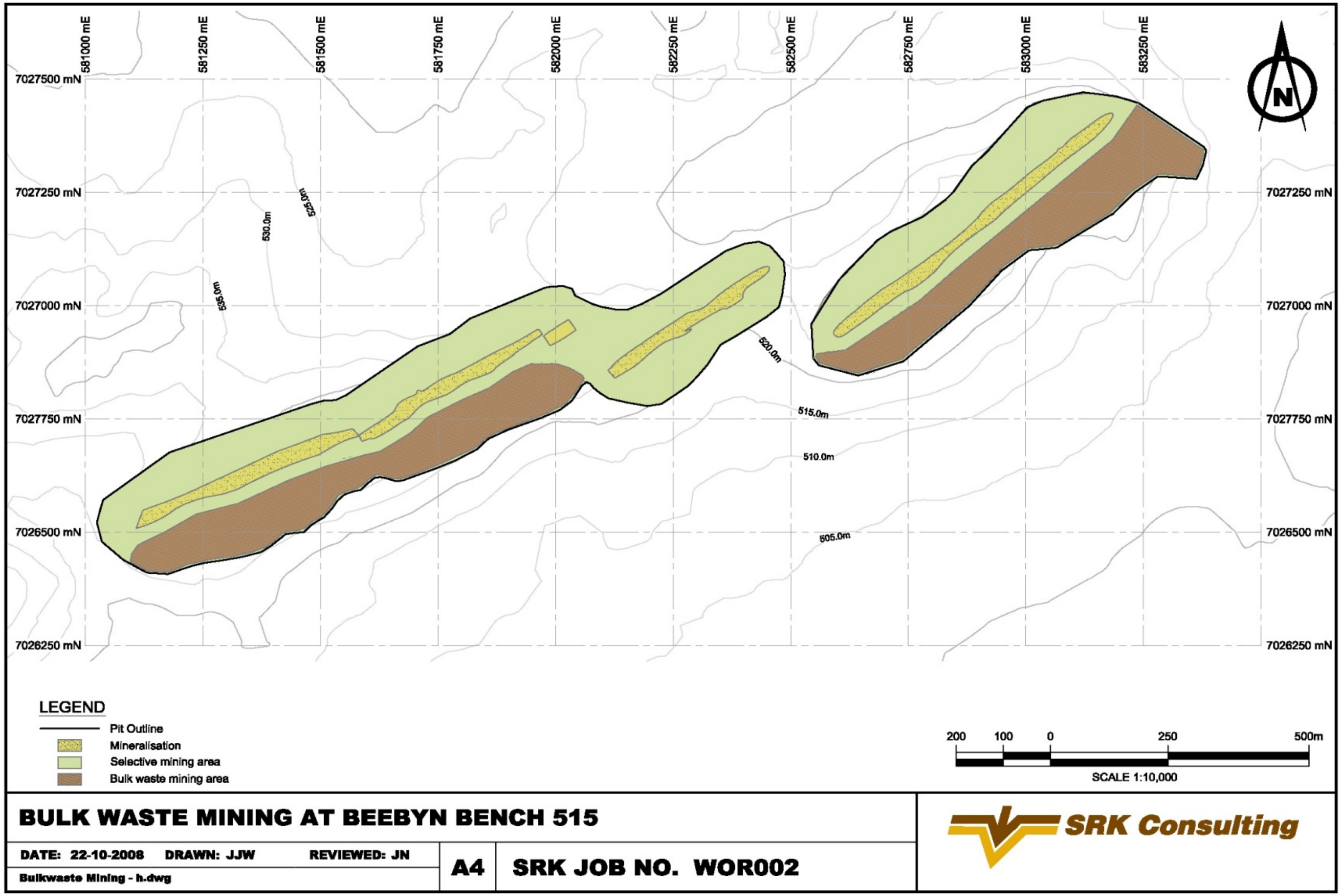


Figure 3-2: Bulk waste zone at Beebyn

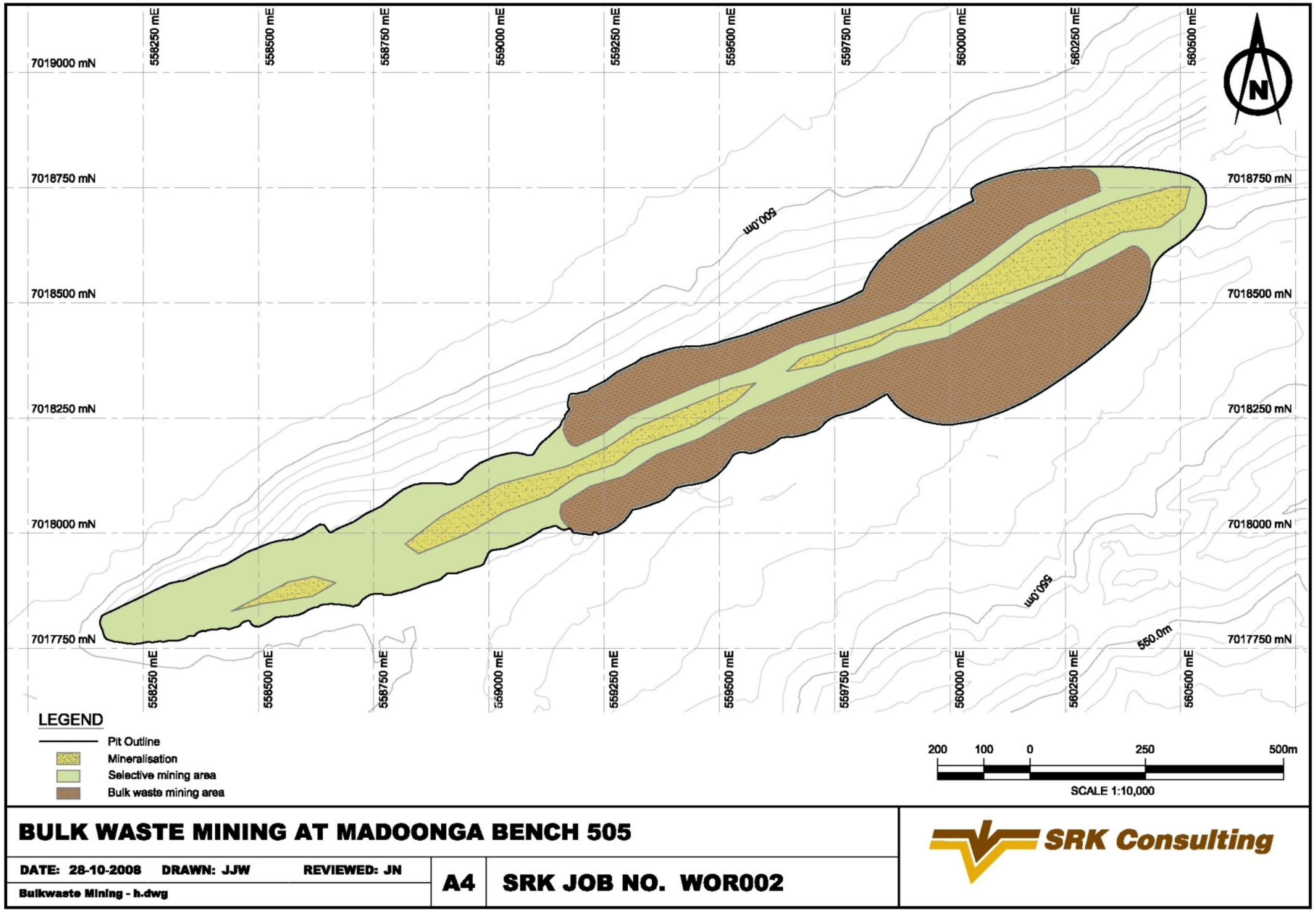


Figure 3-3: Bulk waste zone at Madoonga

3.5 Pre-stripping

The definition for pre-strip, from a mining perspective, is “any material that must be mined to expose a suitable amount of ore to meet specified ore production capacity and quality”.

The target for the pre-strip operation will be to remove the top of the ridges to expose a minimum of a 30 m wide bench (perpendicular to the strike of the orebody) to enable the main mining fleet to operate effectively using conventional open pit mining methods.

The mobilisation date of the pre-strip mining fleet will be dictated by scheduling grade constraints and the volume of ore required to maintain process plant operations from pre-commissioning through to maintaining 15 Mtpa of feed once nameplate commissioning is completed.

A dedicated pre-strip mining fleet of smaller ‘pioneering’ equipment will need to be used. It is likely that conventional mining equipment such as a 120 t excavator and 50 t class off road trucks would be required for the load and haul portion of the pre-stripping operation. Also required will be Caterpillar D10 size dozers and small track-mounted drill rigs suitable to negotiate rough terrain and start drill and blast operation on the crest of the ridge.

3.5.1 Beebyn

The Beebyn orebody outcrops at the centre of the ridge. The pre-stripping method selected will dilute this material to the extent that it will be classed as waste. Based on the supplied topography, this will sterilise approximately 273 kt of potential ore grade material. It should be noted that the top of the ridge is likely to be high in silica and would be reclassed as waste independent of the pre-stripping activity.

Pre-stripping will initially be done by bulldozer creating access to the top of the ridges and pushing off any topsoil. After drill and blast, the bulldozer will push off the top 5 m of the blasted ridges to develop access for the 120 t class excavator and off road trucks. The pushed material will have to be rehandled at a later date and may contain a high proportion of oversize material that will require secondary breaking techniques such as a rock breaker or drill and blast. The 120 t class excavator will load the trucks utilising conventional bottom loading methods using a 2 to 2.5 m high face until a 30 m wide bench is achieved. At this point, approximately ten vertical metres of the ridge height will have been removed, exposing the orebody and completing the pre-stripping phase of mining at Beebyn.

From a visual inspection, the top 5 m of the Beebyn ridge in many locations is near vertical. This level of detail is not present in the electronic topographic file supplied to SRK for the PFS. The implication of the lower level of detail is that the calculated volumes in the pre-strip may not be as presented, and the time taken to access the ridges could be impacted. A more detailed topography should be utilised in future studies. Alternatively, a manual pickup of the ridge would be sufficient.

3.5.2 Madoonga

At Madoonga, the ridges are not as prominent and the orebody is on the southern flank. Pre-stripping will predominantly involve the removal of the footwall waste higher than the outcropping orebody.

It is anticipated that access to the Madoonga ridges will initially be from the SE face of the ridges as the slopes are shallower. Once the clearing and grubbing has been completed, material from the first bench of pre-strip will be used to establish permanent ramps and access on the NW faces of the ridges. This will minimise the haul distances to the project infrastructure and main waste dump.

Most of the pre-strip mining fleet could be the same-sized equipment as that used for the main mining operation. As the orebody at Madoonga mostly outcrops on the SE slope, there is approximately 10 m of waste that has to be removed before the orebody is exposed.

The amount of waste material classed as pre-strip at Madoonga is approximately 4.99 Mt. Most of this material is relatively easy to access and may be mined by the main mining fleet at costs reflected in the surface levels of the optimisation mining costs.

There may be a need for the pioneering pre-strip fleet at the east end of Madoonga where the ridges are steeper. However, this is a minor volume (approximately 45 kt) and will therefore not have a material impact on the pre-stripping at Madoonga. Once the pre-stripping fleet finishes preparing the Beebyn ridges, a decision to mobilise to Madoonga can be made.

Table 3-1: Pre-strip Volumes

Location	Mineralised volume (kt)	Waste volume (kt)	Total volume (kt)
Beebyn (small equipment)	0	801	**801**
Madoonga (main mining fleet)	59	4,929	**4,988**
Madoonga (small equipment)	0	45	**45**
Total pre-strip volume	**59**	**5,775**	**5,834**

3.5.3 Clearing and grubbing

There is minimal topsoil available in the ridge area of Beebyn. Most of the material cleared from this area will be scrub. The topsoil on the slopes below the vertical ridge will be easier to remove and pushed down the slopes. It is expected that topsoil and scrub will be mixed together. The final location of this material has not yet been defined, but as a minimum standard it will be progressively pushed outside the pit limit.

It is expected that more topsoil will be recovered at Madoonga because of the shallower slopes. The pre-stripping phase will require the use of Caterpillar D10 size bulldozers pushing the top soil and scrub into windrows down slope. This material can either be picked up and trucked to a top soil stockpile area, if the operating conditions for a Front End Loader (FEL) are suitable, or pushed further down slope by bulldozer.

3.5.4 Timing

The smaller pioneering pre-strip fleet will mobilise to Beebyn, establish a base of operations and start pre-stripping Beebyn. At the same time, mobilisation of a portion of the main mining fleet should initiate at Madoonga to begin pre-strip operations as both deposits will need to be mined simultaneously to control SiO_2 and Al_2O_3 grades in the RoM ore.

It is estimated that it will take four weeks for a contractor to mobilise to site and set up the base of operations at Beebyn. The initial task will be to establish access to the top of the individual ridges at Beebyn. There will be additional project logistical issues to access the ore at Madoonga.

The top of the ridges will be difficult to access and will require extensive ripping and pushing to establish access to the top. Eight weeks has been envisaged to complete the clearing and grubbing operation. Within two weeks of starting the grubbing and clearing operation, the first ridge will have been drilled and blasted, ready for pushing off. Once the 30 m wide working area is established the main mining fleet will have enough working bench width to operate and the 120 t class excavator will move to the next ridge. It will take approximately 14 weeks to create the 30 m wide benches on all the ridges at Beebyn. Ore mining can commence with the main mining fleet no later than 12 weeks after the first blast, but there may be opportunity to produce ore earlier.

The timing from the start of pre-strip to initial ore production at both Madoonga and Beebyn is approximately 14 weeks.

At this stage of the study, the ramp-up philosophy is that full plant capacity (15 Mtpa) must be achieved in 12 months. The pre-stripping operation will need to start 14 weeks prior to the start of the 12 month ramp-up period.

The key targets dates are:

- January 2011 – Mobilise pre-strip fleet to site
- May 2011 – Start ore production from both Beebyn and Madoonga
- October 2011 – Wet commissioning of the process plant starts
- January 2012 – Process plant at full capacity
- May 2012 – Mining at full capacity

Table 3-2 depicts the relationship between pre-strip, production ramp-up to full capacity, the commissioning of the process plant, and stockpile capacity in front of the process plant.

Table 3-2 : Pre-strip and production ramp-up timeline

Year	**2011**	**2011**	**2011**	**2011**	**2011**	**2011**	**2011**	**2011**	**2011**	**2011**	**2011**	**2011**	**2012**	**2012**	**2012**	**2012**	**2012**	**2012**
End of Month	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**	**Jul**	**Aug**	**Sep**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**	**Apr**	**May**	**Jun**
Mining period	Year -1				Year 0												Year 1	
Pre-strip	Pre-stripping																	
Ore production ramp-up					Ore production ramp-up													
Mine production rate (Mt)					0.10	0.13	0.16	0.21	0.26	0.32	0.41	0.51	0.64	0.80	1.00	1.25	1.25	1.25
Mining at full production																	Full mining	
Processing plant ramp-up										Plant wet commissioning								
Processing plant at full production													Plant at full production					
Instantaneous plant feed rate (Mt)										0.10	0.20	0.33	1.25	1.25	1.25	1.25	1.25	1.25
Net ore tonnes on stockpile (Mt)					0.10	0.24	0.40	0.61	0.86	1.09	1.29	1.48	0.86	0.41	0.16	0.17	0.17	0.17

3.6 Equipment selection

Traditionally, iron ore mining operations have used large, low operating cost mining equipment. However, attempting to mine selectively with large bulk mining equipment will elevate the unit operating costs through lower productivity and potentially reduce the ore quality and quantity. A compromise is required between operating costs and the required mining selectivity.

While economies of scale should be adopted whenever possible, the Beebyn and Madoonga deposits have limited volumes available to sustain large bulk mining equipment at optimum performance for an extended period. The 250 t class excavators and 140 t class trucks are mid-sized mining units and have been selected for both ore and waste mining. The 250 t class excavator will be suitable to selectively mine to a marked-up contact within a metre of accuracy while maintaining good production rates. This size machine has been used extensively in mining operations around Australia and has well proven technology and performance. The 140 t class truck was assessed and recommended in the Hatch Weld Range Scoping Study (9 March 2007) and SRK Preliminary Mining Study.

While this study does not promote any particular equipment manufacturer, examples of 140 t class trucks are Caterpillar 785D, Hitachi EH3000 or the Komatsu HD1500-7. These are the same sized trucks selected in the Preliminary Mining Study. For this study there is no preference between electric drive or mechanical drive trucks. Examples of 250 t class excavators are the Hitachi EX2500-6 and Komatsu PC3000. Both excavators quote 27 t bucket capacity (approx. 11 loose cubic metres (LCM)).

The Madoonga and Beebyn orebodies are typically in the order of 30 m wide. While a single, large digging machine may be able to satisfy the project ore production rates, it is unlikely that this sized machine can be used effectively to control dilution and ore-loss, as the geometry of the contact of the orebody with the footwall and hangingwall waste is complex.

The Weld Range deposits are difficult orebodies to blend. It is an advantage to have more active ore faces to blend from in this situation. As such, additional smaller capacity excavators would be preferred to less, larger capacity units. It is also important to match the face advance capacity of the ore and waste mining fleets, otherwise the mining operation can become waste (or ore) bound.

Having a single excavator and truck size allows units to move between ore and waste mining duties as required, ensuring ore blending opportunities are maximised. An additional benefit of standardising the production fleet is that there is a reduction in the amount of training time required by operators and maintenance personnel and a reduction in the capital allocated to on-site holding stock of spare parts.

The impact of utilising the smaller equipment is:

- the productivity is lower than that of larger equipment. This will result in the need for more personnel and more units of equipment to meet RoM production requirements,
- the unit mining cost per tonne of material is likely to be elevated compared with that for larger equipment,
- bulk mining areas may be mined sub-optimally,
- lower risk of ore-loss and dilution as the machines are more suited to selective mining,
- smaller equipment can work effectively in smaller areas, and
- ancillary equipment costs are higher to support additional digging locations.

Based on limited material type information, the 250 t excavator production rate could range between 1700 and 2400 tph. SRK has assumed 2000 tph as an average instantaneous production rate based on the parameters in Table 3-3, taking into consideration the lower productivity when selective mining near the ore/waste boundary. The 250 t excavator is fitted with an 11 m^3 (27 t) bucket and will load the 140 t class truck in five to six passes. The productivity of an excavator is affected primarily by the bucket capacity, material type and the swing time for each load. Larger equipment typically has a slower swing time but the additional bucket capacity compensates to give a higher productivity.

Table 3-3: 250 t excavator operational parameters

Activity	Time (seconds)
Spot time (or first bucket)	20
Ore bucket cycle time	40
Waste bucket cycle time	35
Bucket fill factor	0.9

Owing to the distance between the two deposits, the Beebyn and Madoonga mining operations will need to be operated essentially as two independent operations. The duplicate infrastructure at Madoonga will be suitable to address day-to-day issues, but the major maintenance and core management will be based at Beebyn. A large low-bed (300 t payload) capable of carrying equipment to the top of the pits from the main workshop or between pits is also required.

3.7 Drill and blast

Drilling will be performed by a sub-contractor under the main mining contractor. Blasting will be performed by the main mining contractor.

The drill and blast philosophy has been dictated largely by the need to control ore-loss and dilution.

The approach to minimise ore-loss is to blast the bulk waste independent of the ore zones on 5 or 10 m benches (10 m whenever possible), and then blast the ore (and buffer waste material) on 5 m benches. With blast heave, the bulk waste may result in 12 to 13 m total height. The 5 m ore blasts have an expected heave of no more than 2 m.

There will be a significant portion of waste included in the 5 m ore blasts as this material is acting as a buffer to the 10 m ‘bulk’ waste blasts and ensures the ore/waste boundary disturbance is kept to a minimum. Techniques to monitor the movement of the ore/waste boundary when blasting should be utilised.

Drill and blast costs have been supplied by HWE based on the production schedule from SRK’s Preliminary Mining Study. HWE have made the assumption that large bulk mining equipment is applicable to the waste portion of the two deposits. The drill and blast costs have not been developed from specific test work on the Beebyn and/or Madoonga rock properties. The information required to perform detailed drill and blast analysis was not available at the time this study was carried out.

Average drill penetration rates have been used. Changes to the penetration rate and drill consumable cost should be expected once the test work and drill and blast optimisation study work is completed. Small changes should then be expected once production starts.

Approximately 15% of the total material to be blasted requires 'wet' blasting explosives. The current dewatering plan is based on the maximum vertical rate of advance of 80 m vertical per year identified in the Preliminary Mining Study. Taking into consideration rain events and the possibility of localised perched water tables, the 15% assumption appears suitable for this study.

Assumptions used for developing the cost estimates are:

- drill and blast will be contractor based activities,
- most of the material to be drilled and blasted will be dry,
- the bulk explosive will be Ammonium Nitrate Fuel Oil (ANFO) and Emulsion,
- drill rigs capable of drilling the benches for the selected bench heights in a single pass will be sourced and used, and
- Weld Range drill and blast conditions will not deviate significantly from similar operations in WA.

There will need to be two main production drill rig types on site. To mitigate blast induced ore dilution, smaller hole diameters will be utilised in the ore (and surrounding waste) on 5 m benches. In the waste areas on both the hangingwall and footwall, there is opportunity to drill and blast on 10 m benches. Larger hole diameters and single pass drilling would be optimal in these waste areas. Blasting is likely to be required daily at each deposit to ensure enough ore and waste is presented to the mining fleet.

Sampling directly from the blast hole drill rigs is possible but has the potential to reduce the productivity of the drill rig. Blast hole sampling is normally manned by the client (SMM) and has not been considered in this costing or manning.

3.8 Ancillary equipment

The ancillary fleet provides support to the main contractor mining fleet. The mining contractor will own and operate the ancillary fleet. The costs for the ancillary fleet have been included in the base mining cost utilised in the pit optimisation process.

The ancillary fleet selection has been based predominantly on the number of excavators and trucks, the dimensions of the pits and the distance between Beebyn and Madoonga making it cost ineffective to continually transport ancillary equipment between the two sites. Although some consideration has been given to potential site conditions, more information is required before final selection of the ancillary equipment can be made. This includes rock mass properties, groundwater, road conditions, and location of infrastructure.

The maintenance of the haul road and light vehicle road between Beebyn and Madoonga has not been considered in the mining costs, labour or equipment list. It should be considered that the maintenance of an unsealed road will be a full time job for a large grader (Cat 24 M size) and water cart. The location of stand pipes along the road may be required to prevent the water cart from having to return to the mine sites to re-fill.

It has been assumed that the wheel dozers and graders will undertake most of the cleanup and provide support to the excavators. The track dozers will be used for clearing, site preparation, pit floor level control and tip-head maintenance on the waste dumps and stockpiles.

Other equipment required will be service trucks fitted with fuel, lubrication and maintenance facilities for in-pit servicing of equipment, particularly excavators. Diesel powered lighting plants will be provided at the working faces, drill and active dump locations. Water carts with a 50,000 litre capacity will also be used for dust control.

Cranes, forklifts and Hiabs (flat-bed truck mounted crain) will be used in service and support roles around workshop, maintenance and dewatering activities.

3.9 Mining facilities

Whilst outside SRK's scope of work, SRK suggest that each mining area requires:

- Offices, ablutions and crib room,
- heavy and light vehicle refuelling,
- communications,
- power and other services,
- workshops for heavy vehicles,
- wash-down facilities for heavy vehicles, and
- heavy vehicle tyre changing facility.

Facilities that may be shared between sites, located at Beebyn, include:

- first aid room,
- boiler-making workshop facility,
- a warehouse and storage area;
- separate wash-down facilities for light and heavy vehicles, and
- vehicle battery storage and charging shed.

The provision and maintenance of explosives magazines and storage facilities can be built into the Explosives Supply Agreement if desired. Similarly, the provision and maintenance of the Fuel Farms (including oil storage) can be built into a Fuel Supply Agreement.

Cost associated with the construction and maintenance of these facilities has not been included in the mining costs.

3.10 RoM locations

The RoM locations for Beebyn and Madoonga determined in the Preliminary Mining Study have not been revised and are based on a compromise between infrastructure requirements and operating cost minimisation.

The Beebyn RoM position was located with the following considerations in mind:

- clear of the 500 m blast exclusion zone,
- near the centre of mass of the proposed main Beebyn mining area, and
- on the north side of the mining area.

The Madoonga RoM position was located to be:

- upwind and clear of the northern Madoonga waste dumps,
- on the northeast side of the deposit, towards Beebyn, and
- outside the 1 in 100 year flooding limits.

The Madoonga RoM location was complicated by the 1 in 100 year flooding limits and the prevalent shoulder country. A preference was indicated by WP for placing the overland road train access on flat ground above the flood limits.

Ideally, the location of the RoM pads should be optimised on the pit ore haulage and surface ore haulage costs, with limited consideration given to proximity to blasting activity.

If the RoM pad is within the blasting clearance limit, personnel and mobile equipment are normally moved to a safe distance. All blasts must be designed to minimise fly rock, blast induced dilution, pit wall damage and minimise ore-loss.

Typically, blasting windows will coincide with in-shift breaks, crib or end of shift, so that the impact of any loss in crushing time can be mitigated.

3.11 Pit dewatering

Groundwater dewatering has been designed outside the pit limits. To maintain dry drilling, blasting and digging conditions, it is anticipated that the water table will need to be a minimum of 12 m below the bench immediately prior to commencement of blast hole drilling.

Surface water will be diverted around the perimeter of the pits by a series of diversion drains designed by WP. Rain water falling inside the diversion drains is assumed to report to the in-pit sumps. Self-contained skid-mounted diesel pumps will be used to service these sumps. Stand pipes at the sumps will be used to refill the water carts.

Allowance in the mining unit rates to account for the installation, operation and maintenance of a pit dewatering system have been made. While HWE's costs are not itemised, these costs are assumed to be adequate to address the surface water issues less than a 1 in 5 year storm event.

Storm events greater than the 1 in 5 year event will be addressed utilising the same pumping systems but the lower bench of each pit may have to be abandoned until the water can be pumped out.

3.12 Acid drainage and metal leaching

Early indications point to the presence of some potential acid forming materials. Further technical studies are progressing which will expand the knowledge base and assist in determining possible mitigation requirements.

Acid drainage or metal leaching has not been considered as a driver for mining costs, mining method or schedules developed in this study.

3.13 Opportunities and issues moving forward

3.13.1 Scheduling periods

The scheduling period is currently one year (without stockpiles) in which time a blended product at market specification is required. In practice the period would be much shorter (possibly monthly) which will place significant pressure on mining operations if stockpiles are not considered. A monthly blended product to market specifications is not currently possible without the use of stockpiles.

3.13.2 Ore/waste contact

The contact boundary shape between ore and waste differs considerably between Beebyn and Madoonga. Beebyn appears to have a relatively consistent footwall and hangingwall contact whereas both the hangingwall and footwall at Madoonga are complex shapes, folding back on them selves resulting in relatively narrow veins of ore that will incur a high degree of ore-loss or dilution when blasted.

More work is required to better define the nature of the footwall and hangingwall contact of those BIF units that are considered as potentially minable.

3.13.3 Pre-strip opportunity

The contractor used for the pre-stripping operation may be the same contractor as that utilised for the main mining operation. The advantage of using the same contractor for both jobs is that the mobilisation costs will be lower as there is some synergy between equipment and infrastructure. The disadvantage is that the equipment is normally smaller and the skills of the operators differ between production mining and the pioneering work.

3.13.4 Bulk mining opportunity

The hangingwall presents an opportunity to utilise larger bulk mining equipment. Under current conditions the extent of the opportunity is very limited. However, with the addition of new SMM deposits in the area to bring the life of mine up to 15 years, there may be areas suitable to maintain a bulk mining fleet for an extended period.

3.13.5 Accuracy of topography

The accuracy of the topography used for the coding of the mineral resource model, pit optimisation and pit design should be improved. Currently the ridge definition is poor. This can impact negatively on drainage, volumes and planning.

3.13.6 Pre-stripping

It may be preferable to hold discussions with the main mining contractor on their ability to complete the pre-stripping for the majority of Madoonga. The smaller pioneering pre-strip equipment will still be required for the ridge section in the east of Madoonga.

HWE have included pre-stripping, clearing and grubbing in the mining cost supplied. However, it would appear that the higher cost of accessing and pre-stripping the ridges has not been accounted for and a typical cost was used. The cost supplied is suitable for most of the Madoonga area.

3.13.7 Labour requirements

Attracting, training and retaining key personnel has been a difficult task for the mining industry in the last decade. This should be addressed prior to the mobilisation of the pre-strip fleet.

3.13.8 Drill and blast optimisation

Drill and blast optimisation based on the specific conditions at Weld Range is still required. This process should reduce both the drill and blast costs and optimise the lump portion of the ore.

3.13.9 Excavator productivity considerations

Considerations of material type, geology, drill and blast, digging orientation and equipment selection will affect productivity. For this study it has been assumed that conditions will be favourable for achieving industry average production rates for the 250 t excavator in both ore and waste. If digging conditions are considered poor, drill and blast parameters can be altered to improve the production rate of the excavator.

A study on the excavator productivity in the ore and waste should form part of the BFS.

3.13.10 Haul road conditions

There has been limited information available to assess the material types from a haul road construction and maintenance perspective. From a general assessment of material types currently identified, the floor conditions on the footwall will generally be hard and suitable for haul routes with minimal construction. Floor conditions within the orebody may be variable, with some areas likely to be softer. Sheeting utilised will need to be used sparingly if it is of poor ‘ore’ quality as dilution of the orebody is not advisable. Low-grade ore should be used whenever possible. The floor in the hangingwall is generally softer than in other areas and will need a higher level of maintenance and sheeting.

3.13.11 Backfilling pits

Waste materials removed from open pit mining operations are typically hauled to external waste dumps adjacent to the pit. Backfilling represents an alternative solution to managing waste disposal by utilising the waste material mined in adjacent pits to fill the void in pits that have reached their final limits. From an environmental perspective, the implementation of backfilling could result in a smaller external waste dumps potentially resulting in less disturbance of the surrounding area.

4 Mine Operating Cost Estimation

4.1 Introduction

Mining costs were developed by SRK, supported by a submission from HWE (Appendix 2). The HWE submission was reviewed by SRK with adjustments made as required to meet the current conditions. The costs developed for the pit optimisation process include allowances for:

- financing and depreciation costs for all mining and ancillary equipment provided by the contractor,
- varying mining costs varied by mining bench,
- drilling and blasting operations,
- pit dewatering,
- contractor overheads (site management and administration),
- Fly-in fly-out (FIFO) costs,
- grade control,
- rehabilitation,
- ore haulage from Madoonga to Beebyn,
- royalties,
- owner mining supervision and tech services,
- rail transport charge,
- external bore field dewatering cost,
- port charge,
- site processing cost, and
- a profit margin for the mining contractor.

Since HWE's submission, the understanding of the project has evolved, altering earlier assumptions. One of the most significant changes to the HWE proposal was the use of 250 t class excavators for waste mining instead of the 650 t class machines. The net effect of these changes was estimated by SRK to be that an additional $0.30 per tonne was required to be added to the cost of mining waste. The resultant waste mining cost is in line with benchmarking from other projects recently worked on by SRK. As HWE used 250 t class excavators for ore mining, there was no adjustment to the base ore mining cost supplied. These parameters are suitable for use in the PFS.

SRK has not considered the mining contractor costs of mobilisation/demobilisation ($19M) and establishment ($31M) as operating costs and these have therefore not been considered in the pit optimisation.

4.2 Pre-stripping

SRK has defined 5.8 Mt of pre-strip material in Beebyn and Madoonga. At Beebyn, 0.8 Mt will be mined by a dedicated pre-stripping mining fleet and the remaining 5 Mt in Madoonga is predominately mined by the main mining fleet. However, it should be noted that the accuracy of the topographic file used to define the pre-strip volume is not suitable for this level of detail and could vary considerably.

The cost of the pre-stripping operation is defined in Table 4-1 an have been included as a mine operating cost. The $18.5M includes the pre-strip contractor mobilisation and demobilisation, establishment costs, management and operational costs. The cost does not include services such as FIFO, accommodation and meals. The pre-strip operational costs have been split between the high cost Beebyn ridge pre-stripping and the easier pre-stripping at Madoonga.

The mining cost includes an elevated mining cost for the surface benches to account for clearing, grubbing and standard difficulties in initiating mining activity. The mining costs do not reflect the higher cost of accessing and mining the ridges at Beebyn and Madoonga though. The cost of accessing and removing the Beebyn ridge pre-strip material has been estimated by SRK at $36/BCM.

The pre-strip cost is relatively high, as it will be:

- a slow mining process,
- likely based on a day-works contract, and
- the influence of the mobilisation and demobilisation cost is a high contributor to the unit rates.

Further negotiations with a pre-strip contractor are required to define the costs and timeframe to complete this task. The equipment configuration may also change following discussions with a suitable contractor.

Table 4-1: Pre-strip cost

Location	Mineralised volume (kt)	Waste volume (kt)	Total volume (kt)	Total cost ($M)
Beebyn (small equipment)	0	801	801	9.6
Madoonga (main mining fleet)	59	4,929	4,988	8.3
Madoonga (small equipment)	0	45	45	0.5
Total pre-strip cost				**18.5**

4.3 Waste mining adjustment

As mentioned in Section 3, additional study work has indicated that both Beebyn and Madoonga have been found to require a more selective mining operation than originally envisaged. HWE's cost estimation submission has been adjusted by adding $0.30 per tonne to the mining cost of waste. The areas that were assessed and adjusted include:

- increased drill and blast cost as pattern size is smaller,
- increased ancillary cost as more ancillary equipment required,
- increased haulage cost due to the use of smaller trucks,
- increased digging cost due to the use of a smaller excavator,
- $31M of capital removed from HWE costs, and
- 6Mt of pre-strip material removed as it is capitalised.

HWE's approach to ore mining and the associated costs have not changed.

4.4 Operating costs

The HWE base mining costs were supplied in the form of a variable $/t of ore and a $/t waste by 20 m bench and deposit. SRK adjusted these costs to reflect a base mining cost for the optimisation process. SRK also adjusted the 20 m bench values to reflect a 12 m bench so that the values could be coded correctly into the mineral resource model. Linear interpolation was used between data points.

The unit mining cost by bench is based on:

- supply and maintain all mining equipment,
- fuel price of A$1.10/litre (after applying the fuel rebate),
- oil price of A$2.30/litre,
- ground engaging tools, and
- labour costs estimates.

As mining activity starts on the outcropping ridges at both deposits, the operations incur an increased unit mining cost due to the more difficult terrain, clearing and grubbing, and longer hauls to the waste dump and RoM pad. Unit mining costs decrease until approximately the 500 m RL at both deposits due to shorter hauls (on average). As the pits progress below the 500 m RL, the longer hauls steadily increase the unit mining cost.

Figure 4-1 and Figure 4-2 indicate the increase in the unit mining costs as mining progresses from the ridges to the flats and then below ground level for Beebyn and Madoonga respectively. The difference in the rate of change of the mining rates is due to new stages starting, reducing the haulage distance for ore and waste.

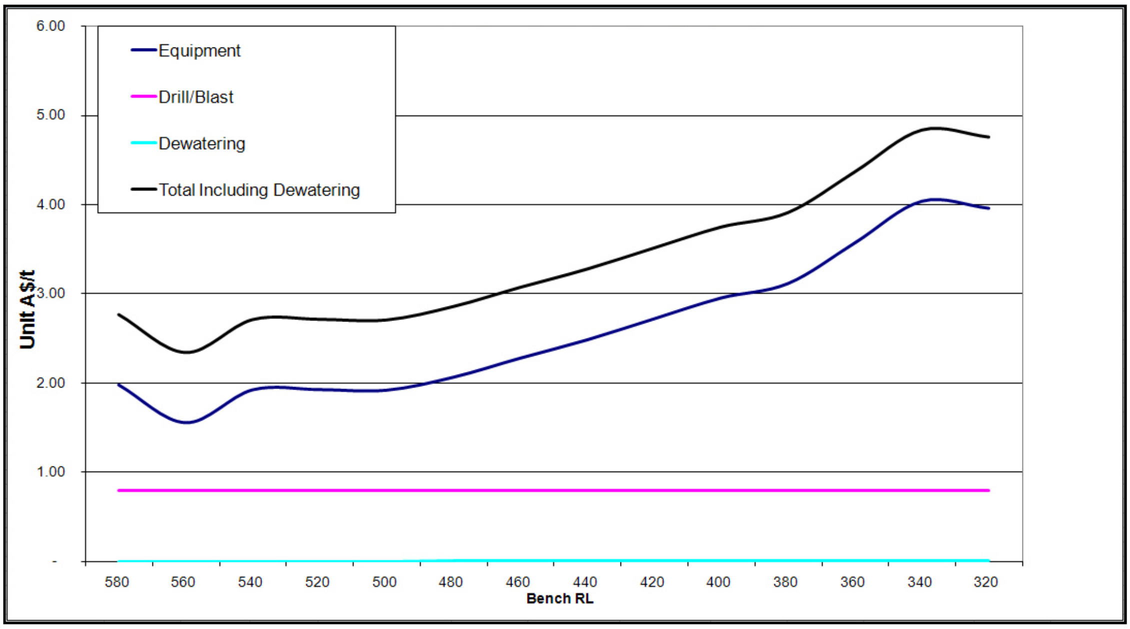


Figure 4-1: Beebyn mining cost input to the optimisation

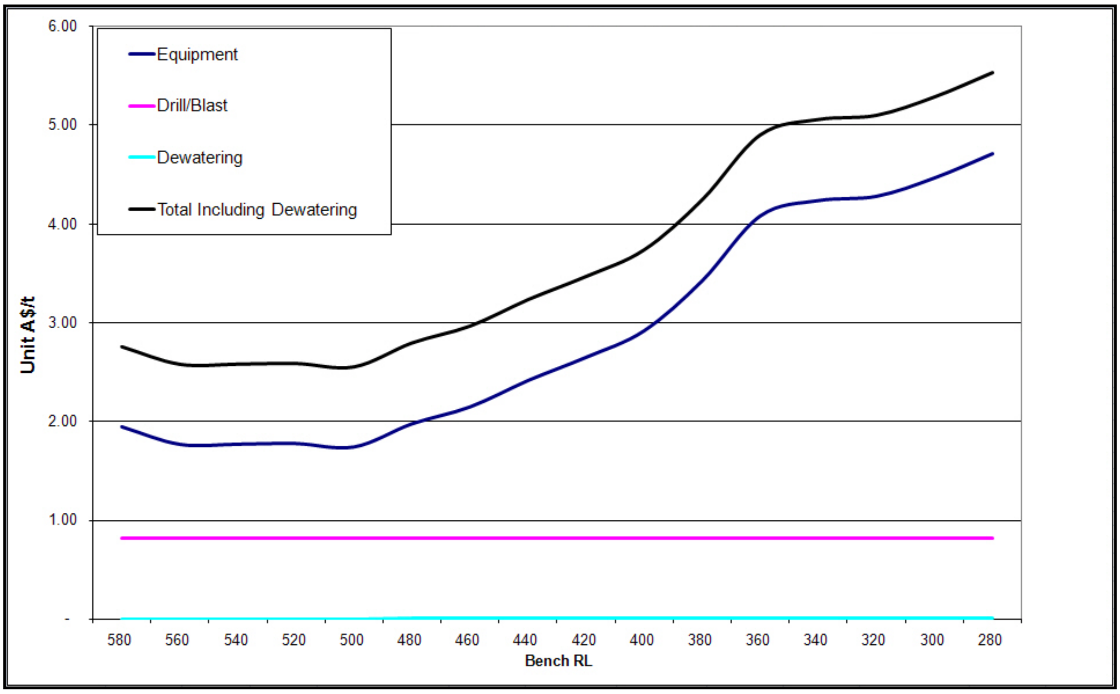


Figure 4-2: Madoonga mining cost input to the optimisation

Based on 69.4Mt of product, the following costs have been applied to the pit optimisation.

Table 4-2: Mining cost summary

Item	Total cost ($M)	Unit cost ($/t product)
Contractor site management	121.2	1.74
Average ore mining cost Beebyn	236.0	3.40
Average ore mining cost Madoonga	244.3	3.52
In-pit dewatering	2.8	0.041
Fly In Fly Out (FIFO)	37.5	0.54
Drill and blast	375.5	5.41
Owner grade control	8.3	0.12
Owner rehabilitation	6.2	0.09
Bore field dewatering	26.4	0.38
Port	1,077.5	15.50
Rail	542.2	7.80
Processing	289.7	4.17
Road trains (WP)	121.3	3.91
SMM supervision and technical services	13.9	0.20

The port, rail, processing and road train costs were supplied by WP. The BoD (Appendix 1) was the basis for the development of costs other than those supplied by HWE.

HWE has supplied a road train cost of $0.20/tkm in their mining submission. This has been replaced with the 7 Mtpa cost data supplied by WP in Table 4-3. However, it is unclear whether there are additional overhead costs for the HWE road trains remaining in the $19M contractor mobilisation/demobilisation and $121M contractor site management items in Table 4-2.

Table 4-3: WorleyParsons road train costs

Mining rate (Mtpa) from Madoonga	2.5 Mtpa ($/t)	9.5 Mtpa ($/t)	7.0 Mtpa ($/t)
Load and haul, including vehicle maintenance	3.780	2.340	2.660
Haul road maintenance	0.230	0.230	0.230
Fuel costs	1.263	0.684	0.803
Flights and accommodation	0.347	0.185	0.214
Total	**5.62**	**3.44**	**3.91**

Areas not covered in the mining costs are:

- all activities with regard to the design of the pits and the identification and demarcation of the orebody suitable for mining,
- capital expenditure,
- SMM will be responsible for all geotechnical requirements, and
- cost of rehandling stockpile material, in line with the BoD guideline that all ore will be direct feed to the crushers at each site.

4.5 Capital costs

As the mining project is contractor based, the only capital costs identified inside SRK's battery limits are the capital costs of the four in-pit dewatering pumps. The cost for the four pumps is estimated to be $1M, including piping to the pit rim, and will be included in WP's financial model.

HWE's tender response includes capital cost allowances for mining infrastructure and site infrastructure. These costs have not been considered by SRK.

4.6 Operating hours

The mine will work a 24 hour mining cycle, 7 days a week, 355 days per year. The standard roster will be two 12 hour shifts per day. The staff will be on an 8 days on, 6 days off roster while the operational personnel will be on a 14 days on, 7 days off roster.

Table 4-4 below summarises the delays applied and the operating hours calculated for use as the basis for developing the cost estimates in this study.

Table 4-4: Operating hours assumptions

Item	Comment	Hours
Hours available in shift		12
Less delays		
Shift change	30 minutes/shift	
Pre-start checks	15 minutes/shift	
Excavator lube and fuel	10 minutes/shift	
Truck refuelling	0 minutes/shift	
In-shift break	20 minutes/shift	
Lunch/crib	30 minutes/shift	
Blasting	25 minutes/day or 12.5 minutes/shift	
Safety meetings	1 hour/fortnight or 2 minutes/shift	
Total delays	119.5 minutes	2
Operating hours per shift		10
Shifts per day	2	
Operating hours per day		20
Days worked per year	355 (assume 10 rain days)	
Possible hours per year		7100
Fleet mechanical availability	85%	
Total operating hours per year		**6035**

4.7 Stockpile rehandle

As per the BoD (Appendix 1), no allowance has been made for stock pile rehandling in the optimisation. However, if there is a requirement to rehandle large volumes of ore prior to primary crushing, an additional cost of approximately $1.00 per tonne would be incurred. This assumes that a Cat 992G FEL and two Cat 777F trucks would be required. If the crusher is within tramming distance (approximately 50 m) for the Cat 992G FEL then the rehandle cost would drop to approximately $0.45 per t.

The level of stockpile rehandle before the primary crusher will be driven by the period length in which the mining operation must deliver an average 'on specification' product to the primary crusher. Generally, the longer the period, the smaller the stockpile volume has to be.

4.8 Royalties

The only royalties applied to the optimisation are the Western Australian State royalties (Appendix 3). These royalties were applied as a direct cost to the optimisation, effectively reducing the $/dmtu realised in the pit optimisation process. Table 4-5 shows the effect on the realised revenue per dmtu.

Table 4-5: Product revenue adjusted for State royalties

	Royalty	FOB price (BoD)	Adjusted FOB price
Adjusted sale price lump	7.5% of FOB price	US$1.4820/dmtu	US$1.3709/dmtu
Adjusted sale price fines	5.625% of FOB price	US$0.9436/dmtu	US$0.8905/dmtu

4.9 Drill and blast

The average drill and blast cost used by HWE in the mining study is approximately $1.06 per tonne in ore and $0.75 per tonne in waste. This cost was based on all material being blasted utilising a powder factor of 0.5 kg per BCM. For the pit optimisation process a weighted average drill and blast cost of $0.81 per tonne has been used.

The drill and blast cost in the waste was increased by $0.30 per tonne to account for smaller drill rigs being used in a large portion of the waste to control ore-loss and dilution. The ore drill and blast cost is unchanged from that supplied by HWE.

The cost of setting up an explosive compound is estimated by HWE to be $4.5M and could be included in an Explosive Supply contract. For a 15 year life of mine (at 15 Mtpa), this will add approximately $0.02 per tonne of ore to the mining costs.

Blast hole sampling is normally manned by the client (SMM) and has not been considered in this costing or manning.

4.10 Haul roads

Only the cost of haul road construction and maintenance in the pit and to the waste dump and RoM pad is included in the unit mining rates.

5 Open Pit Optimisation

Open pit optimisation is used to identify the optimum economic pit shape based on the highest project cash flow (revenue, mining costs, ore processing and ore handling costs, general overhead costs) in present value terms.

The optimisation process seeks a solution to a complex three-dimensional mathematical relationship involving the mineral resource model, geotechnical slope guidelines and product revenue, project constraints, factors and costs.

The Whittle^{TM} software package was used to carry out the open pit optimisation process for this study. Whittle^{TM} software calculates the value of the blocks in the mineral resource model and then calculates a solution observing the geometrical constraints. Waste that must be mined to access the ore as a function of the overall pit slope angles is considered in the solution.

The input factors used in the pit optimisation process include:

- overall pit slope angles,
- mining costs including variation by mining bench,
- mining dilution and mining recovery parameters,
- ore handling and ore processing costs,
- processing recoveries,
- commodity/product revenues,
- selling and transportation costs, and
- royalties.

The standard Whittle^{TM} output is a sequence of three-dimensional pit outlines called pit shells. Pit shells satisfy the overall pit slope factors and economic parameters that were applied to the pit optimisation.

The range of pit shells varies according to the value of the revenue factor as applied by Whittle^{TM}. At a revenue factor of 1.0, the ultimate pit shell is found where the marginal cost for an additional unit of product is equal to the net revenue received for that additional unit of product. This solution is specific to the revenue and project cost assumptions. Revenue factors smaller than 1.0 produce smaller, higher grade pits with higher Net Present Value (NPV) or discounted contribution outcomes. Revenue factors greater than 1.0 will generate larger pits that decrease in profitability until the pits become sub-economic.

Pit shells are used as a guide to subsequent practical mine designs. Mine designs expand on the basic geometry of the pit shells by including details such as safety catch berms, batters and ramps. Mining practicality is also considered more thoroughly in the design stage. A comparison of a mine design with a pit shell on which the pit design was based often shows a difference in reported tonnages and, hence, contained metal, depending on how the overall geotechnical slopes were initially estimated in the pit optimisation process.

The pit shells can be used to report the indicative mining inventory for mineralised material, grades of this material, and the associated waste tonnes. Pit shells smaller than the ultimate pit shell can be useful in identifying smaller pits, that could be used as starter pits or assisting in locating pit push backs or pit cut-backs.

Whittle^{TM}-type analysis does not consider blending requirements. Use of pit shells smaller than the ultimate pit shell may effectively target mining high-grade material early in the mine life with downstream implications on the ability of production to maintain grade later in the mine life. Practical mining considerations will not necessarily accommodate the use of pit shells as pit cut-backs or staged mine designs.

5.1 Mineral resource models

The mineral resource model is the key input into the optimisation process. The mineral resource models developed for the Beebyn and Madoonga deposits, as discussed in Section 2, were combined to create one large combined block model. As the Beebyn deposit is remote from Madoonga, the mineral resource model for Beebyn was spatially offset to move it closer to Madoonga and hence reduce the size of the combined block model.

The original mineral resource model was a sub-blocked model. This was converted to a proportional model with block sizes of 40 x 10 x 12 m. This was further re-blocked to 40 x 50 x 12 m in the Whittle™ software.

Mining costs were developed as discussed in Section 4 and coded into the model in 12 m vertical benches.

5.2 Ore definition

To be classified as ore, mineralised material must satisfy economic and physical criteria. Excessive incremental strip ratios, low Fe grades or undesirable contaminants such as alumina (Al_2O_3) and silica (SiO_2) may downgrade the mineralised material to waste.

Regressions to determine the grade of the lump and fines product based on the insitu grade were supplied by SMM.

5.2.1 Parallel BIF units

Parallel BIF units have been identified at both the Beebyn and Madoonga deposits. In most instances these BIF units represent small tonnages of lower grade mineralisation with elevated contaminant levels. SRK believe these units are likely to be severely impacted by dilution and ore-loss if targeted in a mining operation. On this basis, the optimisation process was not presented with this material and has subsequently not considered the potential value from the mineralisation, although it is acknowledged that the additional BIF units remain an opportunity. Only the primary BIF units were considered for pit optimisation.

5.2.2 Contaminants

The two contaminants currently identified as limiting factors for the project are Al_2O_3 and SiO_2. Phosphorus (P) is at, or exceeds, the upper limit when compared with the high P iron ores sold to steel mills from the Pilbara region. Phosphorus should be reviewed for the BFS. The remaining contaminants are at levels considered by SMM not to impact on their ability to market the lump and fines products from Beebyn and Madoonga.

SMM metallurgical test work has confirmed that elevated contaminant grades are preferentially associated with the fines product. SMM has supplied regressions for the lump and fines Fe, Al_2O_3, SiO_2 and P elements. SMM have indicated that Al_2O_3 grades must be less than 2.60% and SiO_2 less than 5.5% in the fines product.

All other contaminants are reported in this study, but not actively managed.

5.2.2.1 SiO_2

Removal of the high alumina hangingwall zone of the BIF1 unit at Beebyn has reduced the SiO_2 levels from an in situ average of 5.4% to 4.9%. With the application of the fines regression, the resultant SiO_2 grade is 5.5% within the pit design. The Beebyn regression for SiO_2 lowers the lump grade by 0.8% and increases the fines grade by 1.0%. The Madoonga regression for SiO_2 lowers the lump grade by 1.5% and increases the fines grade by 1.2%.

The SiO_2 levels at Madoonga are elevated with an in situ grade of 7.4% but more importantly the fines grade is 9.9%. The higher than expected SiO_2 grade is primarily due to the addition of 40 Mt of Inferred Resource and Unclassified Inventory material (10.8% SiO_2) at the base and either end of the Madoonga deposit. High silica at the Madoonga deposit has affected the ability of the pit optimisation process to produce an on-specification fines grade. To manage the SiO_2 grade, an 8.3% SiO_2 upper cut was applied to the pit optimisation to limit the average SiO_2 grade in the fines to below 5.5%.

5.2.2.2 Al_2O_3

The Beebyn regression for Al_2O_3 lowers the lump Al_2O_3 grade by 0.5% and increases the fines Al_2O_3 grade by 0.6%. The Madoonga regression for Al_2O_3 lowers the lump Al_2O_3 grade by 0.5% and increases the fines Al_2O_3 grade by 0.4%.

The elevated Al_2O_3 levels in the hangingwall of the Beebyn BIF1 unit (the main orebody), as identified in the Preliminary Mining Study, resulted in this zone of the BIF1 unit being modelled separately so that it may be removed discreetly from the orebody as required. The effect on the resultant Al_2O_3 grades for the BIF1 unit was significant, removing approximately 10 Mt at 6.4% Al_2O_3.

While the in situ grade of the entire BIF1 unit is within 'market' tolerances, the conversion to a lump and fines product creates high contaminant levels in the fines fraction. Removing the 10Mt of high Al_2O_3 material reduces the contaminant level to an acceptable level.

The Madoonga BIF unit has a slightly elevated Al_2O_3 level in the fines fraction of 2.65% when the high silica zone of the BIF1 unit is removed. At this stage of the study, Al_2O_3 can be blended out using the Beebyn material.

The high alumina zone identified in the hangingwall of the Beebyn deposit has been considered separately in the Mineral Resource Estimation phase of work. This mineralised material may be amendable to future processing /beneficiation consideration, but is excluded from the primary mineralisation subject to open pit optimisation.

5.2.2.3 Phosphorous

The phosphorous (P) levels at Beebyn and Madoonga are high (0.10% and 0.8% respectively) compared with iron ore products from the Pilbara of between 0.04% and 0.09%. The high P levels have not been addressed as an issue in the PFS but should be reviewed as part of the BFS.

5.3 Mining dilution

Mining dilution occurs when unwanted waste material is mined along with the ore. The additional waste material lowers the Fe grade and increases the contaminant levels. The net effect is that product quality is adversely affected, negatively impacting on the marketability of the product.

The degree of mining dilution is influenced by a number of factors including:

- the mining method utilised,
- the mining equipment type, size and configuration,
- the quality of the equipment operators,
- the nature of the orebody, and
- the quality of grade control.

While the contact material on the footwall and hangingwall are different in nature, the Al_2O_3 and SiO_2 contents of both materials are very high compared with that for the ore.

As the primary mineralisation of both deposits requires special consideration to ensure product specifications are met, the introduction of waste materials with very high contaminant levels will impact more severely on project profitability than an ore-loss scenario. On this basis, the study will progress on the assumption that there will be no dilution of the ore zone with surrounding waste. A planned ore-loss will result from a practical mining approach that will ensure waste materials are not mixed with defined RoM product.

It is recommended that the mining method aims for zero dilution at the expense of ore recovery.

5.4 Ore-loss/mining recovery

Ore-loss or mining recovery primarily occurs when ore is left behind and not mined with the demarcated ore zone. This ‘ore’ that has been left behind is often classed as mineralised waste, and can be mined selectively and stockpiled for possible treatment at a later date. For the purpose of this study, however, the viability of the mineralised waste will not be defined by SRK but should be reviewed during the BFS.

Given the assumption that the mining dilution target is zero, any diluted material mined will be classified as waste.

The practical issues in controlling ore recovery for the orebodies at both Beebyn and Madoonga are the orebody width, the determination of the mineralisation boundaries and identifying what is mineable.

At this stage, there is limited evidence available to identify the ore/waste boundary visually and this will place greater emphasis on the need for the selected grade control method to accurately predict the location of the ore/waste boundary.

For the purpose of the study, SRK has assumed a mining accuracy of 1 m horizontally and 0.5 m vertically. This assumes that the grade control systems can delineate the ore/waste boundaries and that SMM uses experienced operators capable of digging to those boundaries. Application of these assumptions to each orebody suggests mining recoveries of 90% for both Madoonga and Beebyn, which matches both practical and the current theoretical approaches.

5.5 Pit optimisation input parameters

5.5.1 Mining costs

The mining costs used in the pit optimisation are discussed in Section 4 and are summarised in Table 5-1. This cost includes load and haul, drill and blast, in-pit dewatering, ancillary equipment costs, rehandle and the items included in Table 7-27.

Table 5-1: Mining costs

Base elevation (m RL)	Adjusted mining cost (A$/t)	
	Madoonga	Beebyn
600	2.84	2.87
588	2.79	2.81
576	2.72	2.69
564	2.63	2.43
552	2.60	2.49
540	2.60	2.71
528	2.58	2.70
516	2.56	2.70
504	2.54	2.69
492	2.62	2.75
480	2.77	2.84
468	2.87	2.98
456	3.00	3.11
444	3.17	3.24
432	3.32	3.38
420	3.47	3.53
408	3.64	3.67
396	3.86	3.81
384	4.17	3.92
372	4.55	4.15
360	4.95	4.44
348	5.06	4.74
336	5.14	4.93
324	5.19	4.90
312	5.31	4.77
300	5.45	4.77
288	5.62	4.77
276	5.66	4.77

5.5.2 Processing costs

The ore processing costs used in the pit optimisation are a summation of the total product handling costs as discussed in Section 4. The ore costs are summarised in Table 5-2 and Table 5-3.

Table 5-2: Beebyn ore costs

Item	Ore cost (A$/t product)
Owner flights & camp	0.54
Owner grade control	0.12
Owner rehabilitation	0.09
Contractor fixed charges	1.74
Contractor mobilisation	0.72
Rail transport cost	7.80
Bore field dewatering	0.38
Port cost	15.50
Site processing cost	4.17

Table 5-3: Madoonga ore costs

Item	Ore cost (A$/t product)
Owner flights & camp	0.54
Owner grade control	0.12
Owner rehabilitation	0.09
Contractor fixed charges	1.74
Road train haulage	3.91
Contractor mobilisation	0.72
Rail transport cost	7.80
Bore field dewatering	0.38
Port cost	15.50
Site processing cost	4.17

5.5.3 Revenue

The revenue for the project has been defined as selling prices for lump and fines product per contained Fe unit expressed in dry metric tonne units. The revenues applied were supplied by SMM and are listed in Table 5-4.

Table 5-4: Product revenue

Sale price lump	dmtu	US$1.482
Sale price fines	dmtu	US$0.9436

The lump proportion for the deposits were provided by SMM as listed in Table 5-5.

Table 5-5: Lump proportion for Beebyn and Madoonga

Lump proportion Beebyn at mine	50%
Lump proportion Beebyn in ship	45%
Lump proportion Madoonga at mine	45%
Lump proportion Madoonga in ship	40%

The US$ to A$ exchange rate utilised for the PFS was at a rate of US$0.758 = A$1.00.

5.5.4 Royalties

The only royalties applied to the pit optimisation are the Western Australian State royalties. These royalties were applied as a direct cost, effectively reducing the $/dmtu realised in the pit optimisation process. Table 5-6 shows the effect on the realised revenue per dmtu.

Table 5-6: Product revenue adjusted for State royalties

	Royalty	FOB price (BoD)	Adjusted FOB price
Adjusted sale price lump	7.5% of FOB price	US$1.4820/dmtu	US$1.3709/dmtu
Adjusted sale price fines	5.625% of FOB price	US$0.9436/dmtu	US$0.8905/dmtu

5.5.5 Geotechnical parameters

The geotechnical input into the open pit optimisation were overall slope estimates based on the SRK Geotechnical Study (SRK, 2008 Geotechnical Study). The overall slope estimates included allowances for haulage ramps.

5.5.6 Optimisation restrictions and constraints

Based on advice from SMM, the pit optimisation process has not been artificially restricted as it does not interact with any defined exclusion zones.

5.6 Pit Optimisation results

5.6.1 Ultimate pit

The ultimate pit shell is achieved when the Whittle^{TM} economic return is maximised. Whittle^{TM} labels this point, Revenue Factor 1. For this project Revenue Factor 1 occurs at Pit Shell 32. The inventory of the Pit Shell 32 is:

- Total ore : 71.2 Mt
- Grade of Fe : 59.9%
- Grade of SiO_2 : 4.58%
- Grade of Al_2O_3 : 2.11%
- Total waste : 332 Mt
- Strip Ratio : 4.7

NOTE: The inventory quoted above includes mineralisation from unclassified mineral resource. The results listed above do not represent an "Ore Reserve" as defined by the 2004 JORC Code.

The ultimate pit shell is based on application of an 8.3% SiO_2 upper cut to limit the SiO_2 grades in the fines product.

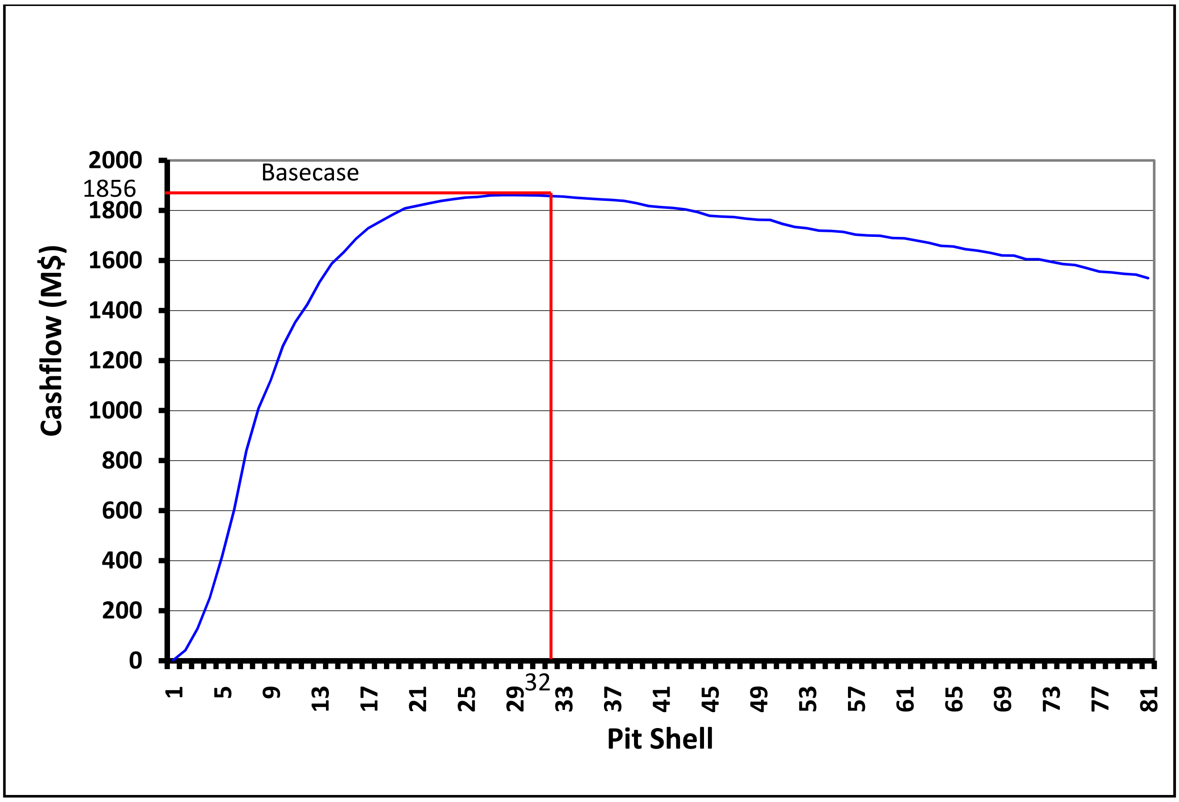


Figure 5-1: Project cash flow by pit

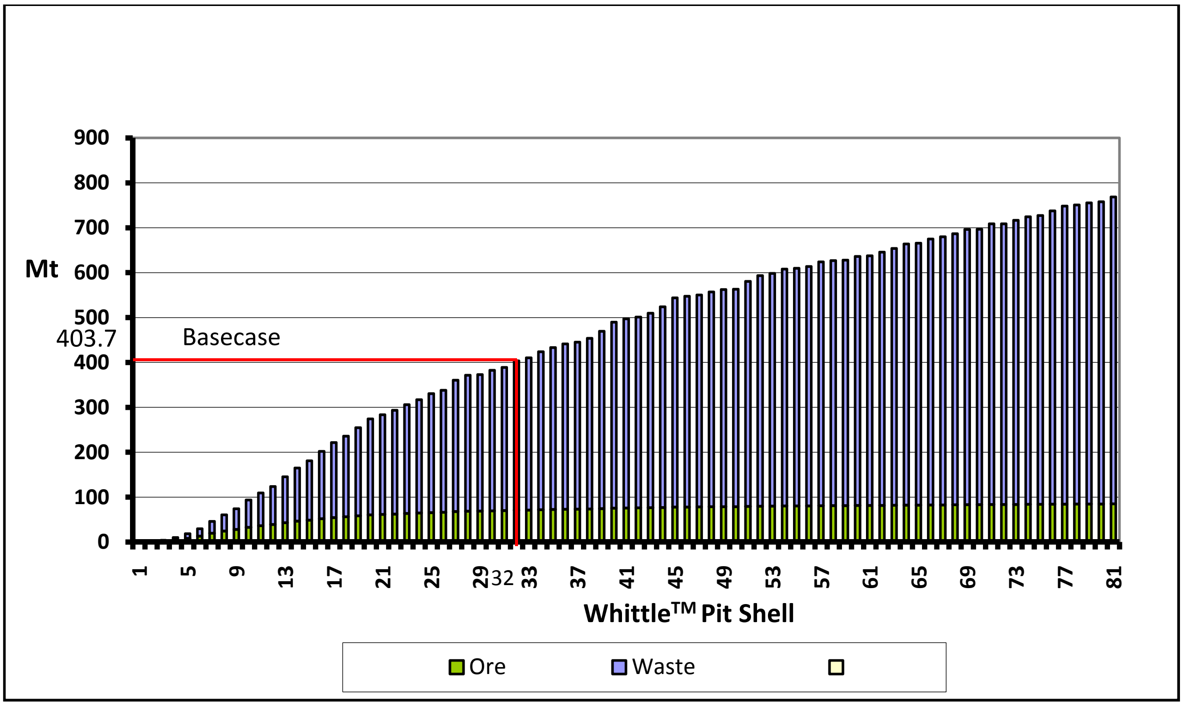


Figure 5-2: Graph indicating tonnes of pit shells

Figure 5-2 indicates the change in project value and tonnage against increasing revenue. The figure highlights that increasing revenue increases the ore tonnage by a small margin. As a result, the project is relatively insensitive to revenue increases and is more sensitive to revenue decreases.

The optimal solution is found where the project value is maximised; pit shell 32 with an ore tonnage of 71.2 Mt.

5.6.2 Sensitivities

A range of sensitivity analysis was conducted within Whittle™ to test the projects sensitivity to varying inputs and assumptions. These included:

- varying the SiO_2 upper cut,
    - 100%, 6.3%, 7.3%, 8.3% (base case), 9.3%, 10.3%
- varying revenue,
    - +/- 15%, -25%
- varying mining cost,
    - +/- 15%
- varying process and product handling cost,
    - +/- 15%
- varying mining recovery,
    - +/- 5%
- varying overall pit slope angle,
    - +/- 5°
- varying lumps proportion in product,
    - +/- 5% and
- varying dilution(completed outside Whittle™).

5.6.2.1 Silica

Pit optimisation and the resultant ore quantity was found to vary significantly with the change in silica upper cut-off grade. Silica upper cut-off grade is the silica grade, all material above which is classified as waste.

At a deposit average of 8.43% silica, the Madoonga deposit has higher silica content. The silica average grade at Beebyn is 4.87%. A silica grade of 5.5% was targeted in fines. This requires the RoM silica grade to average at 4.58% for the two deposits. The upper silica cut-off was varied from 12% to 8% and pit optimisations run on each case. Using this iterative technique an upper cut-off grade for ore was fine tuned. It was found that at 8.3% upper cut-off for silica, the product averaged at 4.58% silica RoM grade and the silica grade in the fines portion of the product was at the market specification of 5.5%.

The base case was set at 8.3% silica cut-off and all other sensitivities were run using this silica cut-off grade.

The inventory of the ultimate pit shell, including the 10% ore-loss, at various upper cut-off grades for silica is shown in Table 5-7 below.

Table 5-7: SiO_2 sensitivity

Silica upper cut-off	6.3%	7.3%	8.3% (base case)	9.3%	10.3%	No cut
Total ore (Mt)	53.0	63.2	71.2	77.6	83.2	101.7
Grade of Fe (%)	60.80	60.30	59.90	59.60	59.30	58.30
Grade of SiO_2 (%)	3.97	4.22	4.58	4.90	5.17	6.40
Grade of Al_2O_3 (%)	2.05	2.08	2.11	2.12	2.13	2.11
Total waste (Mt)	271	307	332	354	379	462
Strip Ratio	5.1	4.8	4.7	4.6	4.6	4.5

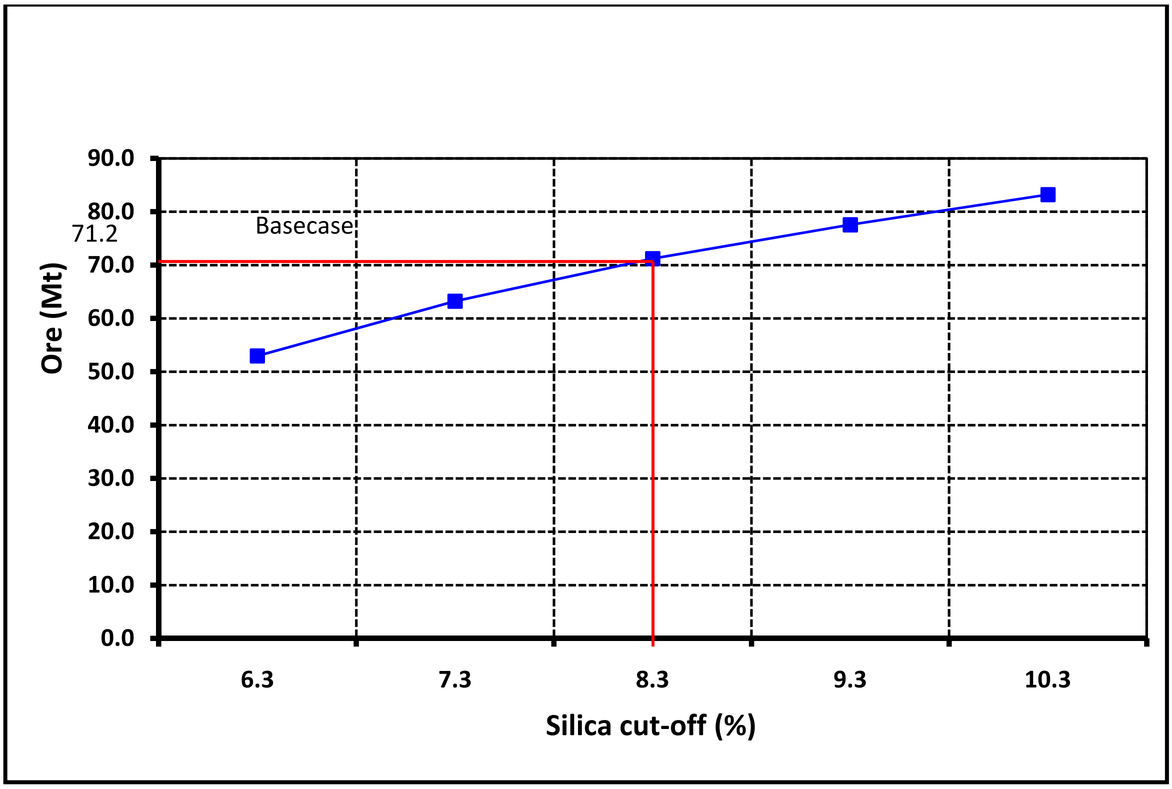


Figure 5-3: Silica sensitivity

5.6.2.2 Other pit optimisation input parameters

Sensitivities were run on the pit optimisation to test the impact of varying revenue, costs, recoveries and pit slopes. The results of the sensitivity analysis are:

Decrease the revenue by 10% results in the following ultimate pit shell statistics:

- Total ore : 68.3 Mt
- Grade of Fe : 59.92%
- Grade of SiO_2 : 4.57%
- Grade of Al_2O_3 : 2.12%
- Total waste : 292 Mt
- Strip Ratio : 4.3

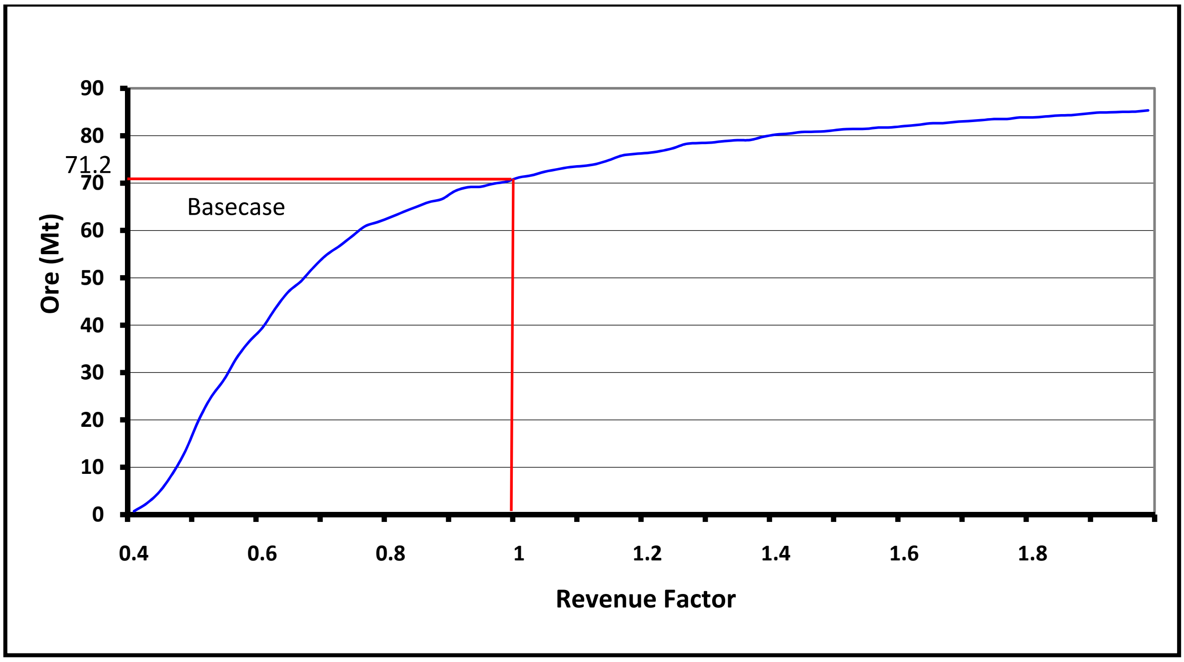


Figure 5-4: Revenue sensitivity

The revenue factor in the above chart represents the multiplying factor applied to the product revenue. Ore quantity of the optimised shell at corresponding revenue appears on the vertical axis. It can be observed that with the increase in revenue, the size of the optimised pit shell increases. Similarly, with the decrease in selling price the optimised ore quantity decreases. However, this change is not observed to be highly sensitive as decreasing product revenue by 10% decreases the ore quantity by 4%.

Increase the mining costs by 10% results in the following ultimate pit shell statistics:

- Total ore : 69.4 Mt
- Grade of Fe : 59.90%
- Grade of SiO_2 : 4.59%
- Grade of Al_2O_3 : 2.12%
- Total waste : 306 Mt
- Strip Ratio : 4.4

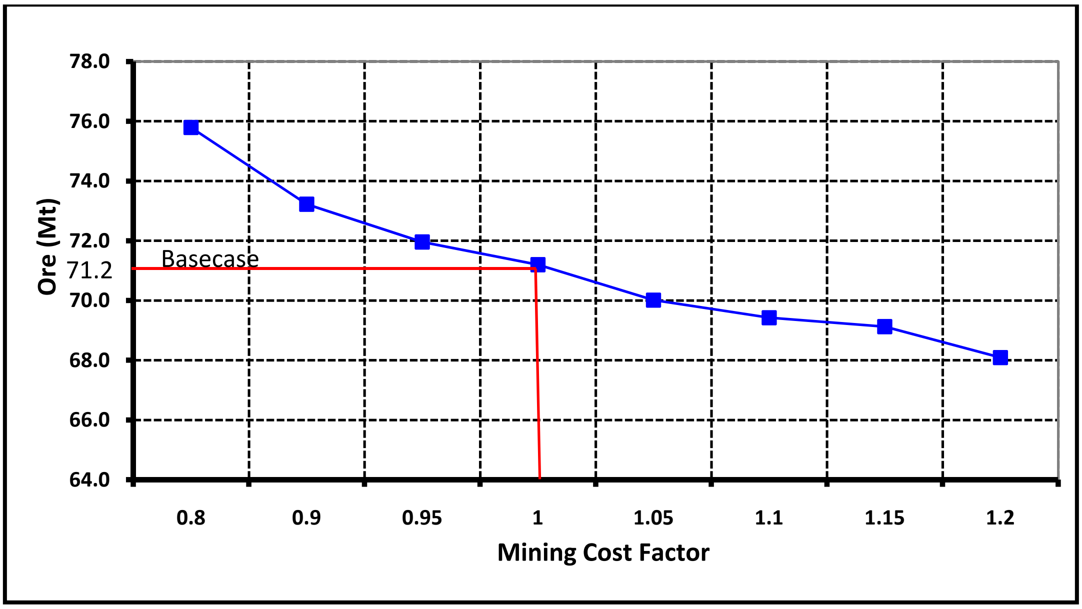


Figure 5-5: Mining cost sensitivity

Sensitivity with respect to mining cost was assessed by varying the reference mining cost in Whittle™ software. Optimised ore quantities from each run were recorded. The above graph indicated that the optimised ore quantity is inversely related to the mining cost. It was found that increasing mining cost by 10% decreases the ore quantity by 2.5%.

Increase the ore handling cost includes processing costs by 10% results in the following ultimate pit shell statistics:

- Total ore : 69.9 Mt
- Grade of Fe : 59.90%
- Grade of SiO_2 : 4.58%
- Grade of Al_2O_3 : 2.12%
- Total waste : 313 Mt
- Strip Ratio : 4.5

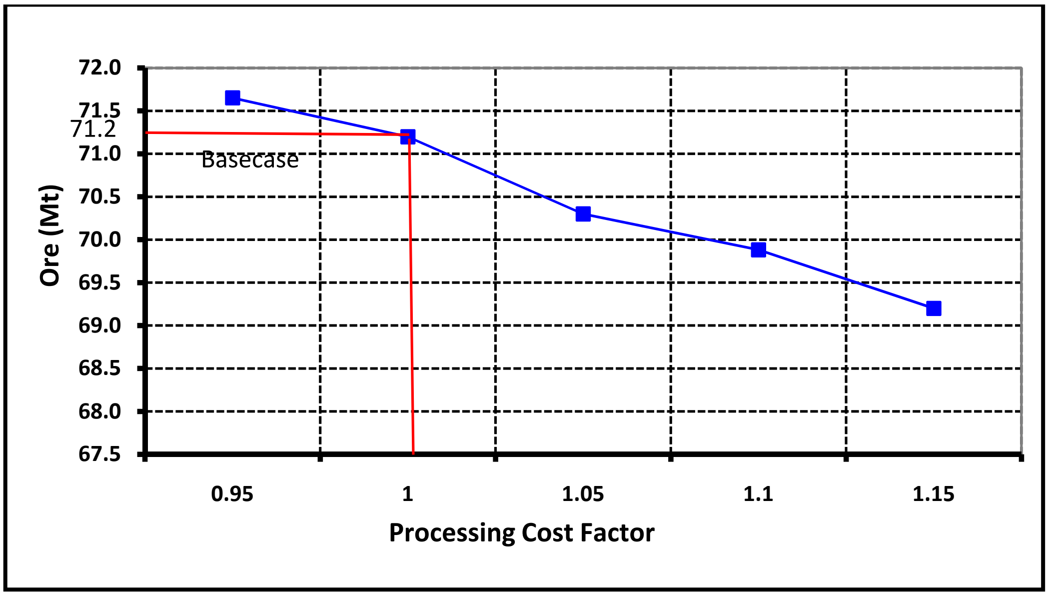


Figure 5-6: Processing and product handling cost sensitivity

Decrease the mining recovery 5% (from 90-85 %) results in the following ultimate pit shell statistics:

- Total ore : 66.0 Mt
- Grade of Fe : 59.90%
- Grade of SiO_2 : 4.59%
- Grade of Al_2O_3 : 2.12%
- Total waste : 317 Mt
- Strip Ratio : 4.8

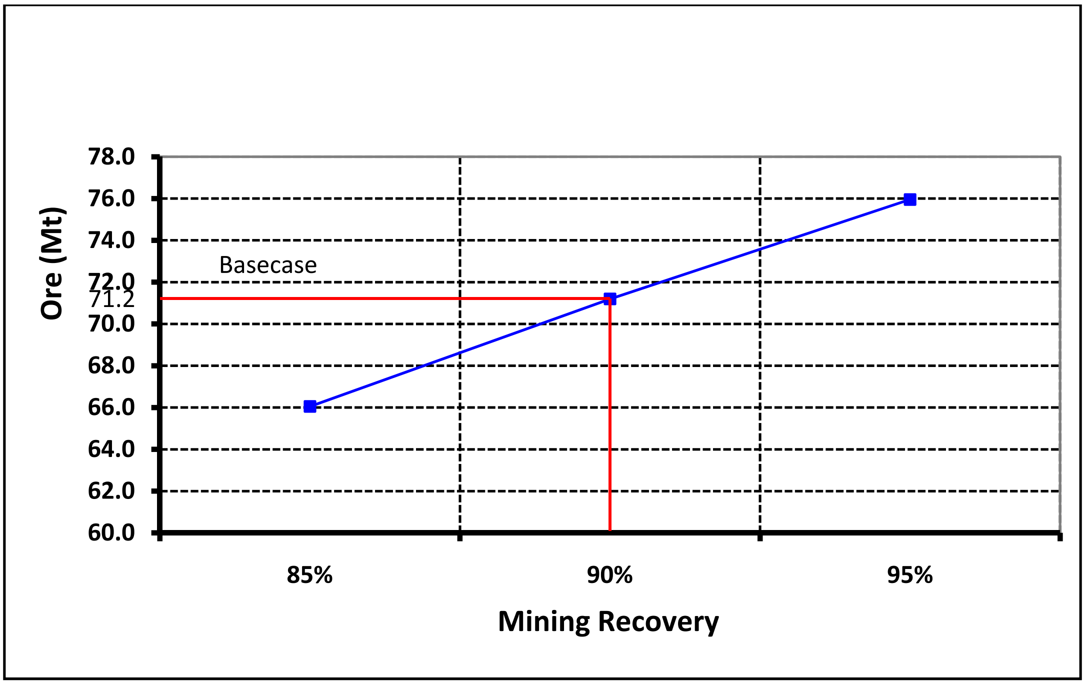


Figure 5-7: Mining recovery sensitivity

Decreasing the mining recovery by 5% decreases the ore quantity by 7.3%. This graph indicates that the ore quantity is highly sensitive to the mining recovery and appropriate measures should be taken to maximise it. It is, however, to be observed that this does not occur at the expense of dilution.

Decrease the overall pit slope angle 5° results in the following ultimate pit shell statistics:

- Total ore : 66.9 Mt
- Grade of Fe : 59.85%
- Grade of SiO_2 : 4.60%
- Grade of Al_2O_3 : 2.14%
- Total waste : 337 Mt
- Strip Ratio : 5.0

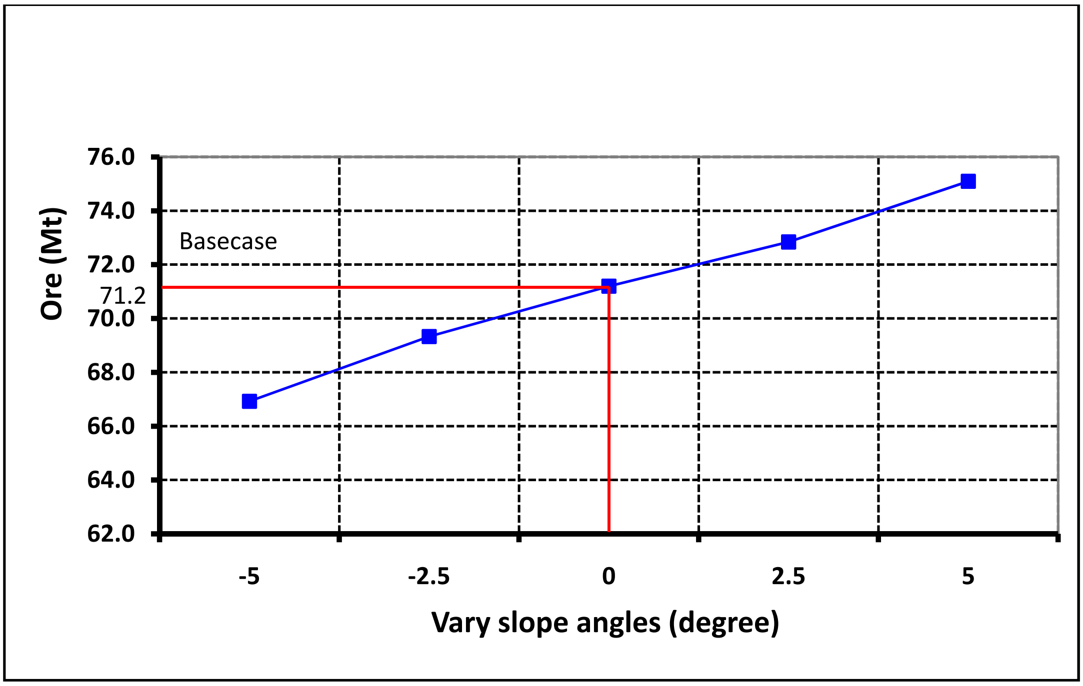


Figure 5-8: Overall pit slope sensitivity

Flattening the overall pit slope by 5° decreases the ore quantity by 6%. Flattening the overall pit slope would add more waste to a pit shell. The pit optimisation algorithm accounts for this by leaving out ore previously mined (at a lower Strip ratio) and in now uneconomic to be mined at the higher Strip ratio.

Reduce the lump proportion at ship by 5% (42.75% lump for Beebyn and 38% lump for Madoonga) results in the following ultimate pit shell statistics:

- Total ore : 70.6 Mt
- Grade of Fe : 59.93%
- Grade of SiO_2 : 4.58%
- Grade of Al_2O_3 : 2.11%
- Total waste : 324 Mt
- Strip Ratio : 4.6

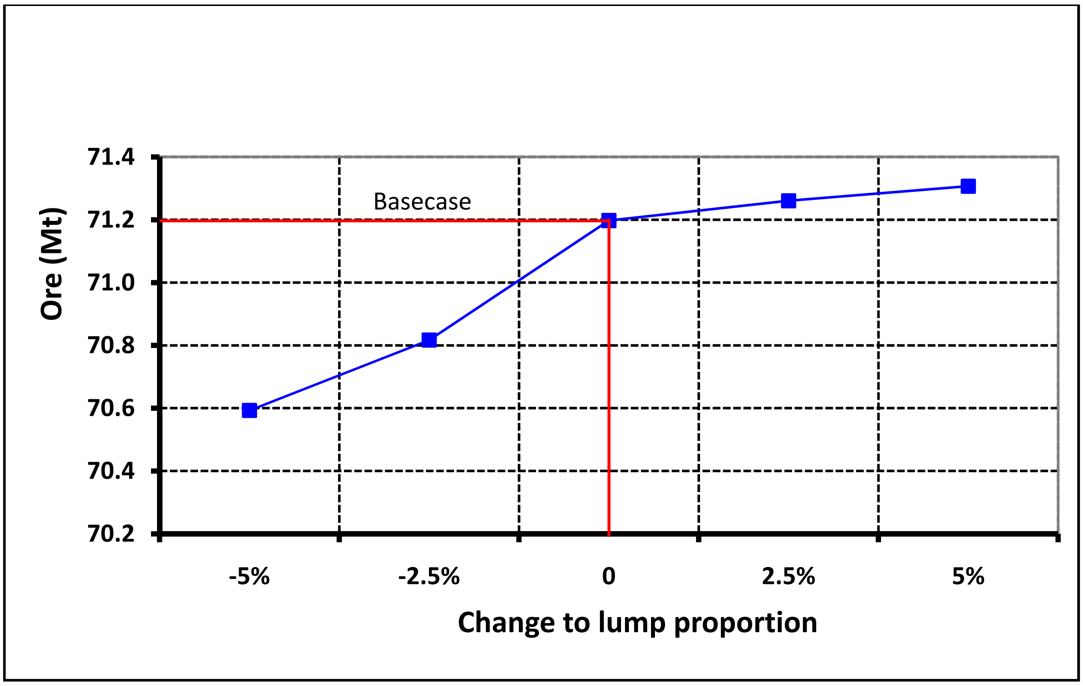


Figure 5-9: Lump proportion sensitivity

Decreasing the lump proportion by 5% decreases the ore quantity by 0.8%. It is worth noting that decreasing the lump proportion effectively reduces the revenue, as the fines sell at a lower price than the lump. The graph reflects the change in ore quantity due to the change in revenue. Moreover, due to the different lump proportion at the two deposits, the optimised ore quantities for each deposit also vary when a constant percentage change is introduced to the lump proportion. It is a combined effect of these parameters which is reflected in Figure 5-9.

5.6.2.3 Dilution

Sensitivity on the extent of ore dilution was handled outside Whittle™. The quantity of dilution material was halved to assess its sensitivity.

Even reducing the calculated diluting material quantity by 50% had very little impact on the contaminant grades in the product. Silica came down by 0.04% from 4.66% to 4.62% only.

The contaminant grades of diluting material are very high and even a small amount of dilution renders the product unsaleable.

5.6.2.4 Owner-operator mining fleet

In a contractor mining operation, the contractor recovers the capital cost of machines in the mining unit rates. For the selected class of fleet, capital cost component is estimated to be 40% of the contractor’s unit mining cost.

SRK carried out a sensitivity run in Whittle™ where the mining operating cost was reduced to 60% of that in base case scenario to reproduce the effects of no capital repayment in the operating costs.

The results identified that the project made an additional $765 M in undiscounted profit over the life of project. This would easily account for the capital required to purchase the fleet (estimated to be approximately $250 M).

Moreover, it adds 9.1Mt of ore to the pit inventory.

SRK suggests further consideration of an owner-operator scenario.

5.6.3 Comparison against prior study

An optimisation was run using the July 2008 Mineral Resource Model and the costs structure used in prior Preliminary Mining Study. The resultant inventory is:

- Total ore : 98.8 Mt
- Grade of Fe : 58.2%
- Grade of SiO_2 : 6.47%
- Grade of Al_2O_3 : 2.11%
- Total waste : 469 Mt
- Strip Ratio : 4.8

This compares to the Preliminary Mining Study optimisation results of:

- Total ore : 85.5 Mt
- Grade of Fe : 58.7%
- Grade of SiO_2 : 5.32%
- Grade of Al_2O_3 : 2.35%
- Total waste : 437 Mt
- Strip Ratio : 5.1

It is worth noting that previous study runs were driven by alumina content and the current study is driven by silica. The above results are without any upper-cut on silica and thus the silica grade in the product is high. SRK did not attempt to do a detailed comparison factoring for the change in methodology (from alumina to silica) in optimisation runs.

It is also interesting to compare this with the one at current cost structure with no cut on silica:

- Total ore : 101.7 Mt
- Grade of Fe : 58.3%
- Grade of SiO_2 : 6.40%
- Grade of Al_2O_3 : 2.11%
- Total waste : 462 Mt
- Strip Ratio : 4.5

The comparison in the results highlights that increases in the mineral resource as well as significant changes in product revenue have led to a larger inventory prior to SiO_2 cut-offs being applied.

5.6.4 Processing/beneficiation opportunities

Whilst recognised as outside the PFS scope of work, SRK recommend consideration of beneficiation to ensure that a single option is presented to the BFS study.

SRK carried out broad sensitivity work to test the impact of a high operating cost processing option on the primary mineralisation. It was assumed that an additional $30 per tonne of ore would allow for a process plant upgrade to allow any level of silica in the RoM. A case was run where this cost was added in Whittle™ software under process head and the 8.3% silica upper cut-off was removed.

The results of this optimization are:

- Total ore : 60.6 Mt
- Grade of Fe : 59.1%
- Grade of SiO_2 : 5.42%
- Grade of Al_2O_3 : 2.22%
- Total waste : 146 Mt
- Strip Ratio : 2.4

In the Preliminary Mining Study, sensitivity work was completed on the Beebyn mineral resource model to assess the distribution of Al_2O_3 grades across the hangingwall contact (SRK, 2007, Low Al_2O_3 Wireframe Alternative for Beebyn). The result of this work indicated that moving the ore/waste boundary farther into the orebody removes a significant proportion of the high Al_2O_3 material. SRK has applied the outcome of this philosophy to the current mining study and as a result has achieved a global fines Al_2O_3 grade of 2.60%, but has reduced the available mineral resource by approximately 10 Mt.

A SiO_2 cut-off was applied to the optimisation to prevent the global fines content from exceeding 5.5%. This reduced the available mineral resource by approximately 40 Mt.

There may be an opportunity to introduce additional processing methods to reduce the high Al_2O_3 and SiO_2 grades giving the pit optimisation access to these materials.

The impact of all other contaminants and LOI has not been reviewed in any detail to date. Regressions should be developed for the other key elements at or near market expectation levels, to quantify their impact on the BFS.

5.6.4.1 Owner-operator mining fleet

In a contractor mining operation, the contractor recovers the capital cost of machines in the mining unit rates. For the selected class of fleet, the capital cost component is estimated to be 40% of the contractor's unit mining cost.

SRK carried out a sensitivity run in Whittle^{TM} where the mining operating cost was reduced to 60% of that in base case scenario to reproduce the effects of no capital repayment in the operating costs.

The results identified that the project made an additional $765 M in undiscounted profit over the life of project. This would easily account for the capital required to purchase the fleet (estimated to be approximately $250 M).

Moreover, it adds 9.1 Mt of ore to the pit inventory.

SRK suggests further consideration of an owner-operator scenario.

6 Mine Design

The mine design work is based on the conversion of the ultimate pit shells, discussed in Section 5, to practical mine designs with berms, batters and ramps.

6.1 Design criteria

The general design criteria used for mine design are given in Table 6-1

Table 6-1: General mine design parameters

Parameter	Value	Units
Bench height	10	m
Road width (dual-lane)	30	m
Road width (single lane)	15	m
Road gradient	10	%

6.2 Geotechnical guidelines

Geotechnical guidelines provided in the SRK Mining Geotechnical Evaluation of the Weld Range Iron Ore Project were used to code specific geotechnical zones in the mineral resource block model. The supplied geotechnical zones are given in Table 6-2 and Table 6-3 and supported by Figure 6-1.

This information was used to apply batter angles (bench face angles) and berms (spill berms) relationships to the mine design. The combination or berms, batters and access ramps lead to the build-up of the overall slopes.

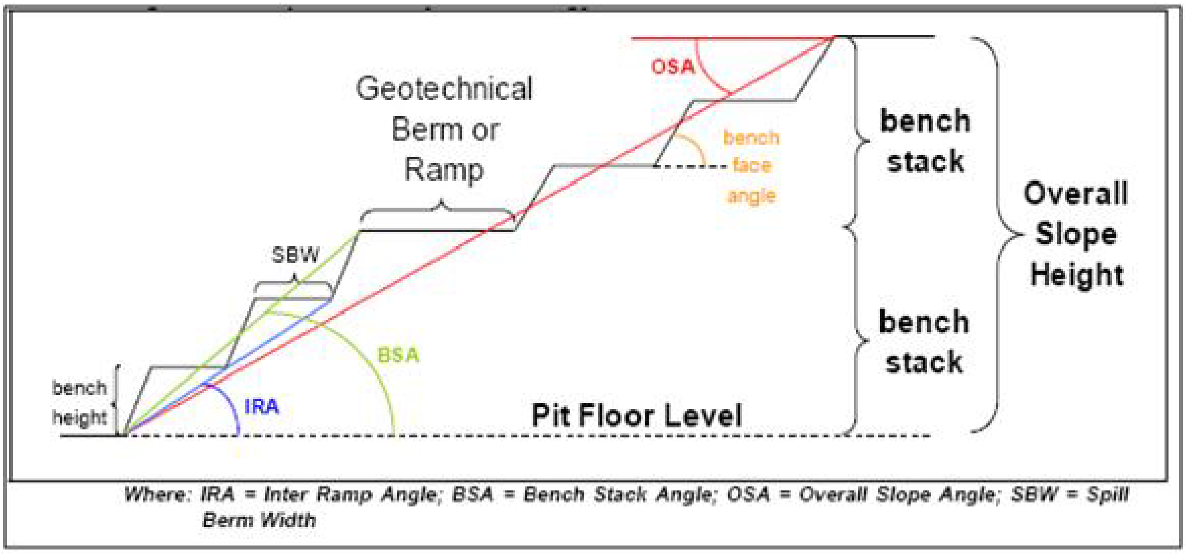


Figure 6-1: Geotechnical abbreviations and terms

Table 6-2: Recommended Beebyn slope design parameters

Wall	Domain	Domain design code & colour	Bench stack geometry				Bench scale geometry		
			Limiting stack height (m)	Geotechnical safety berm width (m)	Bench stack slope angles Empirical - analysis assessment		Bench height (m)	Bench face angle (°)	Spill berm width (m)
					BSA°	IRA°			
North	Saprolite	BS1	50	15	37	35	10	50	6
	Weathered rock	B	80	15	55	52.5	10	75	5
	Fresh rock	B	80	15	55	52.5	10	75	5
	Weak zone	BWK	50	15	48	44.5	10	65	5.5
South	Saprolite	BS1	50	15	37	35	10	50	6
	Weathered rock	B	80	15	55	52.5	10	75	5
	Fresh rock	BSF	80	15	55	52.5	10	75	5
	Weak zone	BWK	50	15	48	44.5	10	65	5.5
South - eastern sector	Saprolite	BS2	50	15	32	29	10	50	9.5
	Weathered rock	B	80	15	55	52.5	10	75	5
	Fresh rock	BSF	80	15	55	52.5	10	75	5
	Weak zone	BWK	50	15	48	44.5	10	65	5.5
East	Saprolite	BS2	50	15	32	29	10	50	9.5
	BIF	B	80	15	55	52.5	10	75	5
West	BIF	B	80	15	55	52.5	10	75	5

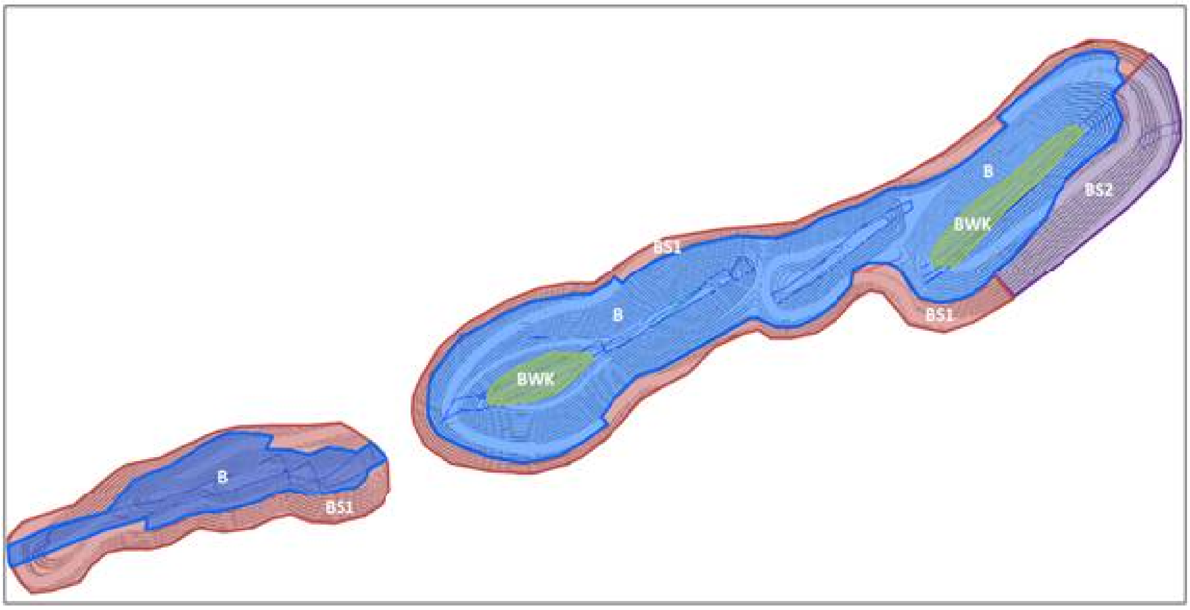


Figure 6-2: Beebyn: geotechnical pit domains used for slope design

Table 6-3: Recommended Madoonga slope design parameters

Wall	Domain	Domain design code & colour	Bench stack geometry				Bench scale geometry		
			Limiting stack height (m)	Geotechnical safety berm width (m)	Bench stack slope angles Empirical - analysis assessment		Bench height (m)	Bench face angle (°)	Spill berm width (m)
					BSA°	IRA°			
North	Saprolite	MS	50	15	37	35	10	50	6
	Weathered rock	MW	80	15	53	51	10	75	5.5
	Fresh rock	M	80	15	55	52.5	10	75	5
	BIF	M	80	15	55	52.5	10	75	5
South	Saprolite	MS	50	15	37	35	10	50	6
	Weathered rock	MW	80	15	53	51	10	75	5.5
	Fresh rock	M	80	15	55	52.5	10	75	5
South - central & western sectors	Saprolite	MS2	50	15	32	29	10	50	9.5
	Weathered rock	MW	80	15	53	51	10	75	5.5
	Fresh rock	M	80	15	55	52.5	10	75	5
East	BIF	M	80	15	55	52.5	10	75	5
West	BIF	M	80	15	55	52.5	10	75	5

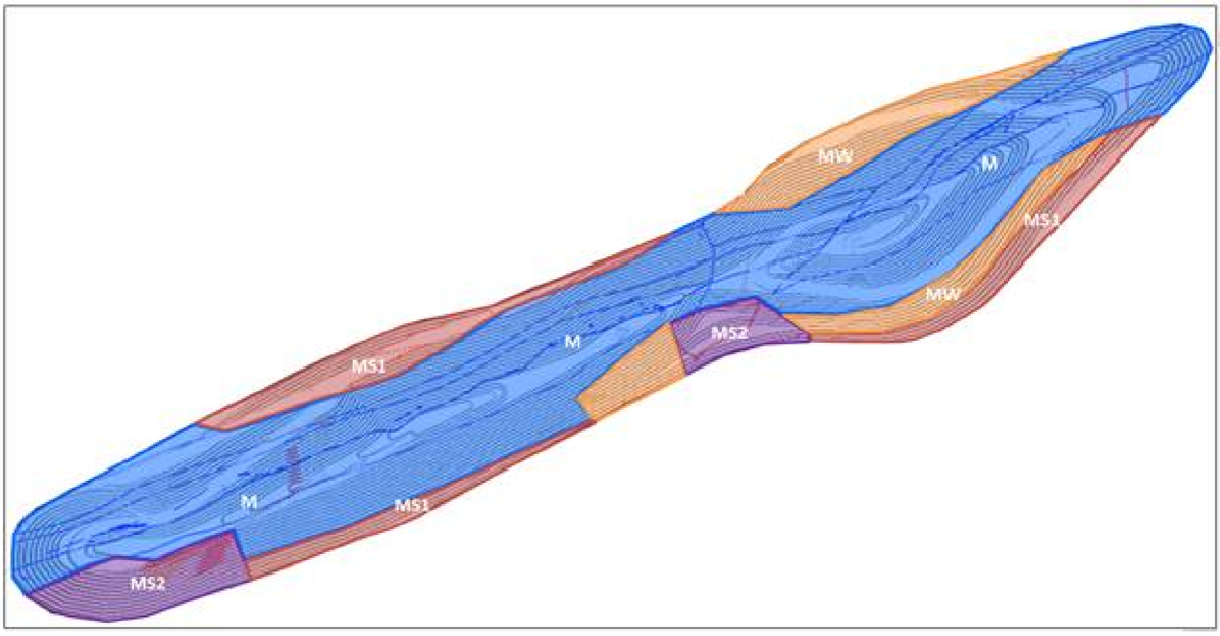


Figure 6-3: Madoonga: geotechnical pit domains used for slope design

6.3 Bench heights

The bench height design parameter was developed to suit the selected mining equipment as discussed in Section 3. The geotechnical slope guidelines have been developed on the early assumption of 10 m benches and hence have not been invalidated.

This bench height does not match the vertical increment in the mineral resource model, which was 12 m. As bench height is a function of mining equipment selection, not modelling methods, the difference is not unexpected. SRK do not see large issues with the differences, but would like to see a match between block heights and bench heights in the next study to ensure that optimisation and design targets relate as closely as possible.

6.3.1 Access and pit ramps

Access to the pits has been designed to suit the equipment selection and location of infrastructure outside the pit limits.

The ramp widths have been set at 30 m for dual-lane access and 15 m towards the bottom of the pits where single lane access is considered appropriate. The use of dual-lane access through the entire pit design creates significant increases in the amount of waste needed to be removed as the frequency of ramp intersections in the walls increases as the pit reduces in areal size at depth.

The dual lane haulage ramp width of 30m is 4.5 times the typical operating width of a 140t class haultruck. For two way traffic the rule of thumb is that the roadway width should be no less than four times the truck width. This was adhered to in the Weld Range mine designs.

The ramp widths take into account safety berms and drains as appropriate.

The ramp gradient is set at 10% (1 in 10) and is an industry accepted gradient for mining operations.

6.4 Beebyn mine design

The ultimate pit shell from the optimisation identified two broad mining areas named Beebyn Pods and Beebyn Main. These areas are shown in a general arrangement of the Beebyn mining area in Figure 6-4.

Beebyn Main pit is a large mining area in which several localised sections of mineralisation are joined by one large pit design. Due to the size of the pit and the local variations in grade, the Beebyn Main pit is proposed to be developed as a series of smaller pits that interact.

The Beebyn Main pit designs adhered to the Whittle™ pit shell output as far as practical. Issues related to the narrow base of the pit shells not being accessible in the design were largely resolved through the use of reduces width one-way ramps in the lower sections of the staged designs.

As discussed in Section 3.5, mineralisation encountered as part of the pre-stripping programme at Beebyn will be assigned to waste. This material has been estimated to include 273 kt of mineralisation and 491 kt of waste.

Including allowances for ore-loss as discussed in Section 5.4, a silica upper cut of 8.3% to meet product specification and pre-strip losses, the planned product produced from the Beebyn Main pits and the Beebyn pods reduces to a total of:

- Total product : 33.3 Mt
- Grade of Fe : 61.8%
- Grade of SiO_2 : 3.89%
- Grade of Al_2O_3 : 2.09%
- Grade of P : 0.08%
- LOI : 4.77%
- Grade of S : 0.01%
- Total waste : 242 Mt
- Strip Ratio : 7.2

Tables 6-4 to 6-21 reflect this material on bench by bench basis.

Table 6-4 defines the mineralised inventory within the Beebyn pit design reported by material classification.

Table 6-4: Beebyn pit design inventory by inventory classification

Classification	ROM(Mt)	Fe%	SiO_2%	Al_2O_3%
Measured	26.1	61.84	3.70	2.15
Indicated	4.0	61.46	4.39	1.85
Inferred	3.2	61.93	4.06	1.93
Unclassified	0.01	66.36	2.10	1.37
Total	**33.3**	**61.80**	**3.81**	**2.09**

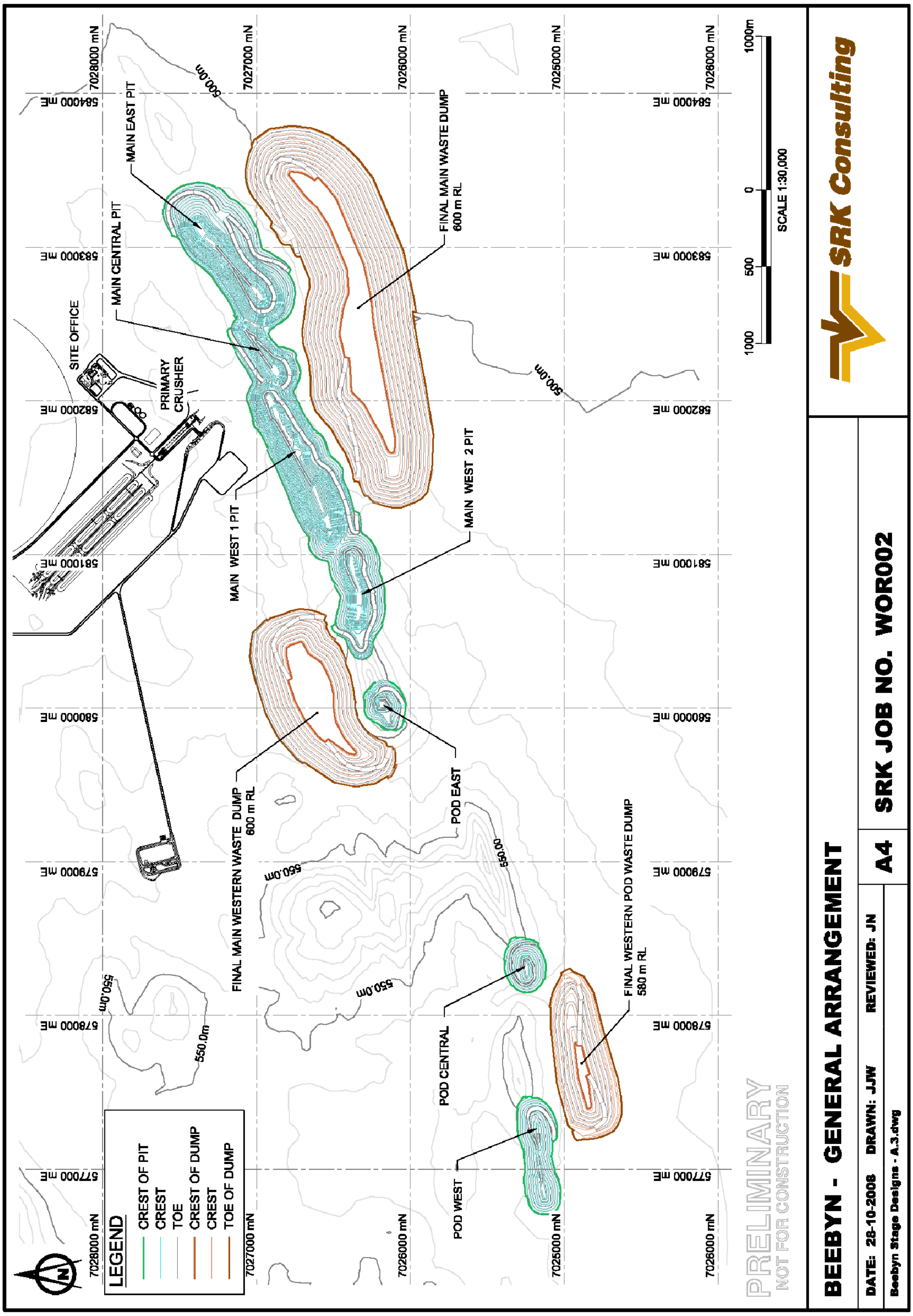


Figure 6-4: Beebyn general site arrangement

Table 6-5: Beebyn Main final pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)
576	-	2,694
564	-	68,295
552	-	126,589
540	-	284,549
528	-	41,874
516	-	10,059
Total	-	**534,060**

Table 6-6: Beebyn Main final pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%	P%	LOI%	S%	TiO_2%
576	-	192	-	-	-	-	-	-	-	-
564	454	190,083	418.4	59.07	5.95	2.13	0.08	6.68	0.02	0.08
552	74,243	820,763	11.1	59.53	5.12	2.20	0.10	6.66	0.04	0.09
540	629,975	2,911,303	4.6	61.79	3.50	2.52	0.08	4.84	0.06	0.11
528	1,427,677	10,005,906	7.0	62.09	3.54	2.47	0.08	4.52	0.05	0.11
516	1,943,482	24,449,417	12.6	61.72	3.81	2.40	0.09	4.78	0.04	0.10
504	2,124,597	30,843,731	14.5	61.78	3.81	2.34	0.09	4.70	0.02	0.10
492	2,189,588	27,714,714	12.7	61.91	3.76	2.29	0.09	4.68	0.01	0.11
480	2,286,243	23,844,150	10.4	61.81	3.85	2.24	0.09	4.80	0.01	0.11
468	2,372,065	20,184,602	8.5	61.77	3.87	2.16	0.09	4.84	0.01	0.11
456	2,380,022	16,981,524	7.1	61.77	3.89	2.03	0.08	4.80	0.01	0.10
444	2,357,567	14,025,793	6.0	61.54	4.09	2.00	0.08	4.79	0.01	0.11
432	2,279,660	11,611,793	5.1	61.33	4.13	1.97	0.08	4.73	0.01	0.11
420	2,122,482	9,471,828	4.5	61.53	4.00	1.93	0.08	4.67	0.01	0.11
408	1,805,681	7,308,651	4.1	62.27	3.49	1.87	0.08	4.33	0.01	0.11
396	1,571,362	5,680,894	3.6	62.74	3.21	1.86	0.08	4.06	0.01	0.11
384	1,419,153	4,318,164	3.0	62.99	2.99	1.76	0.08	4.05	0.01	0.11
372	1,168,964	3,185,939	2.7	63.38	2.86	1.68	0.08	3.81	0.00	0.10
360	832,436	2,120,101	2.6	63.65	2.79	1.61	0.08	3.48	0.00	0.10
348	584,095	1,030,222	1.8	63.81	2.88	1.59	0.08	3.27	0.00	0.10
336	330,570	367,148	1.1	64.19	3.17	1.53	0.07	2.99	0.00	0.10
324	108,087	95,913	0.9	64.10	3.52	1.41	0.07	2.87	0.00	0.09
Total	**30,008,403**	**217,162,831**	**7.2**	**62.05**	3.68	2.07	0.08	4.53	0.01	0.11

6.4.1 Beebyn Main pit final design

The Beebyn Main pit is the largest Beebyn mining area. The Beebyn Main pit contains four sections of mineralisation that are offset by geological faults.

The design criteria used in the Beebyn Main pit considered:

- mining sequence defined by early access to good ore,
- most of the waste haulage to the south, and
- ore haulage ramps to the north to match access to the primary crusher.

The ore haulage ramps all exit at the north side of the pit to minimise the haul route between the pit and the RoM pad. The waste haulage ramps are designed to exit on the south side of the pit to minimise waste haulage distances to the waste dumps. Each section of the mine has ramps to access the ore at depth. As ramps flatten the overall pit-wall slopes, ramps have been designed to be shared between the Beebyn Main pit mining areas to reduce the number of ramps in the final design.

Access to the lower sections of the design features reduced ramp widths, which improves the conversion of mineralised inventory contained in an optimisation pit shell to that contained in a mine design. The reduced width ramps will affect on the productivity of the mining areas when physically mined as no passing bays have been allowed for in the mine design at this stage. The Beebyn Main pit design is shown in Figure 6-5.

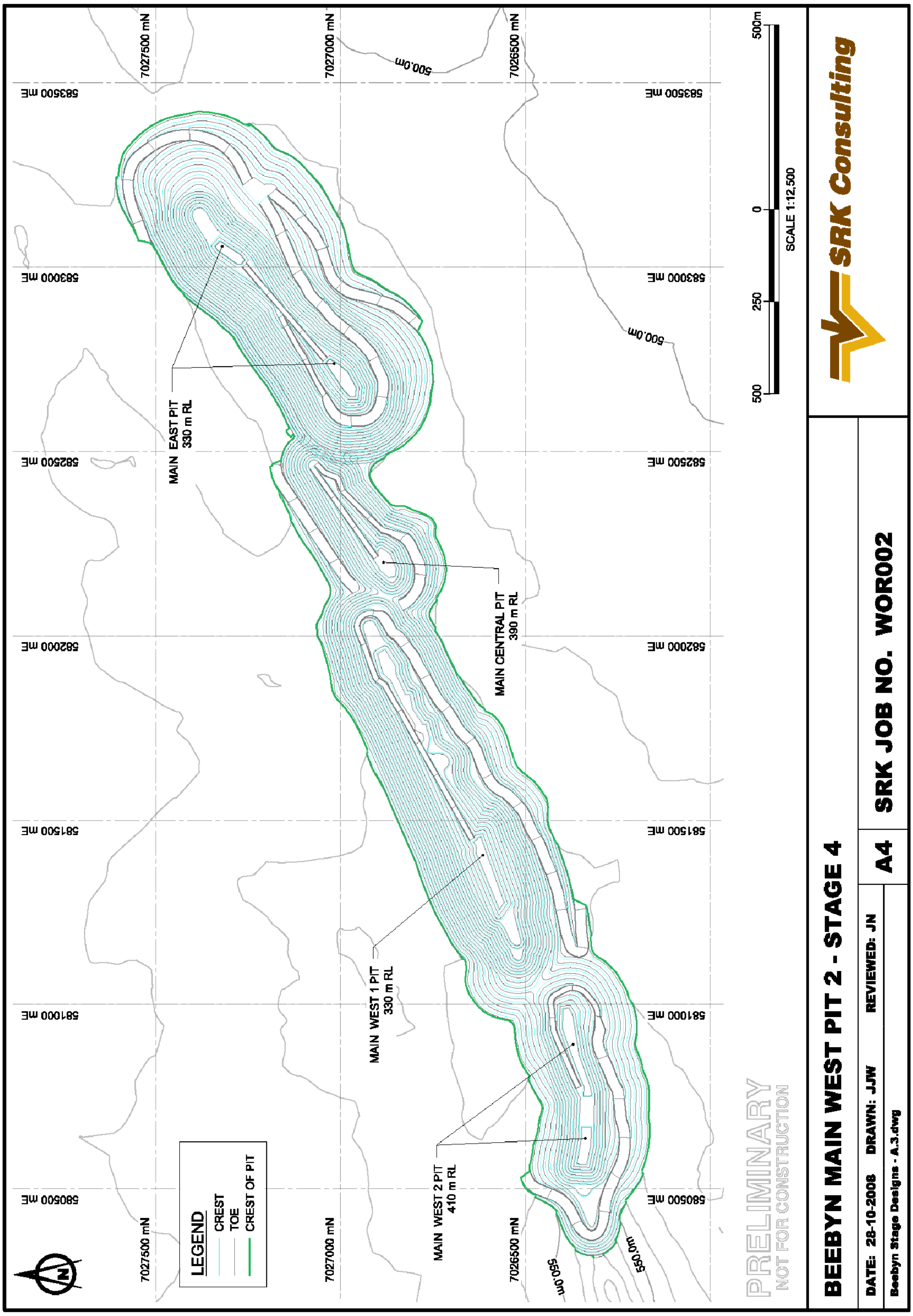


Figure 6-5: Beebyn Main Pit final design

6.4.2 Staging of the Beebyn Main pit design

The final Beebyn Main pit mine design recognises that the Beebyn deposit can be mined in several locations simultaneously. The sequencing of the Beebyn Main pit development leads to staged pit designs being created.

6.4.2.1 Beebyn Stage 1 - Main East pit design

The Beebyn Main East pit design is planned to be the initial development of the Beebyn Main pit area. Beebyn Main East pit allows rapid access to ore, close to product specifications; hence start-up product quality can be managed without having to rely on blending systems. Pre-stripping is required as the pit is located below ridges.

One ramp is used to provide access for both ore and waste haulage. The ramp narrows to single lane access near the pit floor. The Beebyn Main East pit design is shown in Figure 6-6. The inventories given in Table 6-7 and Table 6-8 account for ore-loss, pre-strip losses and are at a silica upper cut of 8.3% to meet the product specifications.

Table 6-7: Beebyn Main East pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)
540	-	34,183
528	-	160,129
516	-	11,435
504	-	956
Total	**-**	**206,702**

Table 6-8: Beebyn Main East pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
540	223,000	400,942	1.8	64.15	2.87	2.53
528	565,847	2,142,192	3.8	64.49	2.8	2.49
516	637,268	6,924,207	10.9	64.4	2.83	2.48
504	687,271	11,983,682	17.4	64.35	2.9	2.43
492	698,642	11,378,842	16.3	64.57	2.78	2.34
480	691,642	9,827,132	14.2	64.44	2.89	2.2
468	682,939	8,357,619	12.2	64.53	2.76	2.04
456	647,444	7,040,466	10.9	64.64	2.43	1.91
444	626,835	5,898,942	9.4	64.23	2.54	1.94
432	627,354	4,981,482	7.9	64.03	2.69	1.97
420	632,608	4,215,541	6.7	64.33	2.79	1.9
408	638,494	3,511,444	5.5	64.66	2.77	1.74
396	633,246	2,919,345	4.6	64.96	2.53	1.66
384	607,197	2,342,634	3.9	64.93	2.41	1.56
372	544,470	1,843,167	3.4	64.87	2.36	1.44
360	463,317	1,394,343	3.0	64.9	2.22	1.46
348	324,156	707,448	2.2	65.14	2.05	1.46
336	146,762	246,457	1.7	65.81	1.94	1.47
324	43,345	70,525	1.6	66.12	1.87	1.45
Total	**10,121,835**	**86,186,408**	**8.5**	**64.58**	**2.63**	**1.97**

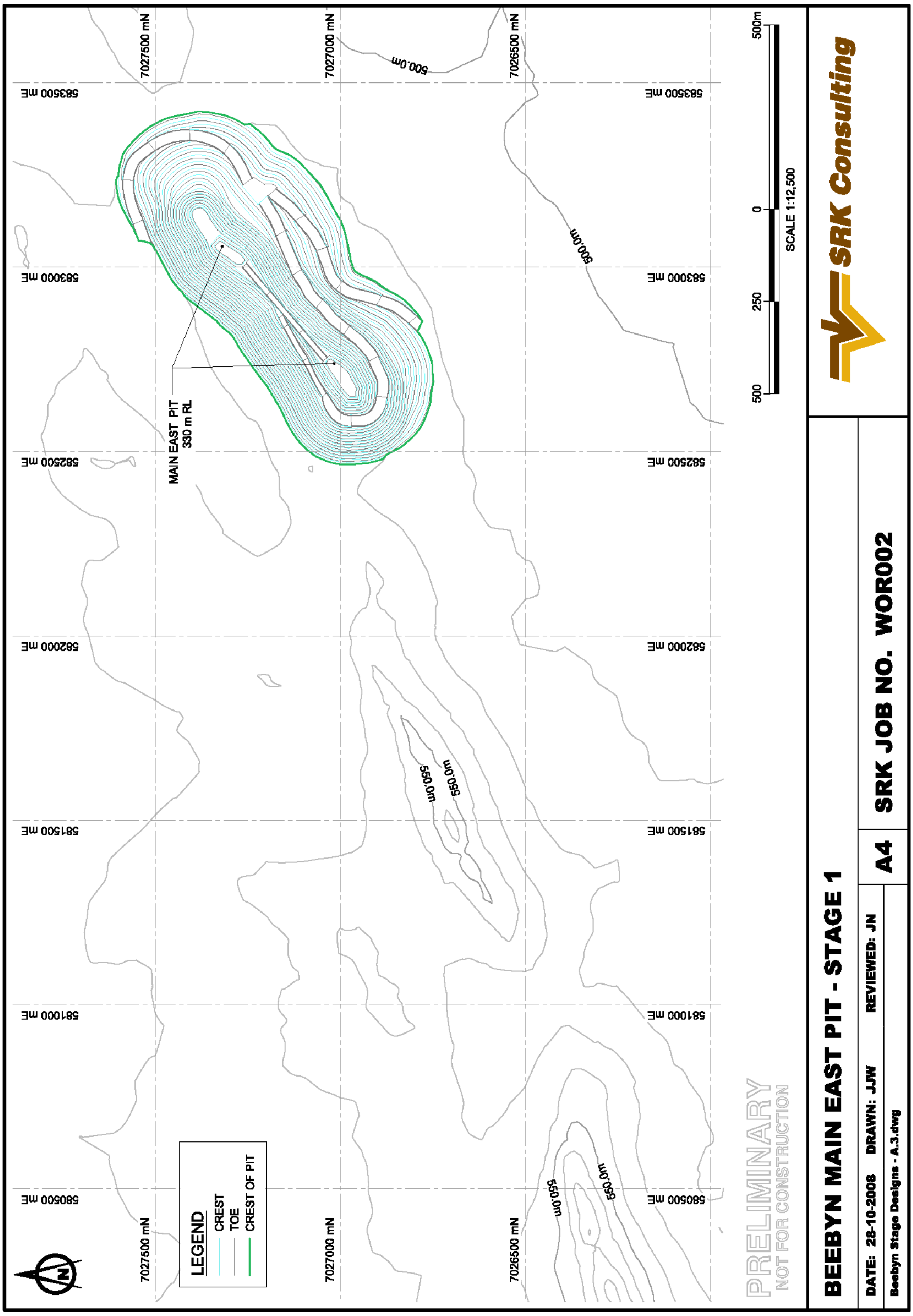


Figure 6-6: Beebyn Stage 1 Main East pit design

6.4.2.2 Beebyn Stage 2 - Main West 1 pit design

The Beebyn Main West 1 pit Stage 2 design is independent of the Beebyn Main East pit design. Ramps are established to ore and waste to the north and south. The ramp narrows to single-lane access near the pit floor.

Pre-stripping is required as the pit is below ridges.

Beebyn Main West 1 pit Stage 2 is intended to be developed either at the same time or offset from Beebyn Main East pit. Ore is generally good quality. The Beebyn Main West 1 pit Stage 2 design is shown in Figure 6-7. The inventory for the Beebyn Main West 1pit Stage 2 design is listed in Table 6-9 and Table 6-10.

Table 6-9: Beebyn Main West 1 pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)
552	-	73,209
540	-	117,912
528	-	28,508
516	-	1,029
Total	**-**	**220,658**

Table 6-10: Beebyn Main West 1 pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
552	26,402	47,365	1.8	60.85	2.91	2.4
540	286,628	1,011,029	3.5	61.15	3.07	2.61
528	608,002	4,803,971	7.9	61.2	3.3	2.57
516	798,707	11,080,798	13.9	60.96	3.43	2.48
504	885,121	11,315,100	12.8	61.07	3.34	2.39
492	928,625	9,932,809	10.7	61.12	3.31	2.31
480	970,818	8,744,326	9.0	61.17	3.31	2.33
468	1,016,959	7,588,109	7.5	61.18	3.31	2.31
456	1,018,875	6,656,479	6.5	61.29	3.46	2.24
444	988,903	5,722,665	5.8	61.31	3.65	2.25
432	962,896	4,891,352	5.1	61.26	3.74	2.22
420	928,862	4,094,545	4.4	61.41	3.66	2.17
408	889,668	3,255,775	3.7	61.59	3.41	2.08
396	858,227	2,578,492	3.0	61.6	3.4	2.02
384	779,842	1,940,292	2.5	61.66	3.31	1.92
372	624,495	1,342,772	2.2	62.08	3.31	1.89
360	369,119	725,757	2.0	62.09	3.51	1.81
348	259,940	322,774	1.2	62.14	3.92	1.75
336	183,736	119,907	0.7	62.9	4.16	1.57
324	64,756	25,375	0.4	62.75	4.62	1.39
Total	**13,450,582**	**86,199,691**	**6.4**	**61.39**	**3.45**	**2.2**

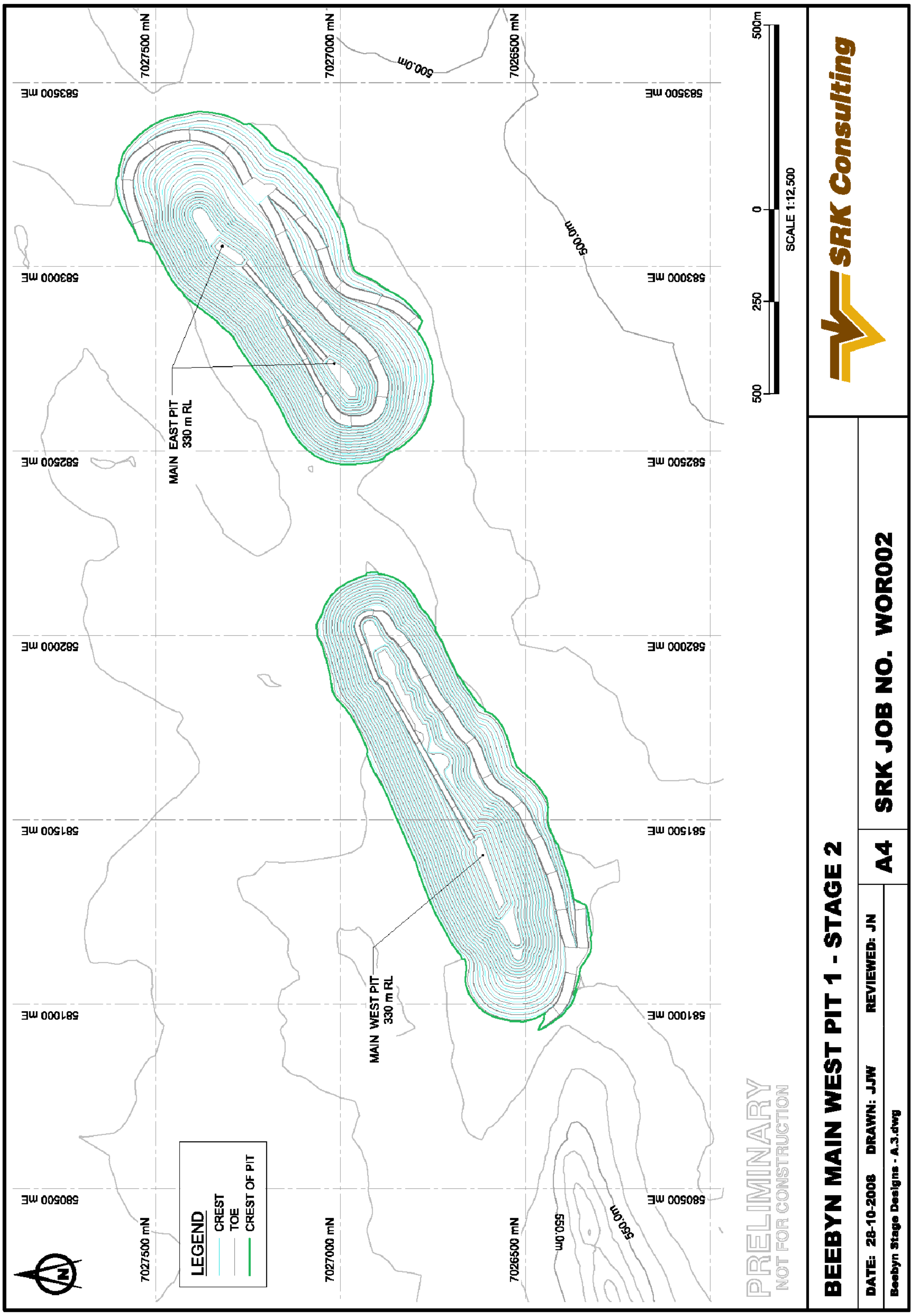


Figure 6-7: Beebyn Main West 1 Stage 2 pit design

6.4.2.3 Beebyn Stage 3 - Main Central pit design

The Beebyn Main Central pit design, joins the east and west components of the Beebyn main design. The pit inventory within the Main Central pit area generally has a lower Fe grade and has relatively high contaminant levels.

The Beebyn Main Central pit design is, however, exposed at surface and requires little pre-strip, hence will be readily accessible once mining is established. Access to the Main Central pit will be via its own internal ramp via east or west cutbacks depending on the relative development rates of the pits. The Beebyn Main Central pit is intended to be mined behind the east and west cutbacks, but can be mined simultaneously if required.

The Main Central pit design is shown in Figure 6-8. The Beebyn Main Central pre-strip amounts are listed in Table 6-11. The Beebyn Main Central pit design inventory, after the pre-strip is listed in Table 6-11.

Table 6-11: Beebyn Main Central pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)
528	-	1,931
516	-	7,188
Total	**-**	**9,119**

Table 6-12: Beebyn Main Central pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
528	1,313	13,286	10.1	57.44	5.8	2.46
516	206,598	1,829,153	8.9	60.16	5.54	2.35
504	292,954	2,994,709	10.2	60.42	5.45	2.33
492	346,722	2,565,258	7.4	60.65	5.48	2.29
480	388,366	2,209,630	5.7	60.81	5.68	2.2
468	418,790	1,889,863	4.5	60.75	6.01	2.07
456	442,399	1,541,854	3.5	60.28	6.4	1.89
444	428,196	1,160,185	2.7	59.64	6.74	1.83
432	355,916	913,731	2.6	58.47	6.86	1.75
420	244,618	679,531	2.8	57.38	7.01	1.71
408	116,791	403,616	3.5	57.59	6.51	1.71
396	79,888	183,058	2.3	57.53	6.55	1.66
384	32,114	35,238	1.1	58.59	6.33	1.43
Total	**3,354,665**	**16,419,112**	**4.9**	**59.78**	**6.18**	**2.00**

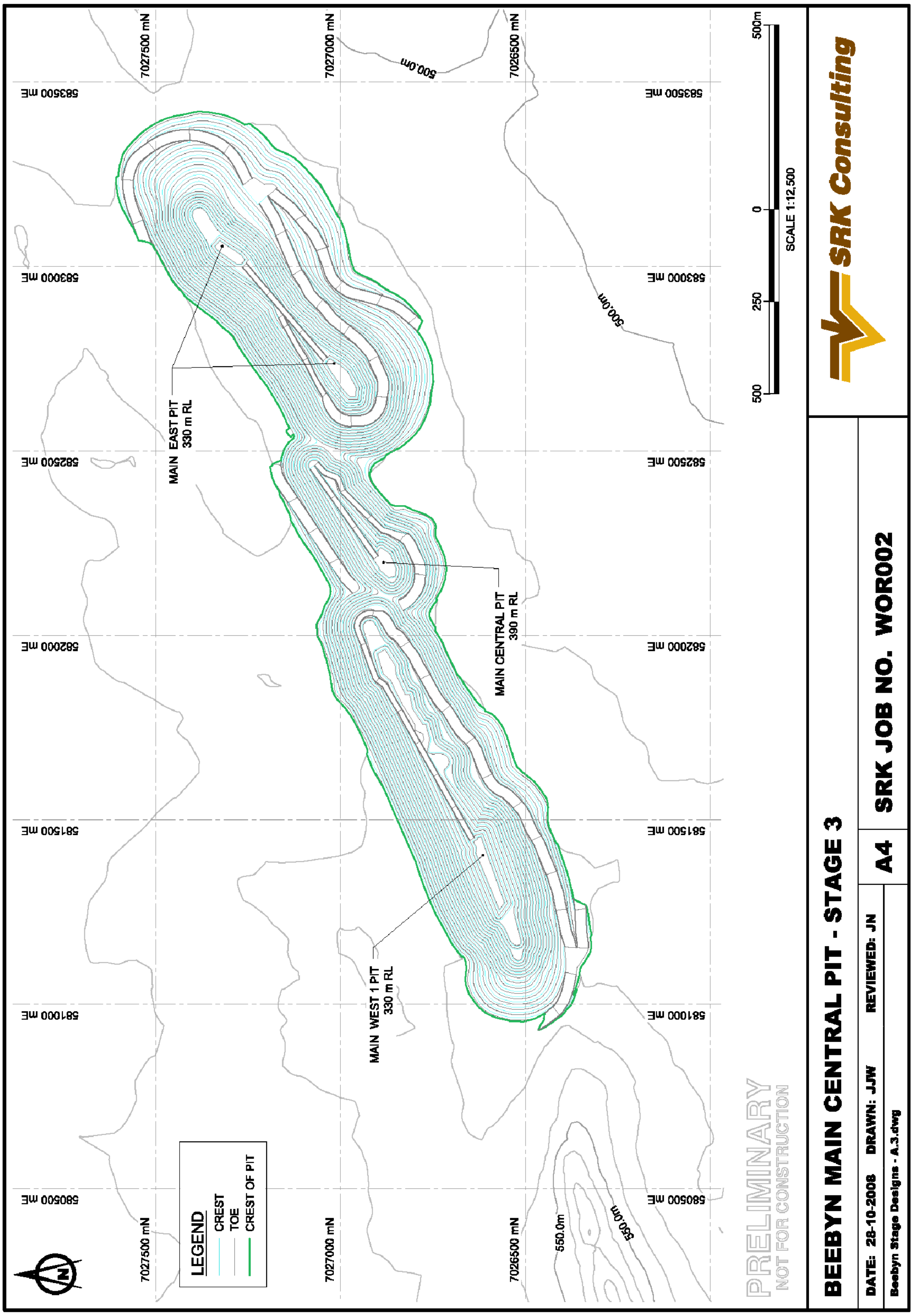


Figure 6-8: Beebyn Main Central Stage 3 pit design

6.4.2.4 Beebyn Stage 4 - Main West 2 pit design

The final stage of mining for the Beebyn Main pit is to mine the remaining western side of the Beebyn Main West 1 pit. On completion of the Beebyn Main West 2 Stage 4 cutback, the Main Beebyn pit is completely mined as shown in Figure 6-5. Beebyn Main West 2 Stage 4 incorporates independent ore and waste haulage ramps, allowing for shorter ore and waste haul as well as easier access to each mining area.

The Beebyn Main West 2 Stage 4 design is shown in Figure 6-5, as part of the Beebyn Main pit design.

The Beebyn Main West 2 Stage 4 inventories are listed in Table 6-13 and Table 6-14.

Table 6-13: Beebyn Main West 2 Stage 4 pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)
576	-	2,694
564	-	68,295
552	-	19,197
540	-	6,507
Total	**-**	**96,695**

Table 6-14: Beebyn Main West 2 Stage 4 pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
576	-	192	-	-	-	-
564	454	190,083	418.4	59.07	5.95	2.13
552	47,841	773,398	16.2	58.8	6.33	2.08
540	120,347	1,499,333	12.5	58.93	5.68	2.3
528	253,045	3,046,457	12.0	58.86	5.74	2.2
516	301,196	4,615,260	15.3	59.1	5.67	2.04
504	259,251	4,550,491	17.6	58.96	5.93	1.98
492	215,600	3,837,471	17.8	58.66	6.06	2
480	235,418	3,063,111	13.0	58.37	5.88	2.02
468	253,377	2,349,187	9.3	58.4	5.62	2
456	271,304	1,742,855	6.4	59.16	4.88	1.77
444	313,633	1,243,800	4.0	59.45	4.93	1.58
432	333,494	825,229	2.5	59.52	5.06	1.51
420	316,394	482,211	1.5	59.48	5.11	1.41
408	160,728	137,816	0.9	59.97	4.56	1.33
Total	**3,082,082**	**28,356,894**	**9.2**	**59.08**	**5.42**	**1.82**

6.4.3 Beebyn Pods

The Beebyn Pods form a group of three independent pits located to the west of the Beebyn Main pit. The combined Beebyn Pods are small and lower grade with higher contaminant levels. Each of the Beebyn Pods pit designs has single ramp access to handle both ore and waste haulage to minimise the Strip ratio. The Beebyn Central pod is very small and hence utilises a 15 m wide ramp. The East and West pods both feature a 30 m wide ramp that narrows to 15 m at depth.

Mining of the pods is independent of the Beebyn Main pit.

The Beebyn Pod pit designs are shown in Figure 6-9. The associated pit design inventory is listed in Table 6-15 and Table 6-16.

Table 6-15: Beebyn Pods pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)
576	-	88,616
564	-	19,719
552	-	123,965
540	-	27,130
528	-	8,507
Total	**-**	**267,937**

Table 6-16: Beebyn Pods pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%	P%	LOI%	S%	TiO_2%
576	235	46,096	195.9	57.37	7.44	2.38	0.13	7.21	0.02	0.12
564	58,290	575,325	9.9	57.62	7.57	2.38	0.12	6.98	0.02	0.13
552	74,937	1,300,450	17.4	57.72	7.58	2.31	0.11	6.88	0.02	0.13
540	179,258	2,724,476	15.5	57.82	6.64	2.46	0.11	7.27	0.02	0.10
528	433,838	5,162,917	11.9	58.27	6.40	2.46	0.11	7.20	0.02	0.10
516	569,389	5,938,652	10.4	58.67	6.10	2.40	0.11	7.10	0.02	0.09
504	551,708	4,074,966	7.4	59.04	5.74	2.40	0.11	7.04	0.01	0.09
492	491,377	2,609,737	5.3	59.51	5.30	2.30	0.12	6.83	0.01	0.08
480	430,149	1,441,742	3.4	59.53	5.30	2.18	0.12	6.81	0.01	0.08
468	320,182	493,949	1.5	59.72	5.00	2.15	0.13	6.65	0.01	0.09
456	169,137	98,116	0.6	59.54	5.04	2.24	0.13	6.76	0.00	0.10
444	32,469	13,872	0.4	59.44	4.95	2.28	0.13	7.02	0.00	0.10
Total	3,310,970	24,480,298	7.4	58.98	5.77	2.33	0.12	6.96	0.01	0.09

Table 6-17 through to Table 6-22 detail the inventory of the individual Beebyn Pods.

Table 6-17: Beebyn Pods East pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)
576	-	88,616
564	-	18,446
552	-	3,292
Total	**-**	**110,353**

Table 6-18: Beebyn Pods East pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
576	235	46,096	195.9	57.37	7.44	2.38
564	58,290	575,325	9.9	57.62	7.57	2.38
552	74,145	1,188,146	16.0	57.72	7.58	2.31
540	74,267	1,340,722	18.1	57.94	7.44	2.25
528	74,726	1,030,580	13.8	58.12	7.25	2.24
516	64,723	647,593	10.0	58.37	7.08	2.15
504	47,253	354,232	7.5	58.14	7.26	2.2
492	22,940	164,541	7.2	58.48	6.46	2.24
480	11,508	52,696	4.6	58.41	6.79	2.16
Total	**428,088**	**5,399,931**	**12.6**	**58.02**	**7.3**	**2.25**

Table 6-19: Beebyn Pods Central pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)
564	-	1,164
552	-	85,955
540	-	6,406
528	-	539
Total	**-**	**94,064**

Table 6-20: Beebyn Pods Central pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
540	25,585	570,604	22.3	58.1	7	2.52
528	130,140	1,634,814	12.6	58.89	6.77	2.25
516	157,221	1,737,471	11.1	59.2	6.79	2.07
504	162,997	1,207,438	7.4	60.46	5.31	2.03
492	158,525	754,026	4.8	61.44	4.21	2.06
480	144,717	379,792	2.6	60.8	4.49	2.13
468	109,810	104,498	1.0	60.75	4.59	2.23
456	38,924	19,359	0.5	61.12	4.51	2.29
Total	**927,919**	**6,408,002**	**7.0**	**60.24**	**5.38**	**2.14**

Table 6-21: Beebyn Pods West pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)
564	-	109
552	-	34,719
540	-	20,723
528	-	7,968
Total	**-**	**63,519**

Table 6-22: Beebyn Pods West pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
552	792	55,833	70.5	57.68	7.85	2.75
540	79,406	869,621	11.0	57.63	5.77	2.63
528	228,973	2,497,523	10.9	57.97	5.91	2.65
516	347,445	3,553,589	10.2	58.49	5.61	2.59
504	341,458	2,513,296	7.4	58.49	5.74	2.61
492	309,912	1,691,170	5.5	58.59	5.78	2.43
480	273,923	1,009,254	3.7	58.91	5.66	2.2
468	210,372	389,451	1.9	59.17	5.22	2.1
456	130,214	78,757	0.6	59.07	5.2	2.23
444	32,470	13,873	0.4	59.44	4.95	2.28
Total	**1,954,964**	**12,672,365**	**6.5**	**58.6**	**5.63**	**2.44**

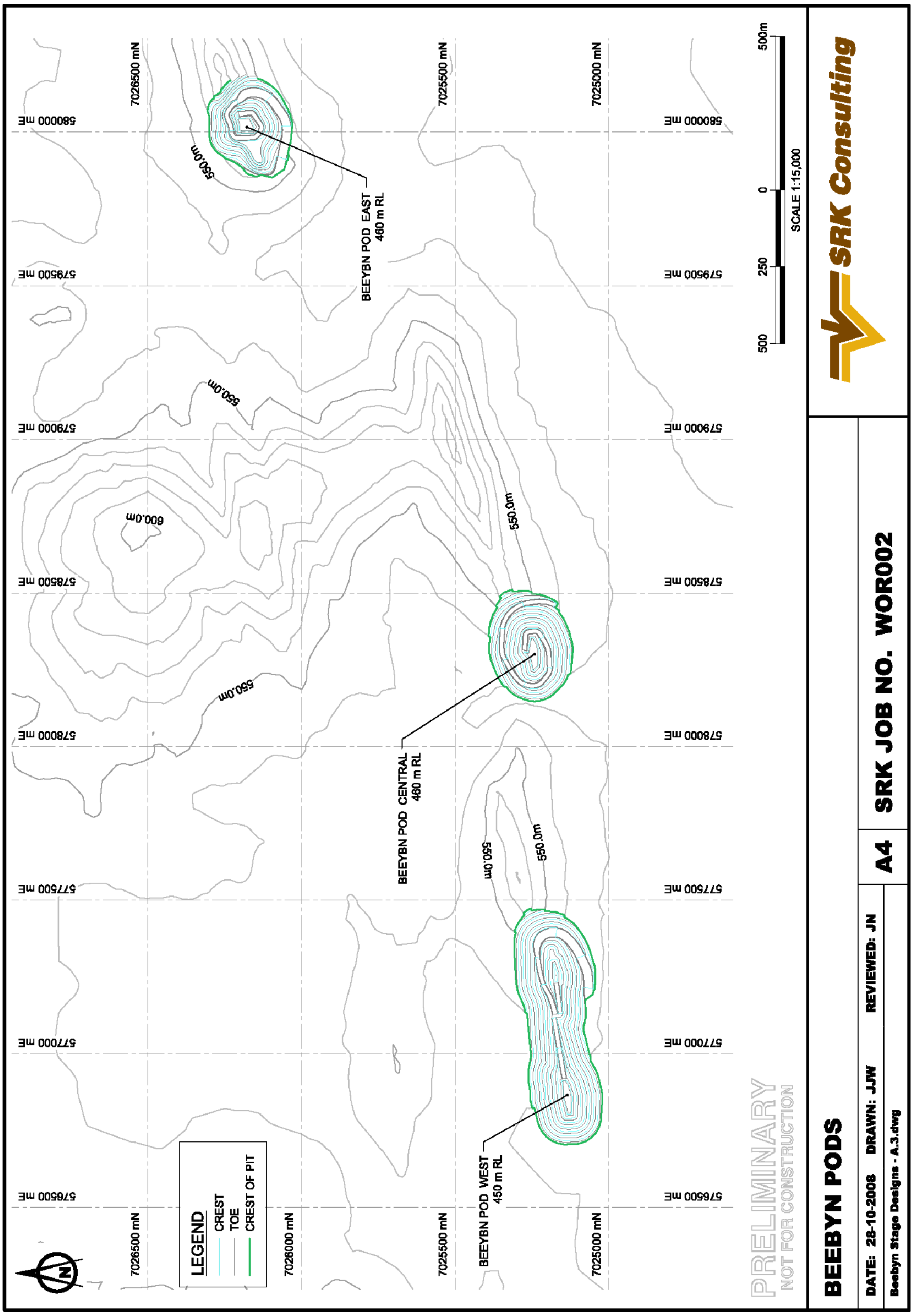


Figure 6-9: Beebyn Pods pit design

6.5 Madoonga final pit design

The Madoonga final pit design was based on the ultimate pit shell selected from the pit optimisation process.

A general arrangement drawing of the Madoonga mining area is shown in Figure 6-10.

As discussed in Section 3.5, only small quantities of mineralisation encountered as part of the pre-stripping programme at Madoonga are anticipated. This material has been estimated to be 59 kt mineralisation and 5.0 Mt waste.

Including allowances for ore-loss as discussed in Section 5.4, silica upper cut of 8.3% to meet product specification and pre-strip losses, the planned production from Madoonga is:

- Total product : 36.1 Mt
- Grade of Fe : 58.4%
- Grade of SiO_2 : 5.13%
- Grade of Al_2O_3 : 2.08%
- Grade of P : 0.08%
- LOI : 8.25%
- Grade of S : 0.08%
- Total waste : 152 Mt
- Strip Ratio : 4.2

Table 6-23 defines the mineralised inventory within the Madoonga pit design reported by material classification.

Table 6-23: Madoonga final pit design inventory by classification

Classification	ROM(Mt)	Fe%	SiO_2%	Al_2O_3%
Measured	7.3	57.58	5.49	2.49
Indicated	26.3	58.64	4.95	2.02
Inferred	2.5	58.31	6.01	1.56
Unclassified	0.01	58.28	5.89	0.89
Total	**36.1**	**58.40**	**5.13**	**2.08**

Table 6-24: Madoonga final pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
576	2,854	76,090	13.4	56.00	7.67	1.97
564	12,952	34,670	2.7	59.40	5.52	1.93
552	37,012	8,751	0.2	60.50	4.71	2.22
540	1,058	35,554	33.6	59.81	4.74	1.69
528	3,047	1,919,447	630.0	55.53	6.86	2.97
516	1,908	1,899,820	995.7	56.14	5.87	2.79
504	337	849,387	2,519.7	56.27	5.67	2.48
492	152	149,842	985.2	56.71	6.40	2.04
Total	**59,320**	**4,973,561**	**83.2**	**59.60**	**5.19**	**2.19**

Table 6-25: Madoonga final pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%	P%	LOI%	S%	TiO_2%
564	158,293	519,150	3.3	57.48	6.92	2.04	0.29	8.15	0.08	0.14
552	427,556	1,018,920	2.4	58.81	5.79	2.30	0.08	7.05	0.07	0.15
540	911,857	1,728,438	1.9	58.69	5.62	2.21	0.09	7.33	0.07	0.18
528	1,200,142	4,117,702	3.4	58.74	5.28	2.19	0.09	7.60	0.07	0.19
516	1,485,810	11,479,193	7.7	58.79	5.11	2.17	0.09	7.28	0.07	0.23
504	1,869,364	17,144,437	9.2	58.32	5.30	2.37	0.07	7.60	0.07	0.28
492	2,615,135	18,233,695	7.0	58.08	5.11	2.31	0.07	8.47	0.07	0.30
480	3,001,003	18,185,295	6.1	58.20	4.85	2.29	0.07	8.74	0.07	0.29
468	3,119,740	15,288,166	4.9	58.24	4.76	2.27	0.07	8.65	0.07	0.29
456	3,114,963	12,897,665	4.1	58.22	4.84	2.23	0.07	8.58	0.06	0.28
444	3,147,075	10,695,846	3.4	58.00	5.23	2.20	0.07	8.67	0.06	0.28
432	2,902,855	8,928,918	3.1	58.21	4.96	2.10	0.07	8.72	0.07	0.27
420	2,538,247	7,297,595	2.9	58.20	5.06	2.11	0.07	8.62	0.08	0.29
408	2,146,724	5,672,114	2.6	58.28	5.11	2.13	0.07	8.43	0.10	0.29
396	1,896,613	4,006,893	2.1	58.33	5.39	1.86	0.07	8.21	0.10	0.28
384	1,535,936	2,927,449	1.9	58.63	5.41	1.72	0.08	7.99	0.10	0.28
372	1,091,288	2,138,979	2.0	58.77	5.32	1.59	0.08	8.04	0.11	0.25
360	846,228	1,537,418	1.8	59.21	5.09	1.44	0.09	7.89	0.11	0.25
348	636,314	1,128,305	1.8	59.67	5.25	1.22	0.10	7.23	0.12	0.22
336	611,845	711,021	1.2	59.63	5.69	1.19	0.10	7.00	0.13	0.24
324	443,701	548,922	1.2	59.61	5.58	1.29	0.10	6.97	0.12	0.24
312	244,073	432,205	1.8	59.60	5.64	1.24	0.10	6.76	0.11	0.30
300	109,788	204,364	1.9	58.88	6.61	1.22	0.11	7.87	0.12	0.43
Total	36,054,550	146,842,690	4.1	58.40	5.13	2.08	0.08	8.25	0.08	0.27

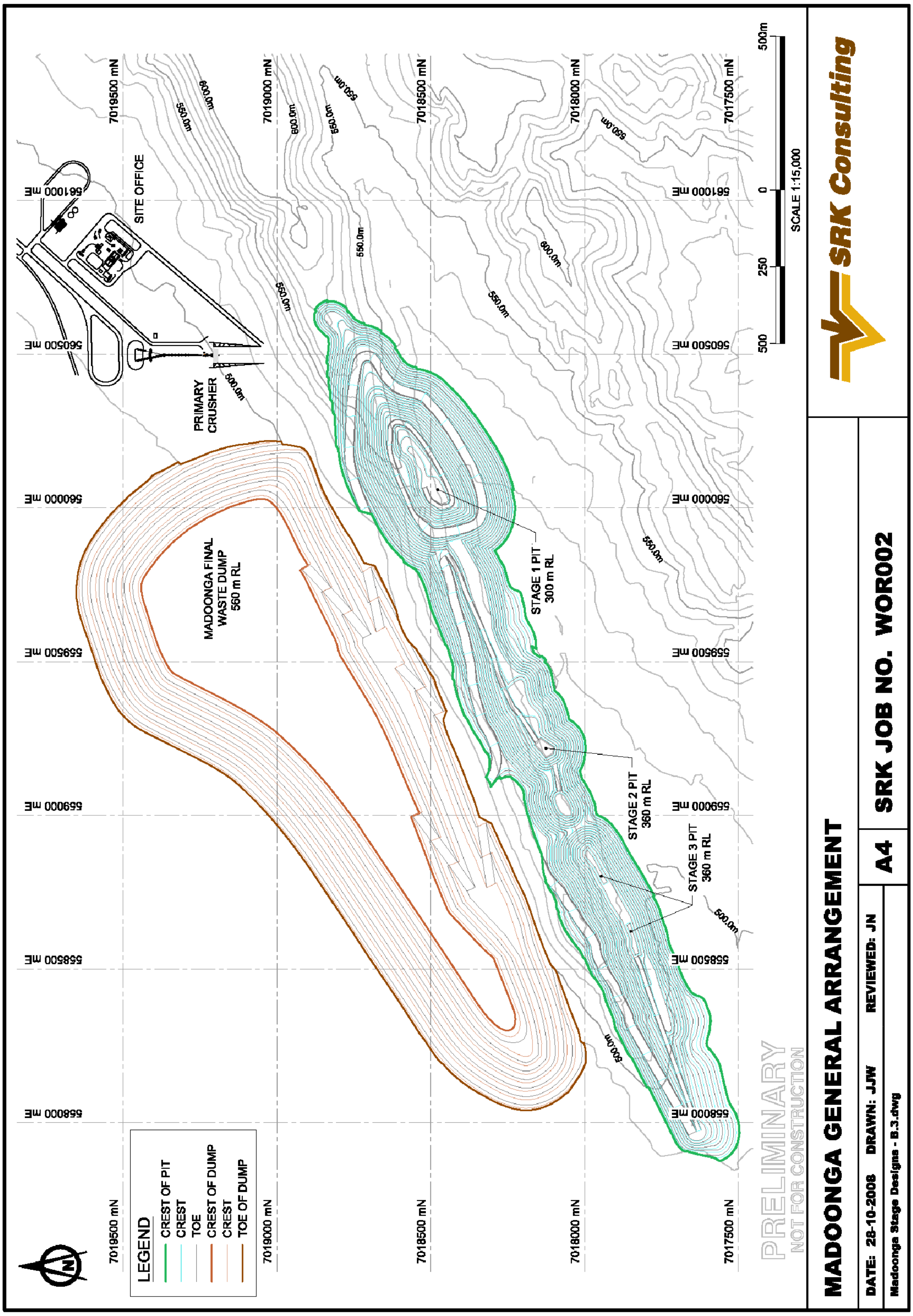


Figure 6-10: Madoonga general site arrangement

6.5.1 Staging of the Madoonga final pit design

The Madoonga orebody was split into three stages for sequencing purposes.

6.5.1.1 Madoonga Stage 1 pit design

Stage 1 of Madoonga final pit design targets the eastern section of the Madoonga orebody. This area exhibits a relatively high Fe grade (>59% Fe) and continues to depth with a near continuous mineralisation width of 100 m (in plan view).

This stage design features an independent ramp system in the upper benches that reduces to a single 15 m wide ramp at depth.

The Madoonga Stage 1 final pit design pre-strip inventory is shown in Table 6-26. Table 6-26 and Table 6-27 list the associated bench by bench pit design inventories. These inventories account for ore-loss, pre-strip losses and use a silica upper cut of 8.3% to meet the product specifications.

Table 6-26: Madoonga Stage 1 pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
576	2,854	76,090	13.4	56	7.67	1.97
564	12,952	34,670	2.7	59.4	5.52	1.93
552	37,012	8,751	0.2	60.5	4.71	2.22
540	1,058	10,848	10.3	59.81	4.74	1.69
528	151	74,393	492.7	57.23	5.47	2.48
Total	**54,027**	**166,952**	**3.1**	**59.98**	**5.07**	**2.12**

Table 6-27: Madoonga Stage 1 pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
564	158,294	519,150	3.3	57.48	6.92	2.04
552	427,556	1,018,920	2.4	58.81	5.79	2.3
540	911,857	1,728,438	1.9	58.69	5.62	2.21
528	1,184,661	3,380,818	2.9	58.79	5.25	2.18
516	1,305,352	6,616,184	5.1	59.23	4.89	2.07
504	1,320,433	7,806,650	5.9	59.35	4.73	2.18
492	1,358,794	7,004,721	5.2	59.22	4.57	2.04
480	1,336,055	6,285,719	4.7	59.36	4.25	1.97
468	1,219,343	5,693,310	4.7	59.47	4.02	1.91
456	1,158,599	5,069,892	4.4	59.58	3.85	1.82
444	1,063,436	4,575,740	4.3	58.9	4.64	1.83
432	915,787	4,135,643	4.5	59.02	4.57	1.82
420	874,655	3,601,228	4.1	59.1	4.66	1.8
408	784,218	3,122,647	4.0	59.52	4.55	1.73
396	906,858	2,495,099	2.8	59.21	5.22	1.57
384	829,321	2,121,681	2.6	59.55	5.13	1.49
372	716,276	1,817,305	2.5	59.71	4.91	1.35
360	704,112	1,463,573	2.1	59.6	5.01	1.27
348	636,314	1,128,305	1.8	59.67	5.25	1.22
336	611,845	711,021	1.2	59.63	5.69	1.19
324	443,701	548,922	1.2	59.61	5.58	1.29
312	244,073	432,205	1.8	59.6	5.64	1.24
300	109,788	204,364	1.9	58.88	6.61	1.22
Total	**19,221,326**	**71,481,536**	**3.7**	**59.27**	**4.84**	**1.82**

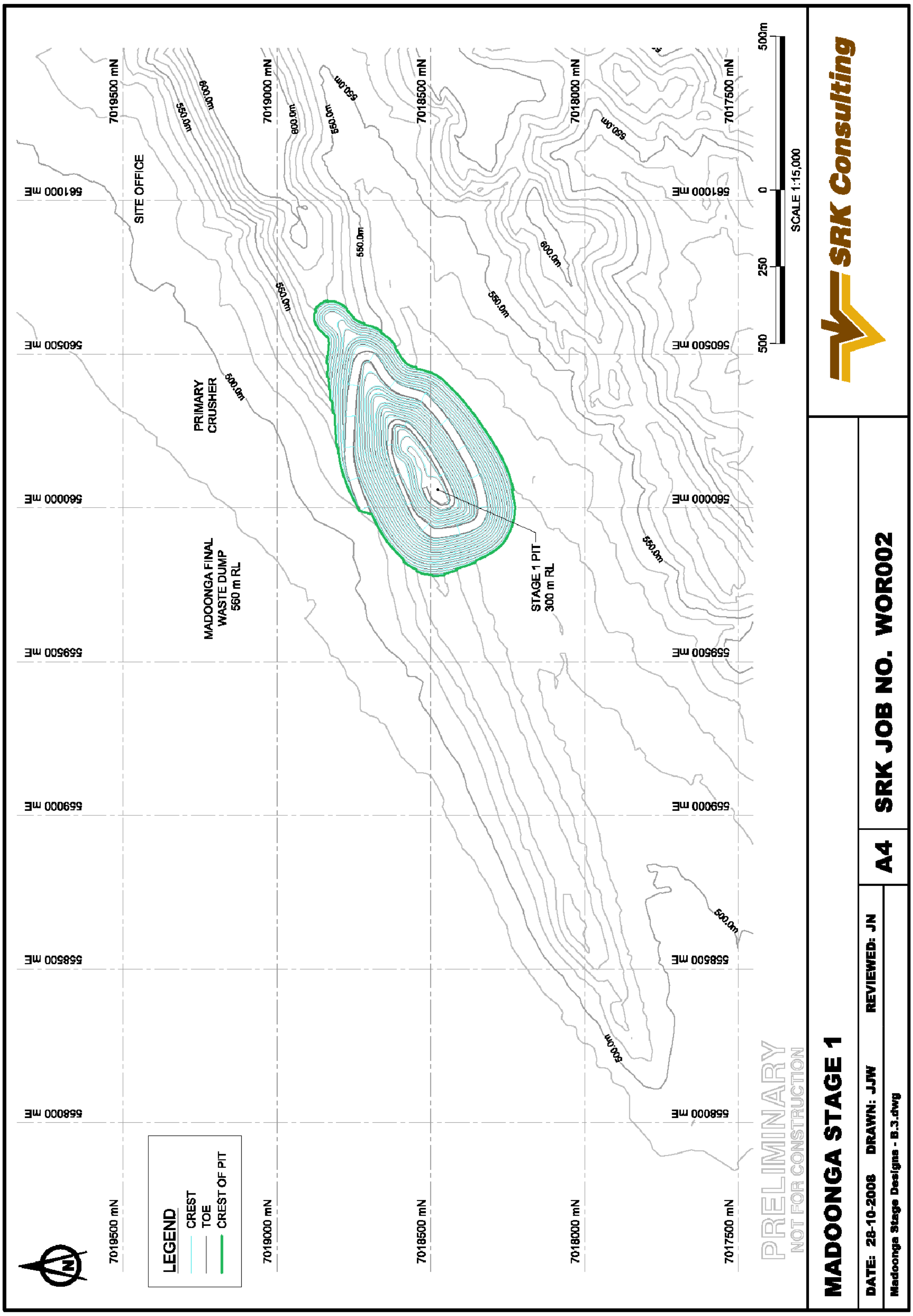


Figure 6-11: Madoonga Stage 1 pit design

6.5.2 Madoonga Stage 2 pit design

The Madoonga Stage 2 pit design is a cut-back along the strike of the orebody. This zone of the orebody contains reduced Fe grade areas, but averages over 57% Fe with high Al_2O_3 grades.

This stage design incorporates a second ramp. This ramp is used to minimise the waste haulage distance.

The Madoonga Stage 2 pit design is shown Figure 6-12. Note: Madoonga Stage 1 pit design is combined for the purpose of illustration.

The Madoonga Stage 2 pit design inventory is listed in Table 6-28 and Table 6-29.

Table 6-28: Madoonga Stage 2 pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
528	2,579	878,994	340.8	55.38	7.06	2.97
516	-	4,140	-	-	-	-
Total	**2,579**	**883,134**	**342.5**	**55.38**	**7.06**	**2.97**

Table 6-29: Madoonga Stage 2 pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
528	15,462	722,858	46.8	55.41	7.09	2.93
516	165,891	4,414,413	26.6	55.55	6.79	2.87
504	420,383	6,849,880	16.3	55.79	6.8	2.87
492	832,375	5,857,221	7.0	57.14	5.35	2.67
480	1,034,018	4,868,026	4.7	57.87	4.68	2.53
468	1,131,377	4,056,746	3.6	58.06	4.77	2.41
456	1,116,995	3,419,998	3.1	58.11	4.95	2.29
444	1,089,130	2,810,135	2.6	57.95	5.46	2.29
432	974,314	2,308,065	2.4	57.66	5.75	2.35
420	761,664	1,871,294	2.5	57.33	6.01	2.4
408	533,777	1,324,742	2.5	57.36	5.96	2.53
396	267,174	672,588	2.5	58.21	5.43	2.03
384	179,286	308,590	1.7	58.15	5.85	2.16
372	70,004	99,226	1.4	57.3	6.88	2.29
360	42,966	26,110	0.6	57.89	5.36	2.19
Total	**8,634,814**	**39,609,892**	**4.6**	**57.63**	**5.43**	**2.43**

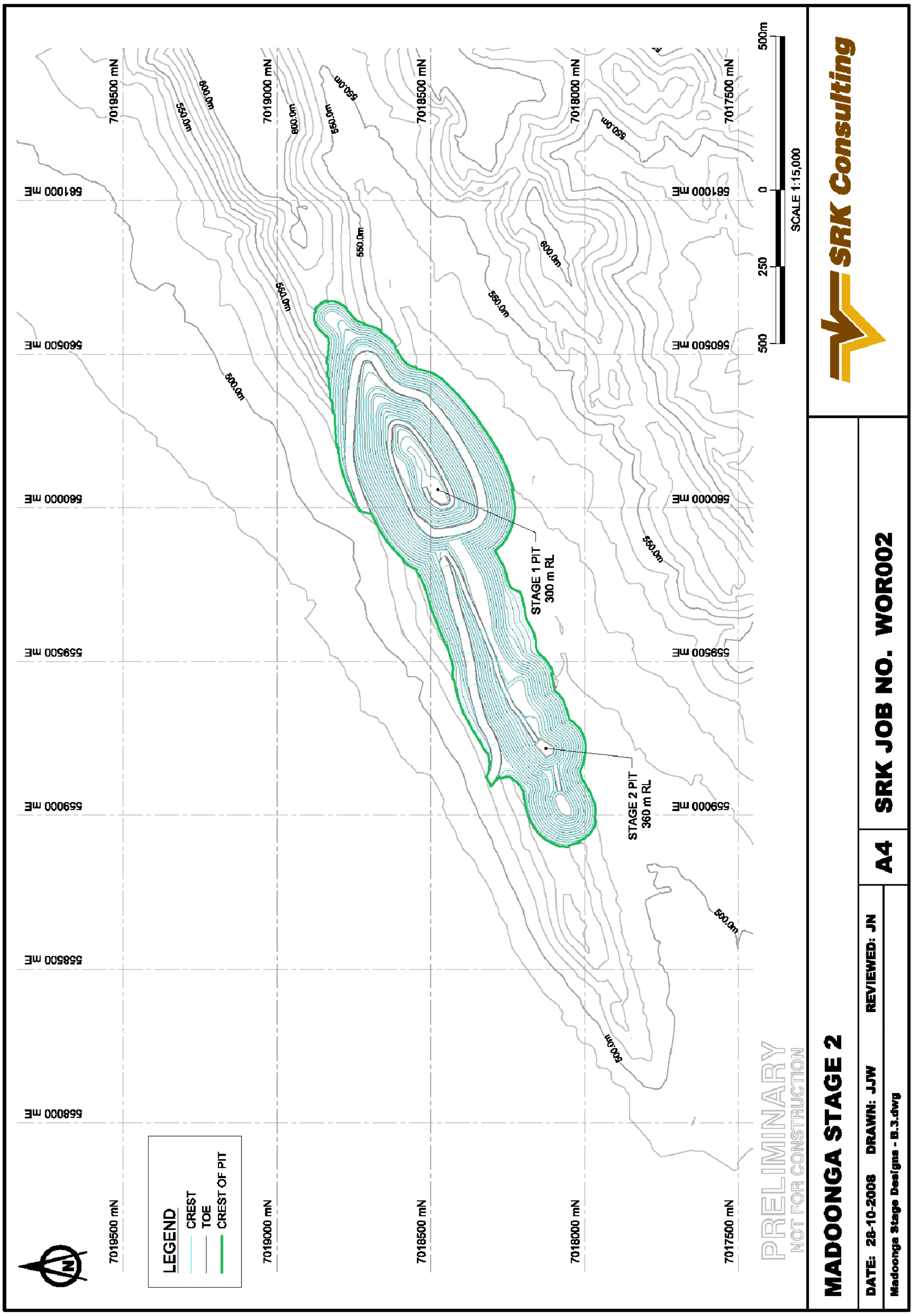


Figure 6-12: Madoonga Stage 2 pit design

6.5.3 Madoonga Stage 3 pit design

The Madoonga Stage 3 pit design cut-back expands the first two stages of the Madoonga final pit design. Fe grades are low in this cut-back, but some zones within the mining benches have grades in excess of 60% Fe. The Al_2O_3 content varies across the cut-back, with the average grades being marginally lower than the Stage 2 cut-back.

The design features an access ramp on the western side of the pit to allow access to the cut-back. This ramp merges with the Stage 2 ramp.

The Madoonga Stage 3 pit design expands the mining area to the Madoonga final design limits as shown in Figure 6-13. Table 6-30 and Table 6-31 list the associated bench by bench pre-strip and pit design inventories after pre-strip.

Table 6-30: Madoonga Stage 3 pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
540	-	24,706	-	-	-	-
528	317	966,060	3,048.5	55.96	5.86	3.12
516	1,908	1,895,680	993.5	56.14	5.87	2.79
504	337	849,387	2,519.7	56.27	5.67	2.48
492	152	149,842	985.2	56.71	6.4	2.04
Total	**2,714**	**3,885,674**	**1,431.6**	**56.16**	**5.88**	**2.75**

Table 6-31: Madoonga Stage 3 pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
528	56	14,026	250.5	55.96	5.85	3.12
516	14,504	448,620	30.9	56.08	5.95	2.93
504	128,548	2,487,829	19.4	56.02	6.27	2.61
492	423,966	5,371,952	12.7	56.24	6.36	2.48
480	630,931	7,031,634	11.1	56.28	6.39	2.55
468	768,936	5,538,211	7.2	56.58	5.93	2.65
456	839,378	4,408,008	5.3	56.49	6.05	2.73
444	994,509	3,309,996	3.3	57.1	5.61	2.49
432	1,012,755	2,485,103	2.5	58.01	4.56	2.12
420	901,929	1,825,209	2.0	58.06	4.66	2.16
408	828,730	1,224,725	1.5	57.69	5.08	2.24
396	722,582	839,205	1.2	57.27	5.59	2.14
384	527,329	497,178	0.9	57.36	5.71	1.94
372	305,008	222,448	0.7	56.89	5.93	2
360	99,151	47,735	0.5	57.03	5.6	2.31
Total	**8,198,311**	**35,751,880**	**4.4**	**57.16**	**5.52**	**2.34**

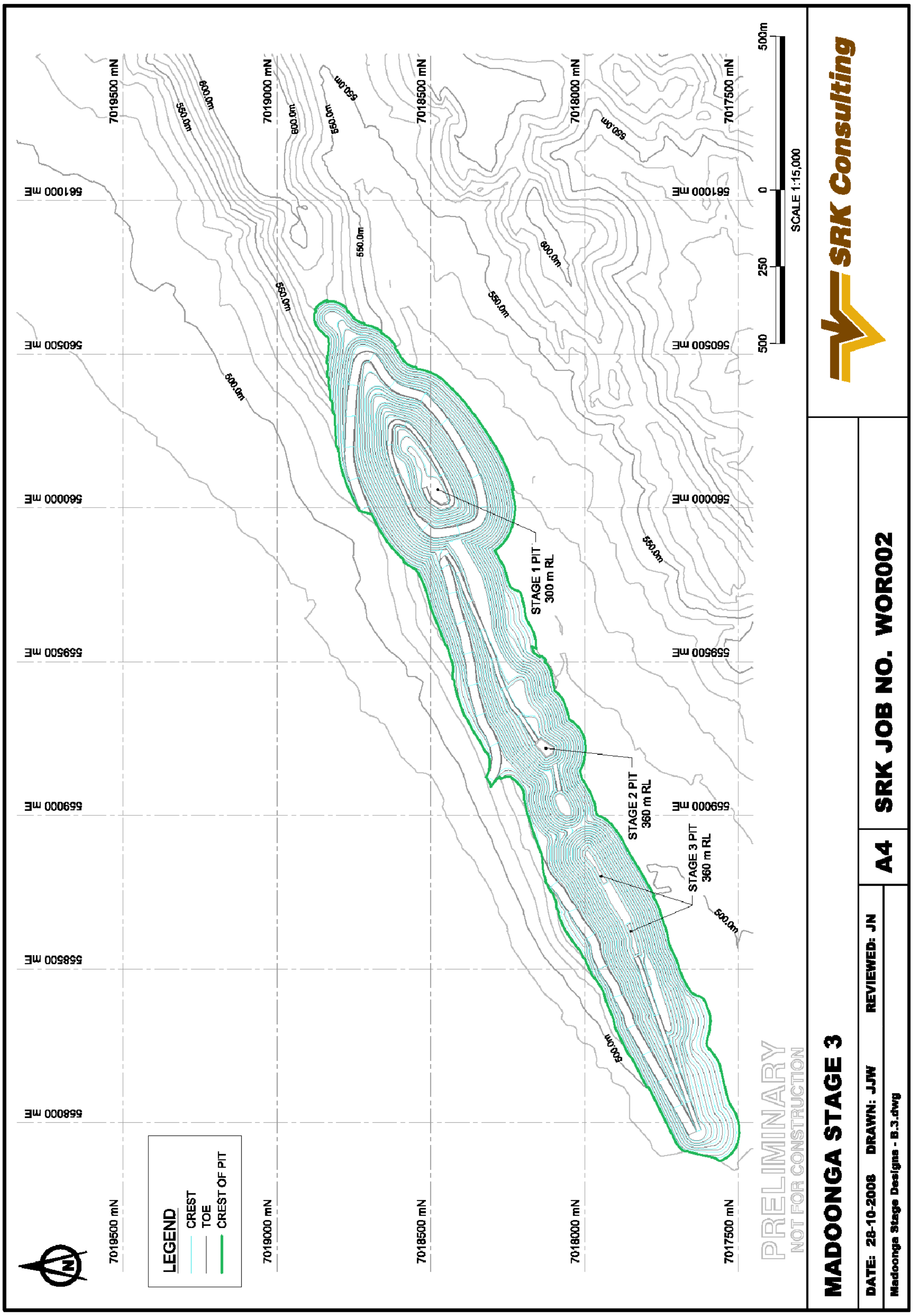


Figure 6-13 : Madoonga Stage 3 pit design

6.6 Combined pit design inventory

The combined inventory of both the Madoonga and the Beebyn (including pods) final pit designs including allowances for ore-loss, silica upper cut and pre-strip losses is:

- Total product : 69.4 Mt
- Grade of Fe : 60.0%
- Grade of SiO_2 : 4.54%
- Grade of Al_2O_3 : 2.09%
- Grade of P : 0.08%
- LOI : 6.58%
- Grade of S : 0.05%
- Total waste : 394 Mt
- Strip Ratio : 5.68

The detailed bench summary for the combined pre-strip is listed in Table 6-32 and the combined pit design inventory after pre-strip is listed in Table 6-33.

Table 6-32: Combined final pit design pre-strip inventory

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%
576	2,854	167,400	58.7	56.00	7.67	1.97
564	12,952	122,685	9.5	59.40	5.52	1.93
552	37,012	259,305	7.0	60.50	4.71	2.22
540	1,058	347,232	328.1	59.81	4.74	1.69
528	3,047	1,969,829	646.5	55.53	6.86	2.97
516	1,908	1,908,992	1,000.5	56.14	5.87	2.79
504	337	849,387	2,519.7	56.27	5.67	2.48
492	152	149,842	985.2	56.71	6.40	2.04
4272	**59,320**	**5,774,671**	**97.3**	**59.60**	**5.19**	**2.19**

Table 6-33: Combined final pit design inventory after pre-strip

Bench elevation	Ore(t)	Waste(t)	Strip Ratio	Fe%	SiO_2%	Al_2O_3%	P%	LOI%	S%	TiO_2%
576	235	46,288	357.8	57.37	7.44	2.38	0.13	7.21	0.02	0.12
564	217,037	1,284,558	5.9	57.52	7.09	2.13	0.24	7.84	0.06	0.14
552	576,736	3,083,662	5.4	58.76	5.94	2.29	0.09	6.97	0.06	0.14
540	1,721,090	7,420,688	4.3	59.73	4.95	2.35	0.09	6.41	0.06	0.15
528	3,061,657	19,286,525	6.3	60.24	4.63	2.36	0.09	6.11	0.06	0.14
516	3,998,681	41,867,262	10.5	60.20	4.62	2.31	0.09	6.04	0.05	0.15
504	4,545,669	52,063,134	11.5	60.02	4.66	2.36	0.09	6.18	0.04	0.18
492	5,296,100	48,558,146	9.2	59.79	4.57	2.30	0.08	6.75	0.04	0.2
480	5,717,395	43,471,187	7.6	59.74	4.48	2.26	0.08	7.02	0.04	0.2
468	5,811,987	35,966,717	6.2	59.77	4.41	2.22	0.08	6.98	0.04	0.2
456	5,664,122	29,977,305	5.3	59.75	4.45	2.15	0.08	6.94	0.04	0.2
444	5,537,111	24,735,511	4.5	59.52	4.74	2.12	0.08	7.01	0.04	0.2
432	5,182,515	20,540,711	4.0	59.58	4.60	2.05	0.08	6.96	0.04	0.2
420	4,660,729	16,769,423	3.6	59.72	4.58	2.03	0.08	6.82	0.05	0.21
408	3,952,405	12,980,765	3.3	60.10	4.37	2.01	0.08	6.56	0.06	0.21
396	3,467,975	9,687,787	2.8	60.33	4.40	1.86	0.08	6.33	0.06	0.21
384	2,955,089	7,245,613	2.5	60.72	4.25	1.74	0.08	6.1	0.06	0.2
372	2,260,252	5,324,918	2.4	61.15	4.05	1.64	0.08	5.85	0.05	0.17
360	1,678,664	3,657,519	2.2	61.42	3.95	1.52	0.09	5.71	0.06	0.17
348	1,220,409	2,158,527	1.8	61.65	4.12	1.40	0.09	5.34	0.07	0.16
336	942,415	1,078,169	1.1	61.23	4.81	1.31	0.09	5.59	0.09	0.19
324	551,788	644,835	1.2	60.49	5.17	1.32	0.09	6.17	0.1	0.21
312	244,073	432,205	1.8	59.60	5.64	1.24	0.1	6.76	0.11	0.3
300	109,788	204,364	1.9	58.88	6.61	1.22	0.11	7.87	0.12	0.43
Total	69,373,922	388,485,820	5.6	60.00	4.54	2.09	0.08	6.58	0.05	0.19

The results indicate a good conversion (97%) from the pit shell inventory (71.2 Mt of mineralisation and 332 Mt of waste) of the optimisation process to the final mine designs (69.4 Mt of mineralisation and 388.5 Mt of waste).

6.7 Waste dump design

The parameters in Table 6-34 were used for the waste dump design for both the Beebyn and Madoonga areas.

Table 6-34: Waste Dump Design Parameters

Design parameters	Value	Units
Berm width	10	m
Bench height	10	m
Overall slope	20	°
Batter slope	30	°
Swell	30	%
Tolerance	10	%
Road width (dual-lane)	30	m

The overall slope of 20° has been adopted from the Department of Industry and Resources (DoIR) guidelines.

The size of the waste dumps has been estimated from assumed swell factors applied to the in situ volume mined.

Haulage distances from the open pit designs and the dump designs have been minimised by locating the pit ramps of the pit designs appropriately.

6.7.1 Beebyn waste dumps

Beebyn currently has three planned waste dumps. These include a large dump servicing the Beebyn Main pit and has been configured so that the dump ramps are aligned with the south wall pit ramps to provide short waste haulage. Smaller waste dumps are planned to service the Beebyn West pit and Beebyn Pods.

The Beebyn Main pit waste dumping area is to the south of the pit area to minimise interaction with infrastructure such as the crushing and screening processes and the rail loop, located to the north of the Beebyn Main pit.

The Beebyn West waste dump is located to the north of the pit. This has been designed large enough to accommodate the waste from the eastern pod. A separate ramp which aligns with the pod's exit is also allocated to minimise the haul distance. As the dump location is away from the main Beebyn infrastructure, the location of the waste dump is less critical.

6.7.2 Madoonga waste dump

Madoonga's waste dumping area is planned at the north side of the pit to avoid environmental issues related to protected fauna located in the valley to the south of the pit.

The Madoonga waste dump is designed to provide a large storage capacity in the vicinity of the Stage 1 pit area as this cut-back produces the largest amount of waste.

The Madoonga waste dump design is shown in the general arrangement of the Madoonga mining area (see Figure 6-10).

6.8 Conversion of mineral resource to pit inventory

The conversion from the mineral resource to the pit inventory has followed the steps outlined in Table 6-35.

Table 6-35: Mineral resource conversion

Conversion process	Mt
Mineralised material in the mineral resource model	155.5
Optimised mineralised inventory (without 10% ore-loss and the 8.3% silica constraint)	101.7
Optimised mineralised inventory after 8.3% upper cut-off is applied on SiO_2 (without 10% ore-loss)	79.1
Optimised mineralised inventory after 8.3% upper cut-off is applied on SiO_2 (with 10% ore-loss)	71.2
Mineralised inventory within pit design with 8.3% SiO_2 upper cut-off applied	77.1
Mineralised inventory in pit design with 8.3% SiO_2 upper cut-off and 10% ore-loss applied	69.4

6.9 Design comparison against prior study

The earlier Preliminary Mining Study resulted in a combined inventory of both the Madoonga and the Beebyn final pit designs of 79.7 Mt of potential product. As detailed in Table 6-36, this study produced 69.4 Mt of potential product.

These results match SRK's expectations based on the understanding of the geology as discussed in Section 2, and the impact of Al_2O_3 and SiO_2 on available mineral resources to schedule.

Table 6-36: Study comparison

Item	Preliminary Mining Study			Pre Feasibility Study			Overall change
	Beebyn	Madoonga	Combined total	Beebyn	Madoonga	Combined total	
Total product	30.0 Mt	49.7 Mt	**79.7 Mt**	33.3 Mt	36.1 Mt	**69.4 Mt**	Reduced by 10 Mt
Total waste	240.0 Mt	224.0 Mt	**464.0 Mt**	242.4 Mt	151.8 Mt	**394.2 Mt**	Reduced by 70 Mt
Strip Ratio	8.00	4.51	**5.82**	7.28	4.20	**5.68**	Reduced by 3%
Fe grade	60.30%	57.40%	**58.50%**	61.74%	58.40%	**60.00%**	Increase by 1.5%
SiO_2 grade	4.78%	2.15%	**5.26%**	3.89%	5.13%	**4.54%**	Reduced by 0.72%
Al_2O_3 grade	2.73%	5.55%	**2.37%**	2.09%	2.08%	**2.09%**	Reduced by 0.28%

7 Life of Mine Scheduling

Mine production scheduling is the process of assigning physical mine production to periods of time and reporting implications by period in terms of tonnes of ore and waste, grades and total operating costs.

The mine production scheduling was carried out using the MineSight® Strategic Planner, a linear programming scheduler. The software optimises a single scheduling period at a time. In this instance, the periods were set to production years.

7.1 Production schedule drivers

SRK developed the production scheduling drivers prior to commencing the scheduling processes. During this process, the targeted market specifications of contaminants in fines were identified as a major schedule driver.

Prior to mine production scheduling, several key constraints were identified. These included the following:

- a target of 15 Mtpa of product, inclusive of ore-loss,
- all mined ore is intended to be sent directly to RoM, no stockpiles are to be used,
- target Fe grades to be maintained at or above 58% in the fines,
- target Al_2O_3 contaminant grades to be maintained at or below 2.6% in the fines,
- target SiO_2 contaminant grades to be maintained at or below 5.5% in the fines, and
- achieve a steady balance of production between Beebyn and Madoonga throughout the mine life.

Preliminary scheduling iterations identified contaminant grades as a significant driver of the production schedule. To achieve the required market product specifications, this schedule is reliant on the Beebyn Main pit and Madoonga Stage 1 blending out high levels of Al_2O_3 and SiO_2 contaminants.

7.2 Contaminant grades

In general, the Beebyn Main pit mineralised inventory is characterised by:

- Fe grades with an overall average of 61% in fines,
- low levels of SiO_2 grades averaging 4.3%,
- high levels of Al_2O_3 near surface, and
- the Al_2O_3 grade in Beebyn Main pit reducing with increasing depth.

The Beebyn pods mineralised inventory is characterised by:

- high levels of $SiO_{2,}$
- Al_2O_3 grades above specified product levels,
- Fe grades tending to be above average as in the Central Pod, and
- Fe grades tending to be below target requirements in the East and West Pods.

Mineralisation contained within the Madoonga pit can be separated into two categories because of differences in inventory grades. The inventory of Madoonga Stage 1 contains the following:

- average Fe fines grade is slightly above market specifications at 58.25%,
- lower Al_2O_3 fines grades with an average of 2.19% (this pit is the main source of low Al_2O_3 grade material in the initial periods of the schedule), and
- SiO_2 grades above market specifications at 5.81% fines.

Madoonga Stages 2 and 3 inventories share many similarities as follows:

- Fe grades lower than target specification,
- Al_2O_3 above specified fines grade requirements, and
- SiO_2 fines grade above the targeted 5.5%.

Additional constraints were developed to consider practical mining requirements such as:

- adhere to pit cut-back design sequences (discussed in Sections 6.4.2 and 6.5.1),
- limit bench turnover to ensure that the maximum vertical advance per year is achievable in practice,
- consider pre-strip material,
- allow a production build-up in Year 0, and
- smooth waste production, where practical, thus limiting maximum material movements to reduce peak fleet requirements.

The pit cut-back design sequences, are linked to the product schedule and imply a mining sequence in which the pit phases can be mined.

The sequencing logic did consider the need to produce an 'on-specification' blend in the first year of ore mining (Year 0). This was approached by arranging the phase sequence, to mine phases containing good average grades in the first year of production. Beyond the first year, multiple mining faces are planned to be developed; hence, blending opportunities will improve.

7.3 Pre-stripping schedule

The key driver for pre-stripping is to open the mining benches for the main mining fleet. Pre-stripping typically involves upfront project capital, there maybe financial advantages in minimising the duration and extent of the pre-strip.

SMM have indicated that pre-strip should commence in project Year -1, prior to commencement of ore production in Year 0. (see Table 3-2)

The inventories for the mine designs indicate that the mineralisation is outcropping at the top of Beebyn. As a consequence, pre-stripping activities can be limited to establishing suitable working areas on the upper mine benches and creating access for the mining equipment to these benches. Mineralisation mined as part of pre-stripping at Beebyn is considered waste. It is also likely to be high in silica and heavily diluted with rank waste. The pre-strip activities at Beebyn can therefore be considered to be a civil-type project activity instead of bulk production earthworks.

The ridges at Madoonga differ significantly from Beebyn in that they offer wide upper benches in waste. Madoonga mineralisation outcrops below the top of the Madoonga ridges. As a result, pre-stripping activities are considered to be simpler, with likely application of the primary mining fleet.

The staging on the mine designs also allows pre-stripping of the mining areas to be staged. This allows both pre-strip and mining activities to occur in the same scheduling period, but physically separated by the different mine phases.

7.4 Production start-up

SMM have indicated that mining project Year 0 commences with the production of ore from the primary mining fleet. The mobilisation of the production mining fleet by the mining contractor will dictate how the mining production will ramp-up to full capacity. As fleet requirements are related to both the ore production schedules and the total material movement, preliminary schedules were developed to consider these aspects.

The mining fleet size varies with the total material movements required by the mine production schedule. The average fleet size is estimated to require in the order of eight excavators along with 64 haul trucks. The complete mobilisation of a fleet of this size is dependent on many variables, but is unlikely to occur in less than six months.

The start of mining is likely to be performed at reduced production rates owing to roads, waste dumps and facilities being developed rather than being completely established. Operators will also need to be trained.

Taking cognisance of the above considerations, SRK set the ore production target for Year 0 at 5.8 Mt and 15 Mt for Year 1 forward to the end of mine life.

7.5 Vertical rate of advance

As both Beebyn and Madoonga deposits are narrow and long in strike length, high ore production rates require that the mining operation progresses rapidly in the vertical direction.

Scheduling scenarios were developed that considered the required vertical rates of advance in each of the mining phases. It was found that attempting to minimise the bench turnover resulted in the schedule producing unfeasible solutions.

The limit applied to the base-case production schedule is seven benches of 12 m (as per the mineral resource model vertical increment), per mining phase, per year. SRK consider this rate of advance achievable but aggressive. Pit dewatering in advance of the pit floor is required to ensure that ground conditions and pit wall are maintained.

7.6 Total material movements

Numerous scheduling scenarios were created to consider the balance between ore production and a practical, smoothed total production rate.

The inventory of the pit stages impacts on the period strip ratios and access to ore. As the waste material has been eroded around the orebody, leaving the orebody exposed the strip ratio encountered in the upper mining benches will become more favourable. The Strip ratios worsen as mining removes the upper benches of the ridges and additional waste is required to be mined as mining progresses to the shoulder country of the ridges. The lower mining benches feature low strip ratios as the designs contract around the mineralisation at depth.

7.7 Balancing production between the deposits

SRK did not apply strict rules to the production scheduler to control the balance of ore production between Beebyn and Madoonga other than to force the schedule to mine approximately one-third ore from Beebyn in each year of operation.

The implications of this approach are that period-by-period production requirements between the two deposits fluctuate as the scheduler attempts to maximise the total project value and is manually constrained to meet the target grade specifications.

7.8 Mine production sequencing

In general, the mine designs contain high levels of Al_2O_3 near surface above the fines product specifications. The Madoonga Stage 1 represents the only area with material containing Al_2O_3 grades below the market specifications. Furthermore, this stage contains over half the total Madoonga mineralised inventory with acceptable Fe fines grades. However this stage contains high levels of SiO_2 contaminants that will need to be blended out. This stage is expected to be heavily mined in the first few years of production as it represents the key source of low Al_2O_3 material.

The Beebyn Main East pit contains the highest consistent grades of Fe at an average of 64.14% in fines. This grade is maintained throughout the stage and increases at depth. This is an important consideration as, ideally, the initial blended product should contain a slightly high Fe grade for marketing purposes. If a high Fe grade is not required, the product can be diluted by blending with lower grade material. High levels of Al_2O_3 contaminants are present near surface. Al_2O_3 contaminants reduce with increasing depth to acceptable levels around the 396 m RL. Low levels of SiO_2 are present throughout all depths of Stage 1.

The Madoonga Stage 1 and Beebyn Main East pit are ideal locations to commence mining and contain contrasting levels of contaminants that can be blended to produce a product meeting targeted fines product specifications.

Beyond these initial stages, mining is intended to spread to the rest of the Beebyn Main pit to provide the operation with material with high Fe grades for blending. Production in Madoonga will gradually spread to Stage 2 and Stage 3 to reduce dependency on Madoonga Stage 1. The final two stages of Madoonga contain a less desirable mix of lower Fe grades and higher levels of SiO_2 and Al_2O_3 contaminants that will need to be blended to acceptable levels.

The three Beebyn pods in total contain 3.3 Mt of mineralisation with high levels of Al_2O_3 and SiO_2 contaminants. Low Fe grades are contained within both the east and west pods. In contrast, the central pod maintains the high Fe grades of the main pit with an overall average fines grade of 59.16%. Due to the high levels of contaminants, the Beebyn pods will be mined where possible when there are sufficient blending opportunities.

The Madoonga Stage 1 is expected to be predominately mined as it represents the key source of low Al_2O_3 material in the initial years of the schedule. Upon depletion of this stage, mining will progress to the lower levels of the Beebyn Main pit. This is the main source of low Al_2O_3 material for blending.

7.9 Mine production scheduling results

Mine scheduling produced a six year mining life excluding four months of pre-stripping.

At the end of mine life an amount of 61.1 Mt of material has been placed on the RoM pads at target product specifications. There is an additional 1.7 Mt of material remaining in an ‘off-spec’ stockpile and 6.6 Mt of ‘off spec’ material remaining in the pits unmined. There has been approximately 2 Mt blended from the ‘off-spec’ stockpile during the LoM.

Table 7-1 lists the production schedule for the Weld Range Iron Ore project. The strip ratio has been calculated including the stockpiled material in the period it was placed on the stockpile, not the period it is reclaimed. The 1.7 Mt of material remaining on the stockpile at the end of mine life is not to market specification, but it is envisaged that it will be blended with material from future open pits in the immediate area. The grades presented in the Beebyn and Madoonga rows of Table 7-1 do not include the grades of the material placed onto stockpile.

Table 7-1: Mine product schedule summary

Scheduling Year	Location	RoM (kt)	Stockpiled (kt)	Waste (kt)	RoM Fe %	RoM SiO_2%	RoM Al_2O_3%	Strip Ratio
-1	Beebyn	0	0	508	0.00	0.00	0.00	-
	Madoonga	0	55	644	0.00	0.00	0.00	11.7
	Stockpile Reclaim	0	0	0	0.00	0.00	0.00	-
	Total	0	55	1,152	0.00	0.00	0.00	20.9
0	Beebyn	1,426	0	9,761	64.40	2.83	2.49	6.8
	Madoonga	4,410	1,579	25,016	59.93	4.38	2.01	4.2
	Stockpile Reclaim	0	0	0	0.00	0.00	0.00	-
	Total	5,836	1,634	34,777	61.02	4.00	2.13	4.7
1	Beebyn	6,111	0	74,209	63.19	3.19	2.26	12.1
	Madoonga	7,247	0	32,864	59.26	4.32	1.88	4.5
	Stockpile Reclaim	1,634	(1,634)	0	56.55	7.11	2.54	-
	Total	14,992	0	107,073	60.57	4.16	2.11	8.0
2	Beebyn	7,920	0	70,951	61.71	3.73	2.18	9.0
	Madoonga	7,041	0	39,596	58.54	5.12	1.98	5.6
	Stockpile Reclaim	0	0	0	0.00	0.00	0.00	-
	Total	14,961	0	110,547	60.22	4.38	2.09	7.4
3	Beebyn	7,775	0	35,128	61.88	3.66	2.04	4.5
	Madoonga	7,518	0	29,955	58.05	5.58	2.09	4.0
	Stockpile Reclaim	0	0	0	0.00	0.00	0.00	-
	Total	15,293	0	65,083	60.00	4.60	2.06	4.3
4	Beebyn	4,323	119	10,423	62.29	3.70	1.71	2.3
	Madoonga	3,015	851	16,600	57.64	5.52	2.31	4.3
	Stockpile Reclaim	0	0	0	0.00	0.00	0.00	-
	Total	7,338	970	27,023	60.38	4.45	1.96	3.3
5	Beebyn	613	11	4,079	60.52	5.16	2.07	6.5
	Madoonga	1,663	1,080	5,535	59.03	3.67	1.86	2.0
	Stockpile Reclaim	395	(395)	0	55.08	7.24	2.94	-
	Total	2,671	1,666	9,614	58.79	4.54	2.07	2.9
Grand Total	Beebyn	28,168	130	205,059	62.28	3.57	2.10	7.2
	Madoonga	30,894	3,565	150,210	58.73	4.90	2.01	4.4
	Stockpile Reclaim	2,029	(2,029)	0	56.27	7.13	2.62	-
	Total	**61,091**	**1,666**	**355,269**	**60.28**	**4.36**	**2.07**	**5.7**

Table 7-2: Mine schedule stockpile summary

Scheduling Year	Location	Stockpile (kt)	Fe %	SiO_2%	Al_2O_3%
-1	Beebyn	0	0.00	0.00	0.00
	Madoonga	55	59.88	5.11	2.14
	Reclaimed	0	0.00	0.00	0.00
	Balance	55	59.88	5.11	2.14
0	Beebyn	0	0.00	0.00	0.00
	Madoonga	1,579	56.44	7.18	2.55
	Reclaimed	0	0.00	0.00	0.00
	Balance	1,634	56.55	7.11	2.54
1	Beebyn	0	0.00	0.00	0.00
	Madoonga	0	0.00	0.00	0.00
	Reclaimed	(1,634)	56.55	7.11	2.54
	Balance	0	0.00	0.00	0.00
2	Beebyn	0	0.00	0.00	0.00
	Madoonga	0	0.00	0.00	0.00
	Reclaimed	0	0.00	0.00	0.00
	Balance	0	0.00	0.00	0.00
3	Beebyn	0	0.00	0.00	0.00
	Madoonga	0	0.00	0.00	0.00
	Reclaimed	0	0.00	0.00	0.00
	Balance	0	0.00	0.00	0.00
4	Beebyn	119	55.04	7.82	1.54
	Madoonga	851	55.08	7.16	3.13
	Reclaimed	0	0.00	0.00	0.00
	Balance	970	55.08	7.24	2.94
5	Beebyn	11	57.47	8.21	2.33
	Madoonga	1,080	56.24	6.41	2.64
	Reclaimed	(395)	55.08	7.24	2.94
	Balance	1,666	55.85	6.71	2.74
Grand Total	**Beebyn**	**130**	**55.24**	**7.86**	**1.61**
	Madoonga	**3,565**	**56.11**	**6.91**	**2.71**
	Reclaimed	**(2,029)**	**56.27**	**7.13**	**2.62**
	Balance	**1,666**	**55.85**	**6.71**	**2.74**

7.9.1 Scheduling period Year -1(negative 1) pre-stripping

7.9.1.1 Targets

Under guidance from SMM, the first scheduling period has been designated as Year 1. This period is intended to be used to pre-strip and prepare the Beebyn and Madoonga pits for ore production. As outlined in the pre-stripping and ore production ramp-up schedule, this period runs from December 2010 to April 2011, when ore production begins.

7.9.1.2 Issues

Due to the nature of the ridges at Beebyn, pre-stripping of this deposit is intended to be carried out by a separate contractor and is to be performed at the start of the mining schedule. Madoonga does not exhibit the same topographical structures and will be pre-stripped by the main mining fleet as required. Small quantities of ore have been identified at Madoonga from outcropping mineralisation; this material is intended to be stockpiled for processing in future periods.

7.9.1.3 Results

The initial years of production are reliant on the Beebyn Main pit and Madoonga Stage 1 and are prioritised for pre-stripping in this period. A total of 0.5 Mt of waste is removed from the top of the Beebyn Main pit. At the end of this period the Beebyn Main East, Central and West Stage 1 are fully pre-stripped and immediately available for production in the following period. Stage 2 of the West Cutback in the Beebyn Main pit is partially pre-stripped in this period. Complete pre-stripping of Stage 2 is deferred as it contains the lower Fe grades and higher levels of contaminants than the rest of the Beebyn Main pit.

Madoonga Stage 1 is fully pre-stripped in this period, with pre-stripping activities commencing at Stage 2. A total of 0.6 Mt of waste material is extracted from this deposit during the period. A total of 55 kt of ore is extracted from these two stages as part of pre-stripping activities; this material is stockpiled for processing in the following period.

A summary of the mining activities of this period is provided in Table 7-3.

Table 7-3: Year -1 production summary

Deposit	Stage	RoM (kt)	Stockpile (kt)	Waste (kt)	Fe%	SiO_2%	Al_2O_3%	Strip Ratio
Beebyn	Beebyn Main Pit Central Pre-strip	0	0	9	0.00	0.00	0.00	0.0
	Beebyn Main Pit East Pre-strip	0	0	207	0.00	0.00	0.00	0.0
	Beebyn Main Pit West Stage One Pre-strip	0	0	221	0.00	0.00	0.00	0.0
	Beebyn Main Pit West Stage Two Pre-strip	0	0	71	0.00	0.00	0.00	0.0
Madoonga	Madoonga Stage 1 Pre-strip	0	54	205	0.00	0.00	0.00	3.8
	Madoonga Stage 2 Pre-strip	0	1	439	0.00	0.00	0.00	439.0
Total		**0**	**55**	**1,152**	**0.00**	**0.00**	**0.00**	**20.9**

7.9.2 Scheduling period Year 0 production ramp-up

7.9.2.1 Targets

This period begins in April 2011 with the first production of ore at Beebyn Main East pit and Madoonga Stage 1. Ore production ramp-up will begin at the start of this period and reach the full 15 Mtpa mining rate at the end of the period (see Table 3-2). A total of 5.8 Mt of ore meeting the specified market requirements is targeted in this period.

The following fines grade specifications apply to all the scheduling years:

- Fe grade greater than 58%
- Al_2O_3 grade less than 2.6%
- SiO_2 grade less than 5.5%

7.9.2.2 Issues

The key issue faced in this period is the distribution and access to exposed ore meeting the Al_2O_3 and SiO_2 requirements. Beebyn ore is more desirable because of higher Fe grades, however, Beebyn inventory is characterised by high levels of Al_2O_3 contaminants near the surface. The SiO_2 grades do not pose an issue in this pit with the exception of the second stage of the West cutback.

In contrast, the Madoonga Stage 1 inventory contains comparatively lower levels of Fe grade with Al_2O_3 grades bordering on meeting the target product specification at surface. Madoonga Stage 1 contains SiO_2 grades in excess of the maximum specifications and will need to be blended or removed from the RoM feed.

A blend of Madoonga and Beebyn ore is unable to achieve a product meeting all three grade targets. Diverting material onto surface stockpiles will be required to ensure the product specifications are obtained.

7.9.2.3 Results

Pre-stripping of Beebyn continues from the previous period. The remainder of the Beebyn Main pit West Stage 2 cutback is pre-stripped along with the three Beebyn pods. Pre-stripping of Madoonga Stage 2 is completed in this period allowing production to spread to commence from that stage.

A total of 5.8 Mt of material meeting targeted grade specifications was sent to RoM in this period as indicated in Table 7-4. This result was achieved through the stockpiling of material with a Fe grade lower than 57%. This has produced a stockpile of 1.6 Mt with the following average fines grades:

- 55.21% Fe
- 3.02% Al_2O_3
- 8.39% SiO_2

The ore split in this period between Beebyn and Madoonga was heavily weighted towards Madoonga; this was driven by the lower Al_2O_3 grades found in Madoonga Stage 1.

Attempts to raise the level of SiO_2 contaminants closer to the allowed market specifications of 5.5% in fines were limited by the levels of Al_2O_3 existing in the current scheduled result. Raising the SiO_2 grade mined in this period will reduce SiO_2 grades in the remaining inventory, increasing the flexibility available to blend SiO_2 in future scheduling years.

Table 7-4: Scheduling period Year 0 summary

Deposit	Stage	ROM (kt)	Stockpile (kt)	Waste (kt)	Fe%	SiO_2%	Al_2O_3%	Strip Ratio
Beebyn	Beebyn Main Pit West Stage Two Prestrip	0	0	26	0.00	0.00	0.00	0.0
	Beebyn Main Pit East	1,426	0	9,467	64.40	2.83	2.49	6.6
	Beebyn Pod West Prestrip	0	0	64	0.00	0.00	0.00	0.0
	Beebyn Pod East Prestrip	0	0	110	0.00	0.00	0.00	0.0
	Beebyn Pod Central Prestrip	0	0	94	0.00	0.00	0.00	0.0
Madoonga	Madoonga Stage 2 Prestrip	0	1	444	0.00	0.00	0.00	375.0
	Madoonga Stage 1	4,410	1,578	24,572	59.93	4.38	2.01	4.1
Total		**5,836**	**1,579**	**34,777**	**61.02**	**4.00**	**2.13**	**4.7**

Table 7-5: RoM fines grades in scheduling period Year 0

Fe% fines	SiO_2% fines	Al_2O_3% fines
60.12	4.84	2.58

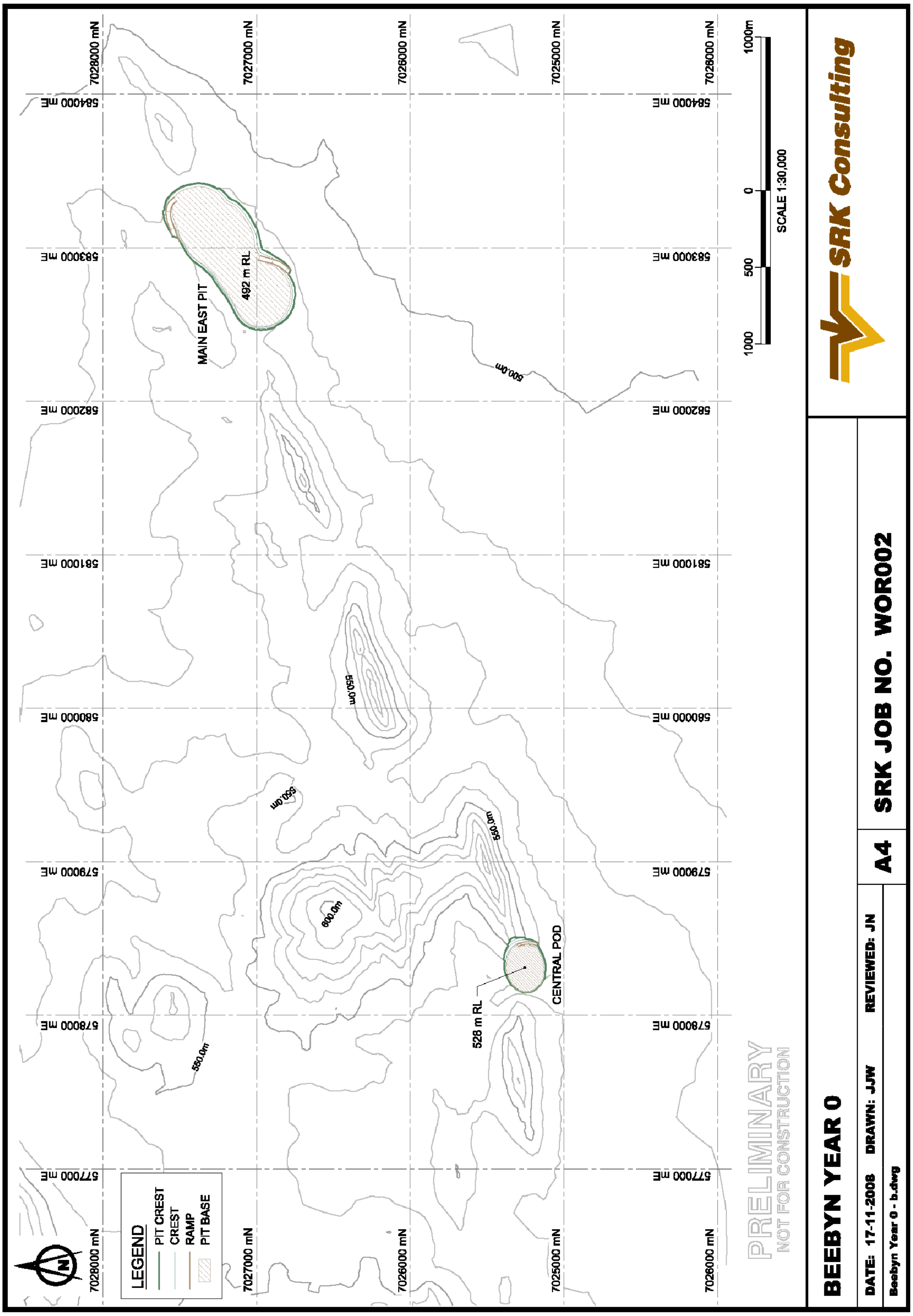


Figure 7-1: Beebyn Year 0 end of period face position

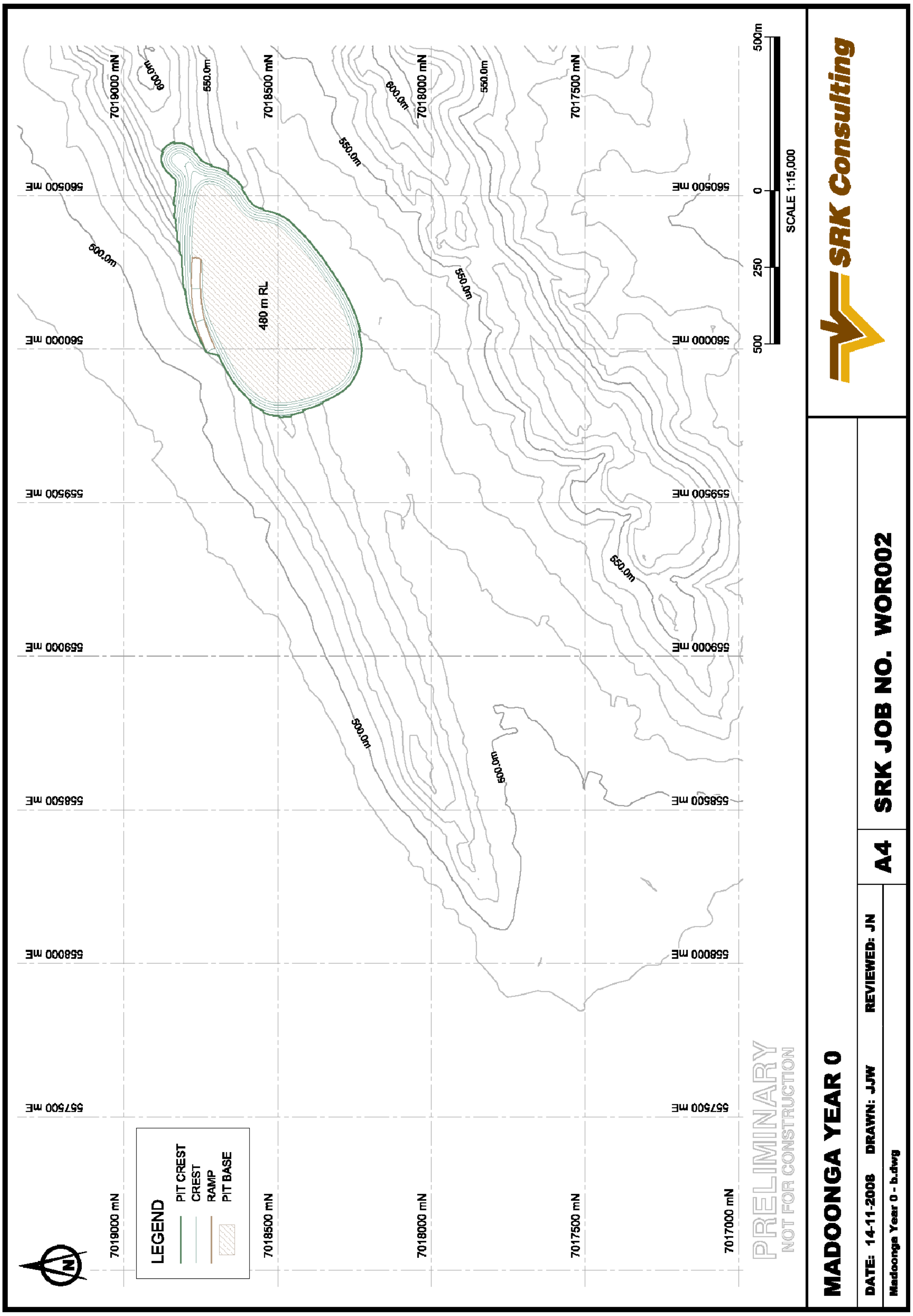


Figure 7-2: Madoonga Year 0 end of period face position

7.9.3 Scheduling period Year 1

7.9.3.1 Targets

Ore production is intended to be set at 15 Mtpa for the remainder of the mine life. The RoM grades must meet the specified fines grades product specification requirements. Mine production is intended to be expanded from the current Beebyn Main East pit to other areas.

7.9.3.2 Issues

Preliminary schedules indicated there was a choice between two scenarios in this period. Mining at Beebyn could either:

- Target more ore from the Beebyn pods, or
- Concentrate on developing the Beebyn Main pit

The Beebyn pods contain 3.3Mt of mineralisation with high levels of Al_2O_3 and SiO_2 contaminants. Targeting the Beebyn pods in this period would raise the RoM grade of SiO_2 closer to the allowed specifications in fines. This will reduce the quantity of high SiO_2 material in the remaining inventory and provide the schedule with more flexibility to blend high-grade SiO_2 material in later scheduling periods.

Conversely focusing on extracting material contained within the pods will lead to a reduction in the resources spent developing the Beebyn Main pit. Low-grade Al_2O_3 material from Madoonga Stage 1 will be consumed by blending material from the pods to acceptable levels of Al_2O_3. Preliminary schedules indicated that upon depletion of Madoonga Stage 1, the Beebyn Main pit remains underdeveloped and unable to access the low-grade Al_2O_3 material at depth. This causes two key problems:

- Inability to source low-grade Al_2O_3 material in later periods of the schedule to produce a blended product meeting Al_2O_3 market specifications.
- Leave high-grade ore with Fe grades in excess of 61% in fines, low levels of Al_2O_3 and SiO_2 contaminants at low strip ratios in the ground unscheduled.

This presents a situation where extensively mining the Beebyn Main pit in favour of Beebyn pods will cause problems with SiO_2 in later periods. However, if the Beebyn pods are preferentially mined, this will increase the blended Al_2O_3 product grade beyond the specified 2.6% in fines. It is preferable to have SiO_2 out of specification rather than Al_2O_3.

7.9.3.3 Results

Schedule for this period could not reach a valid working compromise to meet the Al_2O_3 and SiO_2 targets. High Al_2O_3 was identified as being a more difficult problem to treat than SiO_2 whereas leaving high-grade Fe material in the ground was seen as a fundamental scheduling flaw. The decision was made based on these two outcomes to focus on developing the Beebyn Main pit at the expense of the Beebyn pods and to accept higher SiO_2 grades in later scheduling periods as steel-mills are more likely to accept off-spec SiO_2 compared to off-spec Al_2O_3.

As indicated in Table 7-6, 15 Mt of ore has been scheduled in this year with a total waste movement of 107 Mt. This result has been achieved without any stockpiling. Production at Beebyn Main pit has expanded to the West Stages 1 and 2 and Central cutback. These stages provide the operation with high-grade Fe material at low levels of SiO_2. Al_2O_3 continues to be a problem at Beebyn and will require blending with Madoonga ore to reach the targeted specifications. The end of period face positions are displayed in Figure 7-3 and Figure 7-4.

The opportunity was taken in this period to commence mining in the central Beebyn pod. This pit contains the highest Fe grade of the three pods. Contaminant grades for this pit are relatively lower than for the East and West pods but still exceed the targeted RoM specifications. The inventory mined in this period is intended to raise the level of contaminants closer to the allowable threshold.

The production at Madoonga continues to be reliant on Stage 1. This stage continues to be heavily mined as material with low Al_2O_3 in this stage is intended to be blended with high Al_2O_3 ore sourced from Beebyn. The operation will continue to be reliant on Madoonga Stage 1 for low Al_2O_3 ore until the Beebyn Main pit has progressed to sufficient depth for Al_2O_3 grades to reduce to the acceptable limits required for blending. Madoonga ore continues to contain high levels of SiO_2 and will need to be blended down to the market specifications.

The stockpile built up in Scheduling Years -1 and Year 0 of 1.6 Mt is reclaimed in this period. The stockpile is comprised of low quality material with low Fe grades and high levels of Al_2O_3 and SiO_2 contaminants.

Stockpile reclaim was chosen in preference of additional mining to reduce the total waste movement scheduled in this period. Preliminary schedules show that mining the equivalent of this material from one of the Beebyn pods increased waste movements by approximately 10 Mt. Reclaiming material from the stockpile also has a lower associated cost than ore mining.

Table 7-6: Scheduling period Year 1 summary

Deposit	Stage	ROM (kt)	Stockpile (kt)	Waste (kt)	Fe%	SiO_2%	Al_2O_3%	Strip Ratio
Beebyn	Beebyn Main Pit Central	501	0	4,837	60.30	5.49	2.34	9.7
	Beebyn Main Pit West Stage One	1,408	0	12,375	61.12	3.28	2.53	8.8
	Beebyn Main Pit East	4,035	0	54,487	64.46	2.72	2.15	13.5
	Beebyn Pod Central	156	0	2,205	58.76	6.81	2.29	14.2
	Beebyn Main Pit West Stage Two	12	0	305	58.80	6.34	2.09	24.8
Madoonga	Madoonga Stage 1	7,247	0	32,864	59.26	4.32	1.88	4.5
Stockpile	Stockpile reclaim	1,634	0	0	56.55	7.11	2.54	-
Total		**14,992**	**0**	**107,073**	**60.57**	**4.16**	**2.11**	**7.1**

Table 7-7: RoM fines grades in scheduling period Year 1

Fe% fines	SiO_2% fines	Al_2O_3% fines
59.56	5.02	2.59

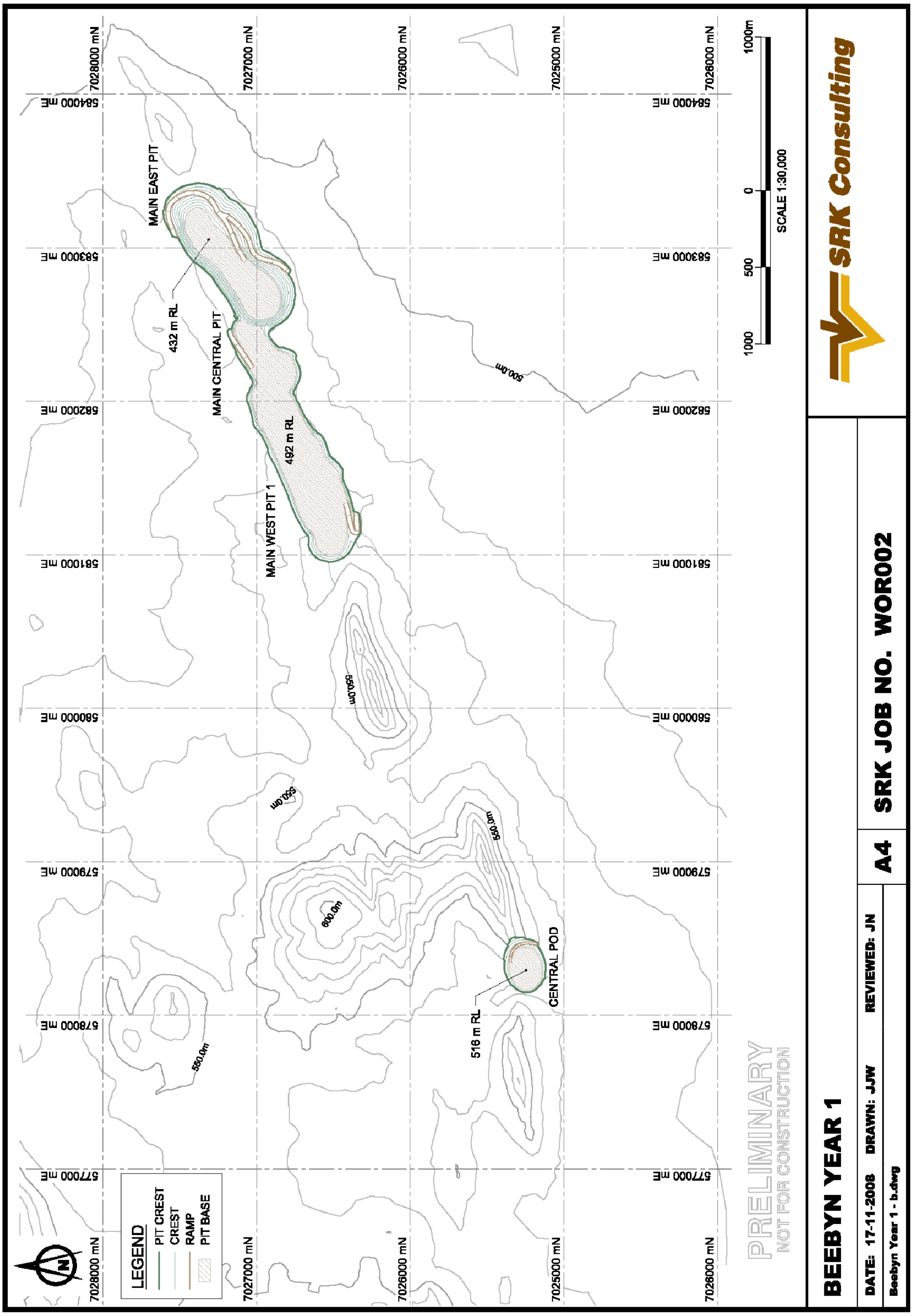


Figure 7-3: Beebyn Year 1 end of period face position

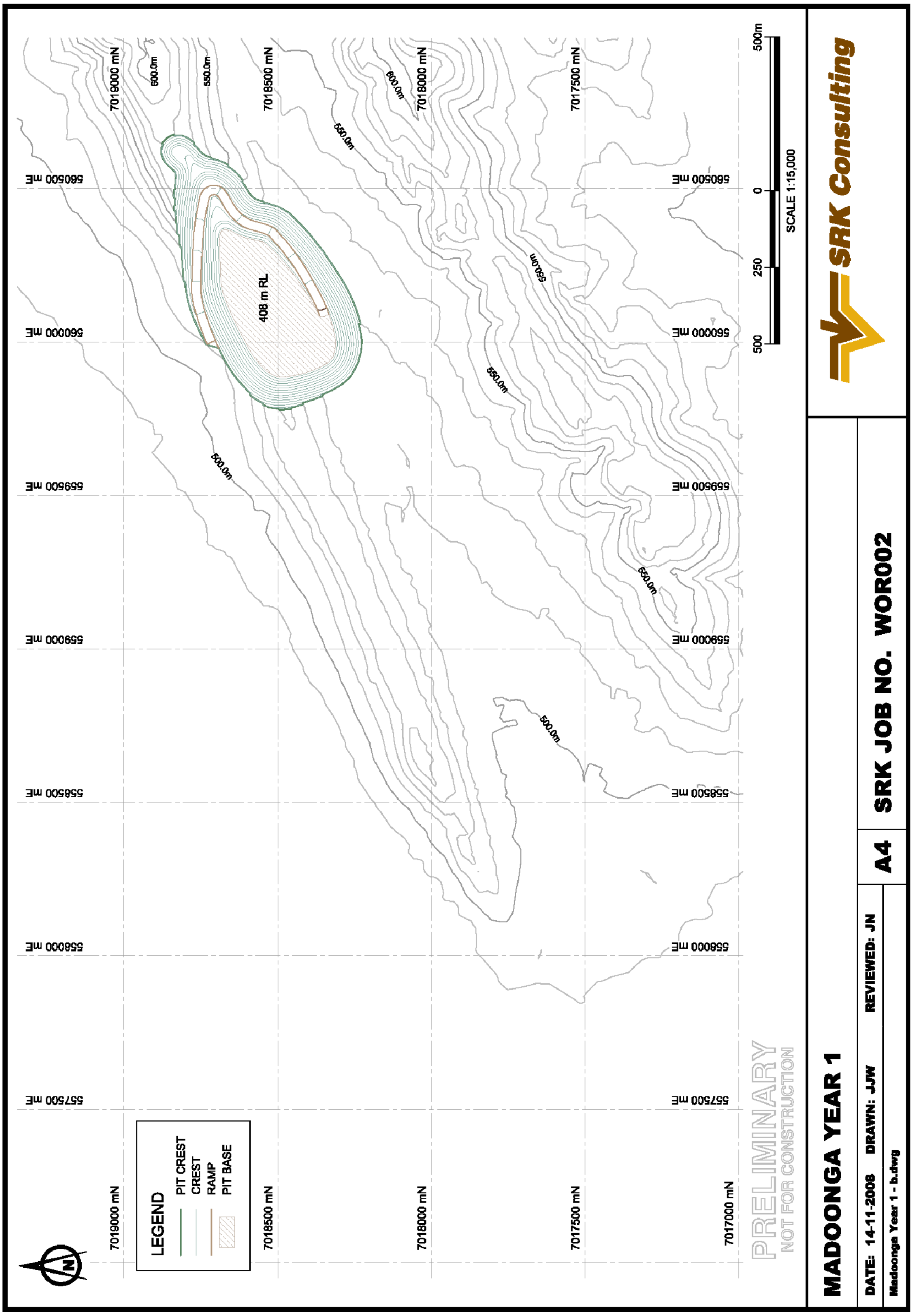


Figure 7-4: Madoonga Year 1 end of period face position

7.9.4 Scheduling Period Year 2

7.9.4.1 Target

This period will continue to target a full 15 Mt of ore meeting target specifications. Mine production at Madoonga is intended to expand to Madoonga Stage 2 and the undeveloped Madoonga Stage 3. Madoonga Stage 3 will be pre-stripped ahead of planned production in scheduling Year 3.

7.9.4.2 Issues

Following the low SiO_2 grades scheduled in the previous year, SiO_2 grades are likely to emerge as a problem in later scheduling periods. Opportunities to blend high SiO_2 materials will be looked at in this period.

The expansion of mining to Madoonga Stages 2 and 3 are likely to increase the level of contaminants in the RoM feed. This may cause some problems in subsequent periods.

7.9.4.3 Results

A full 15 Mt of product was scheduled in this period at a strip ratio of 7.1. Material scheduled within this period meets all the required grade constraints. Production at the Beebyn Main pit continues from the previous period with the focus of continued development.

Very few opportunities were identified for mining the Beebyn pods to raise the SiO_2 grade during this period. As indicated in Table 7-8, the material scheduled in this period has an Al_2O_3 fines grade of 2.6%. Mining from the Beebyn pods instead of the Beebyn Main pit is impractical, as the Beebyn pods contain higher Al_2O_3 grades than exposed inventory in the Beebyn Main pit. Mining has commenced at Stage 2 of Madoonga which contributes a significant quantity of ore to the ore production total. In comparison with Madoonga Stage 1, Stage 2 contains lower Fe grades at higher levels of SiO_2 and Al_2O_3 contaminants.

Scheduling mining at the Beebyn pods will have to be balanced with increased ore production in Madoonga Stage 1 along with a reduction in tonnes sourced from Madoonga Stage 2. Increasing production in Madoonga Stage 1 is restricted by the vertical bench turn over limitations. Reducing the scheduled output from Madoonga Stage 2 would further restrain production to Madoonga Stage 1. The end of period face positions are displayed in Figure 7-5 and Figure 7-6.

Madoonga Stage 3 is pre-stripped in anticipation of mining in the following year.

Table 7-8: Scheduling period Year 2 summary

Deposit	Stage	ROM (kt)	Stockpile (kt)	Waste (kt)	Fe%	SiO_2%	Al_2O_3%	Strip Ratio
Beebyn	Beebyn Main Pit Central	1,154	0	6,665	60.74	5.74	2.18	5.8
	Beebyn Main Pit West Stage One	4,114	0	42,149	61.12	3.33	2.35	10.2
	Beebyn Main Pit East	1,998	0	13,168	64.37	2.74	1.86	6.6
	Beebyn Main Pit West Stage Two	655	0	8,970	58.96	5.74	2.15	13.7
Madoonga	Madoonga Stage 1	3,941	0	11,020	59.50	4.97	1.49	2.8
	Madoonga Stage 2	3,097	0	24,690	57.31	5.30	2.60	8.0
	Madoonga Stage 3 Prestrip	3	0	3,886	56.15	5.88	2.76	1,447.7
Total		**14,961**	**0**	**110,547**	**60.22**	**4.38**	**2.09**	**7.4**

Table 7-9: RoM fines grades in scheduling period Year 2

Fe% fines	SiO_2% fines	Al_2O_3% fines
59.16	5.27	2.60

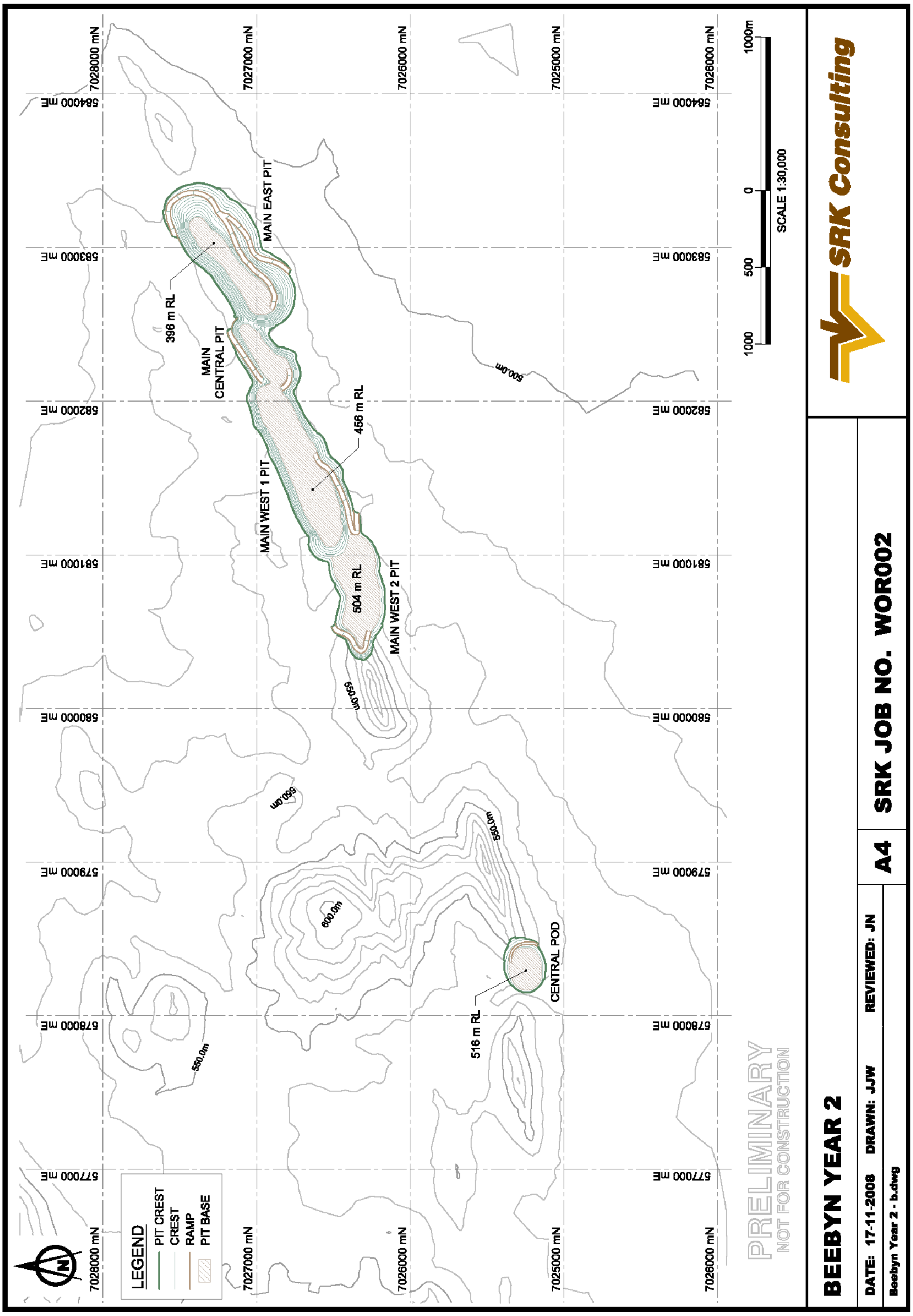


Figure 7-5: Beebyn Year 2 end of period face position

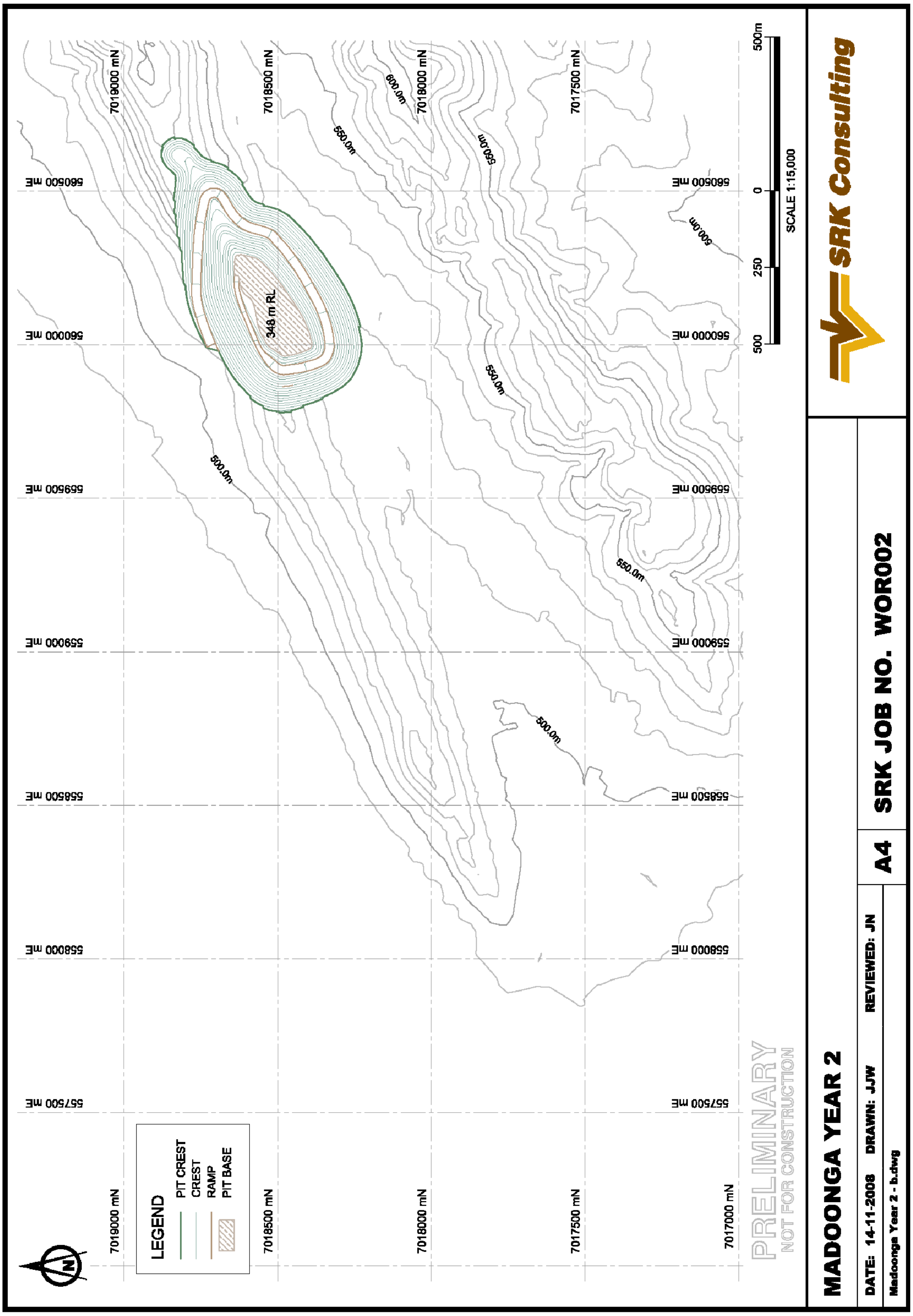


Figure 7-6: Madoonga Year 2 end of period face position

7.9.5 Scheduling Period Year 3

7.9.5.1 Target

Mining in this period is intended to produce 15 Mt of product within market specifications. It is intended to further expand mining in Madoonga to Stage 3. This will reduce dependence on Madoonga Stage 1 for ore.

7.9.5.2 Issues

Madoonga Stages 2 and 3 contain higher levels of Al_2O_3 and SiO_2 contaminants than Madoonga Stage 1. Intended expansion of mine production at these stages is likely to increase contaminant grades, and blending to achieve a product meeting market specification, will be required.

7.9.5.3 Results

A total of 15 Mt of product has been scheduled for this period as summarised in Table 7-10. Waste movements have fallen from 110 Mt in the previous year to 65Mt at a strip ratio of 4.3. Production at Madoonga has been successfully expanded to Stages 2 and 3; these two stages contribute 5.5 Mt of material to the year's ore production target. The end of period face positions are displayed in Figure 7-7 and Figure 7-8.

Fe and Al_2O_3 grades of the blended product fall within the specifications. SiO_2 has increased in this year from the previous scheduling period to 5.53% in fines; this was slightly above the targeted market specifications. The increase in SiO_2 in this period is a result of increased mining of higher contaminant material within Madoonga Stages 2 and 3.

SiO_2 grades have risen in the past few scheduling periods and this is likely to become a major scheduling issue in future periods. SiO_2 grades could be lowered if a strategy of targeting inventory within the Beebyn Pods was adopted in Year 1. This would have prioritised production in the Beebyn Pods over the Beebyn Main pit. Raising the SiO_2 content of earlier periods would reduce the SiO_2 content of remaining pit inventory available for scheduling in this period.

Targeting the Beebyn pods would create problems with Al_2O_3 throughout the schedule. The Beebyn pods contain higher levels of Al_2O_3 contaminants than the Beebyn Main pit. To accommodate the mining of Beebyn pods, production will become increasingly reliant on Madoonga Stage 1 for low Al_2O_3 material for blending and restricted the development of the Beebyn Main pit. This presents two key problems.

- The Beebyn Main pit at depth becomes the main source of low Al_2O_3 material in later periods of the schedule; underdevelopment of this stage will restrict the blending flexibility of the operation. In addition, material with high Fe mineralisation content will not be scheduled due to limitations on the vertical rate of advance.
- The Madoonga inventory contains high levels of SiO_2 and requires blending with material from Beebyn. In conjunction with mining the higher SiO_2 Beebyn pods, increased production at Madoonga will cause significant increases in SiO_2 product grades. This may produce a blended product exceeding the allowable SiO_2 market product specifications.

Table 7-10: Scheduling period Year 3 summary

Deposit	Stage	ROM (kt)	Stockpile (kt)	Waste (kt)	Fe%	SiO_2%	Al_2O_3%	Strip Ratio
Beebyn	Beebyn Main Pit Central	768	0	2,425	60.01	6.55	1.86	3.2
	Beebyn Main Pit West Stage One	5,647	0	27,199	61.40	3.56	2.17	4.8
	Beebyn Main Pit East	1,359	0	5,504	64.94	2.44	1.58	4.0
Madoonga	Madoonga Stage 1	1,936	0	2,820	59.63	5.51	1.23	1.5
	Madoonga Stage 2	4,444	0	12,489	57.82	5.41	2.34	2.8
	Madoonga Stage 3	1,138	0	14,645	56.24	6.36	2.54	12.9
Total		**15,293**	**0**	**65,083**	**60.00**	**4.60**	**2.06**	**4.3**

Table 7-11: RoM fines grades in Scheduling Period Year 3

Fe% fines	SiO_2% fines	Al_2O_3% fines
58.91	5.53	2.58

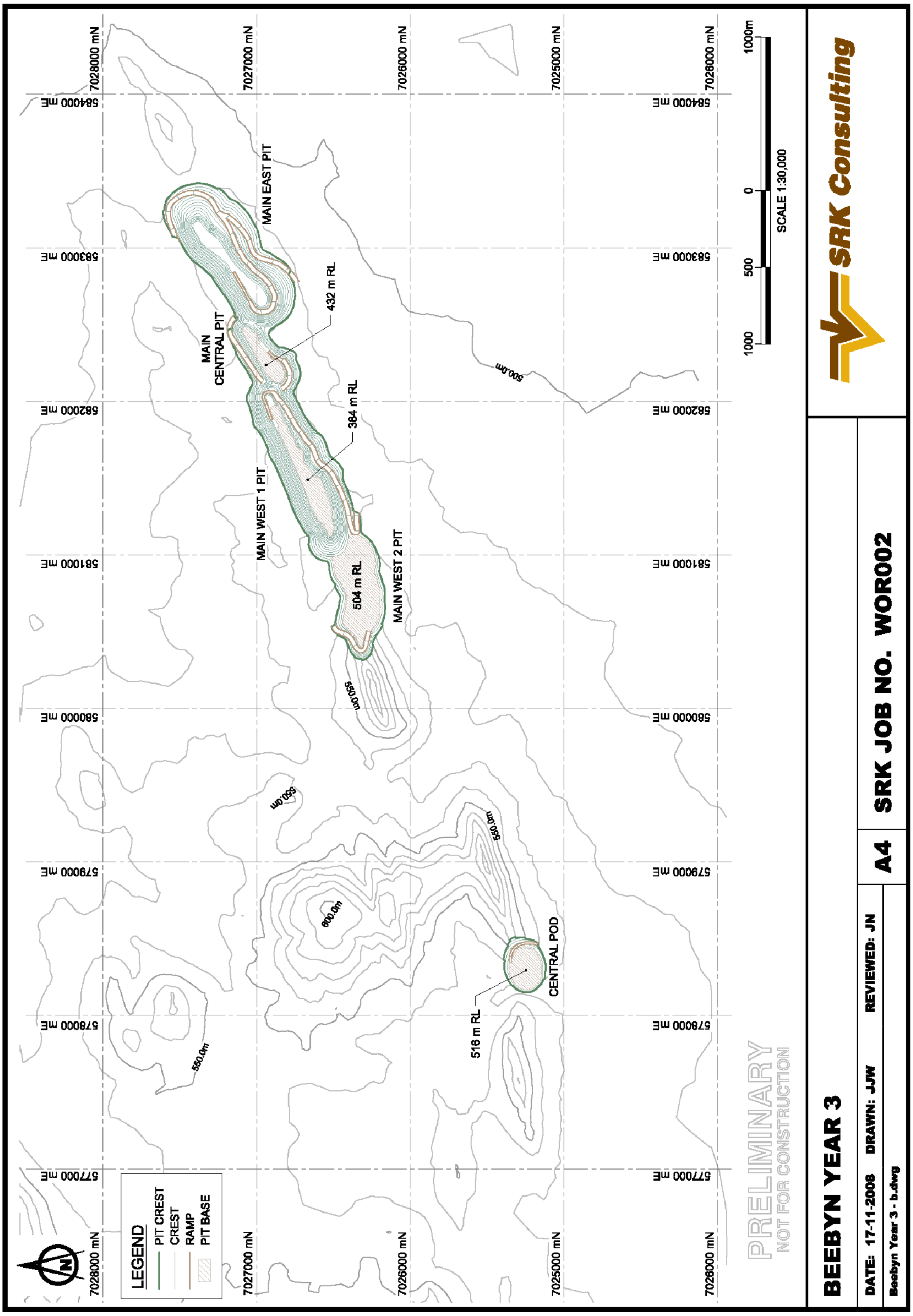


Figure 7-7: Beebyn Year 3 end of year face position

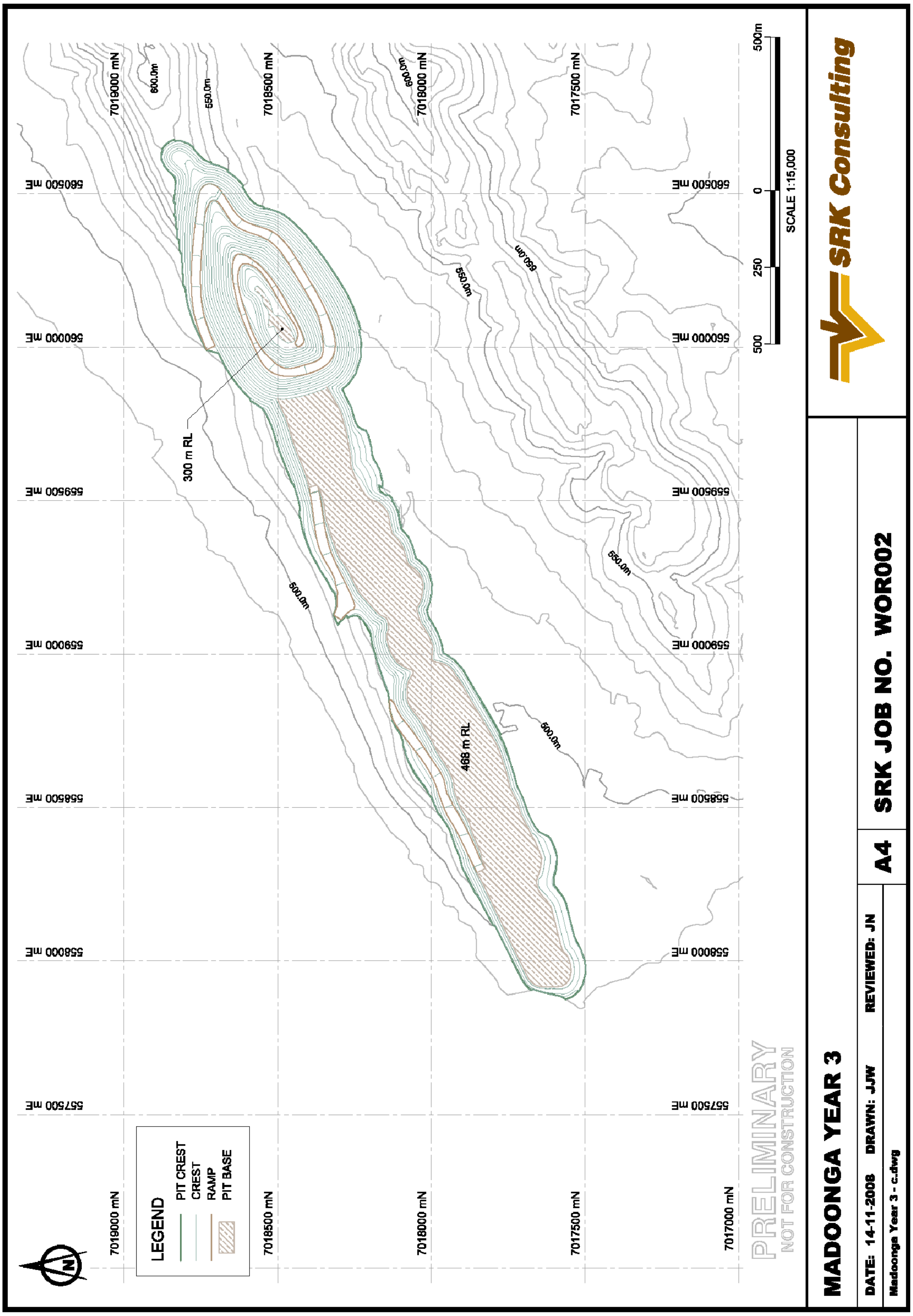


Figure 7-8: Madoonga Year 3 end of year face position

7.9.6 Scheduling period Year 4

7.9.6.1 Targets

The targets remain unchanged from the previous scheduling period.

7.9.6.2 Issues

Reduced pit inventories with acceptable levels of Al_2O_3 and SiO_2 contaminants may cause difficulties in scheduling a year's supply of material meeting the targeted market specifications. This issue is further complicated by the maximum vertical rate of advance restriction; a low contaminant inventory may be inaccessible in this period.

7.9.6.3 Results

As summarised in Table 7-12, 15 Mt of production was not achieved in this period. A total of 7.2 Mt of ore, or approximately half a year's production, is scheduled for this period. This result was achieved by stockpiling material with a Fe grade of 55% or lower. A total of 1.7 Mt of material is stockpiled under this constraint in the scheduling period. The end of period face positions are displayed in Figure 7-9 and Figure 7-10.

Production in this period was constrained by the allowed grades of both Al_2O_3 and SiO_2 contaminants. Some remaining inventory with low contaminant grades is inaccessible at the bottom of the Beebyn Main pit because of limitations on the vertical rate of advance.

The resultant grades indicate some further blending capacity is available to mine high contaminant material, in particular the Beebyn Pods. Mining the Beebyn Pods in this period raises the level of Al_2O_3 contaminant towards the acceptable 2.6% in fines. Furthermore, the results of this scheduling period were achieved with the stockpiling of low Fe material.

Mining the lower grade Beebyn Pods will result in significant proportions of contained pit inventory sent to stockpile. This would lead to a comparatively slight increase in RoM material for larger increases in waste tonnes mined and stockpiled inventory.

Table 7-12: Scheduling period Year 4 summary

Deposit	Stage	ROM (kt)	Stockpile (kt)	Waste (kt)	Fe%	SiO_2%	Al_2O_3%	Strip Ratio
Beebyn	Beebyn Main Pit Central	781	118	2,457	58.58	6.66	1.76	2.7
	Beebyn Main Pit West Stage One	2,281	0	4,477	62.03	3.52	1.83	2.0
	Beebyn Main Pit East	1,260	0	3,489	65.06	2.19	1.46	2.8
Madoonga	Madoonga Stage 1	110	0	204	58.88	6.61	1.22	1.9
	Madoonga Stage 2	1,042	51	2,431	57.82	5.81	2.26	2.2
	Madoonga Stage 3	1,863	800	13,965	57.47	5.29	2.40	5.2
Total		**7,338**	**970**	**27,024**	**60.38**	**4.44**	**1.96**	**3.3**

Table 7-13: RoM fines grades in Scheduling Period Year 4

Fe% fines	SiO_2% fines	Al_2O_3% fines
59.31	5.34	2.50

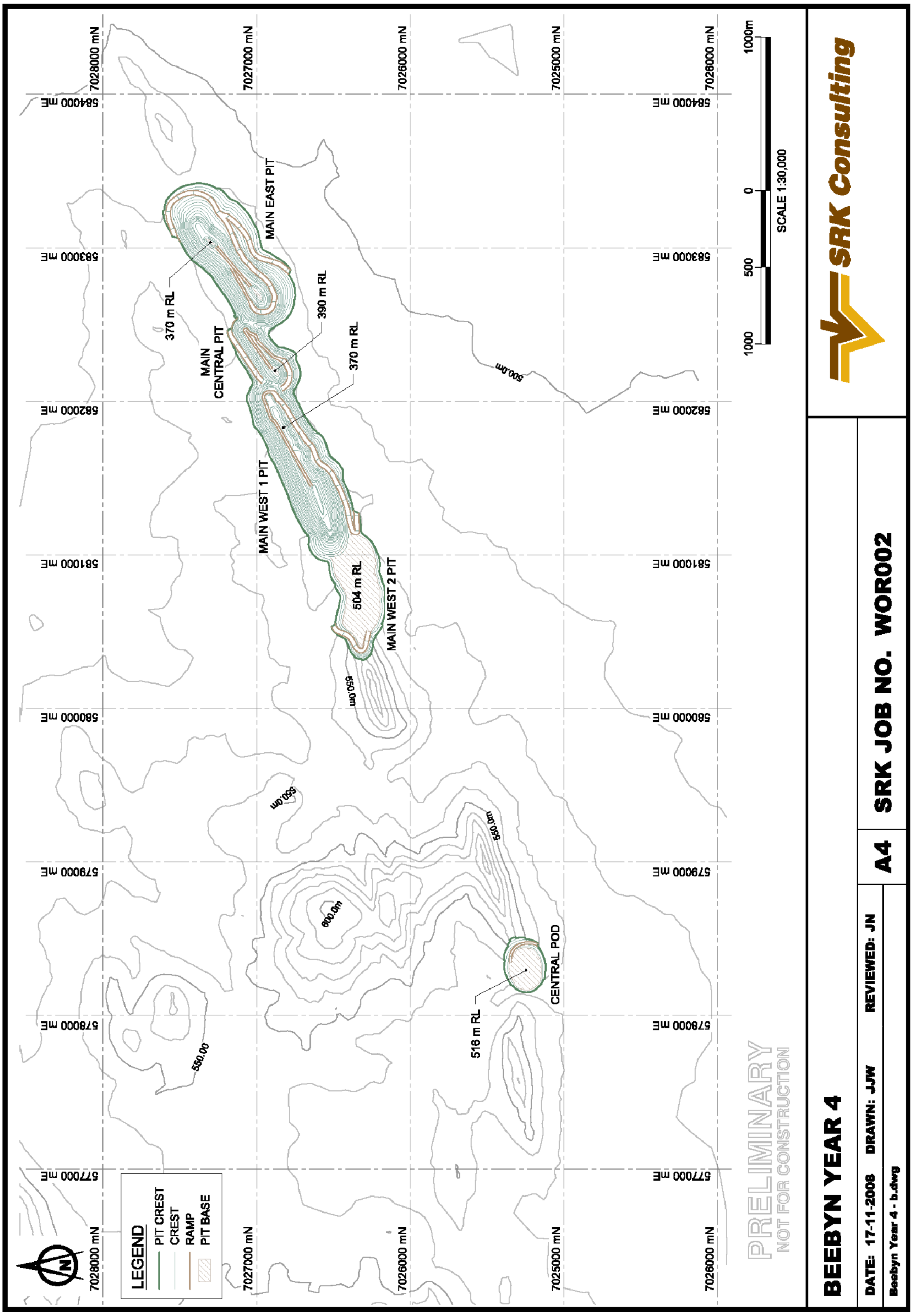


Figure 7-9: Beebyn Year 4 end of period face position

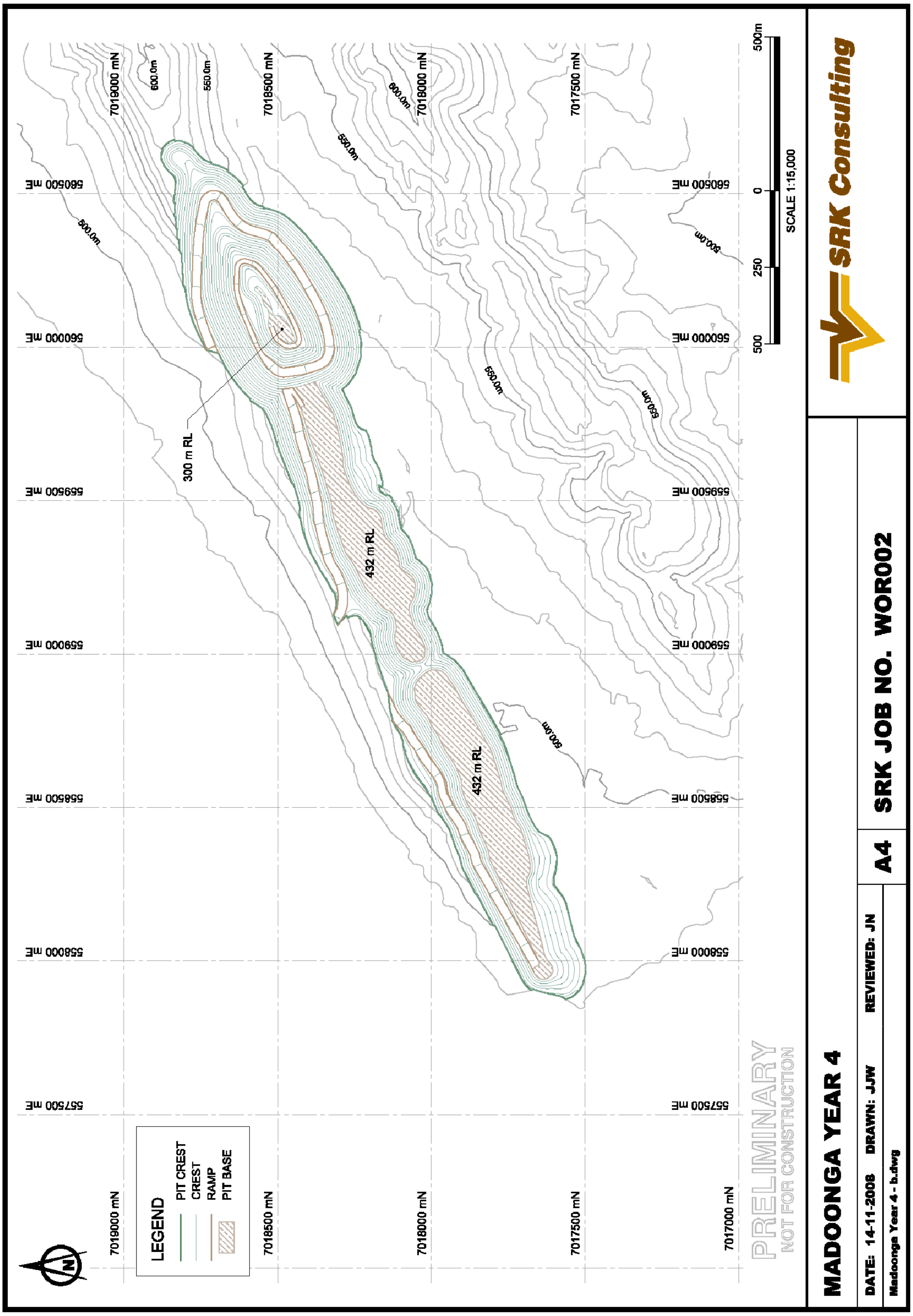


Figure 7-10: Madoonga Year 4 end of period face position

7.9.7 Scheduling period Year 5

7.9.7.1 Target

It was difficult for the previous period to achieve the ore production target of 15 Mt of product. This year will attempt to schedule and capture a blend of material meeting the grade specifications.

7.9.7.2 Issues

Large quantities of remaining low Fe inventory with high levels of Al_2O_3 and SiO_2 contaminants are expected to make scheduling in this period difficult.

7.9.7.3 Results

As summarised in Table 7-14, 2.7 Mt of product meeting the contaminant fines grade specification were scheduled. This results in a Fe fines grade of 57.6%, below the grade target. A total of 1.4 Mt has been stockpiled in this period. This is equivalent to over half the material scheduled to RoM. The end of period face positions are displayed in Figure 7-11 and Figure 7-12.

A total of 0.5 Mt of material was reclaimed from the stockpile was reclaimed and blended to achieve this result. While material from the stockpile has lower Fe and higher contaminant grades than the insitu inventory, stockpile reclaim presents a cheaper option with lower associated waste movement.

Mining the lower Fe grade Beebyn pods can take place in this period. However, the Fe fines grade for scheduled product currently does not meet the market product specifications. There is little scope for mining larger quantities of inventory with low Fe content. In addition, under the stockpiling constraints used in this period, significant proportions of material from the pods will be stockpiled, not sent to RoM.

Table 7-14: Scheduling period Year 5 summary

Deposit	Stage	ROM (kt)	Stockpile (kt)	Waste (kt)	Fe%	SiO_2%	Al_2O_3%	Strip Ratio
Beebyn	Beebyn Main Pit East	0	0	0	65.84	1.94	1.47	1.8
	Beebyn Pod Central	612	11	4,079	60.52	5.16	2.07	6.5
Madoonga	Madoonga Stage 3	1,663	1,080	5,535	59.03	3.67	1.86	2.0
Stockpile	Stockpile reclaim	395	0	0	55.08	7.24	2.94	-
		2,671	**1,091**	**9,614**	**58.79**	**4.54**	**2.07**	**2.9**

Table 7-15: RoM fines grades in scheduling period Year 5

Fe% fines	SiO_2% fines	Al_2O_3% fines
57.63	5.46	2.53

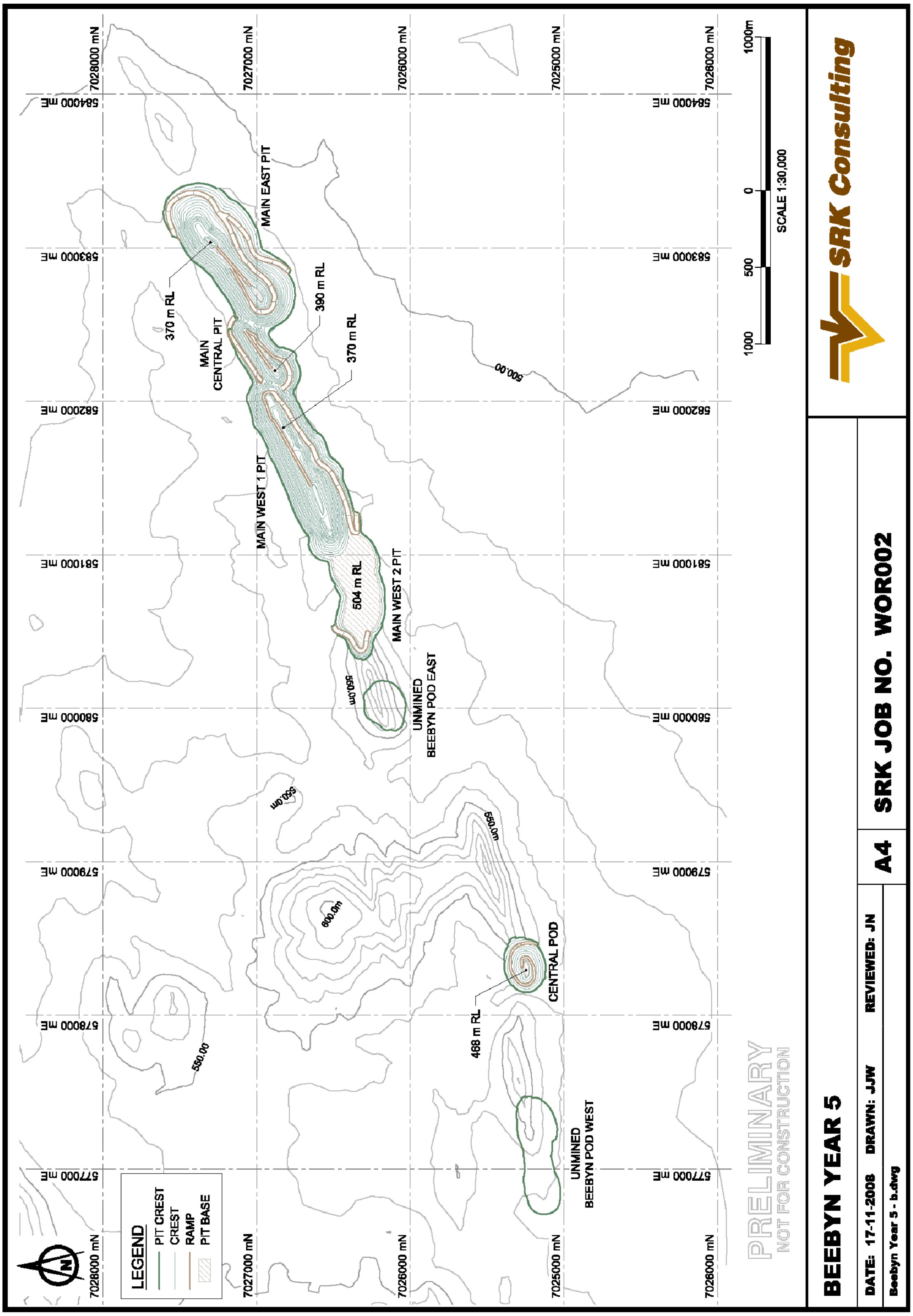


Figure 7-11: Beebyn Year 5 end of period face position

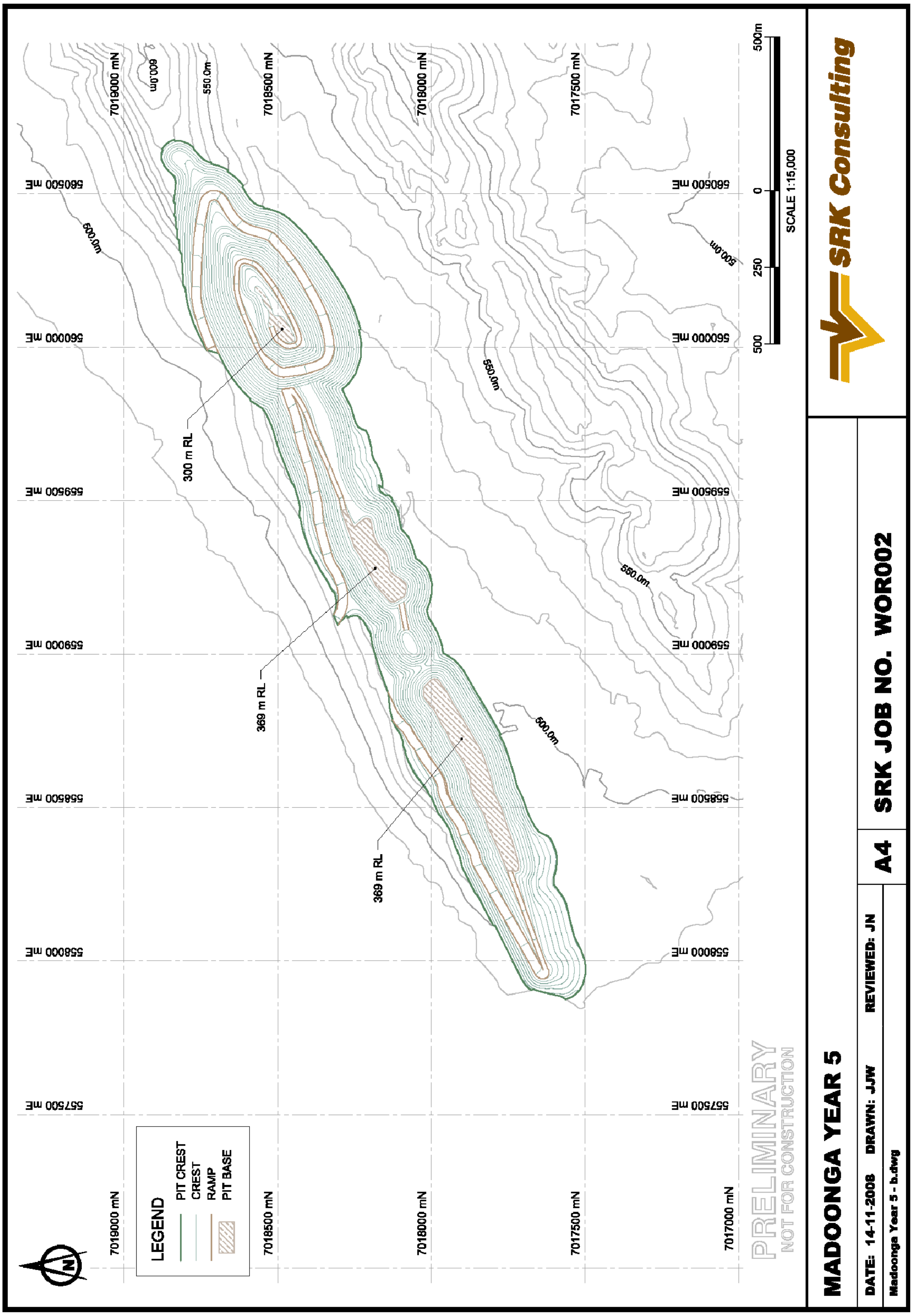


Figure 7-12: Madoonga Year 5 end of period face position

7.9.8 Remaining inventory

Remaining unscheduled pit inventory is summarised in Table 7-16 below. Most of this material is contained at the bottom of the Beebyn Main West Stage 2 pit and the Beebyn Pods. These areas contain reasonable Fe content but high levels of Al_2O_3 and SiO_2 and, at high strip ratios. The scheduling software was unable to target mining of these stages because of both grade restrictions and restrictions on the vertical bench turnover.

Proportions of the Beebyn pods could be scheduled during Years 1 and 2; this would involve mining these stages at the expense of the Beebyn Main pit. This will raise the level of contaminants in earlier periods of the schedule and reduce the Fe product grade. Alternatively, the ore production rate could be raised slightly in these two periods to accommodate mining of the pods; however, this leads to more profound changes in total material movements in the life of mine schedule.

A total of 1.6 Mt of material remains in the stockpile at the end of mine life as indicated in Table 7-16; this material is of low-grade and high contaminant and was built up during scheduling Years 4 and 5.

Table 7-16: Remaining inventory

Stage	Ore (t)	Waste (t)	Fe%	SiO_2%	Al_2O_3%
Beebyn Main Pit West Stage 2	2,414,976	19,082,032	59.08	5.42	1.82
Beebyn Pod Central	148,823	123,857	60.24	5.38	2.14
Beebyn Pod East	428,088	5,399,931	58.02	7.30	2.25
Beebyn Pod West	1,954,964	12,672,365	58.60	5.63	2.44
Madoonga Stage 3	1,654,279	1,606,567	57.16	5.52	2.34
Stockpile remaining	1,665,813	-	55.08	7.24	2.94
Total	**8,266,944**	**38,884,753**	**57.74**	**5.95**	**2.32**

7.10 Fleet size

Given the above production rate, an average of six and maximum of eight excavators are required during the life of the Project. By Year 1 there should be four excavators in Beebyn and four excavators in Madoonga, requiring a total of 63 trucks. As the excavators and trucks are standardised across the operation, the mining of ore and waste is not restricted to any one machine. This enables each machine to dynamically move between ore and waste mining activities with minimal disruption to productivity. Having eight excavators ensures there is additional excavator capacity to complete other duties such as cutting batters and digging sumps. There is suitable capacity and flexibility in the excavation fleet to cover extended unplanned downtime to ensure the continuity of ore supply and maintain a blended product to the Beebyn and Madoonga RoMs.

Table 7-17: Proposed mining fleet

Item	Class/capacity	LOM average units	15 Mtpa average units	Peak units
Excavators	250 t Class (27t bucket payload)	5	6	8
Trucks	Offroad140 t payload	35	46	63

Table 7-18: Proposed blast hole drilling fleet

Item	Class/capacity	LOM average units	15 Mtpa average units	Peak units
Ore blast hole drills	102 mm to 127 mm 6.5 m pass	4	5	7
Waste blast hole drills	127 mm to 200 mm 12 m pass	2	3	4

The proposed ancillary fleet for both production mining operations is combined in Table 7-19.

Table 7-19: Proposed ancillary fleet

Item	Class/model	Quantity
Bulldozer	Caterpillar D10N or equivalent	4
Wheel dozer	Caterpillar 854G or equivalent	2
Grader	Caterpillar 16M or equivalent	5
Water cart	Caterpillar 773D or equivalent	6
Crane	25 t	2
Crane	100 t	1
Forklift/IT		2
Service truck	100t	4
Excavator with rock breaker attachment	25 t	2
Coaster Bus		4
Tyre changer		2
Lighting plants		20
Hiab		2
Pit dewatering pumps	150 litre/sec Capacity	4
Light vehicles		26
Explosives truck		2
Explosive utility vehicles		2
IT28 tool handler		4
Maintenance trucks		2
Low bed or float	300 t carrying capacity	1

7.11 Project manning levels

The operator labour costs have been factored into the equipment operating cost estimates. The SMM technical mining staff (Table 7-20), have been costed into the pit optimisation as an additional ore cost of $0.20 per tonne. Labour not contained in the tables below has not been considered by SRK.

Table 7-20: SMM technical mining staff

Position	Per shift	Total number
Mining manager	1	1
Environmental coordinator	1	1
Senior mining engineer	1	1
Planning engineer	2	4
Senior geologist	1	1
Mine geologist	2	4
Field assistant (14 days on/7 days off)	3	9
Total	**11**	**21**

The peak number of mining personnel on site at any one time is 174 (Table 7-26) with the total number of mining personnel employed at 465, occurring in Year 1. This manning estimate only includes contractor mining personnel and SMM personnel (as listed in Table 7-20) directly supporting the mining operation.

It has been assumed that SMM will maintain control over environmental, safety, mine planning and design, geology, grade control and sampling. The contractor will assume all other responsibilities for the mining operation. However, some of these positions are included within the contractor's numbers but it maybe more appropriate to be SMM positions.

The contractor and SMM staff numbers are effectively fixed, independent of the annual tonnage. The production labour numbers are directly related to the annual tonnage.

Table 7-21 lists personnel that the contractor has included in the $1.475M fixed monthly management charge.

Table 7-21: Contractor mining staff

Position	Per shift	Total number
Shared personnel (8 days on/6 days off)		
Contract manager	1	1
Administration superintendent	1	1
Health and Safety superintendent	1	1
Employee Relations officer	1	1
Quarry manager/senior engineer	1	1
Drill and blast superintendent	1	1
Mobile plant superintendent	2	2
Maintenance planner	1	1
Project/registered manager	1	2
Mining superintendent	1	2
Project engineer	2	4
Surveyor	2	4
Drill and blast foreman	1	2
Safety coordinator	1	2
Training coordinator	1	2
Paramedic (includes1 relief)	1	3
Storeman	1	2
Site clerks(dayshift only including 1 relief)	2	7
Total	**22**	**39**

Table 7-22: Contractor mining production personnel

Position	Per shift	Total number
Main mining personnel (14 days on/7 days off - both sites)		
Mining foreman	1	3
Mining leading hand	2	6
Excavator operator (ref: Table 7-16)	8	24
Truck operator (ref: Table 7-16)	63	189
Drill operator (ref: Table 7-17)	11	33
Blast crew (dayshift only)	8	12
Track dozer operator	3	9
Wheel dozer operator	2	6
Grader operator	4	12
Water cart operator	6	18
Utility crew (dayshift only)	4	6
Total	**112**	**318**

The contractor mining maintenance personnel numbers in Table 7-23 are estimates by SRK based on similar projects. As equipment numbers may be adjusted for the BFS, a review of maintenance personnel numbers should be made during the BFS.

Table 7-23: Contractor mining maintenance personnel

Position	Per shift	Total number
Main mining personnel (14 days on/7 days off - both sites)		
Workshop supervisor	1	3
Leading hand	2	6
Diesel fitter	15	45
Serviceman	4	12
Tyre fitter	2	6
Boilermaker	2	6
Electrician	1	3
Light vehicle fitter	2	6
Total	**29**	**87**

SRK suggest that the personnel in Table 7-24 should be removed from the $1.475M fixed monthly mining project management cost of the contractor and instead be SMM positions. For the purpose of the cost estimation this will have no impact.

Table 7-24: Positions transferred to SMM mining staff

Position	Per shift	Total number
Shared personnel (8 days on/6 days off)		
Health and Safety superintendent	1	1
Project/registered manager	1	2
Safety coordinator	1	2
Paramedic (includes 1 relief)	1	3
Storeman	1	2
Total	**5**	**10**

The people in Table 7-25 are contractor positions that should be removed from the fixed month charge as these positions are performing tasks that could be combined with other positions.

Table 7-25: Removed mining staff

Position	Per Shift	Total Number
Shared personnel (8 days on/6 days off)		
Administration superintendent	1	1
Drill and blast superintendent	1	1
Total	**2**	**2**

The total number of mining personnel in Table 7-26 can be refined once negotiation with suitable experienced mining contractors commence. SRK would expect these numbers to marginally reduce.

Table 7-26: Total mining personnel

Position	Per shift	Total number
SMM	11	21
Shared contractor staff	22	39
Production contractor personnel	112	318
Maintenance contractor personnel	29	87
Total	**174**	**465**

7.12 Mine operating cost reporting

The costs in Table 4-2 were used as project costs for the pit optimisation process. For input into the WP financial model only those costs that are directly mining related are required. This effectively removes all capital costs and any operating costs not directly incurred by the mining operation. The only capital cost defined by SRK is the cost of four in-pit self-contained dewatering pumps and associated piping to capable of pumping from the bottom of the pits to the pit crest. These pumping units cost $250k each for a total of $1M.

The items in Table 7-27 were utilised in the pit optimisation process for the pit optimisation cost structure used in Whittle™. Royalty costs, capital and corporate overheads were also removed.

Table 7-27: Project costs not included in mine reporting

Item	Cost ($/t product)
SMM supervision and technical services	0.20
Flights and camp	0.54
Grade control	0.12
Rehabilitation	0.09
Rail	7.80
Bore field de-watering (external to pit)	0.38
Port	15.50
Site processing	4.17
Road train haulage from Madoonga	3.91

Taking into consideration the removal of the costs in Table 7-27, Table 7-28 is the average mining cost for ore and waste by deposit and reflects only the costs directly related to mining operations such as load and haul, drill and blast, in-pit dewatering and ancillary equipment costs.

Table 7-28: Ore and waste mining costs

Item	Cost ($/t product)
Average ore mining Beebyn	5.15
Average ore mining Madoonga	5.26
Average waste mining Beebyn	20.70
Average waste mining Madoonga	12.78

7.12.1 Operating cost and revenue summary

SRK compiled the yearly mine production, associated mining and ore handling costs and reported these results as listed in Table 7-29.

No capital expenditure is listed in Table 7-29 as the mining operation is a contractor based operation.

Table 7-29: Mine Operating Cost by Period

	Period cost ($M)							Grand total ($M)
	-1	0	1	2	3	4	5	
Total ore mining costs	0.3	40.0	78.7	92.1	98.9	55.94	21.0	387
Total waste mining costs	7.8	104.9	354.6	373.9	242.2	107.2	34.2	1,225
Total rehandle costs	-	-	3.3	-	-	-	0.8	4.1
Total mining cost	**8.1**	**144.9**	**436.6**	**466.1**	**341.2**	**163.1**	**56.0**	**1,616**
Annual mining cost ($/t product)	N/A	24.82	29.12	31.15	22.31	22.22	20.96	Average : $26.45/t product
Annual mining cost ($/t mined)	6.76	3.43	3.62	3.71	4.24	4.61	4.31	Average : $3.86/t mined

7.13 Project opportunities

The annual production schedule achieves the blending requirement, however, on a monthly basis, Al_2O_3 and SiO_2 grades have not been verified as achievable. Opportunity to blend the ore should be reviewed in the BFS. Other contaminants such as S, P and TiO_2 are recognised as being potential marketing problems if specified limits are exceeded. These elements are reported and at this stage of the study, do not appear to be a marketing risk.

The bench height of 10 m selected for the mine design is supported by the mining equipment selection. This bench height matches the geotechnical study, but is different from that used to create the mineral resource model. As bench height is a function of mining equipment selection, the difference is not unexpected. SRK do not see large issues with the differences, but would like to see a match between block heights and bench heights in the next study.

There is approximately 8.3 Mt of ‘off-spec’ material remaining unmined and in stockpiles at the end of mine life. It is likely that the lump portion of this material is at market product specifications. Consideration of producing a lump only product should be reviewed for the BFS.

Some proportion of the ore in pre-strip at Beebyn may potentially be recovered.

7.14 Increased production rates

Increasing the ore production rate from 15 Mtpa to 20 or 25 Mtpa has a number of implications on the Weld Range Project.

Methods to increase the ore production rate:

- increase the number of digging units,
- introduce additional deposits,
- increase the productivity per period from the digging units, and
- increase the size (capacity) of the digging units.

Consideration by SRK has determined that increasing the productivity from the existing digging equipment will not provide a 5 Mtpa increase in productivity.

7.14.1 Maintain the same scale digging units

If the 250 t class excavator is maintained as the ore mining machine there will need to be additional units placed into production. An increase in ore production of 5 Mtpa may lead to an estimated additional three excavators being required in the mining fleet. Each excavator will require approximately seven additional trucks at peak production.

For the 20 Mtpa ore production rate scenario, approximately 10 excavators and 72 trucks are estimated to be required. For the 25 Mtpa scenario, equipment numbers will increase to approximately 13 excavators and 93 trucks.

The impact of the additional fleet is as follows:

- the ore-loss and dilution are not negatively affected,
- there is no additional training for new equipment,
- there is an increase in the number of personnel required,
- facilities such as the camp and workshop will need to increase in size,
- there will be an increase in production delays due to congestion on ramps,
- based on the current pit inventories, the life of mine will reduce,
- there will be lower productivity due to the congestion, resulting in increased operating costs,
- with more excavators and trucks the level of ancillary equipment increases to maintain the roads, and
- while difficult to quantify, the more mobile equipment moving around the site, the higher the probability of an safety related incident in a given period.

7.14.2 Increase the ore digging machine size

The next increase in size of excavator is the 350 t class machine. The bucket size increases from 11 m^3, as used on the 250 t class machine, to approximately 20 m^3 on the 350 t class machine. For the purpose of this exercise, the bucket size increase can be used as a guide to the approximate increase in productivity.

The advantages in increased equipment size include the following:

- higher productivity and lower mining cost per tonne,
- fewer excavators,
- less traffic on haul roads because of larger trucks being matched to the larger excavator, and
- less personnel and ancillary equipment required to meet RoM production requirements.

There are also a number of limitations to increasing the equipment size including:

- more difficult to re-locate between working areas resulting in less blending opportunity,
- larger machines are not designed to mine as selectively as ,
- likely incurring a greater ore-loss or dilution penalty,
- less potential to maintain a blended product from the mining face as there are fewer machines,
- the use of larger trucks will effectively reduce the number of trucks required in the fleet, and
- larger trucks will require the ramp width and minimum mining widths to be increased to be able to accommodate the larger mining equipment. This will affect the pit design and economics by adding additional waste material to recover the same quantity of ore.

While there are distinct productivity increases and lower operating costs when using larger mining equipment, the issue at both Beebyn and Madoonga is that the larger machines will also increase ore-loss and dilution issues while reducing the ability of the mining operation to maintain an on specification blend product directly from the mining face. The productivity gains may be completely offset by the increased ore losses because of contamination issues or by material deliberately being left behind to avoid contamination.

7.14.3 Bench turnover

The increased production rates require a higher vertical rate of mining. The vertical rate limit is reached in several production periods in the 15 Mtpa schedule. The increased production rates regardless of equipment class or fleet size will create significant increased operational pressure and practical difficulties in maintaining the required bench turnover rates. Grade control and assaying processes are likely to become critical path activities.

7.14.4 Conclusion

SRK suggest that if higher production rates are required, additional mining locations beyond the Beebyn and Madoonga areas will be required.

8 Forward Works

SRK has submitted a proposal the provision of technical services for the Weld Range Iron Ore Project – Bankable Feasibility Study (BFS). The mining planning components of the BFS proposal represent SRK's current understanding of the Forward Works requirements for the next phase of mine planning.

8.1 BFS mine planning introduction

The mine planning study is a key task that ties the major aspects of the project together to enable financial modelling and review to be carried out. Because of the dependence on the inputs to the study, the mining study work can only be finalised when the final updates of the key input data are made available.

As the inputs into the BFS study are likely be updated from the PFS with revised mineral resource models, revised revenues and costs etc., the mine planning outcomes of the PFS will need to be revisited to check for significant changes in the underlying base assumptions. This process will involve reworking the open pit optimisation, mine design and mine production scheduling phases to a high standard prior to formal reporting.

8.2 Mine planning assumptions

The key assumptions for the mining study are based on the following:

- detailed BFS mine planning work components are limited to Beebyn and Madoonga deposits,
- the project ore reserve target remains 225 Mt, which implies that the balance of the reserves is to be sourced from currently unidentified orebodies,
- consideration be given to a conventional mining scenario only,
- blending post mining will need to be considered and managed downstream of the mining activities with interaction between SRK, SMM and other parties envisaged to ensure on-specification product delivery,
- the blending targets will be based on Fe, SiO_2 and Al_2O_3 grades only,
- the operating strategy will consider both owner-operator and contractor mining, but will consider only one option in full BFS detail,
- the battery limits are delivery of material to RoM or waste dumps,
- topsoil removal and dumping will be considered,
- mine infrastructure design and costing, and surface water management and assessment will be completed by others,
- waste management option studies will be required with input from SMM,
- products will be 'Direct Shipping Ore' only, and
- SMM will be seeking a JORC standard Ore Reserve statement.

8.3 Inputs

The key inputs into the mine planning study include:

- updated mining contractor tender response,
- updated geotechnical slope recommendations, and
- updated mineral resource models for Beebyn and Madoonga.

8.4 Scope

The BFS tasks that have been considered in this component of work include the following:

- tender documentation for mining contractor involvement (where required),
- mining operations including:
  - mobilisation, pre-strip and production ramp-up,
  - equipment selection,
  - ore-loss/dilution philosophy,
  - open pit optimisation,
  - open pit mine designs based on pit optimisation,
  - staged designs to suit production sequencing,
  - operating cost estimation,
  - capital expenditure estimation,
  - mine production scheduling including, blending considerations, and
  - waste dump designs.
- contribution to an SMM JORC standard Ore Reserve Estimate, and
- report on finalised Weld Range mine planning including mine designs and schedules.

The detail of these tasks is outlined in the sections below.

8.4.1 Tender documentation for mining contractor involvement

SRK recognises that in order to enable rapid project development and to ensure accurate cost estimation, mining contractors need to be contributing to the project prior to the BFS mining study commencing. SRK suggests that tender-type documentation is produced immediately following the PFS mining study, based on the PFS mine planning work, requesting mining contractor contribution to mine planning and mining costs estimation. The response to tender information from the mining contractors will help benchmark first principal cost estimation from SRK for an owner-operator scenario.

The inputs required from mining contractors include:

- drill and blast methodology and cost estimation,
- validation of mining equipment selection,
- mining cost estimation,
- procurement philosophy,
- equipment maintenance and lifecycle philosophy, and
- ancillary support fleet requirements.

To achieve these requirements, SRK recommends involving mining contractors prior to the commencement of the BFS mining studies. This involvement will require the development of an updated project description including the detail supporting the mine planning work performed to date. The process could be used by SMM as a pre-qualification prior to tendering the mining contract on the conclusion of the BFS. SRK proposes that the corporate implications of these arrangements be left to SMM.

As discussed in Section 5, a contract mining scenario will result in a different optimised pit shell to that of an owner-operator, primarily because the mining contractor's capital cost and profit margins will be included in the unit rates, which are treated as operating costs by the Principal. SRK suggests that only one scenario is developed to BFS standards to avoid two parallel studies and associated time and cost implications.

8.4.2 Mining operations

SRK will need to consider the ancillary and operational support activities as well as optimising the main earthworks components. This task is intended to provide time allowance to consider interaction with the mining contractor, SMM and other study participants for mine equipment support services and facilities.

Areas that are likely to require consideration include:

- pit dewatering,
- explosives magazines and bulk compound,
- workshops,
- in-pit surface water management,
- grade control practices, and
- ground control practices.

8.4.3 Mobilisation, pre-strip and production ramp-up

A pre-strip contractor and fleet are likely to be required to be mobilised in advance of the main mining fleet mobilising. SRK will consider the scheduling aspects and practicalities of pre-strip and production ramp-up, and provide an appropriate solution to offset capitalisation of pre-strip costs and meet production targets.

SRK will work with SMM and other contributors to the BFS study, including the mining contractor (as appropriate), to develop a practical and cost effective approach to planning the commencement of the mining activities.

8.4.4 Ore-loss/dilution philosophy

The PFS mine planning work to date has indicated that dilution and ore-loss are issues that need to be well defined. SRK proposes to review the PFS outcomes and seek opportunities to improve the solution before finalising an approach.

8.4.5 Blending

The PFS work to date has indicated that blending at the mine needs to be supported by blending post-mining to ensure on-specification product delivery. This is likely to involve consideration of stockpiling facilities between the primary crushers and the port load out. The inability to provide adequate stockpile management will affect the ability to deliver product on specification in short time frames including on a ship-by-ship basis.

SRK recommend the appointment of appropriate parties with blending and stockpile management expertise.

8.4.6 Open pit optimisation

Open pit optimisation using Whittle™ software or Lerch Grossman algorithms will be undertaken. The pit optimisation process will be used to carry out sensitivities to the pit optimisations to account for a range of iron ore prices and variations in project costs and other project parameters.

The economic and physical design parameters will be compiled for the open pit optimisation study.

The key output of the open pit optimisation is the identification of the final pit limits that will be used to create the final mine designs. The inventory of the pit optimisation shells and sensitivities will be reported.

8.4.7 Open pit mine designs

Pit design will be influenced by several factors including the outcome of the geotechnical and hydrogeological studies. The bench height will be a function of geotechnical parameters, equipment selection and operational considerations. Haul road parameters would be based on the hauling equipment selection, safety requirements and geotechnical aspects.

The mine design criteria will be considered and applied to the final optimisation pit shell to develop draft final mine designs for downstream consideration of production sequencing.

Some of the mine design features considered in this task include:

- bench height,
- pit slope design for designated berm width and batter slopes;
- minimum mining widths, and
- haulage road width, gradient and alignment;

8.4.8 Staged mine designs and production sequencing

The means of developing and opening up the Madoonga and Beebyn deposits will be reviewed from the PFS. The sequencing of mining will influence the mining practicalities and blending opportunities.

The design of proposed pit cutbacks will be analysed on the volume of rock handled, product grades, contaminant grades, availability of ore on the benches and also the yearly vertical movement of the benches. Blending software such as Minemax™ or the Minesight™ strategic planner could be used to guide the definition of the stage pit design by highlighting areas that will satisfy the required market product specifications.

Practical staged mine designs will be drafted with consideration to mining equipment, mining practicalities and blending requirements. The outputs of this task will be finalised staged designs which can be used to finalise the final mine design.

8.4.9 Mine production scheduling

The basis of the mine production scheduling will be the staged mine designs and previously considered production sequencing. Production scheduling will consider blending considerations for Fe grades, SiO_2 and Al_2O_3. The Decrepitation Index (DI) will become a scheduling driver in the BFS phase of work.

The production schedule periods considered are monthly for the first 12 months, quarterly for the next two years, then annually thereafter.

The RoM ore will be calculated and scheduled in units of:

- volume (bcm),
- mass (tonnes), and
- grade.

Waste rock quantities will be calculated and shown in units of:

- volume (bcm),and
- mass (tonnes).

Other production scheduling considerations include:

- mine equipment required to perform the schedule, and
- mine personnel required to perform the scheduled mining operation.

8.4.10 Waste management

Optimisation of the waste haulage to external dumps and internal (to the pit) dump locations should be considered in the BFS. The use of internal waste dumping (backfilling) appears to be an opportunity that is currently surpassed by the key project driver of blending to deliver product to market specifications. To develop a void suitable for backfilling would impose additional scheduling drivers that will make blending significantly more challenging to the project.

The environmental considerations may, however, dictate the use of internal waste dumping. These considerations may be based on:

- the area required for the external waste dump is classed as being excessive,
- the pits have to be backfilled above the natural watertable, or
- the areas allocated for the external dumps contain environmental or archaeological significance.

A combination of external waste dumps and internal dumps is the likely outcome as void space is made available once pits are mined to the final design depth.

External waste dumps can be optimised to minimise waste haulage costs. Alternatively, the waste dumps can be designed to other project drivers such as analogous landform creation or minimal footprints to address potential issues with permitting, heritage and environment requirements. SRK suggest further discussions with SMM are required to select the appropriate approach to the waste dump design.

The technical work to date has not considered Potentially Acid Forming material (PAF) or its encapsulation in the waste dumps. It is possible that the ongoing acid drainage and metal leaching studies will identify waste material that needs to be managed independently.

8.4.11 JORC standard ore reserve estimate

Being a BFS, a JORC standard Ore Reserve report is likely to be required. A JORC Standard Ore Reserve report is a project report that is not owned by SRK or developed solely by SRK. For technical disciplines outside the mining study scope of work, competent persons, as defined by the JORC Code 2004, will need to take responsibility for their technical discipline input data and be able and willing to co-sign an Ore Reserve Statement.

SRK will work with SMM to develop the JORC Ore Reserve statement, and provide signatories in the technical areas in which SRK has contributed. SMM may need to nominate signatories to cover aspects of the project outside SRK's battery limits.

8.4.12 Reporting

SRK will compile a standalone BFS mine planning report that includes:

- report including manning, equipment levels, mine planning philosophies,
- project sensitivities,
- inventory reporting,
- plans of staged and final mine designs,
- capital cost reporting,
- operating cost report including reporting of operating cost by period,

- production scheduling report by period,
- end-of-period face position plans,
- high level project implementation schedule,
- an Ore Reserve Statement will be prepared in accordance with the JORC Code, and
- recommendations and forward works.

Additionally, SRK propose to assist SMM by writing appropriate sections for inclusion into the SMM BFS summary document.

9 Mining Study Comparisons

The prior Preliminary Mining Study presented an analysis of the status of the Weld Range Project based on project knowledge as of November 2007.

9.1 Changes to mineral resource models

The Preliminary Mining Study used the November 2007 mineral resource model as the key input to the mine planning. Improvements in geological understanding have occurred between the November 2007 mineral resource model and the development of the current July 2008 mineral resource model, based on additional drilling and geological studies.

The July 2008 mineral resource model differs in the following respects:

- the July 2008 model has increased the total mineralised tonnage significantly as a result of increases in interpreted mineralisation volumes, including W7, W8, and W12 and significant increases in the density values used,
- significant extensions along strike of the Madoonga deposits were included in the July 2008 model; these zones are very high in SiO_2,
- further deep drilling at Madoonga has improved the confidence of the grade estimate at depth at Madoonga, identifying high SiO_2 zones,
- The average grade of SiO_2 in Beebyn is largely unchanged between mineral resource models, but an increase of 2.3% SiO_2 is noted at Madoonga,
- the high Al_2O_3 zone identified on the hangingwall of the main BIF unit in the Beebyn deposit has been domained and estimated separately from the low Al_2O_3 domain. The high Al_2O_3 domain has not been considered in the economic evaluation for the PFS mining study. This has led to the Madoonga Al_2O_3 grades being largely unchanged, but the average Beebyn Al_2O_3 dropping 0.7%, and
- additional parallel BIF units have been domained in the July 2008 mineral resource model. These minor BIF units were not included in the economic evaluation for this mining study.

9.2 Changes to revenue and marketability

A SiO_2 upper cut of 8.3% was required to limit SiO_2 grades in the fines product to 5.5%. This level of detail was not required in the previous study as the Al_2O_3 levels were the limiting factor in determining a marketable product.

Al_2O_3 has been domained separately for the main BIF unit at Beebyn to limit Al_2O_3 levels in the fines.

The revenue estimates supplied by SMM have increased as indicated in Table 9-1.

Table 9-1: Adjusted metal price

		2007 revenue price estimates	2008 revenue price estimates	Variance
Sale price for lump	dmtu	US$0.8184	US$1.482	81%
Sale price for fines	dmtu	US$0.6279	US$0.9436	50%

9.2.1 Changes to cost and project parameters

Costs and parameters between the two studies are similar, although an additional third party capital repayment cost of $15.50/t product has been included in the current study to cover the cost of rail and port.

9.2.2 Comparison of inventory

A summary of the impact of the various changes between the two studies is listed in Table 9-2.

Table 9-2: Study comparison

Item	Preliminary Mining Study			Pre Feasibility Study			Overall change
	Beebyn	Madoonga	Combined total	Beebyn	Madoonga	Combined total	
Total product	30.0 Mt	49.7 Mt	**79.7 Mt**	33.3 Mt	36.1 Mt	**69.4 Mt**	Reduced by 10 Mt
Total waste	240.0 Mt	224.0 Mt	**464.0 Mt**	242.4 Mt	151.8 Mt	**394.2 Mt**	Reduced by 70 Mt
Strip Ratio	8.00	4.51	**5.82**	7.28	4.20	**5.68**	Reduced by 3%
Fe grade	60.30%	57.40%	**58.50%**	61.74%	58.40%	**60.00%**	Increase by 1.5%
SiO_2 grade	4.78%	2.15%	**5.26%**	3.89%	5.13%	**4.54%**	Reduced by 0.72%
Al_2O_3 grade	2.73%	5.55%	**2.37%**	2.09%	2.08%	**2.09%**	Reduced by 0.28%

10 Conclusions

The July 2008 mineral resource model used as the basis of the mine planning study contained an increased mineralisation tonnage compared with that of the prior mineral resource models, albeit at higher SiO_2 contaminant levels.

The elevated SiO_2 contaminant levels have impacted upon the mining equipment selection and led to the adoption of more selective mining practices and the consideration of mid-size trucks and excavators.

It became evident during the production scheduling process that blending to market specification, only from the mining face, was not possible. Stockpiles were utilised by the scheduler to enable the mining of out-of-specification material as it is presented to the excavator. Even on an annual basis, there was approximately 8 Mt of mineralised inventory not scheduled as it could not be blended to meet market specification. Blending studies will be require for the BFS to better utilise the mineralised inventory.

The use of a pre-stripping mining contractor has been recommended to open up the less accessible Beebyn deposit. Madoonga is considered straightforward and can be pre-stripped with the conventional mining fleet.

The operating cost estimation has been supported by a response from a SMM request for tender by HWE Mining Ltd Pty. HWE’s costs have been adjusted and benchmarked as appropriate to align with SRK’s interpretation of the projects requirements.

Open pit optimisation was carried out. The open pit optimisation sensitivity work conducted by SRK indicates that the project, as currently defined, is relatively insensitive to small changes in most project parameters. However, silica contaminant levels, dilution and ore-loss were identified as key drivers to the project.

Mine designs were developed from the pit optimisation outputs. The final mine designs identified the potential for a combined recoverable mining inventory of 69.4 Mt of product at 60.0% Fe.

Stage mine designs were used to assist in the mine production scheduling. The scheduling periods were annual with targets of supplying 15 Mtpa after ramp-up (12months) and satisfying the contaminant grade constraints in the fines product. This process defined a mine life of seven years including pre-strip and a production ramp-up year. The final two years of mine life do not manage to meet the ore production target of 15Mtpa owing to bench turnover and contaminant grade constraints. To overcome the grade issues identified at the end of the mine life, SRK suggest that blending stockpiles are used, and additional mineral resources be sourced from deposits outside the Beebyn and Madoonga deposits.

As the mineralised pit inventories inside the final pit design limits contain less than the project target of 15 Mtpa of product for 15 years life, SRK consider that it is necessary to continue exploring to identify the additional mineral resource required for the Weld Range Project.

11 Recommendations

SRK recommend that the following items be considered either prior to, or as part of, the BFS. The proposed scope of work for the mine planning components of the BFS is outlined in Section 8, Forward Works.

11.1 Processing

Whilst recognised as being outside of SRK's PFS scope of work, SRK recommend the consideration of beneficiation to ensure that a single option is presented to the BFS study. The PFS has identified that the project is very sensitive to Al_2O_3 and SiO_2 grades from an available mineral resource and blending capacity perspective.

Mineralisation not considered in the current study, which may be amendable in future processing options, includes:

- high alumina zone identified in the hangingwall of the Beebyn orebody,
- the parallel BIF units representing small tonnages of low-grade mineralisation (considered waste in this study),
- magnetite zones (considered waste in this study),
- high silica zones identified largely at Madoonga,
- mineralised waste (mineralisation identified as ore-loss), and
- hard cap and kanga

SRK has carried out broad sensitivity work to test the impact of a high processing operating cost on the primary mineralisation. Valid pit shell solutions could be found with the higher processing costs, reflecting the potential viability of process beneficiation solution.

11.2 Contaminants

Only Fe, Al_2O_3, SiO_2 and P are reported using regressions for the lump and fines grades. The remaining elements are reported as in situ grades.

Phosphorus grades have been recognised as high. SRK recommend reviewing the potential impact of high P grades prior to the commencement of the BFS to ensure product marketability concerns are understood.

SRK recommend the review of the regressed lump and fines grades in all key elements prior to the commencement of the BFS to ensure product marketability concerns are understood.

11.3 Contractor involvement

Mining contractors will be able to assist in providing mining cost estimates and help develop the practical philosophies for equipment mobilisation, pre-strip, project start up and development. The integration of a mining contractor into the BFS process can potentially reduce the time to first production by pre-empting potential issues due to the contractors experience in operational activities.

However, the use of a mining contractor can impact upon technical studies as the contractor's capital costs are treated as operating costs by the Project. The open pit optimisation results change with the inclusion of capital by reducing inventories and altering the production schedules.

11.4 Blending

Ensuring the delivery of an 'on-spec' product without the use of stockpiles on an annual basis proved difficult. As a result, potential ore was not scheduled in the last half of the mine life as Al_2O_3 and SiO_2 were out of specification and could not be blended, requiring the use of stockpiles.

SRK suggest the use of blending stockpiles and management systems as required to maintain the target specifications. SRK recommends that SMM engage the services of blending experts.

Additional project resource through exploration may help provide alternative materials to blend.

11.5 Geology and mineral resources

The shape of the ore/waste contact boundary differs considerably between Beebyn and Madoonga. Beebyn appears to have a relatively consistent footwall and hangingwall contact. The hangingwall and footwall at Madoonga is a complex shape, folding back on itself, resulting in relatively narrow veins of ore that will incur a high degree of ore-loss or dilution when blasted. More work is required to better define the nature of the footwall and hangingwall contact of the BIF units being considered as potentially minable.

There are indications that internal waste is present in both the Beebyn and Madoonga orebodies. The quantity and quality of this internal waste has not been defined in the existing mineral resource model and no allowance has been made in the pit optimisation or mining method. For the BFS, a geological review of how to identify and address any internal waste should be undertaken.

Greater synergies between block sizes and mining bench heights in the ongoing study will help to ensure valid conversions of optimisation pit shells to final mine designs.

11.6 Waste modelling

Waste modelling will be required for input into hydrogeology, geotechnical engineering, acid drainage, metal leaching and waste dump management and design.

11.7 Waste management

SMM should consider the requirements for waste management. Drivers other than minimising operating costs may be identified that may assist in addressing permitting issues.

11.8 Decrepitation index

Decrepitation has been identified as an issue in the lump product at Beebyn. Further test work is required to clarify the impact of decrepitation on the project. Blending opportunities should be explored as the first potential solution pending the quantity identified.

11.9 Accuracy of topography

The accuracy of the topography used for the coding of the mineral resource model, pit optimisation and pit design should be improved.

11.10 Overland haulage

The use of a conveyor or alternative means of material haulage between Beebyn and Madoonga should be considered.

The current PFS assumption utilises a haulage contractor. This assumption loads the haulage operating cost with the contractor's capital, which in turn reduces the contained inventory identified in the open pit optimisation.

The costs to maintain, and problems associated with, high volume road train activities on unsealed roads should be reviewed. Consideration is warranted for the BFS on the use of conveyors for this distance of overland haulage. Should the life of the mining operation be expanded to around 15 years, assuming additional mineral resources being added to the project, the conveyor may provide an viable alternative solution.

12 References

Bruce Sommerville, *Low Al_2O_3 Wireframe Alternative for Beebyn.* SRK Consulting, 2007

Bruce Sommerville, *SRK Preliminary Resource Estimation.* SRK Consulting, 2007

Bruce Sommerville, *SRK Resource Estimation.* SRK Consulting, 2008

Hatch, *Weld Range Scoping Study*, 2007

Scott McEwing, *Desktop Mining Study of the Weld Range Iron Ore Project.* SRK Consulting, 2007

Scott McEwing, *Preliminary Mining Study of the Weld Range Iron Ore Project.* SRK Consulting, March 2008

Scott McEwing, *Review of the Potential for Surface Mining for the Weld Range Iron Ore Project.* SRK Consulting, March 2008

Appendices

Appendix 1: Basis of Design

中钢集团
SINOSTEEL

Midwest Corporation Limited

SINOSTEEL MIDWEST MANAGEMENT Pty Ltd

BASIS OF DESIGN

1.0 Geology / Resources

O/A EST of ACCURACY : +/- %

SIGNATURE :

Competent Person:

Item	Description	Quality of Information	Date of update or Version #	Parameter	Notes	Source of Data and contributors to the Study
	Resource Model	PFS Resource Model	18/08/2008	SRK August 08 Model	Current PFS Standard Resource Model	Bruce Somerville - SRK
	Insitu moisture content for ore and waste (above water table)	Assumption	2/08/2007	3%		Sten Soderstrom - SMM
	Lump Proportion Beebyn at Mine	Assumption	09/09/08	50%	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
	Lump Proportion Beebyn in Ship	Assumption	09/09/08	45%	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
	Lump Proportion Madoogna at Mine	Assumption	09/09/08	45%	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
	Lump Proportion Madoogna in Ship	Assumption	09/09/08	40%	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
	Swell Factor	Assumption	15/12/2007	30%	Assumed	Scott McEwing - SRK
	Lenses Modelled	PFS Resource Model	18/08/2008	SRK August 08 Model	Beebyn W7 to W12 , Madoonga W14	Bruce Somerville - SRK
	Material Densities	Variable based on current density testwork	18/08/2007	SRK August 08 Model		Bruce Somerville - SRK

2.0 Geotech

O/A EST of ACCURACY : +/- %

SIGNATURE :

Competent Person:

Item	Description	Quality of Information	Date of update or Version #	Parameter	Notes	Source of Data and contributors to the Study
	Pit Geometry	Supplied by SRK Geotechnical tear	7/08/2008	Variable		Scott McEwing - SRK

3.0 Hydro

O/A EST of ACCURACY : +/- %

SIGNATURE :

Competent Person:

Item	Description	Quality of Information	Date of update or Version #	Parameter	Notes	Source of Data and contributors to the Study
	Surface Water outside diversion drains managed by WP		Weekly meetings Sept 2008		WP indicate no ingression into the pits from the drainage channel.	WP
	Surface water and rain water inside diversion drains managed by in pit pumps	First Principle Calc.	Weekly meetings Sept 2008			SRK
	Hydrogeological	Anticipating groundwaterbores around pit crest	.		~1000l/s based on regional scale current work. 10 bores predicted to be saline. Reinject disposal likely.	Stefan Muller- SRK

4.0 Mining		O/A EST of ACCURACY : +/- %			SIGNATURE :	
					Competent Person:	
Item	**Description**	**Quality of Information**	**Date of update or Version #**	**Parameter**	**Notes**	**Source of Data and contributors to the Study**
	Diesel fuel pricing	WP Direction/SRK agreement with HWE assumption	27/08/2008	$Aus1.10/litre	Excluding GST and including Govt. rebate. Based on the Geraldton gate price @ 22-Aug-08	Brendan Purcell - WP/Scott McEwing SRK / HWE
	Contractor or Owner Operator Fleet	Client Direction	17/10/2007	Contractor mining		Sten Soderstrom - SMM
	Mining Unit Costs	Contractor mining costs as provided by HWE				Scott McEwing - SRK
	Annual provision for delays due to wet weather, industrial disputes and holidays.	HWE input	1-Sep-08	10 days	24hr, 365 day/year operation	Scott McEwing - SRK
	Mining ramp-up period	Assumption	20-Sep-08	12 months		Scott McEwing - SRK
	Scheduling Period	SRK		Annually		Scott McEwing - SRK
	ROM Feed Grade Fe	SMM	9-Sep-08	Fe = 58%	Initial Pass. Sensitivity analysis for discussion. Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
	ROM Feed Grade Al2O3	SMM	1-Sep-08	Al2O3 <= 2.6%	Initial Pass. Sensitivity analysis for discussion. Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
	ROM Feed Grade SiO2	SRK	17-Sep-08	SiO2 <= 5.5%	Update from SRK Weekly Meeting	
	ROM Feed Grade (all other elements)	SMM	17-Sep-08	No limits applicable	Initial Pass. Sensitivity analysis for discussion	
	ROM Feed Grade DI	Client Direction	1-Sep-08	Not considered	To be addressed in later studies	
	Topography file used	Client Supplied	May-07		Update requested for ongoing study work.	
	Basecase Mining Equipment	Assumption supported by prior work		Mid scale conventional mining equipment of ore, larger equipment for waste.		Scott McEwing - SRK
	SMM Supervison and Technical Services	Assumption for operating cost overhead		$0.20/t Product	Current assumption to account for client costs.	Scott McEwing - SRK
	Dilution and ore loss philosophy	to be defined		10%	Ore loss only	Scott McEwing - SRK
	Waste dump maint/dev $/t (covered elsewhere)	Covered in Mining unit rates				SRK
	Wet Blasting Volume		26-Jun-08	15%	Current assumption by HWE	HWE/SRK
	Grade Control Drilling and Sampling System		1-Sep-08	Blast Hole sampling is the base case.	This still has to be defined. HWE have made an allowance for Blast hole sampling but not assaying.	HWE
	Assay Cost			$35/sample + 4@/sample handing cost.	Benched marked on recent studies for 10 element XRF	SRK Estimate
	PFS Mining study Battery limit		1-Sep-08	Delivery to ROM Stockpile and Maintenance of Upper ROM level (dump from level)	FELs RoM rehandling is not part of the mining study.	WP/SMM/SRK
	Ore Mining Bench Height		1-Sep-08	Maximum = 5m	The mining height for ORE will likely be closer to 3 to 4 meters for the 250 t class Excavator.	SRK/HWE

5.0 Surface Transport		O/A EST of ACCURACY : +/- %			SIGNATURE :	
					Competent Person:	
Item	**Description**	**Quality of Information**	**Date of update or Version #**	**Parameter**	**Notes**	**Source of Data and contributors to the Study**
	Overland Haulage Costs	WP Direction	27/08/2007		Will vary depending on mining rate thus should be iterative. Suggest pre-rata from the haulage costs for the corresponding mining rates	Brendan Purcell - WP
	2.5 Mtpa Mining Rate From Remote Pit			**AU$M 5.62 /t**		**Brendan Purcell email 2/9/08**
	Load & haul, incl. vehicle maintenance			AU$M 3.78 /t		
	Haul road maintenance			AU$M 0.23 /t		
	Fuel costs			AU$M 1.26 /t		
	Flights and Accom.			AU$M 0.35 /t		
	9.5 Mtpa Mining Rate From Remote Pit			**AU$M 3.44 /t**		**Brendan Purcell email 2/9/08**
	Load & haul, incl. vehicle maintenance			AU$M 2.34 /t		
	Haul road maintenance			AU$M 0.23 /t		
	Fuel costs			AU$M 0.68 /t		
	Flights and Accom.			AU$M 0.19 /t		
	7.0 Mtpa Mining Rate From Remote Pit	**Used for the BaseCase**		**AU$M 3.91 /t**		**Brendan Purcell email 2/9/08**
	Load & haul, incl. vehicle maintenance			AU$M 2.66 /t		
	Haul road maintenance			AU$M 0.23 /t		
	Fuel costs			AU$M 0.80 /t		
	Flights and Accom.			AU$M 0.21 /t		
	Overland Conveyor haulage option	Not considered				SMM

6.0 Processing		O/A EST of ACCURACY : +/- %			SIGNATURE :	
					Competent Person:	
Item	**Description**	**Quality of Information**	**Date of update or Version #**	**Parameter**	**Notes**	**Source of Data and contributors to the Study**
	Process Plant Ramp-up	WP Direction	10/1/08	625kt RoM/3 months between Sept 2011 and Dec 2011.	Planned 3 months commissioning ramping up to full capacity. Estimated throughput over this time to be 625kt	Brendan Purcell - WP
	Full Plant Capacity	WP Direction	10/1/08	15Mt per annum	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
	Processing Op. Costs	**WP Direction**	**08/27/08**	**AU$ 3.48 /t**		**Brendan Purcell email 2/9/08**
	Processing & Mining Supervision Labour			AU$ 0.97 /t	Includes processing plant labour only - Excludes mining supervision labour (assumed to be included in mining costs) and administration labour	Brendan Purcell email 2/9/08
	Maintenance Contractor Costs			AU$ 0.07 /t		Brendan Purcell email 2/9/08
	Consumables			AU$ 0.85 /t	Includes consumables / power costs for processing plant equipment, associated infrastructure (e.g. process water bores) as well as general infrastructure (e.g. camp, admin, etc).	Brendan Purcell email 2/9/08
	Power			AU$ 1.58 /t	Includes consumables / power costs for processing plant equipment, associated infrastructure (e.g. process water bores) as well as general infrastructure (e.g. camp, admin, etc).	Brendan Purcell email 2/9/08
	Admin and Generals Costs	**WP Direction**		**AU$ 0.69 /t**		**Brendan Purcell email 2/9/08**
	Admin. Labour			AU$ 0.30 /t		Brendan Purcell email 2/9/08
	FiFo and Messing / Accommodation costs			AU$ 0.22 /t		Brendan Purcell email 2/9/08
	General Expenses			AU$ 0.17 /t		Brendan Purcell email 2/9/08
	Total Op Cost for Materials Handling and Admin/General (6.6 + 6.7)	**WP Direction**		**AU$ 4.17 /t**	Split as $3.13/t Crushing and Screening and $1.04/t Stacking/Stockpiling and train loadout.	**Brendan Purcell email 2/9/08**

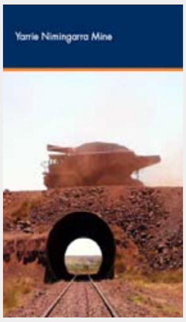
7.0 Rail		O/A EST of ACCURACY : +/- %			SIGNATURE :	
					Competent Person:	
Item	**Description**	**Quality of Information**	**Date of update or Version #**	**Parameter**	**Notes**	**Source of Data and contributors to the Study**
7.1						
7.2	Rail and Port Cash Costs	Client Direction	08/27/08	$7.80/t Product	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision" - SMM Internal Financial model 26/8/08	Sten Soderstrom - SMM
7.3	Rail and Port Capital Costs	Client Direction	08/27/08	$15.50/t Product	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision" - SMM Internal Financial model 26/8/08	Sten Soderstrom - SMM

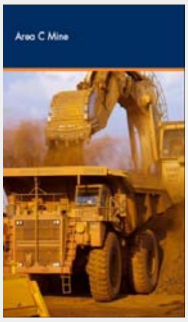
8.0 Marketing		O/A EST of ACCURACY : +/- %			SIGNATURE :	
					Competent Person:	
Item	**Description**	**Quality of Information**	**Date of update or Version #**	**Parameter**	**Notes**	**Source of Data and contributors to the Study**
8.1	Sale price lump	Client Direction	08/27/08	US148.20c/dmtu	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
8.2	Sale price fines	Client Direction	08/27/08	US94.36c/dmtu	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
8.3	Magnetite does form part of the JV - hence treated as waste	Client Direction	WeeklyTechnical Meeting August 2008			Sten Soderstrom - SMM
8.4	Exchange Rate ($US : $Aus)	Assumption	09/09/08	US$0.758	Email to Peter Hairsine _ Final Revision of BOD for Mine Planning.	Sten Soderstrom - SMM
8.5	Royalty Lump	Client Direction	08/27/08	7.50%	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
8.6	Royalty Fines	Client Direction	08/27/08	5.625%	Memo from Sten Soderstrom to Scott McEwing - "Basis of Design Revision"	Sten Soderstrom - SMM
	Currency used for the mining study		1-Sep-08	Aus $	All costs and prices used will be in Australian Dollars unless stated otherwise.	

9.0 Corporate Overheads		O/A EST of ACCURACY : +/- %			SIGNATURE :	
					Competent Person:	
Item	**Description**	**Quality of Information**	**Date of update or Version #**	**Parameter**	**Notes**	**Source of Data and contributors to the Study**
9.1	Corporate overheads	Assumption			No Cost	Sten Soderstrom - SMM

10.0 Acid Drainage		O/A EST of ACCURACY : +/- %			SIGNATURE :	
					Competent Person:	
Item	**Description**	**Quality of Information**	**Date of update or Version #**	**Parameter**	**Notes**	**Source of Data and contributors to the Study**
10.1	Presence of PAF Material	Initial Assessment		Sulphur, some metals that will potentially leach	Currently assume is that PAF is not present. To be reviewed for BFS.	Existing analysis data provided by SMM and updted by SRK, Scoping Study reports provided by SMM.

Appendix 2: HWE Mining Submission





WELD RANGE PROJECT MINING COST STUDY

HWE MINING

TABLE OF CONTENTS

1 SUMMARY

Sinosteel Midwest Management (SMM) is undertaking studies into establishing a 15Mtpa iron ore mining, processing and railing operation at Weld Range in the Mid West region of Western Australia. HWE Mining (HWE) has been assisting SMM by sharing its experiences in constructing and operating open cut iron ore mines as well as its expertise with the operation of surface miners in iron ore deposits. HWE operate the Yandi, Area C, Yarrie and Orebody 25 mines for BHP Billiton Iron Ore, all located within the Pilbara. Additionally HWE operates the Cockatoo mine (a joint venture with Portman) and the South Middleback Ranges mines (for OneSteel). In total HWE is responsible for mining and processing 126Mtpa of Australia's iron ore production, making HWE the second largest miner and processor of iron ore in the country.

Operations at Weld Range are geographically spread over three pits from two separate areas, Madoonga and Beebyn, located 22 kilometres apart. Mining and processing is suited to mining by conventional means. The steeply dipping nature of the bedded iron ore deposits allow a degree of selectivity by hydraulic excavators not usually associated with iron ore mining. Mining operations utilise conventional drill, blast, load and haul techniques for all mining areas. HWE have assumed operations by a combined fleet of Liebherr 996 shovels and Cat793 haul trucks for bulk waste removal and Hitachi EX2500 excavators and Cat785 haul trucks for ore mining to be delivered to local ROM pads for later load out and haulage to the central stockpiling and rail load out area by a bulk haulage fleet.

HWE proposes using 4 x 650 tonne shovels and 2 x 250 tonne hydraulic excavators and 23 x 220 tonne and 12 x 150 tonne haul trucks across the two mining areas or hubs, with each hub acting as a semi-independent mine with its own workforce, management and support facilities and equipment. Drill and blast operations will be based on 10 metre high benches, with waste mined in a single pass and ore on multiple passes. A front end loader has been included in the fleet to provide ROM feed and stockpile rehandling as well as flexibility and mobility for grade control and blending. There will be a requirement for a Cat 992 front end loader to be located at the remote ROM for loading the bulk haulage fleet.

A summary of cost items is included below. Costs have been quoted to an appropriate level of accuracy. The quality and amount of information that was provided to HWE allowed us to provide budget estimates to a +30%/-10% level of accuracy. Our estimators have spend a considerable amount of time to provide estimates as accurately as possible and have achieved +/-10% on the data provided, however the lack of spatial geological, hydrogeological, geotechnical and metallurgical data prevents any higher estimate of accuracy than +30%/-10%.

- Mobilisation and demobilisation - $19M
- Establishment of Contractors Facilities - $31M
- Site Management - $170M
- Ore mining cost (direct tipping, does not include ROM crusher feed) - $291M - $3.7 per ore tonne
- Waste mining cost - $1,099M - $2.4 per waste tonne
- Drill and blast cost - $423M - $0.8 per tonne
- Bulk haulage cost - $254M – $5.1 per ore tonne ($0.2 per tonne per km)
- Total cost for the scope of works - $2,286M - $28.7 per ore tonne

Weld Range contains a surface capping of very hard ore material that will not be mineable by Surface Miner, however, the majority of ore appears conducive to cutting by surface miners. Surface miners enable higher recovery of ore tonnes, reduced contaminant grades and produce an ore size that will not require primary or secondary processing. The effect of the increased ore tonnage and grade and the reduced processing cost should be included in any comparison study of Surface Miners in terms of increased project revenue, reduced mining and non-mining costs (both capital and operating) and increased mine life, to determine the true value of surface miners to operations at Weld Range.

HWE estimate that the capital cost for the primary and secondary processing circuits are 25% to 30% of the OHP infrastructure cost. Similarly primary and secondary processing operating costs are approximately 35% of the OHP operating cost. Reductions in these costs by the use of Surface Miners can therefore have a significant impact on project economics. Marketing of a run of mine 100mm surface miner product could also enable early tonnes for the project. The ability to have a ready supply of road construction material from surface miner waste cuttings would also enable the project to recover more rapidly from extreme weather events.

2 INTRODUCTION

Sinosteel Midwest Management (SMM) is undertaking a Study into establishing a 15Mtpa iron ore mining, processing and railing operation at Weld Range in the Mid West region of Western Australia. HWE Mining (HWE) has been asked to provide operational input and mining cost estimates to a "budget" level of accuracy of +/-10% in June 2008 dollars. HWE has been has been assisting SMM by sharing its experiences in constructing and operating open cut iron ore mines as well as its expertise with the operation of surface miners in iron ore deposits in similar geology and terrain in the Pilbara.

HWE operate the Yandi, Area C, Yarrie and Orebody 25 mines for BHP Billiton Iron Ore, all located within the Pilbara. Additionally HWE operates the Cockatoo mine (a joint venture with Portman) and the South Middleback Ranges mines (for OneSteel). In total HWE is responsible for mining and processing 126Mtpa of Australia's iron ore production, making HWE the second largest miner and processor of iron ore in the country. A copy of HWE's capability statement has been included with this submission.

The use of HWE for construction and mining operations provides the following benefits to SMM:

- Certainty of outcomes;
- Adding value to existing SMM business processes; and
- Managing key business risks.

HWE provides the certainty of outcome in mining costs, production volumes and timeframe that are necessary in financing and operating a new project. Mining costs are either underwritten through the mining contract process, or alternatively, SMM and the contractor share in the upside of the efficiency gains, continuous improvement and new technology and innovation that an experienced miner like HWE is able to deliver.

HWE is able to complement SMM's existing business processes by ensuring that the mining operation is well managed and operated, freeing SMM personnel to concentrate on the quality control, processing, transport and marketing of Weld Range iron ore. HWE have a well trained, experienced and skilled existing workforce, tried and tested work procedures and systems that have been developed in conjunction with some of the world's largest mining companies and the support structure required to efficiently sustain a mining operation in remote locations.

HWE is able to manage the business risks associated with the mining operation due to its experience in operating in a wide variety of mining operations in a number of different commodities, operating environments and locations. In association with Leighton Contractors, HWE's parent company, a comprehensive risk management process has been developed and is used to manage a variety of different project, construction and operating risks.

HWE has provided costs and commentary on the following works.

- Pre-production works including construction of additional mining contractors facilities;
- Mining costs for a traditional shovel and haul truck mining operation;
- Haulage costs to transport ore from each local ROM pad to a central product stockpile and rail loadout.
- Commentary on the likely impacts of a Surface Miner operation

3 DATA PROVIDED

Data for the Mining Cost Study has been provided in electronic format from SMM and SRK and is summarised below.

- Reports
  - Draft Mining Contractor Enquiry Document for Discussion – 3 April 2008
  - Various updates to volumes and tonnages supplied by SRK Consulting (SRK)
- Mine Planning Drawings
  - Pit and waste dump layouts
  - General infrastructure
  - Regional Geology

4 ESTIMATING ASSUMPTIONS

Costing Approach

HWE has extensive experience in managing mining and ore processing operations in similar iron ore deposits and has used this experience in the estimating assumptions for the operations at Weld Range. The quality and amount of information that was provided to HWE allowed us to provide budget estimates to a +30%/-10% level of accuracy. Our estimators have spend a considerable amount of time to provide estimates as accurately as possible and have achieved +/-10% on the data provided, however the lack of spatial geological, hydrogeological, geotechnical and metallurgical data prevents any higher estimate of accuracy than +30%/-10%. Unit rates and costs have been quoted to a level of accuracy appropriate to the accuracy of the data.

General

Accommodation and costs of transport to the accommodation (flights and buses) will be provided by SMM. Suitable transport vehicles will be provided to allow transport of the workforce from the accommodation to the mine.

The material specific gravity of 2.6 tonnes per bank cubic metre for all material was provided by SMM.

Fuel has been assumed at $1.10/litre.

Scope of Work

The following activities are assumed to be the responsibility of SMM.

- Resource drilling, modelling and the orebody model;
- Mine design and the final pit and waste dump limits;
- Geotechnical assessment and management;
- Long term mine planning and the orebody and waste dump development sequence;
- Short term mine planning to achieve quality requirements; and
- Daily grade control and sampling activities.

Mine Planning

Mine planning for Weld Range has been completed by SRK. Preliminary pit designs, waste dump layouts, infrastructure layouts and material movement schedules have been provided. Operations have been scheduled utilising a multi-pit blending approach to sequencing operations to even out ore presentation, product quality and total movement over the life of the mine. Final product blending occurs in a central product stockpiling and rail loadout area.

Ore production has been scheduled to ramp up rapidly to 7Mt in the first year and 15Mtpa from the following year. Beebyn Stages 1-4 and Madoonga Stages 1-2 pits are started concurrently at the start of operations. Madoonga Stage 3 is introduced in the third year. HWE's mining cost estimate is based on the mining schedules provided and listed in Section 3.

Surface Miner Planning

Our analysis of the project suggests that surface miners can be competitive in conjunction with conventional mining equipment for the Weld Range Project by:

Reducing ancillary project costs by reduced power consumption

- Reducing capital costs
- Increasing mining selectivity resulting in improved resource recovery and improved ore quality
- Improving project start-up time

Further input from Sinosteel Midwest Management is required for any meaningful estimate of Surface Miner production and cost estimates to be developed. This information includes:

- Geology sections and bench plans to determine required selectivity, ore distribution and internal waste dilution
- Ore recovery applicable to reducing mining bench heights
- Proportion of ore as hardcap or canga
- Nature and characteristics of internal dilution to be mined by Surface Miner.

HWE have proven expertise in both conventional and Surface Miner applications in iron ore and will be pleased to work with Sinosteel Midwest Management to determine the best path forward for the project. HWE considers that the full value of the Surface Miner to mining and processing operations at Weld Range will not be identified using the current modelling methods. Although exploration drilling data has been composited to 2 metre samples, the cell size for grade estimation is unknown, but likely to be significantly larger given the 10 metre bench height proposed. The degree of selectivity that can be achieved by a mining operation mining on 0.5 to 1.0 metre benches with surface miners is unknown.

These two very different styles of mining operation can result in significantly different tonnage and grade outcomes from mining the same orebody in a different way. The surface miner has the ability to selectively mine ore from waste blocks and waste from ore blocks, effectively resulting in a decreased contaminant grade. This can be used to market a higher grade of ore or to blend in additional quantities of marginal grade ore to increase tonnages within the mine schedule and hence increase mine life.

The cutting action of the surface miner results in a product sizing that is able to bypass the primary and secondary crushing circuits, thereby reducing both the operating and capital cost of the processing infrastructure required to generate final products. HWE estimate that approximately 25% of the capital cost of the processing infrastructure is dedicated to primary and secondary crushing and screening circuits, which could be saved with an all surface miner operation or significantly reduced in a partial surface miner operation.

Similarly, HWE estimate that 35% of the operating cost of the processing infrastructure is dedicated to primary and secondary crushing and screening circuits, which could be saved in an all surface miner operation or significantly reduced in a partial surface miner operation.

Competent waste material cut by the surface miner is ideally sized for use in haul road construction and sheeting, bulk haulage road repair and maintenance, pad sheeting, windrows and any other minor construction jobs around the site. It will be stockpiled separately to enable good quality road surfaces to be constructed and maintained around the mining operation and for the bulk haulage routes to the central stockpiling area. It will also enable rapid recovery of the haulage operations from weather events.

Additional study is required to determine whether loading directly into trucks from the surface miner (which de-rate the surface miner, requires a different grade control strategy but reduces rehandling costs) is a more effective surface miner technique for Weld Range than cutting to the ground, grade controlling the cuttings and rehandling into haul trucks.

Rain Delays

For the purpose of this study we have assumed that on average 5 days of production will be lost each year as a result of rainfall.

Geotechnical Management Program

No geotechnical data has been provided to estimate rock characteristics, strengths, GET wear rates, excavation qualities and blasting requirements. GET costs for similar projects have been used for costing. HWE has made no allowance for special treatment of final walls such as pre-split or trim blasting, cable bolts, split sets or any type of wall support, depressurisation drilling, dozing of batters or any batter treatment other than normal dressing of batters with an shovel to remove loose material.

HWE have assumed that SMM will remain responsible for the geotechnical program. HWE has a long history of operating within the client's geotechnical management program in similar mines. HWE's main focus will be on implementing SMM's wall design, ongoing assessment of how the slope design performs in the field, assisting SMM technical personnel with ongoing geological and geotechnical monitoring and controlling blasting operations to minimise wall damage.

Hydrogeology

HWE understand that the bulk of material within final pit limits is below the local groundwater table. There has been no detail provided on the scale or type of dewatering activities or the quantities of water to be dewatered from the pit. Minor allowances have been made for installation, operation and maintenance of SMM's pit dewatering infrastructure, as well as control and disposal of surface water runoff. HWE has made no allowance for operations being disrupted from ineffective dewatering systems.

No quantities of horizontal depressurisation holes have been provided by SMM, so HWE have made no allowance for them in operational activities or the overall cost of the operation. Rates have been provided for drilling of horizontal depressurisation holes as a rate only item (ie no quantities attached).

No design for the surface drainage system, including sedimentation dams, diversion channels, bunds, surface drains for the pit perimeter, ROM Pad and waste dumps has been provided for costing. However, in general, the following considerations will apply.

- Management of interactions between natural surface drainage, infrastructure, mining operations and waste dumps will be managed through a series of diversion bunds, drains, silt traps and in-pit sumps.
- Water will be diverted around disturbed areas where possible to minimise the volume of sediment-laden water to be handled.
- Mining operations will be scheduled to include a wet weather plan, which will include minimum surface ore stockpile levels to continue primary crushing operations when access to the pit is disrupted by wet weather.
- Large sacrificial sumps will be maintained in the lowest parts of critical pits as well as the normal operational sumps in each working area to allow accumulation of water in the lowest area to prevent disruption of mining in the other areas. Drainage plans will be updated and sumps cleaned out regularly.
- HWE will operate to all statutory requirements and industry best practise to suppress fugitive dust from mine haul roads, benches and waste dumps. A turkeys nest dam capable of holding 5,000 tonnes of water, which should be sufficient for 12 hours of operation in peak periods and a standpipe will be built adjacent to each ROM pad.
- Dewatering of the pit from surface runoff will be from a series of in-pit sumps and drains. Tractor-mounted pumps would dewater sumps directly into water carts or pumped to the dust suppression turkeys nest dam as required.

Drill and Blast

Drill and blast cost estimates have been sourced from independent quotes based on the limited geological information available. Drill and blast will be undertaken for all material on 10 metre high benches mined as a single pass for waste and multiple passes in ore. Drill and blast operations will be planned for production requirements in conjunction with grade control requirements to allow for the proposed sampling regime and to control blast swell and orebody dilution.

Bulk explosives costs have been assumed at $1,550/tonne for ANFO and $1,700/tonne for Emulsion.

Rates for both wet and dry blasting have been estimated, although no quantities of wet blasting have been provided. An allowance of 15% wet blasting has been made for the purposes of an overall cost estimate. Depending on the groundwater regime and the effectiveness of the pit dewatering program, quantities of wet blasting could be significantly higher. The quantities of wet and dry blasting will also determine the requirements for storing wet and dry explosive and therefore the cost of the bulk explosive compound. No allowance for a bulk explosive compound has been made in the rates, and from past projects of a similar type and scale, an allowance of $4.5 million should be made.

Blast-holes filled with water from surface run-off will be pumped dry prior to loading. No allowance has been made for either pre-split or trim blasting; however modified production blasting will be undertaken against final walls. Blasting has been scheduled for day shift operations only and will be to a free face where possible. Bulk explosives trucks will be permanently based on site.

Waste dump and Stockpile Preparation

No special preparation has been assumed for waste dump and stockpile preparation other than the standard environmental requirements for clearing, grubbing and relocating topsoil beneath the areas to be disturbed. Topsoil quantities have been assumed to be limited to the top 150mm and will be recovered where practical. Once the waste dump and stockpile pads have been prepared, the costs of managing and dumping material on the area has been included in the load and haul rates.

Final waste dump profiles have not been provided, however waste dump operations will be scheduled to ensure that waste dumping profiles can be achieved and the dumping schedule can be maintained. HWE has assumed that the final rehabilitated dump design will be a standard combination of batter and berm slopes.

Primary Crushing Operations

The construction and operation of crushing and screening plants to deliver crushed and sized ore to a client's specification and process guarantee is part of HWE's core business. This style of operation is common practice within the iron ore industry at similar or larger tonnages to that proposed for the Weld Range Project. HWE has assumed that for the shovel and truck mining operation, feeding of the primary crusher will be by direct tipping from haul trucks. Where direct feed is not available from the pit, ore will be rehandled by a front end loader from a stockpile adjacent to the primary crusher maintained for that use. Surface miner operations result in bypassing of the primary and secondary crushing circuits.

Site Roads

Roads to be constructed by SMM include the access road to site, the access road from the airstrip to camp, haulage roads from the central processing area and contractors workshop to each local ROM pad, the magazine access road and the bulk explosives shed access road.

Roads to be constructed by HWE include the access road from each local ROM pad to the pit and the access road from the pit to the waste dump and topsoil stockpiles.

Allowance has been included for topsoil stripping of all areas disturbed, including spoil disposal areas. HWE have allowed for clearing and grubbing the area to be prepared with dozers and rehandling the topsoil to the allocated topsoil stockpile by front end loader and trucks. No other preparation has been assumed. HWE has assumed that suitable general fill, sub-base and base course gravel is available within 500 metres haul.

Ancillary Equipment

Ancillary equipment for Weld Range includes a dozer, grader and water cart at each mining hub. The current shortage of tyres means that construction and maintenance of haul roads is very important to ensure that tyre life is maximised and the control and cleanup of spillage will be a priority task.

Supply of dust suppression water will initially be from a 50 metre x 50 metre lined turkeys nest dam and standpipe located adjacent to each ROM pad. HWE has assumed that water will be supplied from a borefield. Minor amounts of pit dewatering supply are expected to supplement rather than replace the external water source for dust suppression.

Mining Contractors Facilities

Mining contractor's facilities to be provided by HWE include the mobile equipment workshop, warehouse, welding and tyre bays, heavy and light vehicle washdown bays, pit office, fuel farm, lube farm, go line, magazine and bulk explosives compound.

The workshop includes separate light and heavy vehicle maintenance areas with provision for expansion as additional items of equipment are mobilised to site. It includes a separate welding bay and tyre fitting facility to isolate areas of high noise. The warehouse and stores yard are included in the workshop complex for efficiency. Overhead cranes are standard in HWE Mining's workshops and welding bay for health and safety reasons and to reduce the cost of mobilising mobile cranes to site on a regular basis. Reticulated oil facilities and a separate service truck bay outside the workshop add to the flexibility of each workshop bay.

A fully bunded fuel farm is also located in the workshop complex. A one way ramp access for road trains delivering fuel to the site has been included to allow for gravity feeding of fuel into the fuel farm. Separate light vehicle and heavy vehicle refuelling facilities are provided to prevent unnecessary interaction. The fuel tanks will be provided and installed by the fuel supplier with the cost recouped through the fuel supply contract.

Separate washdown pads are included for light vehicles and heavy vehicles. This enables light vehicles to be better maintained and reduces the potential for interactions.

The site office is located adjacent to the workshop and warehouse for increased site security and ease of management and communication. This also helps to prevent uncontrolled access to the workshop area.

The go line is located adjacent to the offices and outside the workshop for easy access to both the muster area and to fitters and servicemen during shift change. This minimises the service time and enables minor maintenance issues to be addressed without taking the equipment out of service.

A 10 tonne high explosive magazine and adjacent 50,000 detonator magazine is required to support blasting operations on site. The magazines require 480 metres clearance from buildings or structures where people spend a considerable amount of time (protected works Class B structures) and 320 metres from public areas such as roads and open work areas (protected works Class A).

Explosive magazines will be provided and installed by the explosives supplier with the cost recouped through the explosives supply contract.

An emulsion storage compound and a prilled ammonium nitrate storage compound with sufficient capacity for one months usage are required to prevent interruption of deliveries associated with weather.

HWE has made allowance for the provision of crib sheds and ablutions facilities at each local ROM pad and dewatering and dust suppression infrastructure. There is provision for ongoing minor maintenance of all of the above facilities and connection of basic services.

Work Rosters and Manning Levels

HWE will employ a 24 hr per day mining cycle, 7 days per week. This roster will be 2 x 12 hour shifts per day. The proposed rosters are 9 days on, 5 days off for staff and 2 weeks on, 1 week off for operating personnel.

Establishment of the workforce will begin three months prior to start of operations to allow for sufficient time for personnel to be recruited both internally and externally, undergo inductions and establish specialised site procedures for the operation. HWE's proposal allows for the following management structure.

Common Management

- 1 x Contract Manager
- 1 x Administration Superintendent
- 1 x Health and Safety Superintendent
- 1 x Environmental Coordinator
- 1 x Employee Relations Officer
- 1 x Quarry Manager

- 1 x Drill and Blast Superintendent
- 2 x Mobile Plant Superintendents
- 1 x Maintenance Planner
- 1 x Mechanical Engineer
- 3 x Mobile Plant Foremen

At Each Mining Area

- 2 x Project Managers (1 at each mining area)
- 2 x Mining Superintendent (1 at each mining area)
- 4 x Project Engineers (2 at each mining area)
- 4 x Surveyors (2 at each mining area)
- 2 x Drill and blast Foremen (1 at each mining area)
- 12 x Mining Foremen (6 at each mining area – 2 D/S, 2 N/S, 2 R&R)
- 2 x Safety Coordinators (1 at each mining area)
- 2 x Training Coordinator (1 at each mining area)
- 3 x Paramedics (1 at each mining area plus relief)
- 2 x Storemen (1 at each mining area)
- 7 x Site Clerks (3 at each mining area plus relief)

Operations Schedule

The lead time from contract award to start of operations on site is expected to be 9 to 12 months, determined by the availability of hydraulic shovels and haul trucks. Some of this time would be utilised for pre-production works. No construction schedule has been provided, however an assumed schedule has been allowed. .

Mobilise HWE to site:	Month 1
Mining contractors facilities	Month 1
Mobile equipment mobilisation	Month 1
Site preparation and haul roads:	Month 2
Start of prestrip operations:	Month 3
Start of production operations:	Month 6

5 MINING ESTIMATE – Shovels, Excavators and Haul Trucks

HWE has extensive experience in operating open cut iron ore mines in various parts of Australia. HWE operate the Area C and OB25 iron ore mines of BHP Billiton Iron Ore, located in similar geology and terrain. Other current or recent major open cut iron ore mining contracts include:

- Yandi, Yarrie, Orebody 25, WA – BHP Billiton Iron Ore
- Mesa A – Rio Tinto Iron ore
- Koolyanobbing, Windarling, Mt Jackson, Cockatoo Island, WA – Portman
- South Middle Back Ranges – One Steel

5.1 Scope of Works

HWE has provided cost estimates for the following mining activities for Weld Range.

- Drilling and blasting of bulk material;
- Loading and hauling of ore to the ROM crusher or stockpile;
- Loading and hauling of waste to the external waste dumps;
- Maintenance of unsealed haul roads;
- Waste dump and stockpile maintenance;
- Survey and short term resource planning:
- Provision of on site labour;
- Full supervision of mining operations;
- Mobilisation of all HWE equipment;
- Maintenance of all HWE plant and equipment;
- Bulk haulage of ore from the remote ROM pad;
- Rehabilitation of dumps, stockpiles, roads or lay down areas; and
- Supply of fuel and operation of a fuel storage and distribution facility.

5.2 Operations

Mining Method

HWE proposes a conventional drill, blast, load and haul operation for Weld Range using 2 x 650 tonne hydraulic shovels (Liebherr R996), 1 x 250 tonne hydraulic excavators (Hitachi EX2500), 12x 220 tonne haul trucks (Cat 793) and 6 x 150 tonne haul trucks (Cat 785) located at each of the 2 mining hubs. Each mining hub will act as a semi-independent mine with its own workforce, management and support facilities and equipment. Drill and blast operations will be based on 10 metre high benches to be mined as a single pass in waste areas and multiple passes in ore areas.

Mining Equipment Fleet

Load and Haul Equipment

- 4 x 650 tonne shovel – Liebherr R996
- 2 x 250 tonne excavator – Hitachi EX2500
- 23 x 220 tonne haul trucks – Cat 793
- 12 x 150 tonne haul trucks – Cat 785

Drill and Blast Equipment

- 5 x Down the hole hammer production drills – Atlas Copco DML
- 1 x Top hammer production drills – Tamrock Pantera 1500
- 2 x Bulk explosive trucks
- 2 x Explosives vehicles

Bulk Haulage Equipment

- 2 x Cat 992 front end loaders
- 13x 120 tonne Haulmax trucks

Ancillary Equipment

- 4 x 400kW size dozers - Cat D10R
- 2 x Cat wheel dozers
- 5 x 200kW size graders - Cat 16H
- 6 x 50 tonne water trucks - Cat 773
- 2 x 230kW size utility, tyre handler and workshop loader - Cat988
- 1 x 25 tonne crane
- 4 x Service Trucks
- 4 x Coaster buses
- 2 x Scissor lift truck
- 2 x Maintenance truck
- 20 x Lighting towers
- 26 x Light vehicles

Geology and Grade Control

Grade control will be from blast-hole sampling and generation of a grade control model. HWE have allowed for blast-hole sampling at each deposit using conventional production blast-hole drill rigs. Sampling intensity will be determined by SMM. There has been no allowance for special treatment or stockpiling of lower grade material or sampling the production stream of primary crushed ore.

HWE has assumed a standard mining practice of mining out each grade block before moving to another block to minimise shovel movements. Ore is assumed to be tipped directly into the primary crusher rather than dumped on the ROM pad and rehandled (other than minor amounts of rehandle for operational logistics reasons).

HWE have allowed for daily grade control activities and the direction and day to day scheduling of ore mining operations by SMM technical staff to ensure that ore quality targets are met. There has been no allowance for grade control and blending issues to impact on production such as:

- Holding up mining while waiting for sample returns from the lab;
- Mining from multiple pit faces in one shift to achieve a blended ore source;
- Frequent moves of the mining fleet to achieve narrow tolerances in grade variability;
- Rehandling of ore on the ROM pad except for logistics purposes;
- Selective mining of small waste pods within an ore block; or
- Mining to an undulating base or surface of mineralisation.

Load and Haul Operations

Waste loading operations will be undertaken by hydraulic shovels operating nominally on 10 metre benches (plus blast induced swell) at each mining hub. Ore loading operations will be undertaken by hydraulic excavators operating nominally on 5 metre benches (plus blast induced swell) at each mining hub. One 250 tonne class excavator (Hitachi EX2500) loading ore into 150 tonne haul trucks (Cat 785) and two 650 tonne class shovel (Liebherr R996) loading waste into 220 tonne haul trucks (Cat 793) is proposed for the tonnages indicated in the mining schedule for each mining hub.

Drill and Blast

Drilling will be undertaken by a combination of Atlas Copco DML down the hole hammer and Tamrock Pantera 1500 top hammer production drills. The Atlas Copco DML drills using 165mm hole sizes will be used in the bulk mining areas and the Tamrock Pantera 1500 drills using a variety of drill hole sizes and depths will be used in contour shots. Drill patterns will vary between ore and waste mining areas. Drilling will be done as a single pass. Drilling has been scheduled for both day and night shift operations.

Blasting will be undertaken using ANFO at a powder factor of 0.5 kg/bcm.

Bulk Haulage

Bulk haulage operations will transport ore from the Madoonga ROM pad to a central stockpiling and rail loadout area to be blended together to form a final product. Two Cat992 front end loaders will be located at the Madoonga ROM pad for loading of bulk haulage trucks to deliver to the central processing plant ROM pad.

5.3 Cost Estimate

Details of the cost estimate are summarised below, with details included as a schedule of rates in Appendix 1.

	Total $M	Unit Cost $/tonne	Unit Cost $/tonne product
Mobilisation:	$19M		$0.2
Establishment:	$31M		$0.4
Site Management	$170M		$2.1
Mine ore:	$291M	$3.7	$3.7
Mine waste:	$1,099M	$2.4	$13.8
Drill and blast:	$423M	$0.8	$5.3
Bulk haulage	$254M	$5.1	$3.2
Total:	$2,286M		$28.7

APPENDIX 1
Shovel, Excavator and Haul Truck Estimate




Item No	Item Description	Quantity	Unit	Mhrs	$A Rate	$A Total
	FIXED COST					
A1.1	**TABLE A1.1 - FIXED COST MOBILISATION**					
	MINING					
A1.1.1	*Mobilisation Mining*	*1.00*	*Lump sum*		*18,828,527.00*	*18,828,527.00*
A1.1.2	*Site Establishment*	*1.00*	*Rate Only*		*30,560,000.00*	*30,560,000.00*
A1.1.3	*Demobilisation Mining*	*1.00*	*Lump sum*			
	DRILL & BLAST OPERATION					
A1.1.4	*Mobilisation- Drill and Blast*	*1.00*	*Rate Only*		*164,821.08*	*164,821.08*
A1.1.5	*Drill & Blast Site Establishment*	*1.00*	*Rate Only*		*354,942.46*	*354,942.46*
A1.1.6	*Establish Exposives Storage Facility*	*1.00*	*Rate Only*		*248,459.72*	*248,459.72*
	Section1 SubTotal					**$A 50,156,750.26**
A1.2	**TABLE A1.2 - Monthly Fixed Costs Management Off**					
A1.2.1	*Monthly Fixed Cost - Mining Project Management and Supervision*	*84.00*	*month*		*1,475,444.00*	*123,937,296.00*
A1.2.2	*Monthly Fixed Cost - Mining Site Operations*	*84.00*	*month*		*545,840.00*	*45,850,560.00*
	Section1 SubTotal					**$A 169,787,856**
	MINING OPERATION					
	MINE, LOAD AND HAUL ORE TO ROM					
B2.1	**Madoonga Stage-1 ORE**					
B2.1.1	*RL-580 to OGL*	*7,343.00*	*BCM*	*122.7*	*8.43*	*61,901.49*
B2.1.2	*RL-560 to 580*	*207,938.00*	*Bcm*	*3,007.1*	*7.30*	*1,517,947.40*
B2.1.3	*RL-540 to 560*	*478,570.00*	*Bcm*	*6,447.3*	*6.80*	*3,254,276.00*
B2.1.4	*RL-520 to 540*	*767,370.00*	*Bcm*	*10,340.9*	*6.80*	*5,218,116.00*
B2.1.5	*RL-500 to 520*	*902,778.00*	*Bcm*	*12,165.1*	*6.80*	*6,138,890.40*
B2.1.6	*RL-480 to 500*	*908,772.00*	*Bcm*	*13,585.4*	*7.54*	*6,852,140.88*
B2.1.7	*RL-460 to 480*	*899,148.00*	*Bcm*	*13,679.5*	*7.84*	*7,049,320.32*
B2.1.8	*RL-440 to 460*	*863,146.00*	*Bcm*	*14,118.8*	*8.43*	*7,276,320.78*
B2.1.9	*RL-420 to 440*	*833,706.00*	*Bcm*	*14,137.7*	*8.88*	*7,403,309.28*
B2.1.10	*RL-400 to 420*	*817,893.00*	*Bcm*	*13,984.3*	*8.95*	*7,320,142.35*
B2.1.11	*RL-380 to 400*	*763,434.00*	*Bcm*	*14,250.0*	*9.77*	*7,458,750.18*
B2.1.12	*RL-360 to 380*	*666,342.00*	*Bcm*	*13,052.4*	*10.39*	*6,923,293.38*
B2.1.13	*RL-340 to 360*	*574,784.00*	*Bcm*	*11,876.5*	*10.96*	*6,299,632.64*
B2.1.14	*RL-320 to 340*	*464,858.00*	*Bcm*	*10,884.1*	*12.41*	*5,768,887.78*
B2.1.15	*RL-300 to 320*	*287,820.00*	*Bcm*	*7,506.9*	*13.82*	*3,977,672.40*
B2.1.16	*RL-280 to 300*	*51,877.00*	*Bcm*	*1,428.9*	*14.59*	*756,885.43*
B2.2	**Madoonga Stage-2 ORE**					
B2.2.1	*RL-520 to OGL*	*142,344.00*	*Bcm*	*2,035.4*	*7.22*	*1,027,723.68*
B2.2.2	*RL-500 to 520*	*608,714.00*	*Bcm*	*9,226.0*	*7.65*	*4,656,662.10*
B2.2.3	*RL-480 to 500*	*738,378.00*	*Bcm*	*11,236.5*	*7.84*	*5,788,883.52*
B2.2.4	*RL-460 to 480*	*777,013.00*	*Bcm*	*12,884.9*	*8.54*	*6,635,691.02*
B2.2.5	*RL-440 to 460*	*718,237.00*	*Bcm*	*12,179.0*	*8.88*	*6,377,944.56*
B2.2.6	*RL-420 to 440*	*660,915.00*	*Bcm*	*11,828.4*	*9.37*	*6,192,773.55*
B2.2.7	*RL-400 to 420*	*597,805.00*	*Bcm*	*11,604.6*	*10.29*	*6,151,413.45*
B2.2.8	*RL-380 to 400*	*254,213.00*	*Bcm*	*5,206.1*	*10.86*	*2,760,753.18*
B2.3	**Madoonga Stage-3 ORE**					
B2.3.1	*RL-520 to OGL*	*679.00*	*Bcm*	*11.4*	*8.61*	*5,846.19*
B2.3.2	*RL-500 to 520*	*67,995.00*	*Bcm*	*1,047.3*	*7.77*	*528,321.15*
B2.3.3	*RL-480 to 500*	*303,923.00*	*Bcm*	*4,622.3*	*7.84*	*2,382,756.32*
B2.3.4	*RL-460 to 480*	*477,757.00*	*Bcm*	*8,083.0*	*8.71*	*4,161,263.47*
B2.3.5	*RL-440 to 460*	*592,988.00*	*Bcm*	*11,087.5*	*9.92*	*5,882,440.96*
B2.3.6	*RL-420 to 440*	*634,447.00*	*Bcm*	*12,129.0*	*10.14*	*6,433,292.58*
B2.3.7	*RL-400 to 420*	*639,022.00*	*Bcm*	*13,683.9*	*11.35*	*7,252,899.70*
B2.3.8	*RL-380 to 400*	*874,943.00*	*Bcm*	*20,623.1*	*12.49*	*10,928,038.07*
B2.3.9	*RL-360 to 380*	*814,570.00*	*Bcm*	*21,891.4*	*14.24*	*11,599,476.80*
B2.3.10	*RL-340 to 360*	*451,346.00*	*Bcm*	*13,756.0*	*16.15*	*7,289,237.90*
B2.3.11	*RL-320 to 340*	*220,276.00*	*Bcm*	*6,715.8*	*16.16*	*3,559,660.16*
B2.3.12	*RL-300 to 320*	*48,791.00*	*Bcm*	*1,816.5*	*19.72*	*962,158.52*

B2.4	**Beebyn Stage-1 ORE**					
B2.4.1	RL-510 to OGL	50,664.00	Bcm	726.0	7.23	366,300.72
B2.4.2	RL-500 to 510	182,278.00	Bcm	2,745.5	7.60	1,385,312.80
B2.4.3	RL-480 to 500	219,488.00	Bcm	3,465.4	8.13	1,784,437.44
B2.4.4	RL-460 to 480	237,649.00	Bcm	3,744.5	8.08	1,920,203.92
B2.4.5	RL-440 to 460	230,904.00	Bcm	4,266.5	9.67	2,232,841.68
B2.4.6	RL-420 to 440	185,925.00	Bcm	3,465.3	9.76	1,814,628.00
B2.4.7	RL-400 to 420	72,888.00	Bcm	1,537.1	11.03	803,954.64
B2.5	**Beebyn Stage-2 Ore**					
B2.5.1	RL-540 to OGL	77,610.00	Bcm	1,312.9	8.53	662,013.30
B2.5.2	RL-520 to OGL	269,328.00	Bcm	3,776.2	7.08	1,906,842.24
B2.5.3	RL-500 to 520	360,455.00	Bcm	5,392.6	7.55	2,721,435.25
B2.5.4	RL-480 to 500	376,931.00	Bcm	5,734.5	7.84	2,955,139.04
B2.5.5	RL-460 to 480	378,118.00	Bcm	6,227.1	8.48	3,206,440.64
B2.5.6	RL-440 to 460	386,685.00	Bcm	6,804.5	9.21	3,561,368.85
B2.5.7	RL-420 to 440	395,737.00	Bcm	7,320.7	9.68	3,830,734.16
B2.5.8	RL-400 to 420	414,797.00	Bcm	8,054.2	10.30	4,272,409.10
B2.5.9	RL-380 to 400	423,689.00	Bcm	8,450.7	10.58	4,482,629.62
B2.5.10	RL-360 to 380	400,567.00	Bcm	9,007.5	11.92	4,774,758.64
B2.5.11	RL-340 to 360	302,587.00	Bcm	7,690.8	13.47	4,075,846.89
B2.5.12	RL-320 to 340	82,807.00	Bcm	2,197.7	14.06	1,164,266.42
B2.6	**Beebyn Stage-2 Ore**					
B2.6.1	RL-560 to OGL	2,155.00	Bcm	39.7	9.49	20,450.95
B2.6.2	RL-540 to OGL	191,026.00	Bcm	2,884.9	7.62	1,455,618.12
B2.6.3	RL-520 to 540	437,508.00	Bcm	5,895.8	6.80	2,975,054.40
B2.6.4	RL-500 to 520	482,666.00	Bcm	6,507.9	6.81	3,286,955.46
B2.6.5	RL-480 to 500	520,413.00	Bcm	8,033.3	7.79	4,054,017.27
B2.6.6	RL-460 to 480	553,277.00	Bcm	8,520.9	7.94	4,393,019.38
B2.6.7	RL-440 to 460	592,616.00	Bcm	10,430.7	9.21	5,457,993.36
B2.6.8	RL-420 to 440	576,967.00	Bcm	10,302.1	9.35	5,394,641.45
B2.6.9	RL-400 to 420	548,905.00	Bcm	10,508.8	10.02	5,500,028.10
B2.6.10	RL-380 to 400	499,892.00	Bcm	10,189.4	10.81	5,403,832.52
B2.6.11	RL-360 to 380	379,215.00	Bcm	8,701.5	12.16	4,611,254.40
B2.6.12	RL-340 to 360	199,123.00	Bcm	4,797.0	12.77	2,542,800.71
B2.6.13	RL-320 to 340	60,840.00	Bcm	1,569.7	13.67	831,682.80
B2.7	**Beebyn West Ore**					
B2.7.1	RL-580 to OGL	2,400.00	Bcm	44.5	9.72	23,328.00
B2.7.2	RL-560 to OGL	101,713.00	Bcm	1,705.8	8.64	878,800.32
B2.7.3	RL-540 to 560	173,083.00	Bcm	2,887.1	8.59	1,486,782.97
B2.7.4	RL-0 to 540 A	232,459.00	Bcm	3,667.2	8.13	1,889,891.67
B2.7.5	RL-0 to 520 A	249,451.00	Bcm	4,238.2	8.75	2,182,696.25
B2.7.6	RL-480 to 500	211,741.00	Bcm	3,728.0	9.22	1,952,252.02
B2.7.7	RL-460 to 480	219,900.00	Bcm	4,203.4	10.00	2,199,000.00
B2.7.8	RL-440 to 460	193,288.00	Bcm	4,147.6	11.38	2,199,617.44
B2.7.9	RL-420 to 440	60,640.00	Bcm	1,357.2	11.86	719,190.40
	TOTAL ORE					
C	**MINE, LOAD AND HAUL WASTE TO WASTE DUMPS**					
C2.1	**Madoonga Stage-1 WASTE**					
C2.1.1	RL-580 to OGL	37,872.00	Bcm	292.0	5.23	198,070.56
C2.1.2	RL-560 to 580	603,886.00	Bcm	4,239.9	4.75	2,868,458.50
C2.1.3	RL-540 to 560	1,335,702.00	Bcm	9,381.1	4.75	6,344,584.50
C2.1.4	RL-520 to 540	3,600,589.00	Bcm	25,290.8	4.75	17,102,797.75
C2.1.5	RL-500 to 520	6,965,542.00	Bcm	47,844.8	4.62	32,180,804.04
C2.1.6	RL-480 to 500	5,980,027.00	Bcm	47,320.2	5.37	32,112,744.99
C2.1.7	RL-460 to 480	4,977,332.00	Bcm	41,915.7	5.75	28,619,659.00
C2.1.8	RL-440 to 460	4,033,493.00	Bcm	35,185.9	5.98	24,120,288.14
C2.1.9	RL-420 to 440	3,195,094.00	Bcm	30,148.1	6.50	20,768,111.00
C2.1.10	RL-400 to 420	2,443,547.00	Bcm	24,207.5	6.83	16,689,426.01
C2.1.11	RL-380 to 400	1,770,966.00	Bcm	19,524.3	7.61	13,477,051.26
C2.1.12	RL-360 to 380	1,184,058.00	Bcm	14,908.3	8.71	10,313,145.18
C2.1.13	RL-340 to 360	686,656.00	Bcm	8,921.0	8.99	6,173,037.44
C2.1.14	RL-320 to 340	326,982.00	Bcm	4,876.8	10.34	3,380,993.88
C2.1.15	RL-300 to 320	111,860.00	Bcm	1,860.7	11.54	1,290,864.40
C2.1.16	RL-280 to 300	9,403.00	Bcm	171.5	12.66	119,041.98

C2.2	**Madoonga Stage-2 WASTE**					
C2.2.1	RL-520 to OGL	1,308,752.00	Bcm	9,040.7	4.65	6,085,696.80
C2.2.2	RL-500 to 520	3,852,990.00	Bcm	27,061.1	4.75	18,301,702.50
C2.2.3	RL-480 to 500	4,652,982.00	Bcm	33,919.6	4.94	22,985,731.08
C2.2.4	RL-460 to 480	3,711,466.00	Bcm	29,051.0	5.33	19,782,113.78
C2.2.5	RL-440 to 460	2,969,923.00	Bcm	25,637.3	5.92	17,581,944.16
C2.2.6	RL-420 to 440	2,241,325.00	Bcm	19,825.4	6.06	13,582,429.50
C2.2.7	RL-400 to 420	1,547,955.00	Bcm	15,045.6	6.67	10,324,859.85
C2.2.8	RL-380 to 400	532,987.00	Bcm	5,574.1	7.21	3,842,836.27
C2.3	**Madoonga Stage-3 WASTE**					
C2.3.1	RL-540 to OGL	6,800.00	Bcm	57.0	5.72	38,896.00
C2.3.2	RL-520 to 540	595,753.00	Bcm	4,553.6	5.18	3,086,000.54
C2.3.3	RL-500 to 520	2,063,605.00	Bcm	14,493.6	4.75	9,802,123.75
C2.3.4	RL-480 to 500	5,247,781.00	Bcm	42,851.1	5.57	29,230,140.17
C2.3.5	RL-460 to 480	4,960,643.00	Bcm	44,285.3	6.12	30,359,135.16
C2.3.6	RL-440 to 460	4,159,491.00	Bcm	44,538.2	7.39	30,738,638.49
C2.3.7	RL-420 to 440	3,430,353.00	Bcm	41,631.6	8.39	28,780,661.67
C2.3.8	RL-400 to 420	2,724,978.00	Bcm	37,079.5	9.42	25,669,292.76
C2.3.9	RL-380 to 400	2,352,097.00	Bcm	36,842.1	10.86	25,543,773.42
C2.3.10	RL-360 to 380	1,619,990.00	Bcm	29,442.6	12.62	20,444,273.80
C2.3.11	RL-340 to 360	742,574.00	Bcm	14,536.1	13.60	10,099,006.40
C2.3.12	RL-320 to 340	245,004.00	Bcm	723.4	1.95	477,757.80
C2.3.13	RL-300 to 320	28,809.00	Bcm			
C2.4	**Beebyn Stage-1 Waste**					
C2.4.1	RL-520 to OGL	705,352.00	Bcm	5,264.2	5.06	3,569,081.12
C2.4.2	RL-500 to 510	2,775,249.00	Bcm	21,726.3	5.33	14,792,077.17
C2.4.3	RL-480 to 500	2,102,752.00	Bcm	17,261.9	5.60	11,775,411.20
C2.4.4	RL-460 to 480	1,472,911.00	Bcm	13,196.4	6.14	9,043,673.54
C2.4.5	RL-440 to 460	901,896.00	Bcm	9,045.1	6.89	6,214,063.44
C2.4.6	RL-420 to 440	439,835.00	Bcm	4,552.9	7.14	3,140,421.90
C2.4.7	RL-400 to 420	104,232.00	Bcm	1,216.8	8.06	840,109.92
C2.5	**Beebyn Stage-2 Waste**					
C2.5.1	RL-540 to OGL	188,983.00	Bcm	1,480.5	5.28	997,830.24
C2.5.2	RL-520 to OGL	2,382,664.00	Bcm	15,180.7	4.28	10,197,801.92
C2.5.3	RL-500 to 520	7,148,288.00	Bcm	50,208.8	4.75	33,954,368.00
C2.5.4	RL-480 to 500	6,647,868.00	Bcm	49,732.2	5.07	33,704,690.76
C2.5.5	RL-460 to 480	5,423,002.00	Bcm	45,612.5	5.74	31,128,031.48
C2.5.6	RL-440 to 460	4,277,795.00	Bcm	38,330.0	6.14	26,265,661.30
C2.5.7	RL-420 to 440	3,351,143.00	Bcm	32,828.6	6.75	22,620,215.25
C2.5.8	RL-400 to 420	2,487,763.00	Bcm	25,708.8	7.13	17,737,750.19
C2.5.9	RL-380 to 400	1,683,191.00	Bcm	18,946.8	7.77	13,078,394.07
C2.5.10	RL-360 to 380	985,033.00	Bcm	12,801.8	8.99	8,855,446.67
C2.5.11	RL-340 to 360	462,853.00	Bcm	7,008.8	10.50	4,859,956.50
C2.5.12	RL-320 to 340	110,153.00	Bcm	1,621.0	10.20	1,123,560.60
C2.6	**Beebyn Stage-3 Waste**					
C2.6.1	RL-540 to OGL	415,206.00	Bcm	3,659.1	5.99	2,487,083.94
C2.6.2	RL-520 to 540	4,558,451.00	Bcm	36,424.0	5.42	24,706,804.42
C2.6.3	RL-500 to 520	7,113,886.00	Bcm	53,723.1	5.12	36,423,096.32
C2.6.4	RL-480 to 500	6,026,626.00	Bcm	49,508.9	5.60	33,749,105.60
C2.6.5	RL-460 to 480	4,910,883.00	Bcm	45,132.0	6.31	30,987,671.73
C2.6.6	RL-440 to 460	3,765,144.00	Bcm	37,718.2	6.90	25,979,493.60
C2.6.7	RL-420 to 440	2,747,992.00	Bcm	31,590.8	7.94	21,819,056.48
C2.6.8	RL-400 to 420	1,955,095.00	Bcm	25,284.6	8.95	17,498,100.25
C2.6.9	RL-380 to 400	1,215,628.00	Bcm	16,158.3	9.20	11,183,777.60
C2.6.10	RL-360 to 380	533,265.00	Bcm	8,243.8	10.72	5,716,600.80
C2.6.11	RL-340 to 360	147,916.00	Bcm	2,549.4	11.96	1,769,075.36
C2.6.12	RL-320 to 340	21,240.00	Bcm	395.5	12.93	274,633.20
C2.7	**Beebyn WEST Waste**					
C2.7.1	RL-580 to OGL	13,360.00	Bcm	105.1	5.31	70,941.60
C2.7.2	RL-560 to 580	784,935.00	Bcm	4,883.9	4.17	3,273,178.95
C2.7.3	RL-540 to 560	2,763,429.00	Bcm	20,508.6	5.03	13,900,047.87
C2.7.4	RL-520 to 540 A	4,169,293.00	Bcm	33,148.2	5.42	22,597,568.06
C2.7.5	RL-500 to 520 A	3,351,029.00	Bcm	28,929.4	5.92	19,838,091.68
C2.7.6	RL-480 to 500	2,213,219.00	Bcm	21,683.7	6.75	14,939,228.25
C2.7.7	RL-460 to 480	1,260,100.00	Bcm	12,761.9	6.98	8,795,498.00
C2.7.8	RL-440 to 460	605,592.00	Bcm	7,591.1	8.67	5,250,482.64
C2.7.9	RL-420 to 440	92,800.00	Bcm	1,250.6	9.33	865,824.00

3	**OVERHAUL RATES**					
3.1	**Horizontal**					
3.1.1	*Out of Pit - per 1,000m*		*BCM/1.0km*	*0.1*	*0.68*	*RateOnly*
3.1.2	*In-pit - per 1,000m*		*BCM/1.0km*	*0.1*	*0.92*	*RateOnly*
3.2	**Vertical**					
3.2.1	*Out of Pit - per 10m vertical*		*BCM/100 m*		*0.17*	*RateOnly*
3.2.2	*In-pit - per 10m vertical*		*BCM/100 m*		*0.18*	*RateOnly*
4	**ORE HAULAGE RATES**					
4.1	*Load and Haul of Ore from Madoonga to Beebyn - 22 km distance*	*495,853.61*	*100/Tonnes*	*573,710.4*	*511.89*	*253,822,504.42*
	Rates for Drilling and Blasting and Sundry Drilling					
5.1	**5m Benches including explosives**					
	Dry Material (Heavy ANFO)					
5.1.1	*89mm Dia Drillhole*	*1,000,000.00*	*Bcm*		*3.46*	*3,460,000.00*
5.1.2	*102mm Dia Drillhole*		*Bcm*		*2.40*	*RateOnly*
5.1.3	*115mm Dia Drillhole*		*Bcm*		*2.40*	*RateOnly*
5.1.4	*127mm Dia Drillhole*	*1,000,000.00*	*Bcm*		*2.21*	*2,210,000.00*
5.1.5	*165mm Dia Drillhole*	*1,000,000.00*	*Bcm*		*2.11*	*2,110,000.00*
	Wet Material (Emulsion)					
5.1.6	*89mm Dia Drillhole*		*Bcm*		*3.60*	*RateOnly*
5.1.7	*102mm Dia Drillhole*		*Bcm*		*2.40*	*RateOnly*
5.1.8	*115mm Dia Drillhole*		*Bcm*		*2.40*	*RateOnly*
5.1.9	*127mm Dia Drillhole*	*1,000,000.00*	*Bcm*		*2.27*	*2,270,000.00*
5.1.10	*165mm Dia Drillhole*	*1,000,000.00*	*Bcm*		*2.17*	*2,170,000.00*
A5.16	**Dry Material (Heavy ANFO)**					
5.2.1	*89mm Dia Drillhole*		*Bcm*		*3.60*	*RateOnly*
5.2.2	*102mm Dia Drillhole*		*Bcm*		*2.40*	*RateOnly*
5.2.3	*115mm Dia Drillhole*		*Bcm*		*2.40*	*RateOnly*
5.2.4	*127mm Dia Drillhole*	*1,000,000.00*	*Bcm*		*2.06*	*2,060,000.00*
5.2.5	*165mm Dia Drillhole*	*#############*	*Bcm*		*1.98*	*200,212,452.00*
	Wet Material (Emulsion)					
5.2.6	*89mm Dia Drillhole*		*Bcm*		*3.60*	*RateOnly*
5.2.7	*102mm Dia Drillhole*		*Bcm*		*2.40*	*RateOnly*
5.2.8	*115mm Dia Drillhole*		*Bcm*		*2.40*	*RateOnly*
5.2.9	*127mm Dia Drillhole*	*1,000,000.00*	*Bcm*		*2.12*	*2,120,000.00*
5.2.10	*165mm Dia Drillhole*	*#############*	*Bcm*		*2.04*	*206,279,496.00*
5.3	**Drill Only**					
	Dry Material					
5.3.1	*89mm Dia Drillhole*		*Lin m*		*15.60*	*RateOnly*
5.3.2	*102mm Dia Drillhole*		*Lin m*		*15.60*	*RateOnly*
5.3.3	*115mm Dia Drillhole*		*Lin m*		*15.60*	*RateOnly*
5.3.4	*127mm Dia Drillhole*		*Lin m*		*15.60*	*RateOnly*
5.3.5	*165mm Dia Drillhole*		*Lin m*		*24.00*	*RateOnly*
5.3.6	*203mm Dia Drillhole*		*Lin m*		*24.00*	*RateOnly*
	Wet Material					
5.3.7	*89mm Dia Drillhole*		*Lin m*		*18.00*	*RateOnly*
5.3.8	*102mm Dia Drillhole*		*Lin m*		*18.00*	*RateOnly*
5.3.9	*115mm Dia Drillhole*		*Lin m*		*18.00*	*RateOnly*
5.3.10	*127mm Dia Drillhole*		*Lin m*		*18.00*	*RateOnly*
5.3.11	*165mm Dia Drillhole*		*Lin m*		*31.20*	*RateOnly*
5.3.12	*203mm Dia Drillhole*		*Lin m*		*31.20*	*RateOnly*
5.4	**Final Wall blasting**					
5.4.1	*203mm Dia Dry*		*Lin m*		*24.00*	*RateOnly*
5.4.2	*203mm Dia Wet*		*Lin m*		*31.20*	*RateOnly*
5.4.3	*89mm Presplit Dry*		*Lin m*		*15.60*	*RateOnly*
5.4.4	*89mm Presplit Wet*		*Lin m*		*18.00*	*RateOnly*
5.5	**Ramp blasting**					
5.5.1	*203mm Dia Dry*		*Lin m*		*24.00*	*RateOnly*
5.5.2	*203mm Dia Wet*		*Lin m*		*31.20*	*RateOnly*
5.5.3	*89mm Presplit Dry*		*Lin m*		*15.60*	*RateOnly*
5.5.4	*89mm Presplit Wet*		*Lin m*		*18.00*	*RateOnly*

5.6	**Wall Depressurisation Holes**					
5.6.1	*89mm Dry*		*Lin m*		*20.40*	*RateOnly*
5.6.2	*89mm Wet*		*Lin m*		*22.80*	*RateOnly*
			no			*RateOnly*
5.7	**Grade Control**					
5.7.1	*133mm Dry*		*Lin m*		*36.00*	*RateOnly*
5.7.2	*133mm Wet*		*Lin m*		*36.00*	*RateOnly*
			no			*RateOnly*
5.8	**Exploration**					
5.8.1	*133mm Dry*		*Lin m*		*66.00*	*RateOnly*
5.8.2	*133mm Wet*		*Lin m*		*66.00*	*RateOnly*
			no			*RateOnly*
5.9	**Ground support**					
5.9.1	*Rock bolts*		*ea*		*1.20*	*RateOnly*
5.9.2	*Rock Fencing*		*m2*		*1.20*	*RateOnly*
5.9.3	*Shotcrete*		*m2*		*1.20*	*RateOnly*
5.10	**Sundry Drill and Blast**					
5.10.1	*Magazine Management*		*week*			*RateOnly*
	TABLE B1 DAYWORKS LABOUR TABLE					
B1.1	*Plant Operator - Excavator*		*$/Hr*	*115.0*	*78.73*	*RateOnly*
B1.2	*Plant Operator - General & Dump Truck*		*$/Hr*	*115.0*	*66.08*	*RateOnly*
B1.3	*Fitter*		*$/Hr*	*115.0*	*73.04*	*RateOnly*
B1.4	*Labourer (D&B)*		*$/Hr*	*115.0*	*70.97*	*RateOnly*
B1.5	*Driller (D&B)*		*$/Hr*	*115.0*	*90.28*	*RateOnly*
B1.6	*Shotfirer (D&B)*		*$/Hr*	*115.0*	*73.24*	*RateOnly*
B1.7	*Leading Hand (D&B)*		*$/Hr*	*126.5*	*80.56*	*RateOnly*
B1.8	*Fitter (D&B)*		*$/Hr*	*126.5*	*80.35*	*RateOnly*
B1.9	*Labourer*		*$/Hr*	*115.0*	*70.97*	*RateOnly*
	TABLE B2 DAYWORKS FOR PLANT MOBILISED IN ACCORDANCE WITH SCH A TABLE A1					
B2.1	*Liebherr R996 Shovel*		*$/Hr*	*126.5*	*1,975.62*	*RateOnly*
B2.2	*Hitachi EX2500 Excavator*		*$/Hr*	*126.5*	*938.00*	*RateOnly*
B2.3	*240t Dump Truck*		*$/Hr*	*126.5*	*772.34*	*RateOnly*
B2.4	*180t Dump Truck*		*$/Hr*	*115.0*	*579.18*	*RateOnly*
B2.5	*D10 Dozer*		*$/Hr*	*126.5*	*451.64*	*RateOnly*
B2.6	*Wheel Dozer*		*$/Hr*	*126.5*	*513.68*	*RateOnly*
B2.7	*Grader*		*$/Hr*	*126.5*	*291.34*	*RateOnly*
B2.8	*Watercart*		*$/Hr*	*126.5*	*405.64*	*RateOnly*
B2.9	*Drill Rig*		*$/Hr*			*RateOnly*
B2.10	*Stemming Loader*		*$/Hr*			*RateOnly*
B2.11	*IT*		*$/Hr*	*2.4*	*67.00*	*RateOnly*
B2.12	*Mobile Crane*		*$/Hr*	*110.0*	*118.90*	*RateOnly*
B2.13	*Lighting Set*		*$/Hr*	*11.0*	*24.70*	*RateOnly*
B2.14	*0*		*$/Hr*			*RateOnly*
B2.15	*0*		*$/Hr*			*RateOnly*
						2,286,434,251.76

Appendix 3: WA Government royalties applicable to iron ore sales

WA Government royalties applicable to iron ore sales can be found in section 86 of the WA *Mining Regulations 1981*.

The royalty rates are as follows:

Fine ore (-6 mm) 5.625% of the "royalty value"

Lump Ore (+6 mm) 7.5% of the "royalty value"

"Royalty value" is equivalent to the FOB sales value.

The relevant definitions are shown below:

"**royalty value**", in relation to a mineral other than gold, means the gross invoice value of the mineral less any allowable deductions for the mineral;

"**gross invoice value**", in relation to a mineral, means the amount, in Australian currency, obtained by multiplying the quantity of the mineral, in the form in which it is first sold, for which payment is to be made (as set out in invoices relating to the sale) by the price for the mineral in that form (as set out in those invoices);

"**allowable deductions**", in relation to a mineral, means:

(a) the amount, in Australian currency, of any reasonable costs incurred in transporting the mineral, in the form in which it is first sold, where those costs -

(i) are incurred after the shipment date by the person liable to pay the royalty for the mineral; and

(ii) relate to transport of the mineral by a person other than the person liable to pay the royalty for the mineral;

and

(b) the price, in Australian currency, paid or to be paid by the person liable to pay the royalty for the mineral, for packaging materials used in transporting the mineral, in the form in which it is first sold;

"**shipment date**", in relation to a mineral, means:

(a) if the mineral is exported from Australia, the day on which the aircraft or ship transporting the mineral first leaves port in this State; or

(b) if the mineral is not exported from Australia, the day on which the mineral is first loaded on a vehicle for transport to the purchaser.

Appendix 4: Detailed Production Schedule

Period	Stage Name	Bench Elevation	ROM (kt)	Stockpile	Waste (kt)	Strip Ratio	Fe %	SiO_2%	Al_2O_3%	Ore lump (kt)	Lump Fe %	Lump SiO_2%	Lump Al_2O_3 %	Ore fines (kt)	Fines Fe %	Fines SiO_2 %	Fines Al_2O_3 %
-1	**Madoonga Stage 1 Pre-strip**	576	0	3	76	26.7	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		564	0	13	35	2.7	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		552	0	37	9	0.2	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		540	0	1	11	10.9	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		528	0	0	74	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
	Madoonga Stage 2 Pre-strip	528	0	1	439	371.5	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
	Beebyn Main Pit Central Pre-strip	540	0	0	2	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		528	0	0	7	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
	Beebyn Main Pit East Pre-strip	552	0	0	34	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		540	0	0	160	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		528	0	0	11	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		516	0	0	1	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
	Beebyn Main Pit West Stage One Pre-strip	552	0	0	73	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		540	0	0	118	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		528	0	0	29	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		516	0	0	1	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
	Beebyn Main Pit West Stage Two Pre-strip	576	0	0	3	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		564	0	0	68	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
Total			**0**	**55**	**1,152**	**20.9**	**0.00**	**0.00**	**0.00**	**0**	**0.00**	**0.00**	**0.00**	**0**	**0.00**	**0.00**	**0.00**

Period	Stage Name	Bench Elevation	ROM (kt)	Stockpile	Waste (kt)	Strip Ratio	Fe %	SiO_2%	Al_2O_3%	Ore lump (kt)	Lump Fe %	Lump SiO_2%	Lump Al_2O_3 %	Ore fines (kt)	Fines Fe %	Fines SiO_2 %	Fines Al_2O_3 %
0	**Madoonga Stage 2 Prestrip**	528	0	1	439	371.5	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		516	0	0	4	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
	Madoonga Stage 1	564	85	74	519	3.3	58.13	6.33	2.01	34	59.54	4.86	1.51	51	56.97	7.51	2.41
		552	325	102	1,019	2.4	59.47	5.26	2.28	130	60.64	3.98	1.71	195	58.47	6.28	2.73
		540	605	307	1,728	1.9	60.03	4.62	2.01	242	61.10	3.46	1.51	363	59.10	5.56	2.41
		528	863	322	3,381	2.9	59.65	4.59	2.02	345	60.79	3.43	1.52	518	58.68	5.52	2.42
		516	1,000	305	6,616	5.1	60.10	4.21	1.91	400	61.15	3.13	1.44	600	59.18	5.10	2.30
		504	998	322	7,807	5.9	60.23	4.04	2.04	399	61.26	2.98	1.53	599	59.33	4.89	2.45
		492	534	146	3,502	5.2	59.94	3.90	1.93	214	61.02	2.87	1.45	320	59.00	4.74	2.32
	Beebyn Main Pit West Stage Two Prestrip	552	0	0	19	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		540	0	0	7	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
	Beebyn Pod West Prestrip	564	0	0	0	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		552	0	0	35	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		540	0	0	21	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		528	0	0	8	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
	Beebyn Pod East Prestrip	576	0	0	89	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		564	0	0	18	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		552	0	0	3	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
	Beebyn Pod Central Prestrip	564	0	0	1	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		552	0	0	86	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		540	0	0	6	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		528	0	0	1	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
	Beebyn Main Pit East	540	223	0	401	1.8	64.15	2.87	2.53	100	64.55	2.40	1.95	123	63.65	3.39	3.19
		528	566	0	2,142	3.8	64.49	2.80	2.49	255	64.85	2.34	1.91	311	64.03	3.30	3.14
		516	637	0	6,924	10.9	64.40	2.83	2.48	287	64.77	2.37	1.90	350	63.94	3.34	3.13
Total			**5,836**	**1,579**	**34,777**	**4.7**	**61.02**	**4.00**	**2.13**	**2,406**	**62.01**	**3.02**	**1.62**	**3,430**	**60.12**	**4.84**	**2.58**

Period	Stage Name	Bench Elevation	ROM (kt)	Stockpile	Waste (kt)	Strip Ratio	Fe %	SiO_2%	Al_2O_3%	Ore lump (kt)	Lump Fe %	Lump SiO_2%	Lump Al_2O_3 %	Ore fines (kt)	Fines Fe %	Fines SiO_2 %	Fines Al_2O_3 %
1	**Stockpile reclaim**	-	1,634	0	0		56.55	7.11	2.54	654	58.25	5.50	1.90	980	55.21	8.39	3.02
	Madoonga Stage 1	492	679	0	3,502	5.2	59.22	4.57	2.04	272	60.43	3.42	1.54	408	58.19	5.50	2.45
		480	1,336	0	6,286	4.7	59.36	4.25	1.97	534	60.55	3.15	1.48	802	58.35	5.13	2.36
		468	1,219	0	5,693	4.7	59.47	4.02	1.91	488	60.63	2.97	1.44	732	58.47	4.87	2.30
		456	1,159	0	5,070	4.4	59.58	3.86	1.82	463	60.72	2.83	1.37	695	58.59	4.69	2.19
		444	1,063	0	4,576	4.3	58.90	4.64	1.83	425	60.17	3.48	1.38	638	57.84	5.59	2.21
		432	916	0	4,136	4.5	59.02	4.57	1.82	366	60.27	3.41	1.37	549	57.97	5.50	2.20
		420	875	0	3,601	4.1	59.10	4.66	1.80	350	60.34	3.49	1.35	525	58.06	5.60	2.17
	Beebyn Main Pit Central	528	1	0	13	10.1	57.44	5.80	2.46	1	58.62	4.83	1.88	1	55.94	6.98	3.11
		516	207	0	1,829	8.9	60.16	5.54	2.35	93	61.02	4.61	1.77	114	59.06	6.67	2.99
		504	293	0	2,995	10.2	60.42	5.45	2.33	132	61.25	4.54	1.76	161	59.36	6.56	2.97
	Beebyn Main Pit West Stage One	552	26	0	47	1.8	60.85	2.91	2.40	12	61.63	2.43	1.83	14	59.85	3.44	3.05
		540	287	0	1,011	3.5	61.15	3.07	2.61	129	61.90	2.57	2.02	158	60.20	3.64	3.27
		528	608	0	4,804	7.9	61.20	3.30	2.57	274	61.94	2.76	1.98	334	60.26	3.92	3.22
		516	268	0	3,715	13.9	60.96	3.43	2.48	120	61.73	2.86	1.90	147	59.98	4.07	3.13
		504	219	0	2,798	12.8	61.07	3.34	2.39	98	61.82	2.79	1.81	120	60.11	3.97	3.03
	Beebyn Main Pit East	504	687	0	11,984	17.4	64.35	2.90	2.43	309	64.72	2.43	1.86	378	63.87	3.42	3.08
		492	699	0	11,379	16.3	64.58	2.78	2.34	314	64.92	2.32	1.77	384	64.14	3.27	2.98
		480	692	0	9,827	14.2	64.44	2.89	2.20	311	64.80	2.42	1.64	380	63.98	3.41	2.83
		468	683	0	8,358	12.2	64.53	2.76	2.04	307	64.88	2.31	1.49	376	64.08	3.26	2.67
		456	647	0	7,040	10.9	64.64	2.43	1.91	291	64.98	2.03	1.37	356	64.21	2.84	2.53
		444	627	0	5,899	9.4	64.24	2.54	1.94	282	64.62	2.13	1.39	345	63.75	2.98	2.55
	Beebyn Pod Central	540	26	0	571	22.3	58.10	7.00	2.52	12	59.20	5.82	1.93	14	56.69	8.46	3.17
		528	130	0	1,635	12.6	58.89	6.77	2.25	59	59.90	5.63	1.69	72	57.60	8.18	2.89
	Beebyn Main Pit West Stage Two	576	0	0	0	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		564	0	0	109	583.1	58.74	6.41	2.19	0	59.77	5.33	1.63	0	57.43	7.73	2.83
		552	12	0	196	16.2	58.80	6.33	2.08	5	59.82	5.27	1.53	7	57.50	7.64	2.71
Total			**14,992**	**0**	**107,073**	**8.0**	**60.57**	**4.16**	**2.11**	**6,303**	**61.65**	**3.21**	**1.59**	**8,690**	**59.56**	**5.02**	**2.59**

Period	Stage Name	Bench Elevation	ROM (kt)	Stockpile	Waste (kt)	Strip Ratio	Fe %	SiO_2%	Al_2O_3%	Ore lump (kt)	Lump Fe %	Lump SiO_2%	Lump Al_2O_3 %	Ore fines (kt)	Fines Fe %	Fines SiO_2 %	Fines Al_2O_3 %
2		540	0	0	25	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		528	0	0	966	3,167.4	55.88	5.93	3.14	0	57.70	4.53	2.35	0	54.45	7.05	3.71
	Madoonga Stage 3 Prestrip	516	2	0	1,896	993.0	56.14	5.87	2.79	1	57.91	4.48	2.09	1	54.74	6.99	3.32
		504	0	0	849	2,520.4	56.27	5.67	2.48	0	58.01	4.32	1.86	0	54.89	6.76	2.95
		492	0	0	150	1,126.5	56.70	6.42	2.04	0	58.36	4.93	1.53	0	55.37	7.61	2.45
		408	784	0	3,123	4.0	59.52	4.55	1.73	314	60.68	3.40	1.30	471	58.53	5.48	2.09
		396	907	0	2,495	2.8	59.21	5.22	1.57	363	60.43	3.95	1.18	544	58.19	6.24	1.91
	Madoonga Stage 1	384	829	0	2,122	2.6	59.55	5.13	1.49	332	60.70	3.88	1.12	498	58.56	6.14	1.82
		372	716	0	1,817	2.5	59.71	4.91	1.35	287	60.84	3.70	1.02	430	58.75	5.89	1.66
		360	704	0	1,464	2.1	59.60	5.01	1.27	282	60.74	3.78	0.96	422	58.62	6.00	1.56
		528	15	0	723	46.9	55.41	7.09	2.94	6	57.31	5.48	2.20	9	53.92	8.37	3.48
		516	166	0	4,414	26.6	55.55	6.79	2.87	66	57.43	5.24	2.15	100	54.08	8.03	3.41
	Madoonga Stage 2	504	420	0	6,850	16.3	55.79	6.80	2.87	168	57.63	5.25	2.15	252	54.35	8.04	3.41
		492	832	0	5,857	7.0	57.14	5.35	2.67	333	58.73	4.06	2.00	499	55.87	6.40	3.17
		480	786	0	3,699	4.7	57.87	4.68	2.53	314	59.33	3.51	1.90	471	56.69	5.63	3.01
		468	877	0	3,146	3.6	58.06	4.77	2.41	351	59.48	3.58	1.81	526	56.89	5.73	2.87
		492	347	0	2,565	7.4	60.65	5.48	2.29	156	61.45	4.56	1.72	191	59.62	6.59	2.93
	Beebyn Main Pit Central	480	388	0	2,210	5.7	60.81	5.68	2.20	175	61.59	4.73	1.64	214	59.81	6.84	2.83
		468	419	0	1,890	4.5	60.75	6.01	2.07	188	61.55	5.00	1.51	230	59.75	7.23	2.69
		516	531	0	7,366	13.9	60.96	3.43	2.48	239	61.73	2.86	1.90	292	59.98	4.07	3.13
		504	666	0	8,517	12.8	61.07	3.34	2.39	300	61.82	2.79	1.81	366	60.11	3.97	3.03
	Beebyn Main Pit West Stage One	492	929	0	9,933	10.7	61.12	3.31	2.31	418	61.87	2.77	1.74	511	60.17	3.93	2.95
		480	971	0	8,744	9.0	61.17	3.31	2.33	437	61.91	2.77	1.76	534	60.22	3.93	2.97
		468	1,017	0	7,588	7.5	61.18	3.31	2.31	458	61.92	2.76	1.74	559	60.24	3.92	2.94
		432	627	0	4,981	7.9	64.03	2.69	1.97	282	64.44	2.25	1.42	345	63.51	3.16	2.59
	Beebyn Main Pit East	420	633	0	4,216	6.7	64.33	2.79	1.90	285	64.71	2.34	1.36	348	63.86	3.29	2.51
		408	638	0	3,511	5.5	64.66	2.77	1.74	287	65.00	2.32	1.21	351	64.23	3.26	2.34
		396	100	0	460	4.6	64.96	2.53	1.66	45	65.26	2.12	1.13	55	64.57	2.97	2.25
		564	0	0	81	583.1	58.74	6.41	2.19	0	59.77	5.33	1.63	0	57.43	7.73	2.83
		552	36	0	577	16.2	58.80	6.33	2.08	16	59.82	5.27	1.53	20	57.50	7.64	2.71
	Beebyn Main Pit West Stage Two	540	120	0	1,499	12.5	58.93	5.68	2.30	54	59.93	4.72	1.73	66	57.65	6.83	2.94
		528	253	0	3,046	12.0	58.86	5.74	2.20	114	59.87	4.78	1.63	139	57.57	6.91	2.83
		516	246	0	3,766	15.3	59.10	5.67	2.04	111	60.08	4.72	1.49	135	57.84	6.83	2.66
Total			**14,961**	**0**	**110,547**	**7.4**	**60.22**	**4.38**	**2.09**	**6,380**	**61.28**	**3.45**	**1.56**	**8,581**	**59.16**	**5.27**	**2.60**

Period	Stage Name	Bench Elevation	ROM (kt)	Stockpile	Waste (kt)	Strip Ratio	Fe %	SiO_2%	Al_2O_3%	Ore lump (kt)	Lump Fe %	Lump SiO_2%	Lump Al_2O_3 %	Ore fines (kt)	Fines Fe %	Fines SiO_2 %	Fines Al_2O_3 %
3	**Madoonga Stage 1**	348	636	0	1,128	1.8	59.67	5.25	1.22	255	60.80	3.97	0.92	382	58.70	6.27	1.50
		336	612	0	711	1.2	59.63	5.69	1.19	245	60.77	4.34	0.90	367	58.66	6.78	1.47
		324	444	0	549	1.2	59.61	5.58	1.29	177	60.75	4.24	0.98	266	58.63	6.65	1.59
		312	244	0	432	1.8	59.60	5.64	1.24	98	60.74	4.29	0.94	146	58.62	6.72	1.53
	Madoonga Stage 2	480	248	0	1,169	4.7	57.87	4.68	2.53	99	59.33	3.51	1.90	149	56.69	5.63	3.01
		468	254	0	911	3.6	58.06	4.77	2.41	102	59.48	3.58	1.81	152	56.89	5.73	2.87
		456	1,117	0	3,420	3.1	58.11	4.95	2.29	447	59.52	3.73	1.72	670	56.95	5.94	2.73
		444	1,089	0	2,810	2.6	57.95	5.46	2.29	436	59.39	4.15	1.72	653	56.77	6.52	2.74
		432	974	0	2,308	2.4	57.66	5.75	2.35	390	59.15	4.39	1.76	585	56.44	6.85	2.80
		420	762	0	1,871	2.5	57.33	6.01	2.41	305	58.88	4.60	1.80	457	56.08	7.15	2.87
	Madoonga Stage 3	528	0	0	14	0.0	0.00	0.00	0.00	0	0.00	0.00	0.00	0	0.00	0.00	0.00
		516	15	0	449	30.9	56.08	5.95	2.93	6	57.86	4.55	2.19	9	54.67	7.07	3.47
		504	129	0	2,488	19.4	56.02	6.27	2.61	51	57.81	4.81	1.96	77	54.61	7.44	3.10
		492	400	0	5,065	12.7	56.24	6.36	2.48	160	57.99	4.88	1.86	240	54.86	7.54	2.95
		480	595	0	6,630	11.1	56.28	6.39	2.55	238	58.03	4.91	1.91	357	54.90	7.58	3.04
	Beebyn Main Pit Central	456	442	0	1,542	3.5	60.28	6.40	1.89	199	61.12	5.33	1.35	243	59.20	7.72	2.50
		444	326	0	883	2.7	59.64	6.74	1.83	147	60.56	5.60	1.29	179	58.47	8.13	2.44
	Beebyn Main Pit West Stage One	456	1,019	0	6,656	6.5	61.29	3.46	2.24	458	62.02	2.89	1.68	560	60.37	4.11	2.87
		444	989	0	5,723	5.8	61.31	3.65	2.25	445	62.04	3.05	1.68	544	60.38	4.35	2.88
		432	963	0	4,891	5.1	61.26	3.74	2.22	433	62.00	3.12	1.65	530	60.33	4.46	2.85
		420	929	0	4,095	4.4	61.41	3.66	2.17	418	62.13	3.05	1.61	511	60.50	4.35	2.80
		408	890	0	3,256	3.7	61.59	3.41	2.08	400	62.29	2.85	1.53	489	60.71	4.05	2.71
		396	858	0	2,578	3.0	61.60	3.40	2.02	386	62.29	2.84	1.47	472	60.71	4.04	2.64
	Beebyn Main Pit East	396	534	0	2,460	4.6	64.96	2.53	1.66	240	65.26	2.12	1.13	293	64.58	2.97	2.25
		384	607	0	2,343	3.9	64.93	2.41	1.56	273	65.24	2.02	1.04	334	64.55	2.82	2.15
		372	118	0	400	3.4	64.87	2.36	1.44	53	65.19	1.98	0.93	65	64.48	2.76	2.03
		360	100	0	302	3.0	64.90	2.22	1.46	45	65.21	1.86	0.94	55	64.51	2.58	2.04
Total			**15,293**	**0**	**65,083**	**4.3**	**60.00**	**4.60**	**2.06**	**6,506**	**61.12**	**3.60**	**1.52**	**8,787**	**58.91**	**5.53**	**2.58**

Period	Stage Name	Bench Elevation	ROM (kt)	Stockpile	Waste (kt)	Strip Ratio	Fe %	SiO_2%	Al_2O_3%	Ore lump (kt)	Lump Fe %	Lump SiO_2%	Lump Al_2O_3 %	Ore fines (kt)	Fines Fe %	Fines SiO_2 %	Fines Al_2O_3 %
4	**Madoonga Stage 1**	300	110	0	204	1.9	58.88	6.61	1.22	44	60.15	5.09	0.92	66	57.81	7.82	1.50
	Madoonga Stage 2	408	487	47	1,325	2.5	57.53	5.89	2.44	195	59.05	4.50	1.83	292	56.30	7.00	2.91
		396	263	4	673	2.5	58.25	5.42	2.01	105	59.63	4.12	1.51	158	57.10	6.47	2.41
		384	179	0	309	1.7	58.15	5.85	2.16	72	59.56	4.46	1.62	108	57.00	6.96	2.58
		372	70	0	99	1.4	57.30	6.88	2.29	28	58.86	5.31	1.72	42	56.04	8.13	2.73
		360	43	0	26	0.6	57.89	5.36	2.19	17	59.34	4.06	1.65	26	56.70	6.40	2.62
	Madoonga Stage 3	492	15	9	307	12.7	56.75	5.75	2.43	6	58.41	4.39	1.82	9	55.43	6.85	2.90
		480	21	15	402	11.2	56.92	5.82	2.39	9	58.55	4.44	1.80	13	55.62	6.92	2.85
		468	523	246	5,538	7.2	57.28	5.41	2.40	209	58.85	4.11	1.80	314	56.03	6.46	2.86
		456	515	324	4,408	5.3	57.41	5.29	2.50	206	58.95	4.01	1.88	309	56.17	6.32	2.98
		444	789	206	3,310	3.3	57.65	5.18	2.32	315	59.15	3.92	1.74	473	56.44	6.20	2.77
	Beebyn Main Pit Central	444	101	1	277	2.7	59.68	6.73	1.83	46	60.60	5.60	1.29	56	58.51	8.13	2.44
		432	321	35	914	2.6	58.82	6.76	1.77	145	59.84	5.62	1.23	177	57.52	8.16	2.37
		420	205	40	680	2.8	57.91	6.84	1.75	92	59.04	5.69	1.22	113	56.48	8.26	2.35
		408	95	22	404	3.5	58.18	6.20	1.75	43	59.27	5.16	1.22	52	56.79	7.48	2.35
		396	59	21	183	2.3	58.30	6.10	1.70	27	59.37	5.07	1.17	32	56.92	7.35	2.30
	Beebyn Main Pit West Stage One	384	780	0	1,940	2.5	61.66	3.31	1.92	351	62.35	2.77	1.38	429	60.78	3.93	2.54
		372	624	0	1,343	2.2	62.08	3.31	1.89	281	62.72	2.76	1.35	343	61.27	3.92	2.50
		360	369	0	726	2.0	62.09	3.51	1.81	166	62.73	2.93	1.28	203	61.29	4.18	2.42
		348	260	0	323	1.2	62.14	3.92	1.75	117	62.77	3.27	1.21	143	61.34	4.67	2.35
		336	184	0	120	0.7	62.90	4.15	1.57	83	63.44	3.46	1.05	101	62.21	4.96	2.16
		324	65	0	25	0.4	62.75	4.62	1.39	29	63.31	3.85	0.88	36	62.04	5.54	1.97
	Beebyn Main Pit East	372	426	0	1,444	3.4	64.87	2.36	1.44	192	65.19	1.98	0.93	235	64.48	2.76	2.03
		360	363	0	1,092	3.0	64.90	2.22	1.46	163	65.21	1.86	0.94	200	64.51	2.58	2.04
		348	324	0	707	2.2	65.14	2.05	1.46	146	65.43	1.72	0.95	178	64.79	2.38	2.04
		336	147	0	246	1.7	65.82	1.94	1.47	66	66.02	1.63	0.96	81	65.56	2.25	2.06
Total			**7,338**	**970**	**27,024**	**3.3**	**60.38**	**4.44**	**1.96**	**3,151**	**61.46**	**3.51**	**1.39**	**4,186**	**59.31**	**5.34**	**2.50**

Period	Stage name	Bench Elevation	ROM (kt)	Stockpile	Waste (kt)	Strip Ratio	Fe %	SiO_2%	Al_2O_3%	Ore lump (kt)	Lump Fe %	Lump SiO_2%	Lump Al_2O_3 %	Ore fines (kt)	Fines Fe %	Fines SiO_2 %	Fines Al_2O_3 %
5	**Stockpile reclaim**	-	395	0	0	0.0	55.08	7.24	2.94	158	57.04	5.61	2.20	237	53.55	8.55	3.48
	Madoonga Stage 3	432	624	389	2,485	2.5	59.01	3.47	1.90	250	60.26	2.52	1.43	374	57.97	4.25	2.28
		420	566	336	1,825	2.0	59.20	3.56	1.78	226	60.42	2.59	1.34	340	58.18	4.35	2.14
		408	473	356	1,225	1.5	58.84	4.06	1.93	189	60.12	3.00	1.45	284	57.77	4.92	2.32
	Beebyn Main Pit East	336	0	0	0	1.8	65.84	1.94	1.47	0	66.04	1.63	0.96	0	65.59	2.24	2.05
	Beebyn Pod Central	516	146	11	1,737	11.1	59.33	6.68	2.05	66	60.28	5.56	1.50	80	58.11	8.07	2.68
		504	163	0	1,207	7.4	60.46	5.31	2.03	73	61.28	4.42	1.48	90	59.40	6.38	2.66
		492	159	0	754	4.8	61.44	4.21	2.06	71	62.15	3.51	1.51	87	60.54	5.03	2.69
		480	145	0	380	2.6	60.80	4.49	2.13	65	61.58	3.74	1.57	80	59.79	5.37	2.76
Total			**2,671**	**1,091**	**9,614**	**2.9**	**58.79**	**4.54**	**2.07**	**1,099**	**60.08**	**3.51**	**1.55**	**1,572**	**57.63**	**5.46**	**2.53**

	ROM (kt)	Off Spec. Stockpile	Waste (kt)	Strip Ratio	Fe %	SiO_2 %	Al_2O_3 %	Ore Lump (kt)	Lump Fe %	Lump SiO_2 %	Lump Al_2O_3 %	Ore Fines (kt)	Fines Fe %	Fines SiO_2 %	Fines Al_2O_3 %
Grand Total	**61,091**	**1,666**	**355,262**	**5.82**	**60.28**	**4.36**	**2.07**	**25,845**	**61.37**	**3.40**	**1.54**	**35,246**	**59.24**	**5.25**	**2.58**

Note : Additional 6.6 Mt of potential ore material remains in the ground.

SRK Report Control Sheet

Ref: WOR002_MIN_RP_005: Rev5
Pre-Feasibility Mining Study Weld Range
Iron Ore Project

Name/Title	Company	Copy #
Beng Ko	Sinosteel Midwest Management Pty Ltd	1 x PDF on CD Copy 1 - Bound Hardcopy
Library	SRK Consulting	Copy 2 - Bound Hardcopy
Scott McEwing	SRK Consulting	Copy 3 - Bound Hardcopy
	Worley Parsons / Sinosteel Midwest Management Pty Ltd	Copies 4-10

SRK Approval Signature:

Scott McEwing, Project Manager

Rev No.	Date	SRK Approval for Release	Revision Details
0	7/11/08	C Murray	Preliminary draft issued to client
1	12/11/08	C Murray	Updated preliminary draft issued to client
2	21/11/08	C Murray	Final Draft issued to client
3	28/11/08	C Murray	Final Report issued to client
4	14/01/08	C Murray	Final Report amended and issued to client
5	20/01/08	C Murray	Report Correction and reissue

Client Approval Signature:

Name and Designation: BENG KO - MINING MANAGER

Date: 20/01/2009