ENVIRONMENTAL SCOPING DOCUMENT

SORBY HILLS SILVER LEAD ZINC PROJECT

EAST KIMBERLEY, WESTERN AUSTRALIA

SEPTEMBER 2012

ENVIRONMENTAL SCOPING DOCUMENT FOR THE SORBY HILLS SILVER LEAD ZINC PROJECT MINE SITE

Tenements M80/197 & M80/286

KBL Mining Limited

APM ANIMAL PLANT MINERAL

Prepared by Sorby Management Pty Ltd with the assistance of Animal Plant Mineral Pty Ltd

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EXECUTIVE SUMMARY

Sorby Management Propriety Limited is seeking to develop a new Silver Lead Zinc mine at the Sorby Hills deposit in the East Kimberley Region of Western Australia. The Sorby Hills Project (the Project) is located approximately 50km by road north-east from the regional centre of Kununurra.

Sorby Hills is a major undeveloped deposit which has been well defined by extensive exploration. The shallow nature of the deposits will allow for the extraction of ore by open cut mining; the ore will be processed by flotation and a concentrate produced for export through Wyndham Port. The expected operational mine life is approximately 14 years.

The proposal for the Project was referred to the Environmental Protection Authority under Section 38 of the *Environmental Protection Act (1986)*; the level of assessment for the Project was set at Public Environmental Review. Assessment at this level requires the preparation of an Environmental Scoping Document to identify the potential risks and impacts associated with the proposed Project and provide the scope of works required to ensure that the risks and impacts are properly considered and that comprehensive management plans can be developed.

An assessment of the potential environmental impacts associated with the proposal identified key potential issues relating to flora and vegetation, fauna, surface and groundwater, waste products, handling of ore concentrate, emissions, Aboriginal heritage, and closure and rehabilitation. These issues are discussed, with Environmental Protection Authority objectives, potential impacts, proposed investigations and management responses identified. The Environmental Protection Authority's 'Principles of Environmental Protection' have also been considered and addressed.

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

Abbreviation	Meaning
%	Percentage
µS/cm	Micro seconds per centimetre
Ag	Silver
AHD	Australian Height Datum
APM	Animal Plant Mineral Propriety Limited
ARD	Acid Rock Drainage
AS/NZS	Australian Standard/New Zealand Standard
CEMP	Construction Environmental Management Plan
CGL	Cambridge Gulf Limited
DEC	Department of Environment and Conservation
DIA	Department of Indigenous Affairs
DIPE	Department of Infrastructure Planning and the Environment
DMP	Department of Mines and Petroleum
DOW	Department of Water
DRF	Declared Rare Flora
EC	Electrical conductivity
EMP	Environmental Management Plan
EPA	Environmental Protection Authority
EP Act	*Environmental Protection Act (1986)*
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
ESD	Environmental Scoping Document
FIFO	Fly-in Fly-out
Ha	Hectare
Hr	Hour
HYG&L	Henan Yuguang Gold and Lead
IBRA	Interim Biogeographic Regionalisation for Australia
ISO	International Organisation for Standardisation
KBL	KBL Mining Ltd (formerly Kimberley Metals Limited)
Kl	Kilolitre
Km	Kilometre
Kph	Kilometres per hour
kW	Kilowatt
Ltd	Limited
MCP	Mine Closure Plan
MD	Metalliferous Drainage
MG Corp	Miriuwung Gajerrong Corporation
MOU	Memorandum of Understanding
MRWA	Main Roads Western Australia
MWHrs	Megawatt Hours
NAF	Non-acid forming
NEPM	National Environmental Protection Measure

Abbreviation	Meaning
NOHSC	National Occupational Health and Safety Commission
NSW	New South Wales
NT	Northern Territory
OEMP	Operational Environmental Management Plan
ORIA	Ord River Irrigation Area
PAF	Potentially acid forming
Pb	Lead
PEC	Priority Ecological Community
PER	Public Environmental Review
ROM	Run-of-Mine
SEWPaC	Department of Sustainability, Environment, Water, Population and Communities
SG	Specific Gravity
SHECMS	Safety, Health Environmental and Community Management System
SMPL	Sorby Management Propriety Limited
SWEK	Shire of Wyndham East Kimberley
T	Tonne
TEC	Threatened Ecological Community
the Project	Sorby Hills Silver Lead Zinc Project
Tpa	Tonnes per annum
TSF	Tailings Storage Facility
WA	Western Australia
Wildlife Conservation Act	*Wildlife Conservation Act 1950* (WA)
Zn	Zinc

1 INTRODUCTION

1.1 OVERVIEW

Sorby Management Propriety Limited (SMPL) is seeking to develop a new Silver Lead Zinc (Ag Pb Zn) mine at the Sorby Hills deposit 50km north of Kununurra in the East Kimberley Region of Western Australia (WA).

The Sorby Hills mining tenements M80/196, M80/197, M80/285, M80/286, and M80/287 cover a total area of 12,612.40 hectares (ha). Within these tenements, a total of 13 individual mineralised pods have been delineated by exploration to date. The ore pods form a linear belt (trending north-south) over an 8km long and up to 1km wide strike length on the eastern margin of the Pincombe Inlier.

The current development project is contained within two of these leases, M80/197 and M80/286, which cover an area of 1,782.27ha.

The project will initially consist of three open cut pits, comprising ore pods C, D and E, which are to be mined sequentially as separate entities. As mining progresses the three ore bodies will be contained within one larger pit; the focus will be on resources within 70m of the surface. The ore will be processed by flotation and a concentrate produced for export through Wyndham. In addition to the open cut pits, the project will consist of a run-of-mine (ROM) pad, haul roads, a mill and concentrator, laboratory, road train loading area, tailings dam, access roads, workshop and site office at the Mine Site, as well as laydown facilities at Wyndham Port.

Between 400,000 and 600,000 tonnes per annum (Tpa) of ore will be excavated from the open pits and processed through the facility to produce 45,000Tpa of concentrate for export. Concentrate will be transported to Wyndham Port via an existing road network, utilising road trains. SMPL are planning to utilise existing Wyndham Port facilities and ship once a month for 11 months each year. Shipping consignments will contain approximately 4,000T of concentrate. The expected operational mine life is approximately 14 years.

1.2 PURPOSE OF ENVIRONMENTAL SCOPING DOCUMENT

The proposal for the Project was referred to the Environment Protection Authority (EPA) under Section 38 of the *Environmental Protection Act (1986)* in December 2011. The EPA has set the level of assessment for the Project at Public Environmental Review (PER) with a 4 week public review period. Assessment at the level of PER requires the preparation of an Environmental Scoping Document (ESD). The intention of the ESD is to assist the EPA in identifying the work required to ensure that all significant issues are properly considered as part of the EPAs environmental assessment of the proposal. Specifically this ESD has been prepared to provide:

- A description of the proposed Project and environmental setting
- Information on the potential environmental impacts of the Project and the proposed strategies to avoid, manage and mitigate these impacts
- Identify and address key environmental factors and principles for the Project
- A proposed scope of studies for incorporation into the PER
- Details of community and stakeholder consultation.

1.3 PROPONENT DETAILS

The Sorby Hills Project is being developed by the Sorby Hills Joint Venture Partners KBL Mining Limited (KBL) (formerly Kimberley Metals Limited) of Australia (75%) and Yuguang (Australia) Pty Ltd, a wholly owned subsidiary of China's largest lead producer, Henan Yuguang Gold and Lead Co., Ltd (HYG&L) (25%). The Manager of the Joint Venture is SMPL, which is 100% owned by KBL.

The tenements associated with the Project are currently held by KBL. Transfers of a 25% interest in these tenements have been executed by KBL in favour of Yuguang (Australia) Pty Ltd and these are currently with the Office of State Revenue for stamping. Tenements related to the Sorby Hills Project Mine Site are situated on unallocated Crown Land Lot 373 on Deposited Plan 51355.

A summary of the key contacts and tenement information associated with the Project is presented below.

Proponent:	Sorby Management Pty Ltd ACN 145 292 486
Address:	Level 3, 2 Elizabeth Plaza North Sydney, New South Wales, 2060
Joint Venture Partners:	KBL Mining Ltd and Yuguang (Australia) Pty Ltd
Tenement Holders:	KBL Mining Ltd. pending transfers to KBL Mining Limited (75%) and Yuguang (Australia) Pty Ltd (25%)
Key Contact:	Edgar Newman Project Manager – Sorby Management Pty Ltd Ph: (02) 9927 2006 Fax: (02) 9927 2050 Mobile: 0458 881 445 Email: ednewman@kblmining.com.au
Tenements Held:	M80/196; M80/197; M80/285; M80/286; M80/287; E80/1187

The Project proposal relates to activities on tenements M80/197 and M80/286.

1.4 Project and Assessment Schedule

An outline of the proposed timetable for completion of studies and the assessment process is presented in Table 1-1: Estimated Approval Timeframe. This schedule is dependent upon availability of key information for each stage of the assessment.

Table 1-1: Estimated Approval Timeframe

Assessment Phase	Approximate Timeframe	Expected Completion Date
Submission of draft ESD to OEPA	-	Mid April 2012
OEPA reviews draft and provides comment	1 week	Mid – Late April 2012
Submission of final draft ESD for referral to DMA's	1 week	Mid – Late April 2012
OEPA provides comment of final draft ESD.	2 weeks	Mid June 2012
Submission of Final ESD to OEPA	1 week	Early July 2012
OEPA approves ESD as basis for PER	5 weeks	Mid-September 2012
Submission of draft PER to OEPA	-	October 2012
OEPA reviews draft PER and provides comment	3 weeks	Early – Mid November 2012
Submission of revised draft PER	-	Early December 2012
Referral of Draft PER to DMA's for comment	3 weeks	Late December 2012
Submission of Final Draft PER to OEPA	-	Early January 2013
OEPA authorises release of PER document for public review	2 weeks	Mid – Late January 2013
Public review period for PER	4 weeks	Mid – Late February 2013
OEPA provides summary of submissions to SMPL	3 weeks	Early February 2013
SMPL response to submissions	3 weeks	Mid - Late March 2013
OEPA assessment and consultation	9 weeks	Mid – Late May 2013
Publication of EPA report	5 weeks	Mid – Late June 2013
Public appeal period	2 weeks	Early July 2013
Ministers consideration of EPA report	-	-
Release of Ministerial Statement	-	-

2 SUMMARY DESCRIPTION OF THE PROPOSAL

2.1 PROJECT LOCATION

The Sorby Hills Project is situated in the North-East Kimberley region of Western Australia (WA) close to the Northern Territory (NT) border. The Sorby Hills Mine Site is located approximately 50km by road north-east from the regional centre of Kununurra. The relevant Sorby Hills Project tenements lie to the south-east of the currently proposed Ord Irrigation Expansion Project Stage Two.

The south-eastern corner of the Ord Irrigation project is common with the north-western corner of Mining lease M80/286.

The proposed processing plant lies 1km south-east of the boundary corner behind the Pincombe Range, and the proposed pits lie 3.2km to the south-east of this boundary corner.

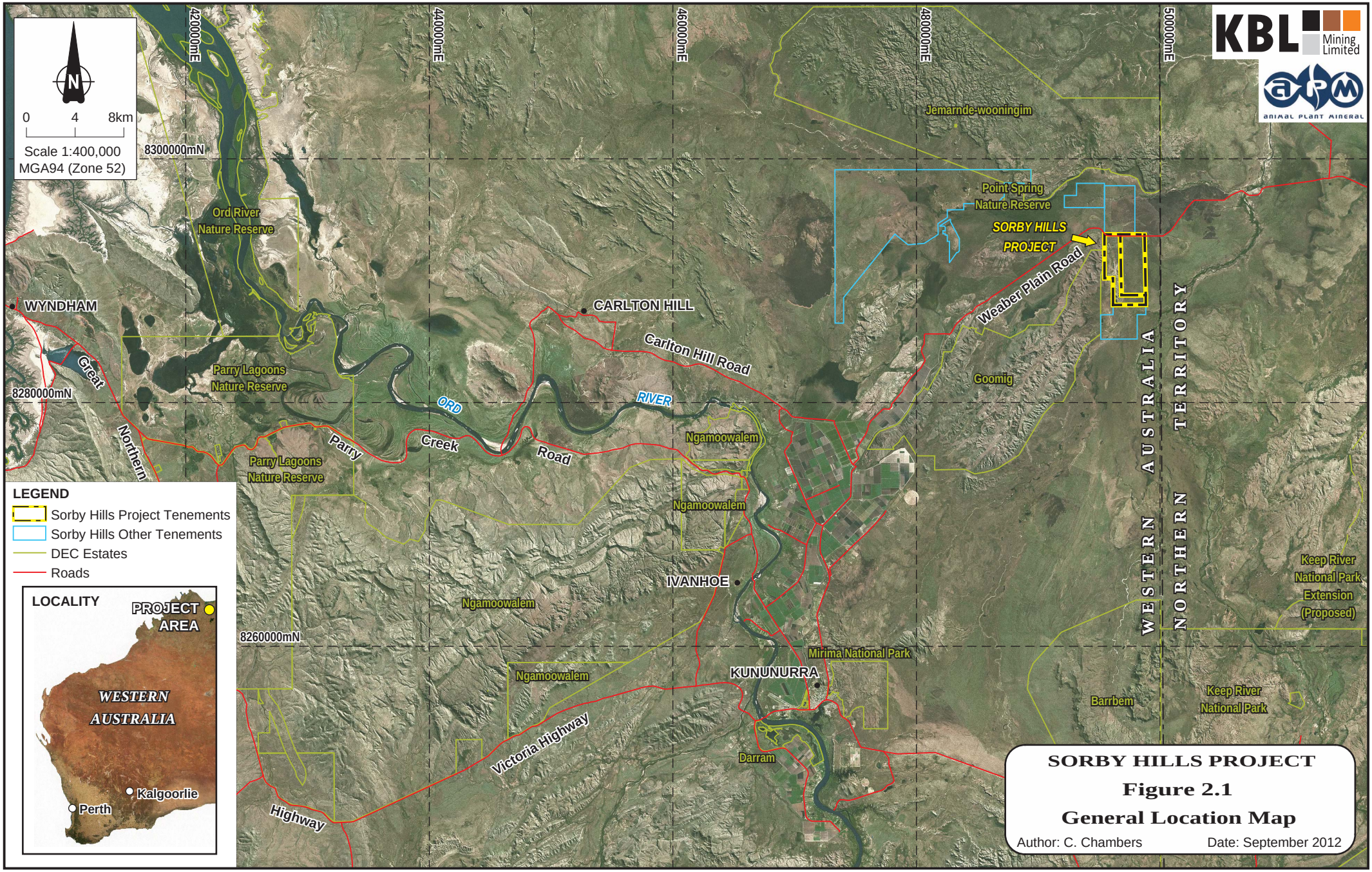
A location map is provided as Figure 2-1: General Location Map.

2.2 PROJECT DESCRIPTION

The Sorby Hills Project consists of 3 open pits, ROM, crusher, processing circuit, laboratory, tailings storage facility (TSF) and support infrastructure at the Mine Site. A detailed site layout plan for the Sorby Hills Project Mine Site is provided as Figure 2-2: Detailed Site Layout Plan. These plans illustrate the location and scale of site infrastructure (overlaid on topographic data and aerial photography), along with key aspects of the existing environment such as vegetation communities, creeks and drainage lines, major topographic features and heritage site locations. The Project also includes the transportation of concentrate from the Mine Site, via road train on existing public roads, to existing laydown facilities at Wyndham Port; the concentrate will be held for short term storage prior to loading onto ships for export.

A summary of the key characteristics for the Project is provided in Table 2-1: Key Project Characteristics.

Author: C. Chambers ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ Date Sept 2012 ~ A4 ~ CAD Ref g2004_KBL_Rep_F02_01_20120901.dgn

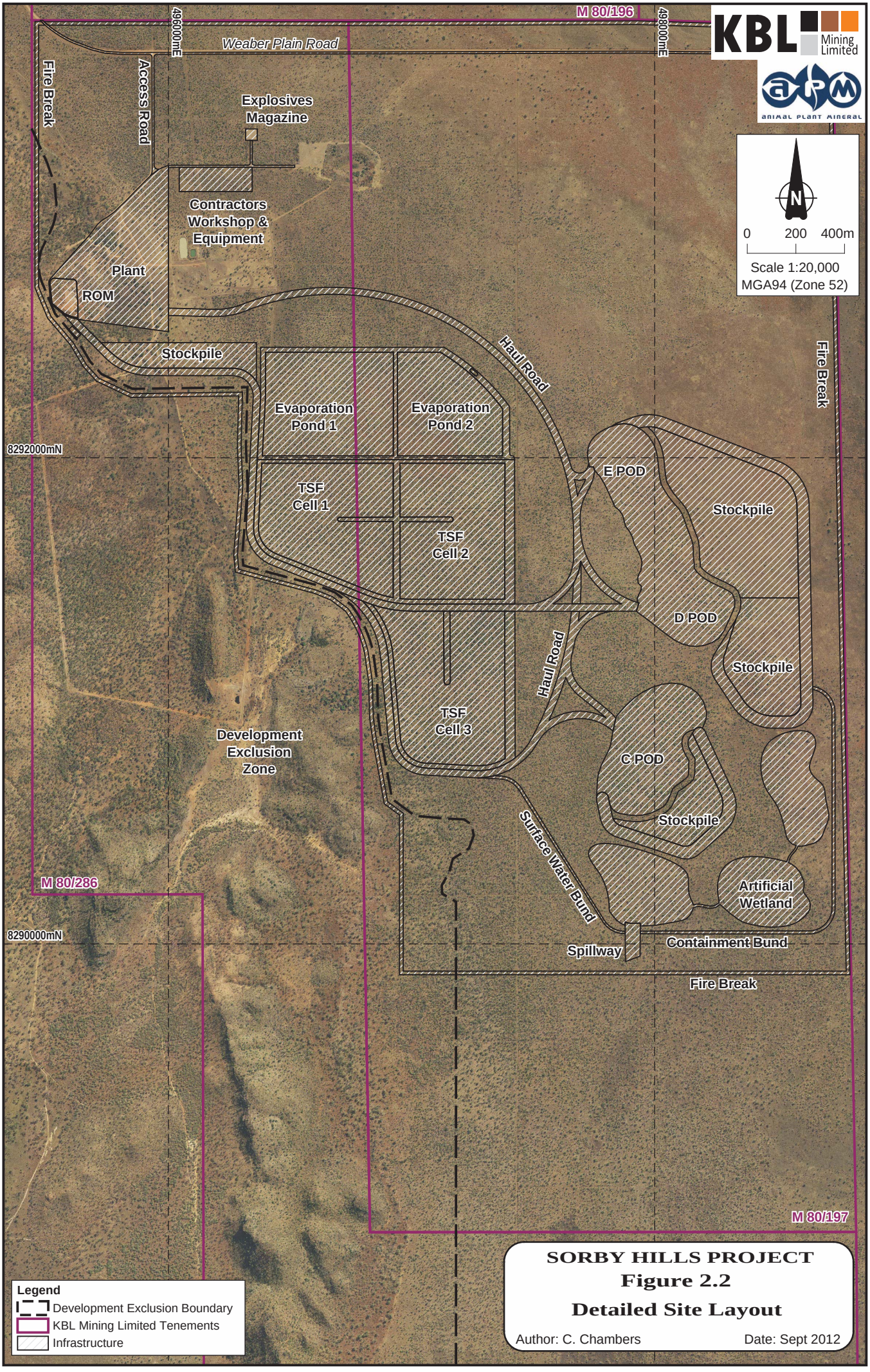


SORBY HILLS PROJECT

Figure 2.1

General Location Map

Author: C. Chambers Date: September 2012



Author: C. Chambers ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ Date Sept 2012 ~ A4 ~ CAD Ref g2004_KBL_Rep_F02_02_20120904.dgn

Table 2-1: Key Project Characteristics

Element	Description
General	
Project Life (mine production)	Approximately 14 Years
Area of disturbance (including roads and firebreaks)	Approximately 767.25ha
Mining	
Resource	5.96Mt at a grade of 3.15% Pb, 0.35% Zn and 34g/t Ag
Ore Mining Rate	600,000tpa
Production Rate	45,000tpa of Ag Pb Zn Concentrate
Depth of mine	Up to 70m
Method	Conventional open pit with drill and blast
Operations	24 hours per day, 7 days per week • 24 hour operations for process, laboratory and haulage. • 12 hour day shift operations for mining, crushing, maintenance, management, administration and environmental staff.
Mineralised Waste Materials (Maximum)	16.4Mt
Mineralised Waste Materials Management	All waste is anticipated to be consumed during development and construction of roads, TSF embankments and flood bunds. Some waste material will be set aside to cap the TSF. If there is excess waste it will be used as pit back fill material. Therefore no permanent waste dumps will be required for the Project.
Tailings	
Tailings Production Rate	355,000T of solid per annum
Tailings Storage	Above ground paddock style TSF
Transportation	
Road Transport	Concentrate will be loaded onto road trains at the mine site and transported to Wyndham Port storage facility. There will be an average of 12 truck movements per week.
Export	Shipping will occur once per month for 11 months of the year.
Support Infrastructure	

Element	Description
Additional Mine Site Facilities will include	Laboratory Access roads Power generation Hardstand area Diesel storage & refuelling area Workshop Site Office Landfill site Potable water storage tank
Accommodation	Employees will be housed in Kununurra and transported to site daily by bus
Fuel storage capacity and quantity used	Storage Capacity: 200KL (refilled approximately weekly) Quantity Used: 10,400KL per year (approximately)
Power	Power usage will be approximately 8624MWHrs/annum and will require five 500kW diesel operated generator sets on site.
Water	
Source - Potable	Potable water will be sourced from rainwater and a groundwater production bore situated away from the mineralised field.
Source - Operations	Process and dust suppression water will be sourced from mine dewatering and recycled water from the processing plant.
Processing Requirement	The current water balance for the site indicates a maximum of 2678m^3/day will be extracted from pit dewatering, with 227m^3/day required in the processing plant. The remaining 2451m^3/day will be directed to an artificial wetland.

2.2.1 AREA OF DISTURBANCE

The Sorby Hills Mining tenure area covers 12,612.40ha, with this proposal covering an area of 1,782.27ha (tenements M80/197 and M80/286). Clearing of native vegetation will be required for development of the Project; areas to be cleared for specific aspects of the proposal are outlined in Table 2-2: Indicative Areas of Disturbance*, the total disturbance footprint for the Project will be approximately 767.25ha, including firebreaks which will be 16m wide in accordance with the *Kimberley Bush Fire Burning and Firebreak Location, Construction and Maintenance Guidelines* (FESA, 2007).

Table 2-2: Indicative Areas of Disturbance*+

Disturbances	M80/197	M80/286
Open Pits	46.6ha	-
Tailings Facilities	76.7ha	21.8ha
Evaporation Pond	28.7ha	20.4ha
ROM Pad	-	4ha
Plant Site and support infrastructure including process plant, office, workshops	-	60ha
Explosives Magazine	-	0.25ha
Hypersaline pipeline corridors (>15, 000TDS)	-	2.2ha (2.2km x 10m)

Disturbances	M80/197	M80/286
Fresh water pipeline corridors (<15, 000TDS)	2.5ha (2.5km x 10m)	1ha (1km x 10m)
Haul roads	22.1ha	10.8ha
Access Tracks	6ha (1.5km x 40m)	12ha (3km x 40m)
Topsoil Stockpiles	27.9ha	6.8ha
Clay and Rock Stockpiles	40.3ha	-
Flood Bunds and Diversion Channel	90ha	70ha
Landfill Site	-	2ha
Artificial Wetland	31.1ha	-
Area Internal to infrastructure	132.9ha	17.2ha
Firebreaks	11.2 ha	22.8 ha
Total	**516ha**	**251.25ha**
Tenement Area	***993.91ha***	***788.36ha***

*Areas are indicative only and may vary. + Disturbance area for NAF Siltstone Stockpiles is yet to be determined.

2.2.2 Mining Operations

The mining operation for the C, D and E pods is planned over a period of 14 years at an ore production rate of 400,000 to 600,000Tpa. The mining technique will be consistent with a typical open cut, drill and blast operation. Initially the C, D and E pods will be mined sequentially as separate entities in three small pits commencing with D pod; as mining progresses the three ore bodies will be contained within one larger pit.

There is a groundwater aquifer in the mineralised dolomites and a dewatering system will be required to enable mining. SMPL will construct periphery dewatering bores and install a typical in-pit sump.

Mining will be carried out predominantly during dayshift, with some night operations occurring.

2.2.3 Ore Processing

The processing plant at the Sorby Hills Project Mine Site will comprise the following components;

- ROM pad and crusher loading facility
- Primary and secondary crusher, screens and associated fine ore bins
- Grinding circuit comprising a sag mill and a ball mill
- Flotation circuit, including flotation tanks, pumps and pipe work
- Associated infrastructure including a thickener, electrical switch room, backup generators and diesel storage area.

The ROM pad will be used to stockpile ore and low grade material prior to processing; ore will be fed into the crusher hopper using a front-end loader. The feed material will be crushed using a primary jaw crusher then conveyed to a coarse ore stockpile. Material from this stockpile is then fed to a primary sag mill followed by a secondary ball mill. The capacity of the processing circuit is approximately 400,000Tpa based on 24hour (Hr) operations.

From the coarse ore stockpile, ore will be mixed with water and milled to -200microns before passing to the flotation circuit. The ore-water slurry will be mixed with a range of industry standard reagents; the slurry and reagent mixture will then be passed to a series of tanks where air is blown through the substance. Selected sulphide materials will adhere to these air bubbles, float to the surface and be skimmed off to form a concentrate. The concentrate will be of Ag Pb Zn composition.

Following skimming the concentrate will be de-watered in a conventional thickener circuit followed by drying to shipping moisture specification in a ceramic filter press. The concentrate will then be packaged directly into fully sealed and lockable containers for short term on site storage and subsequent transport off site. The tails from the flotation circuit will report to the TSF. The flotation circuit, filter press and container loading dock will be situated within covered concrete bunded areas.

2.2.4 TAILINGS STORAGE

Tailings produced during the processing of the ore material will be discharged and stored within a purposed built above ground paddock style TSF. The development of the TSF will be staged and involve a cell by cell approach over the mine life.

2.2.5 CONCENTRATE HANDLING

SMPL will endeavour to achieve minimal handling of concentrate by utilising a predominantly mechanised system. SMPL propose to use “Rotabox” (or similar) shipping containers for the collection, storage and transport of concentrate. “Rotabox” containers are purpose built, stackable, bulk ore containers that can be fully sealed with lockable lids as shown in Figure 2-3: “Rotabox” Container (a), Container Unloading (b) and the Wyndham Port Facility (c). The sealable lids provide security from product spillage, accidental discharge and variation in moisture level during transport. There is no requirement for internal bags or packaging.

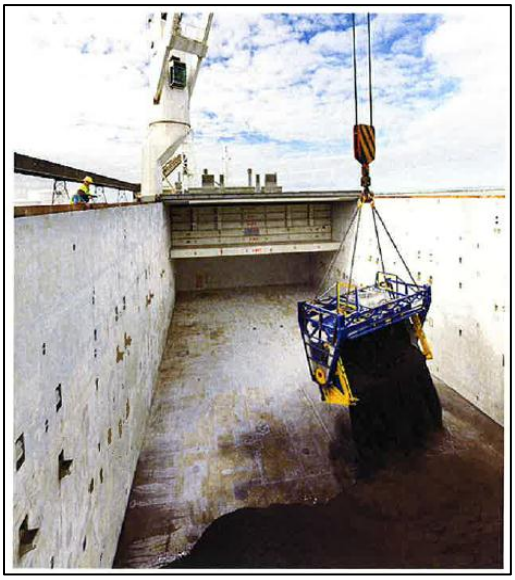
Once the containers have been filled they will be removed from the loading dock and a lid immediately applied and locked. The sealed containers will then be transferred to a designated hardstand area for short term storage prior to transportation off site via road train.

The Sorby Hills concentrate has a high specific gravity (SG) and is therefore a heavy substance; containers will only be half filled and will be stacked two high as a maximum due to their weight. Load cells will be installed in the loading dock at site to control the quantity and weight of concentrate placed into each container.

An existing hardstand area at Wyndham Port will be modified to include wash down facilities and sumps (Figure 2-3) and will be utilised for container storage. The “Rotabox” containers are designed to be handled by ship cranes and can therefore be easily manoeuvred into position over the ships hold and the contents unloaded by rotation of the container (Figure 2-3 (b)). The smooth internal surfaces of the containers enable the contents to be easily emptied with minimal residue remaining. Shipping will be undertaken by a specialist contractor.

a)

b)



c)

Figure 2-3: "Rotabox" Container (a), Container Unloading (b) and the Wyndham Port Facility (c)

2.2.6 INFRASTRUCTURE

2.2.6.1 Accommodation and transport

The Project will have a combination of a residential and fly-in fly-out (FIFO) workforce with flights for the operation utilising Kununurra Airport. Employees will be transported between Kununurra and the Sorby Hills Project site by bus on a daily basis for the duration of their roster. Employees that are not permanently resident in the township will be accommodated in Kununurra.

Rental housing will be provided in Kununurra for senior management staff; other staff will be housed in an accommodation facility. It is anticipated that the Ord Irrigation Expansion Project workers accommodation village will be available for use by SMPL and its employees by the time the Sorby Hills Project is operational.

2.2.6.2 Power

Power generation for the processing plant will be supplied using new diesel powered generator sets. In addition there may be the possibility of sourcing a gas supply from the Weaber Gas Field (Advent Energy) by the time the Sorby Hills Project is operational, in which case the existing diesel generator sets will be replaced by new natural gas powered generators. Power usage will be approximately 8624MWHrs/annum and will require five 500kW generator sets on site.

2.2.6.3 Water

Process water will be sourced from mine dewatering and recycled water from the processing plant. Potable water will most likely be sourced from rainwater and a groundwater production bore situated away from the mineralised field.

2.2.6.4 Fuel

Fuel will be transported to the site via road; appropriately registered and qualified fuel transport companies will be used for diesel deliveries with procedures in place. Diesel will be stored in four 50kl self-bunded fuel tanks which are expected to be refilled approximately weekly by a diesel fuel delivery from Wyndham.

2.2.6.5 Road Access

SMPL plan to utilise the Weaber Plain Road, Mills Road, Ivanhoe Road, Victoria Highway and Great Northern Highway for haulage of concentrate from the Sorby Hills Project Mine Site to the laydown facilities at Wyndham Port and for normal Mine Site deliveries and transport of personnel.

There is an existing access road linking the Sorby Hills Project site to the Weaber Plain Road. This will be upgraded and widened and the intersection will be modified to allow integration of Mine Site vehicles onto the Weaber Plain Road; road works will be carried out in line with Main Roads Western Australia (MRWA) specifications.

2.2.6.6 Port Operations

Concentrate will be transported via road train from the Mine Site to the facilities at Wyndham Port. An existing hardstand area will be utilised by SMPL for container storage before unloading directly into the ships hold. SMPL operations will only require the use of existing port facilities as indicated by Figure 2-3(c); there will be no need for additional infrastructure, port modifications (e.g. additional berth pockets) or dredging to enable shipping of concentrate.

The Sorby Hills Project will increase the number and frequency of ships operating out of the port, however as the port is not currently operating at full capacity and SMPL only anticipate shipping once a month for 11 months each year the increase is not expected to be significant.

Cambridge Gulf Limited (CGL) personnel will be involved in stevedoring activities. CGL is the port operator under licence to the Department of Transport.

2.2.7 WORKFORCE

It is estimated that approximately 40 personnel will be required during the construction phase and a regular complement of approximately 64 personnel during ongoing operations.

2.2.8 TIMING

Provided all relevant approvals are obtained for the Project, construction at the site is scheduled to commence in the first quarter of 2013 with the Project becoming operational in late 2013. The operational life of the mine is dependent on a number of factors including achievement of expected production rates, results of any exploration and market conditions; it is expected that the Sorby Hills Project will be operational for 14 years.

2.3 PROJECT JUSTIFICATION AND ALTERNATIVES CONSIDERED

The Sorby Hills deposits subject to this proposal will contribute to Ag Pb Zn exports over the next 14 years; the proposal is expected to produce up to 45,000Tpa of Ag Pb Zn concentrate for export. The Project will have a significant positive influence on the economy of the Kimberley region in addition to a localised positive impact on the economy, business opportunities and employment prospects for the communities of Kununurra and Wyndham. The 'do nothing' alternative would result in the loss of economic and social opportunities, particularly within Wyndham and Kununurra.

Project design has been heavily influenced by the findings of biological assessments; in order to maintain biological diversity in the project area the mine plan has been tailored and a self-imposed exclusion boundary developed to retain comprehensive, adequate and representative habitats by the avoidance of impact to Sorby Hills (an extension of the proposed Goomig Conservation Park) and the valuable and diverse interzone habitat between the foothills and the flood plains.

Working within the constraints of engineering and economic feasibility, the areas now targeted for construction of the mine infrastructure will utilise sites that are already degraded, more broadly representative of the surrounding area and are of lower value for fauna wherever possible. In addition, the original haul road design has been re-routed to avoid direct impact to populations of priority plant species.

3 APPLICABLE LEGISLATION

A range of legislation will have relevance to the Sorby Hills Project as outlined in Table 3-1: Legislation Relevant to the Sorby Hills Project.

Table 3-1: Legislation Relevant to the Sorby Hills Project

Act	Application
Environmental Protection Act 1986	Part IV – environmental impact assessment and approval. Part V – prevention, control and abatement of pollution and environmental harm; clearing of vegetation.
Dangerous Goods Safety Act 2004 (replaces Explosives and Dangerous Goods Act 1961 and Dangerous Goods (Transport) Act 1998)	Management of explosive and dangerous goods. Regulations under this Act specific to this project include: • Dangerous Goods Safety (Road and Rail Transport of Non explosives) Regulations 2007 • Dangerous Goods Safety (Storage and Handling of Non explosives) Regulations 2007 • Dangerous Goods Safety (Explosives) Regulations 2007 • Dangerous Goods Safety (Goods in Ports) Regulations 2007
National Environment Protection Council (Western Australia) Act 1996	State requirement to implement National Environment Protection Measures (NEPMs) – e.g. Ambient Air Quality
Rights in Water & Irrigation Act 1914	Water rights & management of impacts on downstream users/beneficial uses, licences for groundwater extraction for ore processing
Health Act 1911	Protection of public health
Mining Act 1978	Right to mine, land access and environmental assessment
Mine Safety & Inspection Act 1994	Safety of the mine and mining operations; occupational health and safety issues
Occupational Safety and Health Act 1984	Occupational health and safety issues
Waterways Conservation Act 1976	Protection of waterways
Wildlife Conservation Act 1950	Protection of endangered flora and fauna
Contaminated Sites Act 2003	Investigation, reporting and remediation of contaminated sites
Aboriginal Heritage Act 1972	Protection and management of Aboriginal Heritage
Native Title (State Provisions) Act 1999	Protection and recognition of native title
Bush Fires Act 1954	Prevention, control and extinguishment of bush fires
Soil and Land Conservation Act 1945	Prevention of land degradation and promotion of soil conservation
Environment Protection and Biodiversity Conservation Act 1999	Protection and management of nationally and internationally important flora, fauna, ecological communities and heritage places

The Sorby Hills Project was referred to the Department of Sustainability, Environment, Water, Population and Communities (SEWPaC) under the *Environment Protection and Biodiversity*

Conservation Act 1999 (*EPBC Act*) in December 2011; the current status of the referral is currently on hold pending further information to be sought through additional proposed surveys.

4 REGIONAL AND ENVIRONMENTAL SETTING

4.1 REGIONAL SETTING

The Sorby Hills Project area is situated at the north-eastern extent of the Sorby Hills Ranges. Tenement M80/286 encompasses a portion of the Ranges and associated foot slopes; to the east of the hills in tenements M80/286 and M80/197 the environment is predominantly broad flood plains of red-grey clay pan (cracking clay) soils with Bauhinia trees. The project area encompasses the Pinkerton and Ivanhoe Land Systems (Department of Agriculture and Food, 2009).

The Project area is within the Knox Creek floodplain. Floodwaters draining off the eastern rangelands flow south-east towards Knox Creek, however residual water bodies can remain present for extended periods at the base of the ranges.

4.2 PHYSICAL ENVIRONMENT

4.2.1 CLIMATE

The Sorby Hills area has a tropical monsoonal climate with distinct wet and dry seasons, separated by brief transition periods. The East Kimberley region is subject to a hot and humid wet season from November to April (summer), with highly variable rainfall resulting from monsoonal depressions and tropical cyclones, and a warm dry season extending from May to October (winter). The region receives approximately 90% of its annual rainfall during the summer wet season, with torrential rain events often leading to wide-scale flooding. The dry season experiences infrequent rainfall, with consecutive dry months common. Evaporation rates are high, with the average annual pan evaporation exceeding the average annual rainfall by a factor of 3.3.

The Bureau of Meteorology has been recording rainfall and temperature since 1944 at the Kimberley Research Station, 36.5km south-west of the Sorby Hills Project Mine Site. Average monthly temperature and rainfall data for the period up to August 2010 is presented in Table 4-1: Kimberley Research Station Meteorological Data. SMPL have also recently established a weather station on site, with data to be incorporated into the PER.

The Sorby Hills Mine Site is within a cyclone area and is categorised as Wind Region B which is characterised by a regional basic wind velocity of up to 176.4kph.

Table 4-1: Kimberley Research Station Meteorological Data

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Mean Max Temp (°C)	36.2	35.0	35.6	35.4	33.2	30.6	30.7	33.1	36.5	38.6	39.0	37.6	***35.1***
Mean Min Temp (°C)	24.6	24.4	23.5	20.8	18.1	15.3	14.3	15.6	19.5	22.9	24.7	24.9	***20.7***
Mean Rainfall (mm)	203.3	207.9	133.1	41.1	8.6	4.1	3.8	0.4	2.6	22.4	60.8	144.8	***834.7***

4.2.2 GEOLOGY

The Sorby Hills mineralisation consists of 13 discrete carbonate hosted Ag Pb Zn deposits (pods); the pods form a linear north-south belt extending over 8km, sub parallel to the eastern margin of the Pincombe Inlier and within the Burt Range Formation of the Bonaparte Basin. Three pods have been targeted for sequential mining; these are the C, D and E pods.

The carbonate sequences of the Burt Range Formation are pervasively dolomitised in the area of the Sorby Hills deposits. Dolomitisation has been described to both precede and accompany mineralisation, as mineralisation commonly has dolomite spar gangue. The pods are dominantly shallow dipping stratabound lenses within dolomitic intraclastic and tectonic breccias of the Burt Range Formation. The lenses average 7-10m in thickness, are generally less than 1km long and are 100m-500m wide. There is some structural control to the mineralisation, with higher grade zones associated with faulting.

The Sorby Hills mineralisation is typically Galena (Lead sulphide) rich with moderate to high pyrite content and generally low amounts of sphalerite (Zinc sulphide). Galena occurs as massive to semi massive crystalline lenses often in more argillaceous units. The galena occurs as coarse to fine disseminations or as open-space fill in fractures, breccias and vughs. Sphalerite typically predates galena and occurs as colloform open-space fill. Silver values tend to increase as the Galena content increases. The upper portions of the deposits are often oxidised and are composed of a variable mix of cerussite and galena.

4.2.3 HYDROLOGY

No significant creeks or defined drainage systems occur within the proposed Project Area, with the ephemeral Border and Knox Creeks located 3.5km to the north and south respectively, and the Keep River (which Knox Creek flows into) situated 4.6km to the south-east.

The Sorby Hills Project is located in the upper portions of the Knox Creek and Keep River Catchments; all surface flows within the floodplain of the Project area are towards the south-east. The upstream catchment for the Project Area (eastern side of Sorby Hills) is relatively small, with all surface water reporting to Knox Creek. All surface flows north of the Weaber Plain Road and draining the western side of the Pincombe Ranges and Sorby Hills (area covered by Ord Stage 2 development) flows into Border Creek and does not enter the project area.

4.2.4 HYDROGEOLOGY

The Sorby Hills Project area has a geology dominated by Carboniferous aged dolomitic formations which overlie the Devonian basement stratigraphy. Whilst the Carboniferous sediments are permeable, the basement Devonian geology complex is distinctly less permeable. As a result of this geological setting, three groundwater aquifers occur within the site:

- An upper alluvial aquifer within the surficial alluvial sediments, which is considered unconfined
- An intermediate confined aquifer within the D3 dolomite unit
- A deeper confined aquifer within D2/D1 dolomite units.

Within the proposed pit area only the two deeper aquifers have been found to occur. Variability in hydraulic conductivity of the groundwater in these aquifers suggests that these are faulted/fractured rock aquifers. The alluvial aquifer typically exists in the sandy to gravelly alluvium that occurs around Border Creek which is 3.6km north of the proposed pits.

Groundwater levels are highest at the southern end of the mining tenements where they range from 14.4m Australian Height Datum (AHD) to 8.2m AHD adjacent to Knox Creek. Groundwater quality is generally neutral pH and brackish, with EC (Electrical Conductivity) ranging between 1100µS/cm and 2700µS/cm. The cation/anion balance of the groundwater shows no dominant water type other than an overall predominance associated with sodium, magnesium, calcium, sulphate and bicarbonate. With the exception of EC, Pb, Zn and to a lesser extent total phosphorus and aluminium, the water quality is generally within freshwater guidelines.

4.3 Biological Environment

4.3.1 Bioregion

Mapping for the Interim Biogeographic Regionalisation for Australia (IBRA) (version 6.1) programme placed the Sorby Hills Project area in the Victoria Bonaparte Bioregion. This bioregion comes under the Tropical and Subtropical Grasslands, Savannas and Shrublands ecoregion, as defined by the World Wildlife Fund and described by SEWPaC. The Victoria Bonaparte Bioregion continues into the NT as far as Bradshaw and stretches across northern Australia into northern New South Wales (NSW) (SEWPaC, 2011). Within the Victoria Bonaparte Bioregion the vegetation over lowland parts of the survey area has been mapped as 'Tussock grasslands' while upland areas come under 'Tropical Eucalyptus woodland/grasslands'. Tussock grasslands covered an estimated 631,088ha (8.7%) of the bioregion prior to European settlement. By 1997 this area was little changed at 631,032ha (8.7%). Tropical Eucalyptus woodland/grasslands covered an estimated 4,696,792ha (64.6%) of the bioregion prior to European settlement. By 1997 this area had been slightly reduced to 4,678,368ha equating to 64.4% (Australian Government, 2011).

4.3.2 Vegetation Communities

The Level 2 flora and vegetation assessment undertaken by Animal Plant Mineral (APM) in 2011 identified that vegetation units within the Project area encompass a range of community types related to landscape, soils and disturbance. Eight vegetation units were recognised, including one forest, one shrubland and six woodland units. The condition of the vegetation within the survey area ranged from Excellent to Completely Degraded. The main impacts were from weeds, grazing, old earthworks and vehicular disturbance. In total, 31 introduced (weed) species were identified during the survey including three that are listed by the Department of Agriculture and Food as Declared Plants for the Shire of Wyndham-East Kimberley (SWEK).

The Kimberley has 11 recognised Threatened Ecological Communities (TECs); the vegetation within the survey area does not resemble any of these. There are 16 Priority Ecological Communities (PECs) listed for the Kimberley region. The project tenements support two areas that may be classified as the 'Monsoon vine thickets of limestone ranges' which are a Priority 1 PEC; these areas will not be disturbed as they occur within the development exclusion zone.

4.3.3 Flora

A total of 334 taxa (species, subspecies and varieties) from 69 families and 201 genera were recorded in the Project area by the 2011 APM survey. Representation was greatest among the Fabaceae (53 taxa), Poaceae (52 taxa), Cyperaceae (24 taxa) and Malvaceae (22 taxa) families.

The survey did not find any plant taxon gazetted as Declared Rare Flora (DRF) species, pursuant to the *Wildlife Conservation Act 1950* (WA) (*Wildlife Conservation Act*), or listed as 'Threatened' under Schedule 1 of the *EPBC Act*.

Eighteen flora of conservation significance are known to occur within Sorby Hills tenements M80/197 and M80/286, these species are listed in Table 4-2.

Table 4-2: Taxa of Conservation Significance with their Priority Ranking within the West Australian Flora (Florabase 2011). P = Priority, PNT = Possible New Taxa, RE = Range Extension

Taxa	Conservation Significance Ranking
Croton arnhemicus	P1
Diospyros calycantha	P1
Fimbristylis pachyptera	P1
Goodenia sp. cf. brachypoda	P1
Goodenia byrnesii	P1
Goodenia durackiana	P1
Goodenia malvina	P1
Hydrolea zeylanica	P1 / RE
Jacquemontia sp. Keep River (J.L. Egan 5051)	P1
Polygala sp. Rhianthoides shoulders (M.H. Andrews 398)	P1
Fimbrisylis laxiglumis	P2
Minuria macrorhiza	P2
Eragrostis schultzii	P3
Fimbristylis aff. *Carolinii*	PNT
Fimbristylis cf. *dichotoma* (desert form)	RE
Hibiscus aff. *Calcicola*	PNT
Polygala triflora	PNT
Spermacoce aff. *leptoloba*	PNT

4.3.4 TERRESTRIAL FAUNA

During 2011 APM carried out Level 2 terrestrial fauna, ornithological and echolocation assessments of the Project area. A number of other fauna surveys have been conducted in the Project area and in the surrounding Weaber and Knox Creek plains in 2009 by APM and other consultants in 2005 and 1996. The results of all these surveys have been integrated into the analysis of the fauna values of the Sorby Hills Project.

A total of eight non-volant mammal, 15 amphibian and 25 reptile species were recorded from the Project area. Additionally, the echolocation survey identified ten bat species and the bird survey recorded a total of 113 species in the area.

The current survey at Sorby Hills and previous surveys in the local region reveal that 12 recorded terrestrial fauna species are listed under the following three ranks of conservation significance:

1. *EPBC Act 1999* or *Wildlife Conservation Act 1950*
2. DEC Priority Fauna
3. Local or Regional Significance

Three non-volant species were listed under the first two ranks of conservation significance. These species are:

- Freshwater Crocodile, *Crocodylus johnstoni* – Other Matters *EPBC* and *WC Act*
- Short-tailed Mouse, *Leggadina lakedownensis* – Priority 4
- *Cryptoblepharus exochus* – Priority 4

All of these species have the potential to occur within the Project area. The invasive Cane Toad was also recorded in the area.

The results of the ornithological surveys found the following *EPBC Act* species of conservation significance within the Project area:

- Cattle Egret – Migratory (wetland/marine)
- Eastern Great Egret – Migratory (wetland/marine)
- Gouldian Finch – Endangered, Migratory (terrestrial)
- Rainbow Bee-eater – Migratory (terrestrial)
- Magpie Goose – Other Matters (marine)

4.3.5 SUBTERRANEAN FAUNA

A desktop compilation of previous troglofauna records was conducted over an area that included the extensive floodplains on which the proposed Project area is located. The results identified a moderately rich array of troglofauna species in this broad area and none of these troglofauna species are listed as specially protected under either Commonwealth or Western Australian legislative or policy frameworks.

Furthermore, the desktop survey revealed that no troglofauna species have been previously collected from within the Sorby Hill tenements (M80/197 and M80/286). In the area of proposed mining the occurrence of very fine grained alluvial sediments which are unlikely to contain extensive interconnected voids, the generally shallow water table and likely seasonal inundation suggest that there is no suitable habitat and therefore it is unlikely that troglofauna even occur in the Project area.

Desktop surveys did reveal the potential presence of stygofauna, and as such a stygofauna survey was conducted within tenements M80/197 and M80/286 in 2011. This survey identified the presence of ten species. All of the species were new to science and therefore none are currently listed as specially protected under either Commonwealth or Western Australian legislative or policy frameworks.

Of the ten species, all but one (*Ostracoda* sp. A), was collected outside of the proposed impact area. This individual was collected as a single valve and is considered to be a surface water species with a range likely to be orders of magnitude greater than the predicted impact area. *Ostrocoda* sp. A was identified to the highest possible current known taxonomic level by Dr Stuart Halse, who is recognised as Australasia's leading Ostracod taxonomist. Further consideration of this species is possible, however, the specimen was not a 'whole animal' and the world expert on Ostracods, Dr Koen Martins, would be unlikely to contribute further to the taxonomic resolution of this species (pers comm. Dr Stuart Halse).

It is considered that the localised impact of mining in the Sorby Hills Project is unlikely to threaten the persistence of any stygofauna species.

4.4 Social Environment

4.4.1 Existing Land Uses

Tenements related to the Sorby Hills Project Mine Site lie to the south-east of the currently proposed Ord Irrigation Expansion Project Stage Two and are situated on unallocated Crown Land; this land was previously covered by a pastoral lease and is currently stocked under a grazing permit issued by the Department of Regional Development and Lands. Prior to the commencement of mining activities, the grazing licence will be rescinded and the land de-stocked.

The town of Kununurra is the closest township to the Sorby Hills project, being 50km south-west of the site by road; another significant community in the region is Wyndham which is approximately 160km north-west of Sorby Hills. There are a further 42 small Indigenous communities in the region.

The nearest farming location is 21km to the south west of the proposed mining project.

4.4.2 Aboriginal Heritage and Native Title

The Project site lies within the traditional lands of the Miriuwung Gajerrong people. Although the Sorby Hills tenements pre-date the *Native Title (State Provisions) Act 1999*, a Heritage Protection Agreement was developed between the previous owners of the Sorby Hills tenements and the Miriuwung Gajerrong Corporation (MG Corp). As part of this agreement SMPL will develop a Memorandum of Understanding (MOU) with the MG Corp.

The Department of Indigenous Affairs (DIA) Heritage Register identifies five sites that lie wholly or partly within the Sorby Hills tenement areas. Of these registered sites, only the buffer zone of Site 15427 (Jingil Complex) is intersected by the northern edge (approximately 300m) of the relevant tenements (M80/197 and M80/286).

Ethnographic and archaeological surveys have been conducted of the areas proposed to be impacted by the Sorby Hills Project. These surveys were conducted with the full participation of the Miriuwung Gajerrong people. In consultation and discussion with the Mirriuwung Gajerrong people the disturbance boundary for the project footprint was moved to exclude a small limestone hill. As a result of this boundary change, the Traditional Owners and MG Corporation advised that they approved the development of the mine within the new boundary area. No archaeological material was collected in the areas inspected during this survey

4.5 Wyndham Port

4.5.1 Regional Setting

Wyndham Port is situated on the eastern bank of the West Arm Estuary of the Cambridge Gulf and is approximately 100km from Kununurra by road.

The Cambridge Gulf supports habitats such as mudflats, marshes and mangrove stands. The tidal pattern at Wyndham is fortnightly with Spring tides occurring every 14 days at the new and full moons and neap tides occurring every 14 days at the half moon. The highest astronomical tide (HAT) ever recorded at Wyndham is 8.7m.

Mapping for the IBRA programme also placed the Wyndham Port area in the Victoria Bonaparte Bioregion.

4.5.2 MARINE AND INTERTIDAL FAUNA

The waters around Wyndham Port have a high turbidity which limits the number of species that can utilise the local marine environment. A review of the Commonwealth and Western Australian legislation in conjunction with database searches showed that 36 protected species had the potential to occur in the area. Of these, only 16 have actually been recorded.

The local marine and intertidal fauna can generally be divided into four distinct communities:

- ***Marine community:*** These species spend the majority of their life in the water column and mostly include a diverse fish community and marine mammals and reptiles. The Green Turtle is a protected species under Commonwealth legislation and has been recorded in the vicinity of the Port.
- ***Mudflat community:*** These species feed on the exposed mudflat and either move inland or into the water column when the mudflat is submerged. This community mostly includes shorebirds, egrets, crabs and mudskippers. Three protected species have been recorded within this habitat; these are the Eastern Great Egret, Eastern Curlew and White-bellied Sea-eagle.
- ***Mangrove community:*** These species utilise the mangrove habitat at low tides when the mud underneath is exposed and include mangrove specialist birds, mangrove snakes, Saltwater Crocodile, Water Rat, crabs and fish. Four protected species could potentially utilise this habitat, these are the Rufous Fantail, Rainbow Bee-eater, Water Rat and Saltwater Crocodile.
- ***Grassland and low shrubland community:*** This is an incredibly varied community and consists of many bird, reptile and small mammal species. Four protected species that utilise this particular habitat have been recorded within a 20 km radius of Wyndham Port; these are the Bush Stone-Curlew, Flock Bronzewing, Gouldian Finch and Pictorella Mannikin.

4.5.3 CONTAMINATED SITE STATUS

Wyndham Port is currently listed as a site with potential contamination under the *Contaminated Sites Act 2003.* This classification relates to the area surrounding an old nickel, lead and zinc transit shed at the Port. The shed is not located in the vicinity of the areas which will be utilised by SMPL for the Sorby Hills Project. Nickel, lead and zinc levels at the Port are currently below those that relate to industrial land use however, SMPL may conduct sampling prior to the commencement of export for the Project to establish baseline conditions.

5 POTENTIAL ENVIRONMENTAL IMPACTS AND MANAGEMENT RESPONSES

5.1 IDENTIFICATION OF POTENTIAL ENVIRONMENTAL ISSUES

An assessment of the potential environmental impacts associated with the proposal using available survey data and Proposal information identified the following key potential issues and related impacts:

- ***Flora and Vegetation:*** The Proposal will require the clearing of approximately 767.25ha of native vegetation. There are several species of Priority flora, possible new species, flora at possible range extensions and a PEC that are known to occur within tenements M80/197 and M80/286. No DRF have been recorded from the site.

- ***Terrestrial Fauna:*** The Proposal will involve the clearing of vegetation and landforms that provide fauna habitat. There is the potential for fauna species of conservation significance to be affected by habitat removal including the *Cryptoblepharus exochus,* Short-tailed Mouse, Gouldian Finch and Rainbow Bee-eater. The creation of an artificial wetland will attract migratory bird species. The wetland will be filled by pit dewatering; as such the water has the potential to contain elevated levels of lead and zinc. The quality of the water entering the wetland will be monitored; if the water quality is unsuitable it will be diverted to the evaporation pond. A plant community will be established in the wetland to enhance phytostabilisation of any potential metals in the water. The artificial wetland will provide a breeding area for the invasive Cane Toad. However, given the proliferation of naturally occurring water in the Kununurra area and the increase in year round surface water due to the water carrying channels and consistent irrigation of Ord stage 2, it is not envisioned that the artificial wetland will significantly add to the Cane Toad population of the area. No successful method of eradication has yet been developed however SMPL can contribute to Cane Toad management by providing quantitative data at a site specific level over a reasonable long period of time. These data may then be used by research groups that are actively working on Cane Toad control on a regional scale.

- ***Subterranean Fauna:*** Impacts could potentially occur through loss of habitat due to excavation of ore and/or alterations to habitat due to dewatering activities, however a subterranean fauna survey carried out for SMPL found that troglofauna species are unlikely to occur in the area of proposed mining and that the localised impact of mining in the Sorby Hills Project is unlikely to threaten the persistence of any stygofauna species.

- ***Conservation Areas:*** The Project could potentially impact the proposed Goomig Conservation Park as it is situated immediately adjacent to the Project area; however a self-imposed development exclusion boundary has been placed to provide a buffer between the proposed conservation reserve and the Project area.

- ***Surface Water:*** No significant drainage systems occur within the proposed Project area. There may be minor impacts to infrastructure from flooding and to surface water flow as a result of localised modifications to flow paths for protection of infrastructure, additional water input from dewatering and the creation of an artificial wetland. Storm and waste water is not anticipated to result in detrimental contamination of nearby waterways as appropriate management will be implemented throughout the life of the project.

- ***Groundwater:*** Mining will occur below the water table and as such there may be potential impacts to the regional aquifer as a result of dewatering activities lowering the water table.

There may also be impacts to the surrounding water system from the disposal of excess water. Project activities are not anticipated to result in detrimental contamination of groundwater as appropriate management will be implemented throughout the life of the project.

- ***Marine Environment:*** Quality of marine water in the Cambridge Gulf could potentially be impacted through spillage of concentrate or fugitive concentrate dust escape during ship loading. This in turn could result in impacts on marine flora and fauna utilising the marine habitat. Project activities are however not expected to result in contamination of the marine environment due to the container loading system that will be utilised and environmental management measures that will be in place at the Port. A similar containerised system is currently utilised for the export of nickel concentrate at Wyndham Port and is used at other Australian Ports such as Adelaide and Darwin. The system has been operational at Wyndham Port for the past 12 months and no dust issues have been experienced to date.

- ***Concentrate:*** Potential exposure of Site and Port personnel, members of the public and the environment to concentrate or fugitive concentrate dust containing Silver, Lead and Zinc during processing and transportation.

- ***Mineral Waste and Tailings Storage:*** Potential contamination of soils and water resources through adverse geochemical or acid rock drainage (ARD) or from inappropriate construction or management of the TSF. Geochemical characterisation has identified that source materials and mining by-products have a low potential for either acidic or neutral mine drainage and that the majority of waste rock and tailings can be classified as non-acid forming (NAF) with a low potential to produce ARD. However there is a localised presence of potentially acid forming (PAF) materials within the proposed mine voids. Consideration for alkaline conditions will be incorporated into the PER.

- ***Non-mineral Waste:*** The generation and storage of non-mineral wastes (including putrescible waste, hydrocarbons and hazardous materials) could adversely affect faunal habitats and lead to contamination of soils and/or water resources, if inappropriately managed. This is not anticipated to occur at the Project as management will be in accordance with relevant standards and regulations.

- ***Emissions:*** Dust, noise, vibration, greenhouse gases, light and odour emissions may be generated throughout the life of the mine. This may lead to occupational health and safety impacts for the workforce on site and at Wyndham Port, as well as fauna and vegetation on Site and in the immediate vicinity. Emissions associated with transport activities may also impact the communities of Kununurra and Wyndham.

- ***Aboriginal Heritage:*** There should be no disturbance to sites of Aboriginal Heritage Significance as no sites have been identified within the Project area. The development of the mine has been approved by the Traditional Owners and MG Corporation.

- ***Closure and Rehabilitation:*** The Proposal will result in a modified post-closure landscape that will need to be decommissioned and rehabilitated to a stakeholder acceptable standard. Considerations for closure and rehabilitation will need to be ongoing throughout the life of the proposal.

5.2 Proposed Environmental Management Responses

SMPL aims to conduct business in an efficient and environmentally responsible manner that meets the expectations of shareholders, regulatory authorities and the community. SMPL acknowledge that some environmental impacts may occur during construction and operations at the Sorby Hills Project Mine Site; as a result a number of measures will be adopted to mitigate or minimise any environmental impacts associated with the Project.

SMPL is committed to protecting the environment in accordance with the KBL Environmental Policy and key strategic documents that will include the Sorby Hills Project PER document, Mining Proposal and Environment Management Plans (EMP). This commitment encompasses not only compliance with all applicable laws and regulations, but also encouraging employees, contractors and suppliers to exercise exemplary environmental practices.

SMPL will develop a Safety, Health, Environmental and Community Management System (SHECMS) to ensure environmental management is effectively integrated into operations and that planning, implementation and review processes achieve continuous improvement. This SHECMS will be developed in accordance with the principles of Australian Standard/New Zealand Standard (AS/NZS) International Organisation for Standardisation (ISO) 14001:2004 and AS/NZS 4801:2001, and will provide a structured approach to environmental management across the site.

The environmental aspects of the Project during the construction phase are proposed to be managed in accordance with the Sorby Hills Construction Environment Management Plan (CEMP). Implementation of the CEMP will ensure that the Proposal is constructed in accordance with legislative requirements and that all internal and external environmental objectives and obligations are met.

The operation of the Project will be primarily managed through an Operational Environment Management Plan (OEMP). Implementation of the OEMP will ensure that the Project meets all its environmental obligations including internal objectives, legislation regulations and conditions of approval relating to the Project. The OEMP will comprise a series of environmental management strategies that will address the key environmental risks and impacts identified in Section 5.1. Each strategy will describe measures to be applied to avoid and minimise the environmental impact of the Project and will include contingency measures to mitigate accidental impact. The OEMP will be a dynamic document that will be regularly reviewed and updated to maintain relevance.

A Mine Closure Plan (MCP) will be developed to address potential long term/permanent impacts of the Project. The MCP will be regularly reviewed and revised throughout the life of the Project to allow for incorporation of new information. The MCP will consider the Department of Mines and Petroleum (DMP)/EPA 'Guidelines for Preparing Mine Closure Plans' (June 2011).

Additional information relating to the management responses for the potential environmental impacts is provided in Section 7.

5.3 Environmental Offsets

As part of the PER process the Project will be assessed to determine whether there will be significant adverse residual impacts that need offsetting following development, operations and closure.

EPA Guidance Statement No. 19: Environmental Offsets – Biodiversity and Position Statement No. 9: Environmental Offsets will be considered as part of this process and the 'Environmental Offsets Reporting Form' will be completed and included in the PER documentation.

5.4 PRINCIPLES OF ENVIRONMENTAL PROTECTION

Section 4A of the *Environment Protection Act (1986)* establishes five principles of environmental protection, which has been expanded upon in EPA Position Statement Number 7, 'Principles of Environmental Protection'. Table 5-1: Consideration of the Principles of Environmental Protection summarises how these principles will be considered with respect to the Sorby Hills Project proposal.

Table 5-1: Consideration of the Principles of Environmental Protection

Principle	Relevant	Consideration
The Precautionary Principle Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In application of the precautionary principle decisions should be guided by: a) Careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and b) An assessment of the risk with weighted consequences of various options	Yes	SMPL will conduct a thorough risk assessment for the Sorby Hills Project to ascertain the potential issues and risks. The risk assessment process will include the development of comprehensive management actions to mitigate those issues and risks identified.
The Principle of intergenerational equity The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.	Yes	To ensure that the Project is managed sustainably an environmental impact assessment will be carried out.
The principle of the conservation of biological diversity and ecological integrity Conservation of biological diversity and ecological integrity should be a fundamental consideration.	Yes	Biological studies have been undertaken to assess the ecological value of areas which could be impacted by the Project. A development exclusion zone has been self-imposed by SMPL to protect foothills habitat and further environmental management strategies will be included into the OEMP as required.
Principles relating to improved valuation, pricing and incentive mechanisms a) Environmental factors should be included in the valuation of assets and services b) The polluter pays principle – those who generate pollution and waste should bear the cost of containment, avoidance or abatement c) The users of goods and services should pay prices based on the full life cycle costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any wastes d) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, which enable those best placed to maximise benefits and/or minimise costs to develop their own solutions and responses to environmental problems.	Yes	Environmental management costs for the life of the Project have been taken into consideration and accepted by SMPL. SMPL recognises the 'polluter pays' principle and will design the project to ensure that pollution impacts are avoided as far as practicable.
The principle of waste generation All reasonable and practicable measures should be taken to minimise the generation of waste and its discharge into the environment.	Yes	SMPL plans to employ the 'Reduce, Reuse, Recycle and Recover' principles to minimise waste disposal requirements at the Sorby Hills Project. Environmental management strategies relating to waste management and minimisation will be included into the OEMP.

6 SCOPE OF WORKS FOR PUBLIC ENVIRONMENTAL REVIEW

6.1 FAUNA, FLORA AND VEGETATION

Level 2 terrestrial fauna, ornithological and echolocation assessments have been undertaken for the Sorby Hills Project area. The assessments were designed in accordance with EPA Guidance Statement No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (2004) and Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (2002). A second ornithological survey was undertaken to sample migratory bird species at the end of the dry season, to augment the surveys undertaken at the end of the wet season.

The terrestrial fauna survey was undertaken over three phases to adequately sample the terrestrial vertebrate fauna over the changing seasons. The first survey occurred immediately after the cessation of wet season rainfall in early April when the majority of the Project area was still flooded. The second survey occurred in mid-May and the final survey was completed in early June when rainfall had ceased completely, the Project area had become dry and the temperature and relative humidity had fallen significantly. All terrestrial vertebrate surveys were undertaken by expert zoologist Dr Mitch Ladyman. Dr Ladyman has undertaken numerous surveys over the Project area and areas immediately adjacent in 1996, 2009 and 2011.

A total of 23 systematic fauna survey sites were established, with their locations selected based on available habitat, potential mining impact, soil and vegetation types, accessibility and the species likely to be present. Some sites were sampled on more than one occasion with the method of sampling differing over the different phases of the survey. Table 6-1: Terrestrial Fauna Survey Effort presents the total fauna trapping survey effort from April to June 2011.

Table 6-1: Terrestrial Fauna Survey Effort

Standard Trapping Array									
Trap Site and Phase	*Start Date*	*Finish Date*	*Number of Nights*	*Trap Type and Number*					*Total Trap Nights*
				Cage	*Box*	*Pit*	*Turtle*	*Funnel*	
KML Site 1 (Phase I)	17-Apr	21-Apr	4					16	64
KML Site 2 (Phase I)	17-Apr	21-Apr	4					16	64
KML Site 3 (Phase I)	17-Apr	21-Apr	4					9	36
KML Site 4 (Phase I)	18-Apr	21-Apr	3					16	48
KML Site 5 (Phase I)	18-Apr	21-Apr	3					16	48
KML Site 6 (Phase I)	18-Apr	21-Apr	3					16	48
KML Site 7 (Phase I)	19-Apr	21-Apr	2					16	32
KML Site 2 (Phase II)	10-May	18-May	8			7		16	184
KML Site 3 (Phase II)	10-May	18-May	8			7		16	184
KML Site 4 (Phase II)	10-May	17-May	7			7		16	161
KML Site 6 (Phase II)	10-May	17-May	7			7		16	161
KML Site 7 (Phase II)	10-May	18-May	8			7		16	184
KML Site 8 (Phase II)	10-May	18-May	8			6		16	176
KML Site 8 (Phase II - additional traps)	15-May	18-May	3		20				60

Standard Trapping Array									
Trap Site and Phase	***Start Date***	***Finish Date***	***Number of Nights***	***Trap Type and Number***					***Total Trap Nights***
				Cage	***Box***	***Pit***	***Turtle***	***Funnel***	
KML Site 9 (Phase II)	10-May	17-May	7			7		14	147
KML Site 10 (Phase II)	10-May	17-May	7			7		16	161
KML Site 11 (Phase II)	11-May	18-May	7					14	98
KML Site 11 (Phase II - additional traps)	15-May	18-May	3		20				60
KML Site 12 (Phase II)	14-May	18-May	4		20				80
KML Site 12 (Phase III)	30-May	3-Jun	4		20				80
KML Site 13 (Phase II)	14-May	18-May	4		40				160
KML Site 13 (Phase III)	30-May	3-Jun	4		40				160
KML Site 14 (Phase III)	30-May	3-Jun	4	30					120
KML Site 15 (Phase III)	30-May	3-Jun	4	20					80
KML Site 16 (Phase III)	30-May	3-Jun	4	30					120
KML Site 17 (Phase III)	30-May	3-Jun	4	8					32
KML Site 18 (Phase I)	17-Apr	21-Apr	4				5		20
KML Site 19 (Phase I)	17-Apr	21-Apr	4				2		8
KML Site 18 (Phase II)	14-May	18-May	4				2		8
KML Site 19 (Phase II)	14-May	18-May	4				2		8
KML Site 18 (Phase III)	30-May	3-Jun	4				2		8
KML Site 19 (Phase III)	30-May	3-Jun	4				2		8
KML Site 20 (Phase II)	14-May	18-May	4				5		20
KML Site 20 (Phase III)	30-May	1-Jun	2				5		10
KML Site 21 (Phase III)	1-Jun	3-Jun	2				5		10
KML Site 22 (Phase III)	1-Jun	3-Jun	2				5		10
KML Site 23 (Phase III)	30-May	3-Jun	4		20				80
Total			***166***	***88***	***180***	***55***	***35***	***245***	***2938***

The ornithological field surveys at Sorby Hills were undertaken from 16 - 21 April 2011 and from 27 - 30 November 2011. A systematic survey was conducted in April, whereby the ornithologist conducted surveys on five sites representing similar habitat. Surveys lasted 20 minutes, covered 2.5ha and were repeated five times at different hours during the day. These surveys were designed to enable comparison with similar surveys conducted in the buffer zone of Weaber Plain and at Parry Lagoons and enable an assessment of the quality of avifauna habitat the Sorby Hills area provided, relative to neighbouring areas already set aside for conservation purposes.

Additionally, during both April and November, opportunistic surveys were conducted across all habitat types at Sorby Hills. Surveys commenced half an hour before sunrise and proceeded throughout the day. A number of nocturnal surveys were conducted to augment the diurnal surveys. A total of 42 hours was spent conducting surveys. Ornithological surveys were undertaken by Kimberley region expert ornithologists, George Swann and Dr Steve Reynolds, of Charles Darwin

University. Both ornithologists had surveyed the project area in previous years and were familiar with the expected and observed avifauna assemblages.

An echolocation survey for bats was conducted from 17-20 April and 14-16 May 2011. Two Anabat II recorders were positioned in three areas where bats were expected to occur; the foothills of the Sorby Hills, a limestone rise on the floodplain and along a creek line. Recordings lasted between one and three days. The recordings were analysed by Robert Bullen, a regional bat expert. Mr Bullen has undertaken numerous surveys in the local area in association with the Department of Environment and Conservation's Mr Norm McKenzie with both scientists recently publishing on biodiversity values of Kimberley bats in Records of the Western Australian Museum.

Initially, a desktop study was conducted for subterranean fauna to establish their presence in the project area. A 100km by 100km area was covered in the study. The lack of troglofauna specimens and suitable habitat within the Project area suggested that significant troglofauna communities were unlikely to occur. The desktop study did reveal a moderately diverse array of stygofauna species and a two-phase stygofauna survey was conducted between August and November 2011, with 41 impact and 40 reference samples being collected.

Stygofauna sampling followed the methods recommended by the EPA Guidance Statement 54a (Draft): Sampling Methods and Survey Considerations for Subterranean Fauna in Western Australia (2007). At each bore, six net hauls were collected using weighted plankton nets; three hauls with a 50µm mesh net and three with a 150µm mesh net. After the net was lowered to the bottom of the bore it was jerked up and down briefly to agitate benthic stygofauna into the water column prior to slowly retrieving the net. Contents of the net were transferred to a 125ml polycarbonate vial after each haul and preserved in 100% ethanol. Nets were washed between bores to minimise contamination between sites. Each set of six hauls from a single bore made on the same day were combined as a single sample. The sampling, analysis and reporting were all undertaken by subterranean fauna experts at Bennalongia Pty Ltd.

In addition to the surveys completed, a quantitative evaluation of the regional, local and project specific impacts to fauna habitats will be undertaken and an assessment will be carried out to determine whether the creation of the permanent surface water bodies at the Project will result in a significant difference to Cane Toad populations. It is not expected that the Project will significantly contribute either a regional or local difference in Cane Toad populations as large amounts of permanent surface water such as the ORIA irrigation channels and Lake Argyle, in addition to large seasonal waterlogged areas of the floodplain, exist in the area providing ample ideal Cane Toad habitat.

The likelihood of short range endemic invertebrate fauna occurring in the project area was considered in accordance with EPA Guidance Statement 20: Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia (2009). A broad habitat assessment conducted at the inception of the Project showed that the area could be divided into two habitat types; the upland sandstone of the Sorby Hills and the cracking clay floodplain of the Knox Creek Plain. The only fragmented habitat present in the Project area is two isolated patches of monsoon vine thicket in the Sorby Hills and the development zone is designed in such a way as to leave the sandstone hills and the monsoon vine thickets undisturbed. The development zone will occur on the dominant habitat type of the area, the cracking clay floodplain. This habitat is continuous both to the east, north and south of the Project area. Additionally, the development zone does not intersect any creek lines or limestone outcrops. Due to this obvious lack of discontinuous or disjunct fauna habitat types that may promote endemism it was determined that no survey work for short range endemic invertebrate fauna was required. This approach was

discussed and approved by the DEC Environmental Management Branch in March, 2011 (pers comm. Brad Durrant).

A Level 2 flora and vegetation assessment has been carried out for the proposed Project area, this assessment included priority flora searches, an inventory of species and mapping of flora and vegetation of conservation significance. This assessment was undertaken in accordance with EPAs guidelines for flora surveys as outlined in Guidance Statement No. 51: Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia (2004) and Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (2002).

The flora fieldwork was undertaken from the 10th to the 17th of May 2011, and the 26th of May to the 3rd of June 2011 with 43 sampling sites being assessed by Dr Chris Hancock. Dr Hancock is a senior botanist with more than 10 years' experience and has undertaken a number of Kimberley botanical surveys in that time. The taxonomy and status of all plant taxa collected was determined by noted expert Kimberley botanist Dr Russell Barrett.

Prior to commencing the fieldwork, most sampling points were selected based on aerial photographs supplied by SMPL such that the entire study area and all structural vegetation types were covered. Some points were moved during the course of the study and extra sites were added in order to better sample certain vegetation types.

Each sampling site consisted of a 50m x 50m quadrat, except where plant communities were restricted to narrower areas such as drainage lines or ridge tops. At each sampling location the following details were recorded:

- soil type and colour
- geographic co-ordinates (GDA94, MGA Zone 52L)
- percentage litter cover
- percentage bare ground
- amount and type of any outcropping
- landscape unit
- aspect
- time since fire
- height and percentage cover of each stratum
- height and percentage cover of each vascular plant species
- vegetation condition according to the modified Keighery scale

Plants with unknown or uncertain identities were collected and pressed on site; these plants were provided to Dr Russell Barret to define their taxonomy and compare his determination with confirmed specimens housed at the Western Australian Herbarium to ensure correct identifications.

A follow up flora survey will be undertaken which will target the flora of conservation significance identified during the initial assessment. The aim of the follow up survey work is to establish representations of populations both inside and outside of the proposed disturbance footprint and provide a quantitative impact assessment at a local and regional level.

The conservation significant flora survey will be conducted shortly after the wet season in 2012. A method of random sampling will be used to audit the population size of each conservation significant taxon occurring within the impact footprint. The method used will be based on the "Random Walk" method as outlined by Kent & Coker (1996). This method is designed to ensure that every point in a designated area of suitable habitat has an equal chance of being chosen.

The survey areas will comprise of 12 randomly selected quadrats of 5x5m. The number of individuals found in the quadrats will be recorded for all conservation significant taxa. Once known populations are assessed for their abundance and distribution, other areas of suitable habitat will be surveyed. Specimen vouchers from each known population and any new populations encountered during the survey will be collected for verification by an expert.

A table will be created to represent the impact of the Project on the local populations of each taxon of conservation significance. A sample table is provided as Table 6-2. The report will also include a detailed discussion of observations and recommendations for the Project.

Table 6-2: Sample Table Representing the Impact of the Project on the Local Populations of each Taxon of Conservation Significance

Taxa/Conservation Code	Mean Density (300m²)	Sample Population Within the Project Area		Sample Population Outside the Project Area/Tenements		Total Sample Population
		Number of Plants	% of Sample Population	Number of Plants	% of Sample Population	

Fauna, Flora and Vegetation survey results, reports and recommendations will be utilised for the environmental protection and management of the Project site and to reduce impacts to the proposed Goomig Conservation Park situated adjacent to the Sorby Hills Project. An assessment of the potential indirect impacts on conservation values such as conservation significant flora, fauna vegetation, habitats and the proposed Goomig Conservation Park will also be undertaken.

6.2 Surface Water

A surface water flow analysis has been carried out for the Project; this analysis will be expanded to further describe surface water flow impacts and patterns within the Project area.

It has been identified that ponding of water is possible in some parts of the Project area during the wet season; this could lead to localised flooding of the proposed site infrastructure. To mitigate this and ensure that access to all areas of the site is maintained, infrastructure situated within the potential flood zone will be raised by 1m. A geotechnical assessment, including designs and plans,

will be carried out for this proposed raised infrastructure, this will also cover an assessment of the materials to be used for construction.

Although no significant drainage systems occur within the Project area there will be a requirement for the localised modification of surface water flow paths for protection of site infrastructure and management of excess water. This will include the construction of diversion channels and flood bunds and the creation of an artificial wetland. A geotechnical assessment, including designs and plans, will be carried out for the proposed diversion channels and wetland. All geotechnical designs and plans for the Project will be based on the DMP requirements of 1:100year, 72 hour rain event. The PER will discuss how the risk of extreme rainfall events has been built into the mine infrastructure design and any contingency actions that will reduce the potential of environmental impacts from these rainfall events.

A surface water monitoring program, designed in accordance with AS/NZS 5667.1:1998 – Standards for Water Quality Sampling, has been established. Monitoring commenced in July 2011 to provide baseline data for the site. The program will be continued upon commencement of construction and throughout operations to provide ongoing monitoring and assessment of surface water quality for the duration of the Project life.

6.3 GROUNDWATER

A hydrogeological assessment has been carried out for the Project; the assessment was prepared in accordance with DoWs Operational Policy No. 5.12: Hydrological Reporting Associated with a Groundwater Licence.

Further assessment will be carried out to determine the potential impacts, risks and constraints on the groundwater regime and to confirm that any groundwater impacts will not extend to the Ord River Irrigation Area (ORIA) or other surrounding water sources. Groundwater investigations will include identification of the potential loss of contaminants from all sources associated with the Project including the TSF, evaporation ponds, landfill and artificial wetland.

It is not anticipated that the Project will impact on groundwater dependant ecosystems. As discussed in Section 4.3.5 it is unlikely that troglofauna will occur in the Project area and stygofauna are not likely to be threatened by the localised impact of the Project. Flora and vegetation can be susceptible to changes in groundwater levels however no impacts are expected as pumping tests indicate that the drawdown extent will be limited to the immediate vicinity of the proposed pits. Additionally the groundwater aquifer that will be intersected by the mine development is recharged by rainfall and hence is not susceptible to significant depletion.

A groundwater monitoring program, designed in accordance with AS/NZS 5667.1:1998 – Standards for Water Quality Sampling, has been established. Monitoring commenced in July 2011 to provide baseline data for the site. This program will be continued upon commencement of construction and throughout operations to provide ongoing monitoring and assessment of surface water quality for the duration of the Project life. Monitoring locations are located within the proposed impact footprint and regionally.

6.4 MARINE ENVIRONMENT

SMPL will commission an assessment of the marine habitats and species of flora and fauna known to occur in the region by means of a desktop analysis and consultation with relevant local experts where required. A risk assessment of the potential direct and indirect impacts of the proposed operations at the Wyndham Port facility on the local marine environment will also be conducted. If

the desktop assessment of the risk to the marine environment, including marine fauna, is determined to be significant field surveys will be undertaken.

A Port EMP will be developed which will outline the practical implementation of the Environmental Quality Management Framework set out in the *Pilbara Coastal Water Quality Consultation Outcomes* (DoE 2006), *State Water Quality Management Strategy* (Government of Western Australia 2004) and *State Environmental (Cockburn Sound) Policy* (Government of Western Australia 2005)

6.5 Mineral Waste

Waste material with appropriate physical and geochemical characteristics (e.g. non-acid forming) will be used for infrastructure construction. The majority of waste is anticipated to be consumed during development of infrastructure therefore no designated waste dumps will be required for this Project; if there is excess waste material it will predominantly be used as back fill material into the mine void. Sufficient topsoil, subsoil and excess mine waste of suitable characteristics, will be stockpiled for use in rehabilitation of the TSF.

SMPL will undertake block modelling to determine the total volumes of materials to be mined, including both adverse (physically and chemically) and inert material. A materials balance will be produced to demonstrate use and management of all waste material that will be created by the Project.

A geochemical characterisation of the waste material that will be produced by the Project has been conducted. This characterisation was carried out in accordance with the requirements outlined in the DMP Guidelines document *Mining Proposals in Western Australia*.

The geochemical assessment concluded that localised PAF materials were present in the proposed mine voids, block modelling will be utilised to determine the expected PAF volumes and interception timeframes.

As an environmental management strategy SMPL propose to place all PAF materials below the water table where possible, if this is not possible PAF material will be encapsulated within the pit. Modelling will be required to confirm that these management strategies will be appropriate;

- Void water recovery modelling will be conducted to determine whether PAF material is likely to be water-covered within an appropriate timeframe during mining and continue to be covered post mining. Modelling will also be used to confirm that the pit will not contaminate karst aquifers or overtop during large monsoonal events (i.e. 100 year 72 hour rainfall events)
- Contaminant chemistry modelling of the pit lake will be developed to predict the environmental risks if the cover fails and determine whether any metals with the potential to detrimentally impact on the local aquifers are likely to become concentrated in the pit void following mine closure

In addition to the proposed modelling a supplementary geochemical characterisation report will be produced providing additional information on chemical analysis and an ecotoxicology assessment undertaken to better understand the potential of waste rock to affect receptors within and adjacent to the Project operations.

6.6 Tailings Characterisation and Storage

The geochemical characterisation of the waste material that will be produced by the Project included an assessment of the tailings material; the supplementary geochemical characterisation report will provide further information on tailings characterisation. Further information on the potential effects to receptors posed by the tailings material will be obtained through the ecotoxicological assessment.

A geotechnical assessment, in accordance with the "Safe Design and Operating Standards for Tailings Storage", will be undertaken to provide a detailed design for the TSF and will include a geotechnical assessment of the proposed construction materials. Lining requirements will be determined through assessment of the geochemical nature of the tailings and the receiving environment.

6.7 Non-mineral Waste

Potential non-mineralised waste streams for the Project have been identified; wastes will include putrescible waste, hydrocarbons and minor hazardous materials such as laboratory wastes.

A landfill site for inert and putrescibles waste will be established in accordance with the *Environmental Protection (Rural Landfill) Regulations* 2002. The landfill site for the Project has been selected to reduce any surface and groundwater interactions with waste materials.

A bioremediation facility will be developed for the treatment of any contaminated soils. Design and location plans for this facility will be produced; these plans will consider inundation of the Project area during monsoonal conditions.

Minor hazardous wastes such as laboratory wastes, controlled wastes such as tyres and waste oil and other recyclables will be removed from site by licensed contractors operating from Darwin.

Further details on waste management will be provided in the PER.

6.8 Concentrate

SMPL propose to transport concentrate from the Sorby Hills Site to Wyndham Port via road train. Concentrate will be carried in fully sealed and locked containers designed specifically for the transport of bulk ore. An assessment of the transportation methods and logistics for the Project was undertaken by POAGS Transport Logistics.

Further assessments will be undertaken to determine container construction standards and reliability in the event of haulage truck roll over or other road traffic incident, to assess the potential for the release of fugitive concentrate dust during ship loading and to provide a comparison of shipping methods against current industry standards for lead shipment.

SMPL will also undertake further consultation with Cambridge Gulf Limited with respect to storage facilities and pollution control measures at Wyndham Port, including licensing of port under Part V of the *EP Act*.

6.9 Dust

A dust monitoring program has been established to provide background data for the site, the program has been designed in accordance with *AS/NZS 3580.10.1:2003 – Methods for Sampling and Analysis of Ambient Air: Determination of Particulate Matter – Deposited Matter – Gravimetric*

Method. This sampling will continue throughout the life of the Project as an ongoing assessment for dust emissions.

Wind and climatic data obtained from a weather station within the Sorby Hills Project Area will be analysed to determine wind directions, velocities and patterns which will enable an assessment of the impact on potential dust emissions. In addition a dust assessment will be carried out with the aim of identifying key emission sources, receptors and pathways and the quantity and variability of the potential emissions. This information will enable the development of management plans for dust emissions.

6.10 Other Emissions

Assessments will be undertaken for noise, vibration, greenhouse gases, light and odour. The assessments will enable the identification of key emissions sources, pathways and receptors and include an evaluation of emission levels, where applicable, which will facilitate the development of emission reduction initiatives and management plans.

6.11 Aboriginal Heritage

SMPL previously commissioned a desktop aboriginal heritage assessment, including a search of the DIA Heritage Register, and detailed on-ground archaeological and ethnographic assessments of the Project area; no heritage sites have been identified. A further assessment will be undertaken of the potential impacts to Aboriginal heritage values both in the immediate area and downstream of the Project which may result from dewatering activities. A Cultural Management Plan will also be developed for the Project.

6.12 Rehabilitation and Closure

Closure concepts, financial provisioning, material balances and soils characterisation have been completed for the Project. Further work will be carried out to assess rehabilitation objectives and closure options for the Project, including consideration of PAF and tailings material issues. These closure concepts will be presented in the PER. A full Mine Closure Plan, developed in accordance with EPA/DMP *Guidelines for Preparing Mine Closure Plans* will be submitted to DMP with the Mining Proposal.

7 KEY ENVIRONMENTAL FACTORS FOR THIS PROPOSAL

The key environmental factors identified for the Project are discussed in detail in Section 5. A summary table that identifies the EPA objectives, potential impacts, proposed investigations and management responses for these key environmental factors is presented in Table 7-1: Key Environmental Factors for the Sorby Hills Project. For some factors, specified management strategies may need to be further defined following technical studies and investigations.

Table 7-1: Key Environmental Factors for the Sorby Hills Project

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
Biophysical							
Flora and Vegetation	Within the Victoria Bonaparte Bioregion, with emphasis on the Project area (Sorby Hills and immediate surrounds)	To maintain the abundance, diversity, geographic distribution and productivity of flora at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.	• Establishment of the Project site will require the clearing of approximately 767.25ha of native vegetation. • Several plants of conservation interest are known to be present within the Project area: ▪ Thirteen Priority taxa ▪ Four possible new species ▪ Two plants outside their previous known ranges (one of which is a Priority taxa) ▪ One Priority Ecological Community (Monsoon vine thickets of limestone ranges) • Construction and operation activities have the potential to introduce or spread weeds across the site. • Indirect impacts such as fire and dust.	A Level 2 flora and vegetation assessment including priority flora searches and an inventory of species was undertaken late May to early June 2011 by APM. The field assessment was designed in accordance with EPA Guidance Statement 51 and Position Statement 3.	• Follow up flora assessment including: ▪ Population census of significant flora, detected during the 2011 Level 2 flora survey, occurring inside the impact footprint ▪ Rare flora assessment aimed at detecting and mapping the abundance and distribution of new populations of significant flora, discovered during the 2011 survey, occurring outside the impact footprint ▪ Quantitative impact assessment of flora of conservation significance at a local and regional level. • An assessment of the potential indirect impacts to conservation values such as conservation significant	• Project designed to maximise use of pre-cleared/disturbed areas and minimise clearing of vegetation. • Self-imposed development boundary to minimise impact on flora of conservation significance. • Project design will be refined following additional flora survey work to avoid direct impact to flora of conservation significance where possible. • Weed management and hygiene program will be implemented. The program will adopt the same approach and management strategies as the ORIA project • Clearing controls to be included in EMPs: ▪ Prevention of unauthorised clearing ▪ Ensure all required licences and permits have been obtained prior	*Environment Protection and Biodiversity Act (1999)* *Wildlife Conservation Act (1950)* *Conservation and Land Management Act (1984)* *Environmental Protection (Clearing of Native Vegetation) Regulations 2004* EPA Position Statement No. 2: Environmental Protection of Native Vegetation in Western Australia (2000) EPA Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (2002) EPA Guidance Statement No. 51: Terrestrial Flora and Fauna Surveys for Environmental Impact Assessment in Western Australia (2004)

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
					flora, fauna vegetation, habitats and the proposed Goomig Conservation Park.	to clearing ▪ Adequate marking to ensure only the required clearing undertaken ▪ Stockpiling topsoil and vegetation debris for future use in rehabilitation ▪ Rehabilitation of areas not required for ongoing operations	
Fauna	Within the Victoria Bonaparte Bioregion, with emphasis on the Project area (Sorby Hills and immediate surrounds)	To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.	• Establishment of the Project site will require clearing of fauna habitat. • Death of individual animals due to loss of habitat and/or vehicle movements. • Fauna and avifauna species of conservation significance may potentially occur in the Project area. • Indirect impacts from noise, fire, contaminated surface water (both mine void and artificial wetland).	• Level 2 terrestrial fauna assessment carried out by APM in April and May 2011. The field assessment was designed in accordance with EPA Guidance Statement 56, Position Statement 3 and *EPBC Act* Policy Statement 3.25. • Ornithological assessment describing all avifauna species carried out by APM in April and November 2011 in accordance with EPA Guidance Statement 56. • Echolocation survey to describe bat species present carried out by	• Evaluation of the likely impacts of the creation of a permanent surface water body on Cane Toad populations. This will be included in the Artificial Wetland Environmental Management Plan. • Gouldian Finch Management Plan will include an assessment of the potential impacts and risks to distribution, population and habitat requirements. • Quantitative assessment of the regional, local and project specific impacts to fauna habitats • An assessment of the potential indirect	• Project designed to utilise sites that are already degraded and therefore of lower value for fauna. • Self-imposed development boundary to avoid impacting the most valuable of the fauna habitats in the Project area. • Fauna management to be included in EMPs to address: ▪ Minimising disturbance to fauna habitats where practicable ▪ Weed management and feral animal (including Cane Toads) control to maintain and enhance the condition of fauna habitat and reduce	*Environment Protection and Biodiversity Act (1999)* *Wildlife Conservation Act (1950)* EPA Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (2002) EPA Guidance Statement No. 56: Terrestrial Fauna Surveys for Environmental Impact Assessment in Western Australia (2004) EPA Technical Guide: Terrestrial Fauna Surveys for Environmental Impact Assessment. EPA Guidance Statement

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
				APM in conjunction with Bat Call WA in April – May 2011. This survey was carried out in accordance with EPA Guidance Statement 56.	impacts to conservation values such as conservation significant flora, fauna vegetation, habitats and the proposed Goomig Conservation Park.	predation impacts ▪ Retention of microhabitats and establishment and monitoring of nesting hollows ▪ Litter management and regular landfill covering to discourage feral animal species, which could impact on local native fauna ▪ Ensure habitat preservation is included in training and inductions ▪ If trenching required a zoologist will be present to clear fauna	No. 20: Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia (2009) Draft *EPBC Act* Policy Statement 3.25: *Environmental Protection and Biodiversity Conservation Act 1999* Referral Guidelines for the Endangered Northern Quoll, *Dasyurus hallucatus*, SEWPaC (2011)
Conservation Areas	The proposed Goomig Conservation Park	To protect the environmental values of areas identified as having significant environmental attributes.	The proposed Goomig Conservation Park is immediately adjacent to the Sorby Hills project area.	• Level 2 flora and vegetation assessment undertaken late May to early June 2011 by APM. The assessment was designed in accordance with EPA Guidance Statement 51 and Position Statement 3. • Level 2 terrestrial fauna assessment carried out by APM in April and May 2011. The assessment was designed in accordance	• Follow up flora assessment including: ▪ Population census of significant flora, detected during the 2011 Level 2 flora survey, occurring inside the impact footprint ▪ Rare flora assessment aimed at detecting and mapping the abundance and distribution of new populations of significant flora, discovered during the 2011 survey, occurring	• Results of existing biological surveys can be used to determine the likely effects on the nearby proposed Conservation Reserve. • A self-imposed development exclusion boundary provides a buffer between the proposed conservation reserve and the project area. • Development of EMPs to address the management of weeds, priority species,	*Environment Protection and Biodiversity Act (1999)* *Wildlife Conservation Act (1950)* *Conservation and Land Management Act (1984)* *Environmental Protection (Clearing of Native Vegetation) Regulations (2004)* EPA Position Statement No. 2: Environmental Protection of Native

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
				with EPA Guidance Statement 56, Position Statement 3 and *EPBC Act* Policy Statement 3.25. • Ornithological assessment describing all avifauna species carried out by APM in April and November 2011 in accordance with EPA Guidance Statement 56. • Echolocation survey to describe bat species present carried out by APM in conjunction with Bat Call WA in April – May 2011. This survey was carried out in accordance with EPA Guidance Statement 56.	outside the impact footprint • Evaluation of the likely impacts of the creation of a permanent surface water body on cane toad populations. This will be included in the Artificial Wetland Environmental Management Plan. • An assessment of the potential indirect impacts to conservation significant flora, fauna vegetation, habitats and the proposed Goomig Conservation Park. • Quantitative assessment of the regional, local and project specific impacts to fauna habitats	feral animals (including Cane Toads) and emissions across the site to reduce potential impacts to the adjacent proposed Conservation Reserve.	Vegetation in Western Australia (2000) EPA Position Statement No. 3: Terrestrial Biological Surveys as an Element of Biodiversity Protection (2002) EPA Guidance Statement No. 51: Terrestrial Flora and Fauna Surveys for Environmental Impact Assessment in Western Australia (2004)
Subterranean Fauna (Stygofauna and Troglofauna)	Areas within the Project Site that are subject to below ground level disturbance and the Project's zone of	To maintain the abundance, diversity, geographic distribution and productivity of fauna at species and ecosystem levels through the avoidance or	• Loss of subterranean fauna habitat through the excavation of ore in the mining process. • Impacts from dewatering activities may occur across the area of potential water drawdown.	A troglofauna desktop survey and a field survey of stygofauna at an intensity to meet the recommendations of EPA Guidance Statement 54a was undertaken by Bennelongia Pty Ltd in September and November 2011.	Finalisation of subterranean fauna report by Bennelongia Pty Ltd based on desktop and field survey work that has already been undertaken.	• Development of EMPs to address minimising impacts to subterranean fauna populations by restricting mine pit disturbance areas where possible.	EPA Guidance Statement No. 54: Consideration of Subterranean Fauna in Groundwater and Caves during Environmental Impact Assessment in Western Australia (2007) EPA Guidance Statement No. 54a (Draft): Sampling

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
	hydrological influence.	management of adverse impacts and improvement in knowledge.					Methods and Survey Considerations for Subterranean Fauna in Western Australia (2007)
Surface Water Quantity	The Project Site and immediate surrounds	To maintain the quantity of water so that existing and potential environmental values, including ecosystem maintenance, are protected.	• No significant drainage systems occur within the proposed Project Area; Border and Knox Creeks are located 3.5km to the north and south respectively, and the Keep River is situated 4.6km to the south-east. • There may be minor impacts to surface water flow as a result of: ▪ localised modification of flow paths (i.e. diversion channels and flood bunds) to protect site infrastructure ▪ additional water input from dewatering activities ▪ the creation of an artificial wetland	Sorby Hills Deposit Surface Flow Analysis carried out by Soil Water Consultants in December 2011.	• Expand current surface flow analysis report to further describe surface water flow impacts and patterns. • Geotechnical assessment, designs and plans for raised infrastructure. This will include an assessment of the materials to be used in construction. • Geotechnical assessment, designs and plans for the artificial wetland. The artificial wetland design will be influenced by the requirements of the expected bird population • Geotechnical designs and plans will be based on the DMP requirements of 1:100yr, 72hour rain event. • The PER will discuss how the risk of extreme rainfall events has been	• Development of EMPs to address interactions between natural surface water drainage and the mining operations, this will include standard management practices such as flood bunds, drains and sediment traps • To mitigate against flooding and maintain access to all areas of the Project site, infrastructure situated in areas where ponding of water is likely will be raised to a height of 1m • Creation of an artificial wetland to contain diverted runoff and excess water from dewatering activities	Environmental Water Provisions Policy for Western Australia: State-wide Policy No. 5, Water and Rivers Commission (2000) *Rights in Water and Irrigation Act (1914)*

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
					built into the mine infrastructure design and any contingency actions that will reduce the potential of environmental impacts from these rainfall events		
Surface Water Quality	The Project Site and immediate surrounds	To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.	Pollution of surface water from: • Inappropriate storage and management of hydrocarbons and hazardous materials • Sedimentation or contamination due to Project activities or design	Surface water monitoring program designed in accordance with *AS/NZS 5667.1:1998 – Standards for Water Quality Sampling* established for the site. Initial results will provide baseline data. The program will be continued upon commencement of construction and throughout operations to monitor surface water quality for the duration of the Project life Sorby Hills Deposit Surface Flow Analysis carried out by Soil Water Consultants in December 2011.	• Geotechnical assessment, designs and plans for diversion channels, artificial wetland, evaporation basin and flood bunding. • Geotechnical designs and plans will be based on the DMP requirements of 1:100yr, 72hour rain event. • Study into the potential impacts of discharging dewatering into the artificial wetland. This will include: ▪ Ecological risk assessment for the wetland including predictions of water quality in the wetland over time, taking evaporation rates into account	• Flood bunds around site infrastructure will: ▪ divert clean water away from the site ▪ Contain potentially sediment laden or contaminated waters and subsequently divert to the evaporation basin. • Diversion channels will direct clean run-off into the artificial wetland; water quality measurements will be taken. • Categorise run off into ''clean'' and ''potentially contaminated'' and manage accordingly. • Ongoing surface water quality monitoring at the Keep River and Knox and Border Creeks. • Sediment trapping devices	Environmental Water Provisions Policy for Western Australia: State-wide Policy No. 5, Water and Rivers Commission (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC/ARMCANZ (2000) AS/NZS 5667.1:1998 – Water Quality Sampling AS/NZS 1940:2004 – The Storage and Handling of Flammable and Combustible Liquids *Dangerous Goods Safety Act (2004)* *Dangerous Goods Safety (Storage and Handling of*

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
					▪ Impacts of elevated groundwater levels ▪ Possible seepage to local groundwater ▪ Availability of potentially toxic solutes in the food web of the wetland ▪ Wetland closure strategy	will be installed. • Stormwater will be diverted away from the tipping area at the landfill; water that comes in contact with waste will be retained on site. • Storage and handling of hydrocarbons and hazardous materials will be in accordance with relevant regulations and standards; appropriate licences will be obtained.	*Non Explosives) Regulations (2007)* *Environmental Protection (Rural Landfill) Regulations (2002)* *Rights in Water and Irrigation Act (1914)*
Groundwater Quantity	The Project Site and immediate surrounds	To maintain the quantity of water so that existing and potential environmental values, including ecosystem maintenance, are protected.	• Possible impacts to the regional aquifer as a result of dewatering activities lowering the water table. • Potential impacts to surrounding water systems from the disposal of excess water.	Hydrogeological Assessment for the Sorby Hills Project Silver Lead Zinc Ore bodies carried out by Australasian Groundwater and Environmental Consultants Pty Ltd in November 2011. The assessment was prepared in accordance with Operational Policy 5.12: Hydrological Reporting Associated with a Groundwater Licence.	Further assessment to: • Confirm that any groundwater impacts will not extend to the ORIA or other surrounding water resources. • Determine the potential impacts, risks and constraints on the groundwater regime for the Project following development of a predictive numerical groundwater model to simulate the dewatering requirements for the	Groundwater quantity management to be included in EMPs: • Ensure appropriate licences are obtained for water abstraction on the site • No extraction of groundwater beyond that permitted under the water licence • Quarterly monitoring programme to assess water levels associated with production bores • Report annual water use to the appropriate Regulatory	Environmental Water Provisions Policy for Western Australia: State-wide Policy No. 5, Water and Rivers Commission (2000) *Rights in Water and Irrigation Act (1914)* Operational Policy No. 5.12: Hydrological Reporting Associated with a Groundwater Licence, Department of Water (DoW) (2009)

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
					project. • Provide hydrogeological cross-sections that show all aquifers identified by drilling, locations and depths of monitoring and production bores, depths to groundwater in each aquifer, locations of features such as faults and extent of the predicted dewatering impact.	Authority • Regular inspections of bores and associated pipelines to ensure any leaks are detected and repaired promptly • Recycling of process waters to offset demands • Excess water will be diverted to the proposed artificial wetland or evaporation basin	
Groundwater Quality	The Project Site and immediate surrounds	To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.	Pollution of groundwater from: • Inappropriate storage and management of hydrocarbons and hazardous materials. • Contamination due to Project activities or design. • Contamination due to inadequate closure planning for mine voids and TSF	Hydrogeological Assessment for the Sorby Hills Project Silver Lead Zinc Ore bodies carried out by Australasian Groundwater and Environmental Consultants Pty Ltd (November 2011) in accordance with Operational Policy 5.12: Hydrological Reporting Associated with a Groundwater Licence. Groundwater monitoring program (designed in accordance with *AS/NZS 5667.1:1998 – Standards for Water Quality*	• Risk assessment for partial oxidation of sulphide materials as a result of dewatering. Results and management measures will be provided in the PER. • Groundwater investigations will include identification of the potential loss of contaminants from all sources associated with the Project including the TSF, evaporation ponds, landfill and artificial wetland • Study into the potential impacts of discharging	• Storage and handling of hydrocarbons and hazardous materials will be in accordance with relevant regulations and standards; appropriate licences will be obtained. • Monitoring programme will be continued to assess groundwater quality. • Contaminated water storages will be designed to minimise seepage.	Environmental Water Provisions Policy for Western Australia: State-wide Policy No. 5, Water and Rivers Commission (2000) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC/ARMCANZ (2000) AS/NZS 5667.1:1998 – Water Quality Sampling AS/NZS 1940:2004 – The Storage and Handling of Flammable and Combustible Liquids

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
				Sampling) established. Monitoring is undertaken on a quarterly basis and sites are located within the proposed impact zone and regionally. Initial monitoring will provide baseline data for the site and upon commencement of construction and operations ongoing monitoring will provide groundwater quality information for the duration of the Project.	dewatering into the artificial wetland. This will include: ▪ Ecological risk assessment for the wetland including predictions of water quality in the wetland over time, taking evaporation rates into account ▪ Impacts of elevated groundwater levels ▪ Possible seepage to local groundwater ▪ Availability of potentially toxic solutes in the food web of the wetland ▪ Wetland closure strategy		*Dangerous Goods Safety Act (2004)* *Dangerous Goods Safety (Storage and Handling of Non Explosives) Regulations (2007)* *Rights in Water and Irrigation Act (1914)* Operational Policy No. 5.12: Hydrological Reporting Associated with a Groundwater Licence, DoW (2009)
Marine Environment	Marine Environment surrounding the Wyndham Port Facility	To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.	Pollution of marine environment and subsequent impacts to marine flora and fauna through accidental discharge of concentrate during ship loading	POAGS Transport Logistics Method Statement, October 2011	• Desktop assessment of marine habitats and species of flora and fauna known to occur in the region • Desktop risk assessment of the potential direct and indirect impacts of the proposed operations on the marine environment • If the desktop risk	• Concentrate management at the Port will be included in EMPs • Fully sealed containers will be used for concentrate transport to, and short term storage at the Port therefore no stockpiling of concentrate will be necessary • Containers will be unloaded directly into the	Pilbara Coastal Water Quality Consultation Outcomes, Department of Environment (2006) State Water Quality Management Strategy, Government of Western Australia (2004) State Environmental (Cockburn Sound) Policy, Government of Western

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
					assessment is determined to be significant, field surveys will be undertaken • If potential impacts from port activities are identified a Port EMP will be developed which will outline the practical implementation of the Environmental Quality Management Framework set out in the Pilbara Coastal Water Quality Consultation Outcomes (DoE 2006), State Water Quality Management Strategy (Government of Western Australia 2004) and State Environmental (Cockburn Sound) Policy (Government of Western Australia 2005) • Assessment to determine the potential for release of fugitive concentrate dust during ship loading; the assessment will consider the experience of using similar rotating container systems for ship loading at the ports of Adelaide and Darwin.	ships hold • Concentrate will be transferred to ships using a rotation system specifically designed to minimise the chance of spillage and fugitive dust emissions • All operators involved in ship loading will be trained to ensure correct operation of loading machinery • Ship loading training and procedures will include spill prevention measures and clean up actions	Australia (2005) EPA Environmental Assessment Guideline No. 3: Protection of Benthic Primary Producer Habitats in Western Australia's Marine Environment (2009) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC/ARMCANZ (2000)

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
					• Water quality assessment to establish baseline conditions • Marine water quality monitoring program to be implemented		
Pollution Management							
Mineral Waste, Metalliferous Drainage (MD) and PAF	The Project Site	To ensure that wastes do not affect groundwater or surface water quality, nor lead to soil contamination.	Contamination of soils, groundwater or surface water through: • Adverse geochemical or acid rock drainage. • Inappropriate storage and management of mineral waste.	Sorby Hills Geochemical Characterisation carried out by Soil Water Consultants in December 2011. This characterisation was carried out with consideration for the DMP Guidelines document *Mining Proposals in Western Australia*. Geochemical characterisation identified that: • Source materials and mining by-products have low potential for either acidic or neutral mine drainage • The majority of waste rock and tailings can be classified as NAF with	• Consideration for alkaline conditions will be incorporated into the PER • Supplementary report providing additional information on chemical analysis. • Ecotoxicology assessment to better understand the potential of mineral waste to affect receptors within and adjacent to the proposed operation. • Block modelling to: ▪ Determine total volumes of materials to be mined ▪ Determine expected PAF volumes and interception timeframes ▪ Determine volume of	Proposed PAF management at the Project will involve: • Delineation and segregation of PAF during mining to ensure all PAF materials are appropriately managed during mining and rehabilitation • Where possible all PAF materials will be placed directly below the watertable to prevent oxidation and acidification • If not possible to place below the watertable, all PAF material will be encapsulated within the pit to minimise risk of oxidation • Sufficient volume of competent NAF siltstone will be segregated for later use in rehabilitation to stabilise the post-mine	Environmental Notes on Mining: Acid Mine Drainage, DMP (2009) Best Practice Environmental Management in Mining: Managing Sulphidic Mine Wastes and Acid Drainage, Environment Australia (1997) ARD Test Handbook, AMIRA International (2002) EPA Position Statement No. 7: Principles of Environmental Protection (2007) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC/ARMCANZ (2000)

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
				low potential to produce ARD • Some localised PAF materials present in proposed mine voids	cover materials for encapsulation of PAF ▪ Enable production of a materials balance to demonstrate use and management of all waste • Void water recovery modelling will be conducted to determine whether PAF material is likely to be water-covered within an appropriate timeframe during mining and continue to be covered post mining. Modelling will also be used to confirm that the pit will not contaminate karst aquifers or overtop during large monsoonal events (i.e. 100 year 72 hour rainfall events) • Contaminant chemistry modelling of pit lake will be developed to: ▪ predict the environmental risks if the cover fails or if the pit is flooded before the cover is in place ▪ determine whether any metals with the	land surfaces • PAF management will be incorporated into the EMP	Identification and Investigation of Acid Sulphate Soils and Acidic Landscapes Guidelines, Acid Sulphate Soils Guideline Series, DEC (2009) Assessment Levels for Soil, Sediment and Water, Contaminated Sites Management Series, DEC (2010)

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
					potential to detrimentally impact on the local aquifers are likely to become concentrated in pit void water after mine closure		
Tailings Characterisation and Storage (including TSF and evaporation pond design, construction and management)	The Project Site	To ensure that waste storage does not affect fauna, groundwater or surface water quality, nor result in soil contamination.	Contamination of soils, groundwater or surface water from tailings materials due to inappropriate construction or management of the TSF. Utilisation of the TSF as a water source by Fauna, particularly migratory birds, due to inappropriate management.	Sorby Hills Geochemical Characterisation carried out by Soil Water Consultants in December 2011. This characterisation was carried out utilising the DEC Identification and Investigation of Acid Sulphate Soils and Acidic Landscapes Guidelines (2009) and Assessment Levels for Soil, Sediment and Water (2010).	• Supplementary report providing additional information on tailings characterisation. • Ecotoxicology assessment to better understand the potential of tailings materials to affect receptors within and adjacent to the proposed operation. • Geotechnical assessment in accordance with the "Safe Design and Operating Standards for Tailings Storage" which will include: ▪ Detailed design of the TSF and evaporation pond ▪ Geotechnical assessment of the construction materials for the TSF and evaporation pond ▪ Further clarification on	• No management strategies are required for ARD or MD because all tailings materials are classified as NAF with a highly alkaline pH. This, together with the low content of available oxyanion metals and metalloids, results in a low potential for MD to occur. • Drill holes located within the TSF footprint will be sealed to prevent water flowing through preferential pathways to the subsurface geology. • Diversion channels will be cut along the western and eastern boundaries of the TSF for protection against the potentially damaging effects of stormwater run-off. • Management of potential overtopping of TSF embankment:	Safe Design and Operating Standards for Tailings Storage, DMP (1999) *Mines Safety and Inspection Act (1994)* *Mining Act (1978)* *Environment Protection Act (1986)*

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
					closure methodology • Lining requirements will be determined through assessment of the geochemical nature of the tailings and the receiving environment.	▪ A 1m high freeboard will be maintained to minimise potential overtopping during a 1:100 72Hr rainfall event ▪ Where possible multiple discharge points will be used for the tailings material to prevent build-up of sediment and allow removal of clay materials ▪ Daily inspections of TSF and associated pipelines as a minimum • Design and management measures for the TSF and evaporation pond to discourage use by fauna (particularly migratory birds) will be provided in the PER	
Non-mineral Waste (including putrescible waste, hydrocarbons and hazardous materials)	The Project Site	To ensure that wastes do not affect groundwater or surface water quality, nor lead to soil contamination.	• Contamination of soils, ground or surface water bodies from inappropriate storage and management of non-mineral waste. • Faunal habitats could be adversely affected.	Potential non-mineralised waste streams have been identified. Selection of the landfill site has been determined to reduce groundwater and surface water interactions.	Design and location plans for the bioremediation facility; inundation of the area during monsoonal conditions will be considered	• Storage and handling of hydrocarbons and hazardous materials will be in accordance with relevant regulations and standards; appropriate licences will be obtained. • Disposal of dangerous goods and hazardous materials will be in accordance with MSDSs	*Environmental Protection (Rural Landfill) Regulations (2002)* *Dangerous Goods Safety Act WA (2004)* AS/NZS 1940:2004 – The Storage and Handling of Flammable and Combustible Liquids

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
						and any DEC requirements. • Employ reduce, reuse, recycle and recover principles to minimise waste disposal requirements. • Sewage will be treated using a bio-sewage system and will conform to the standards of the SWEK and any Department of Health requirements. • The landfill facility will be managed in accordance with requirements of the *Environmental Protection (Rural Landfill) Regulations (2002).* • Bioremediation facility will be developed to treat any contaminated soil in situ. • Incorporate management of non-mineralised waste into the EMP.	The Contaminated Sites Management Series guideline: Bioremediation of hydrocarbon-contaminated soils in Western Australia, DEC (2004) *Health Act (1911)*
Emissions: Dust	The Project Site and immediate surrounds, Wyndham Port Facility and the	To ensure that emissions do not adversely affect environmental values or the health, welfare and amenity of	• May lead to occupational health and safety impacts for the workforce on site and at Wyndham Port if staff exposed to unacceptable levels of dust.	Dust monitoring program established to provide background data for the site. Analysis of six dust deposition gauges is undertaken monthly during the dry season.	Dust assessment to: • Identify key emission sources • Identify receptors and pathways • Determine emission	Dust management to be included in EMPs to address: • Minimising clearing of vegetation as far as practicable to reduce areas susceptible to dust lift-off.	*Mines Safety and Inspection Regulations (1995)* A Guideline for Managing the Impacts of Dust and Associated Contaminants

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
	communities of Kununurra and Wyndham	people and land uses by meeting statutory requirements and acceptable standards.	• May impact on native fauna and vegetation on site and in the immediate vicinity. • May impact on the communities of Kununurra and Wyndham due to road side dust mobilisation as a result of ore haulage trucks passing through the townships. • Dust impacts on adjacent receptors such as Ord Irrigation Area Stage 2	The dust monitoring program has been designed in accordance with *AS/NZS 3580.10.1:2003 – Methods for Sampling and Analysis of Ambient Air* Data relating to dust at the Wyndham Port will be provided to SMPL by the Port Authority.	composition • Determine emission quantity and variability • Allow comparison of emissions with relevant standards • Enable determination of risk • Develop management and contingency plans • Develop treatment methods • Enable SMPL to reduce and manage emissions and ensure that dust emissions do not cause environmental or human harm • Assess wind and climatic data from the recently installed weather station within the Sorby Hill Project area to determine wind directions, velocities and patterns, and the subsequent impact on potential dust emissions.	• Undertaking progressive rehabilitation where practicable • Blasting will not be undertaken during unfavourable weather • Utilisation of a water cart to adequately dampen the ROM pad, stockpiles, roads, laydown areas, tipping areas and car parks • Dust suppression systems on the crusher and process conveyors • Speed restrictions for haulage trucks whilst travelling on site, through the townships of Kununurra and Wyndham and whilst at the Port facility	from Land Development Sites, Contaminated Sites Remediation and Other Related Activities, DEC (2011) EPA Guidance Statement No. 18: Prevention of Air Quality Impacts from Land Development Sites (2000) National Environment Protection (Ambient Air Quality) Measure (2003) AS/NZS 3580.10.1:2003 – Methods for Sampling and Analysis of Ambient Air; Method 10.1: Determination of Particulate Matter – Deposited Matter – Gravimetric Method. *Environmental Protection Act (1986)*
Emissions: Concentrate	The Project Site and	To ensure that emissions do not	Exposure of personnel, members of the public and	POAGS Transport Logistics Method	Assessment to determine container strength and	• SMPL will endeavour to achieve minimal handling	Adopted National Exposure Standards for

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
	immediate surrounds, Wyndham Port Facility and the communities of Kununurra and Wyndham	adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.	the environment to concentrate containing Silver, Lead and Zinc during: • On site processing and production of concentrate • Transfer of concentrate into transport containers • Transport of concentrate from the Project Site to Wyndham Port • Transfer of concentrate to ships at Wyndham Port	Statement, October 2011	reliability in the event of haulage truck roll over or other road traffic incident. Assessment to determine the potential for release of fugitive concentrate dust during ship loading; the assessment will consider the experience of using similar rotating container systems for ship loading at the ports of Adelaide and Darwin. Undertake further consultation with Cambridge Gulf Limited with respect to storage facilities and pollution control measures at Wyndham Port, including licensing of port under Part V of the *EP Act.* Assessment to determine if existing potentially contaminated sites at Wyndham Port will impact on the project. Comparison of shipping methods against current industry standards for lead shipment.	of concentrate by utilising a predominantly mechanised system. • Concentrate management to be included in EMPs to address: ▪ All concentrate loads to be carried in fully sealed and locked containers ▪ Concentrate will be loaded directly into containers - the loading system will be integrated into the final stage of the production process ▪ Weightometer at container loading station and truck weighbridge to ensure no overloading ▪ Containers to be individually inspected prior to transport off site ▪ Speed restrictions will apply to haulage trucks ▪ Containers to be inspected on arrival at the Port ▪ Concentrate will be unloaded directly into ships hold ▪ Once emptied, containers will be inspected (and repaired if necessary) prior to dispatch back to the	Atmospheric Contaminants in the Occupational Environment [National Occupational Health and Safety Commission (NOHSC):1003] (1995) *Mines Safety and Inspection Regulations (1995)* EPA Guidance Statement No. 18: Prevention of Air Quality Impacts from Land Development Sites (2000) National Environment Protection (Ambient Air Quality) Measure (2003) *Dangerous Goods Safety (Storage and Handling of Non Explosives) Regulations (2007).* *Dangerous Goods Safety (Road and Rail Transport of Non-explosives) Regulations (2007).* *Dangerous Goods Safety Act, specifically the Dangerous Goods Safety (Goods in Ports) Regulations (2007).*

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
						Project site for re-use ▪ Along route monitoring ▪ Monitoring of moisture levels in concentrate	*Environmental Protection Act (1986).* *Contaminated Sites Act (2003).*
Emissions: Noise and Vibration	The Project Site, Wyndham Port Facility and the communities of Kununurra and Wyndham	To protect the amenity of nearby residents from noise impacts resulting from activities associated with the proposal by ensuring noise levels meet statutory requirements and acceptable standards.	• May lead to occupational health and safety impacts for the workforce on site and at Wyndham Port. • May impact on the communities of Kununurra and Wyndham as a result of ore haulage trucks passing through the townships.		Noise and vibration assessment to: • Identify key emission sources • Identify receptors and pathways • Determine emission quantity and variability • Allow comparison of emissions with relevant standards • Enable determination of risk • Enable development of management strategies to ensure compliance with the *Environmental Protection (Noise) Regulations (1997)*	Noise and vibration management to be included in EMPs to address: • Application of speed restrictions and a ban on exhaust braking for concentrate haulage trucks whilst travelling through the Kununurra and Wyndham townships • Concentrate haulage trucks will only operate during daylight hours • Incorporation of noise and vibration performance criteria into purchasing requirements for relevant equipment and machinery • On site generators will have modern noise suppression devices attached • Blasting will only occur during daylight hours • Ensure vehicles, plant and equipment are serviced	*Environmental Protection (Noise) Regulations (1997)* EPA Guidance Statement No. 8 (Draft): Environmental Noise (2007)

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
						and maintained to system requirements to avoid unnecessary noise	
Emissions: Greenhouse Gases / Air Emissions	The Kimberley Region	To minimise emissions to levels as low as practicable on an on-going basis and consider offsets to further reduce cumulative emissions.	Activities or aspects of the proposal that may emit greenhouse gases include: • Fuel usage by mobile plant and equipment • Energy usage by processing plant • Explosives used for blasting • Land clearing	None completed to date	Evaluation of Greenhouse Gas (GHG) emission levels which will include: • An inventory of emissions during construction and annual operational emissions for major GHG's attributable to specific components of the Project • The Projects annual and overall contribution to the WA and national GHG emissions profile • The upstream GHG generating activities associated with the Project • A high-level commentary on the significance of predicted GHG emissions on the environment and legislative implications of these emissions to the Project • A high-level investigation of GHG abatement opportunities, including a description of the	Greenhouse gas management to be included in EMPs: • Ensure that all vehicles, plant and equipment are serviced and maintained to requirements to retain high levels of energy efficiency. • Renewable technologies, such as solar, will be considered for power generation • Greenhouse gas impact may be considered during the procurement process	EPA Guidance Statement No. 12: Minimising Greenhouse Gases (2002)

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
					intended measures to avoid and/or minimise GHG emissions directly as identified in a best practice review • Benchmarking of the GHG emissions intensity of the Project against comparable projects and demonstrate performance which is equal to, or better than, best practice		
Emissions: Light	Project Area and adjacent Weaber Plains Road.	To avoid or manage potential impacts from light overspill and comply with acceptable standards.	• May impact on users of the Weaber Plain Road during hours of darkness as a result of the 24 hour operation of the crushing and processing facilities. • Death of nocturnal fauna resulting from vehicles travelling during hours of darkness for nightshift.	None completed to date	Light emission assessment to: • Identify key emission sources • Identify receptors and pathways • Determine community risk and environmental impact • Enable development of management strategies to reduce emissions and ensure that light emissions do not cause environmental or human harm.	• All lighting will be directed inwards at the site to result in a "glow" being visible from the Weaber Plain Road rather than direct light. • Site speed limits will adjusted to suit conditions during the hours of darkness to provide increased driver reaction time should fauna be "stunned" in vehicle headlights. • Incorporate light management into the EMP.	
Emissions: Odour	The processing	To ensure that emissions do not	May lead to occupational health and safety impacts	None to Date	Odour assessment to: • Identify key emission	• Waste material will be covered in accordance with	EPA Guidance Statement No. 18: Prevention of Air

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
	plant and landfill facility	adversely affect environmental values or the health, welfare and amenity of people and land uses by meeting statutory requirements and acceptable standards.	for the workforce on site.		sources • Identify receptors and pathways • determine emission composition, quantity and variability • Determination of risk • Enable development of management and contingency plans, and treatment methods where required to ensure that odour emissions do not cause environmental or human harm.	the schedule identified in Section 6 of the *Environmental Protection (Rural Landfill) Regulations 2002.* • Odour emissions will be considered and best practice used to select processing chemicals that will have the least impact.	Quality Impacts from Land Development Sites (2000) National Environment Protection (Ambient Air Quality) Measure (2003) *Environmental Protection (Rural Landfill) Regulations (2002)*
Social Surrounds							
Aboriginal Heritage	The Project Site and immediate surrounds	To ensure that changes to the biophysical environment do not adversely affect historical and cultural associations and comply with relevant heritage legislation.	Disturbance to Aboriginal Heritage Sites through physical disturbance of the land for development of the Project.	Desktop Aboriginal Heritage Assessment, including a search of the DIA Heritage Register, carried out by Land Access Solutions in June 2011. Detailed on-ground Archaeological Assessment conducted by Greg Carver, through the MG Corp, in October 2011. Detailed on-ground	No heritage sites have been identified within the Project area to date. The Traditional Owners advised SMPL that they approved the development of the mine and the MG Corp confirmed this position.	• Development of a MOU with the MG Corp whose traditional lands the Project site lies within. • Assessment of the potential impacts both in the immediate area and downstream of the Project which may result from dewatering activities. • Development of a Cultural management Plan to allow adequate management of known and unknown	*Aboriginal Heritage Act (1972)* *Native Title (State Provisions) Act (1999)* EPA Guidance Statement No. 41: Assessment of Aboriginal Heritage (2004) Section 18 Notice of Application for Ministers Consent to Use Land: Notes and Guidelines, DIA (2006) Guidelines for Preparing

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
				Ethnographic Assessment conducted by Mintupela Pty Ltd, through the MG Corp, in October 2011.		heritage values which may be located in the Project area. • Project footprint altered following ethnographic survey to avoid small limestone hill of Aboriginal Heritage significance. • Ensure clearing only occurs in areas that have been surveyed for Aboriginal heritage significance. • Aboriginal heritage will be included in the Environmental Clearance Permit process.	Reports for Applications to the Aboriginal Cultural Material Committee under Section 18 of the *Aboriginal Heritage Act*, DIA (2005)
Visual Amenity	The Project Site and immediate surrounds	To ensure that aesthetic values are considered and measures are adopted to reduce visual impacts on the landscape as low as reasonably practical.	The alteration of the landscape associated with the excavation of pits and the placement of infrastructure may detract from the visual amenity of the area.		Assess the potential changes to the landscape and how this will change the visual character of the locality.	Adverse impacts to visual amenity are proposed to be minimised by: • Considering landscape amenity during project design • Minimising disturbance as far as practicable • Project designed to maximise use of pre-cleared/disturbed areas and minimise clearing of vegetation. • Appropriate placement of infrastructure and facilities	

Environmental Factor	Relevant Area	EPA Objective	Potential Impacts	Completed Investigations	Proposed Further Investigations	Proposed Management	Applicable Standards, Guidelines and Policies
Other							
Closure and rehabilitation	The Project Site and immediate surrounds	To ensure, as far as practicable, that rehabilitation achieves a stable and functioning landform which is consistent with the surrounding landscape and other environmental values.	• Adverse impacts to rehabilitation efforts due to poor quality soil. • Adverse impacts on flora, fauna, soil quality, ground and surface water quality and quantity, visual amenity and economic and social impacts due to poor rehabilitation. • Insufficient allocation of funds/resources for closure, particularly in the event of unforseen closure, due to poor closure planning.	• Basic closure concepts, financial provisioning and material balances have been completed. • Sorby Hills Pre-Mine Soils Characterisation carried out by Soil Water Consultants in November 2011.	• Assess closure options for the Project, including consideration of PAF and tailings material issues. • Geochemical testing and modelling to determine likely pit lake water quality following closure • Assessment for wetland closure, including how relevant standards will be met. • Prepare Mine Closure Concepts for the Project for submission with the PER. • Geotechnical assessment of TSF construction materials and surface soils.	• Soil characterisation has identified the need for careful management to promote surface stability of post-mine landforms whilst also retaining the optimal water retention properties for rehabilitation; as such soil management will be incorporated into the EMP. • Development of a Mine Closure Plan (to be submitted to DMP with the Mining Proposal) to address: ▪ Post closure vision and preliminary completion criteria ▪ Progressive rehabilitation ▪ Ongoing research and development into rehabilitation and closure techniques to improve closure outcomes	Guidelines for Preparing Mine Closure Plans, DMP/EPA (2011) EPA Guidance Statement No. 6: Rehabilitation of Terrestrial Ecosystems (2006) Australian and New Zealand Guidelines for Fresh and Marine Water Quality, ANZECC/ARMCANZ (2000)

8 COMMUNITY AND STAKEHOLDER CONSULTATION

SMPL has engaged in stakeholder consultation on no less than 35 separate occasions with 26 Federal, State or Local authorities or private companies.

The first major stakeholder consultation took place in Kununurra and the majority of local government regulators were represented by one or more personnel. The following agencies attended:

- Department of Environment and Conservation
- Department of Water
- Main Roads Western Australia
- Department of Resource and Land Development
- Shire of Wyndham and the East Kimberley.

The objective of this initial meeting was to give the regulators a broad overview of the project and provide them with an opportunity to identify any major issues or development constraints. The Sorby Hills Project was well received with the majority of stakeholders considering the potential of the Project to provide social and economic benefits to the towns of Kununurra and Wyndham. Issues raised centred predominantly around transport methods of concentrate from the Sorby Hills Project to the Wyndham port. Other transport related issues included the cumulative impact of the increased number of road trains moving through the town of Wyndham.

On the 18th of November 2011 a meeting was held at the Chamber of Commerce and 65 individuals signed the attendance register. On the 7th December 2011, SMPL compiled and issued a number of letters to key stakeholders asking for comments on the most appropriate final land use for mine closure. One response received from Department of Regional Development and Lands acknowledged the return of the site to a pastoral land use at this stage of the project however expressed interest in holding further negotiations with SMPL as the project progressed with the view of a final land use of agricultural purposes.

SMPL has also distributed a community information pamphlet to 378 households in Wyndham and 1126 households in Kununurra, and purchased a full page advert in the local Kimberley Echo, both of which detail the nature, size and extent of the project. The advert was published on the 12th December, 2011, with the express purpose of raising awareness of the project and to give the receiving public the greatest opportunity to comment.

SMPL will endeavour to update the public and other stakeholders on the progress of the development throughout the life of the Project. The objective is to maintain a high degree of transparency with the Project and enable the general public in Kununurra the greatest possible opportunity to become involved in the project as prospective employees.

Stakeholder consultation has been an important aspect of the Sorby Hills Project to date and will continue to be an integral factor in the overall environmental management of the Project.

9 STUDY TEAM

A multi-discipline project team has been assembled which includes SMPL personnel and experienced environmental practitioners that are providing advice to SMPL and undertaking the relevant environmental investigations in conjunction with other specialist consultants as required. The project team personnel are listed in Table 9-1: Study Team.

Table 9-1: Study Team

Proponent Study Team	
Key Personnel	***Title***
Edgar Newman	Project Manager
Lubor Hon	Project Engineer
Dr Adam McKinnon	Project Geoscientist

PER Preparation		
Consultant	***Key Personnel***	***Title***
Animal Plant Mineral Pty Ltd	Dr Mitchell Ladyman	Director and Principal Biologist
	Sharon Arena	Principal Environmental Advisor
	Corinne Chambers	Environmental Scientist
	Cherie Cooper	Quality Control

Specialist Consultants	
Consultant	***Field(s) of Expertise***
Animal Plant Mineral Pty Ltd	Flora and vegetation, terrestrial fauna, avifauna
Bennelongia Pty Ltd	Subterranean fauna
Soil Water Consultants	Soil science, geochemistry, hydrology
Australasian Groundwater and Environmental Consultants	Hydrogeology
Coffey Geotechnics	Geotechnical Engineering
POAGS Bulk Logistics	Transport and stevedoring logistics and port management
Land Access Solutions	Aboriginal Heritage
Mintupela Pty Ltd	Aboriginal Heritage (Ethnographic)
Greg Carver	Aboriginal Heritage (Archaeological)
Cambridge Gulf	Stevedoring – port operations

10 REFERENCES

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