



# Report and recommendations of the Environmental Protection Authority



## Sorby Hills Silver Lead Zinc Project

Sorby Management Pty Ltd

Report 1491

October 2013

## Public Environmental Review Environmental Impact Assessment Process Timelines

Date	Progress stages	Time (weeks)
13/02/12	Level of assessment set	
19/09/12	Final Environmental Scoping Document(ESD)approved	31
11/03/13	Environmental Review Document (ERD) released for public review	25
08/04/13	Public review period for ERD closed	4
19/9/13	Final Proponent response to ERD issues raised	19
21/10/13	Publication of EPA report	5
4/11/13	Close of appeals period	2

Timelines for an assessment may vary according to the complexity of the project and are usually agreed with the proponent soon after the level of assessment is determined.

In this case, the Environmental Protection Authority met its timeline objective in the completion of the assessment and provision of a report to the Minister.



Dr Paul Vogel  
Chairman

16 October 2013

ISSN 1836-0483 (Print)  
ISSN 1836-0491 (Online)  
Assessment No. 1920

## Summary and recommendations

This report provides the Environmental Protection Authority's (EPA's) advice and recommendations to the Minister for Environment on the proposal to develop a silver, lead and zinc mine with infrastructure and processing facilities approximately 50 kilometres (km) north of Kununurra with the concentrate transported by road and shipped through Wyndham Port by Sorby Management Pty Ltd.

Section 44 of the *Environmental Protection Act 1986* (EP Act) requires the EPA to report to the Minister for Environment on the outcome of its assessment of a proposal. The report must set out:

- The key environmental factors identified in the course of the assessment; and
- The EPA's recommendations as to whether or not the proposal may be implemented, and, if the EPA recommends that implementation be allowed, the conditions and procedures to which implementation should be subject.

The EPA may include in the report any other advice and recommendations as it sees fit.

The EPA is also required to have regard for the principles set out in section 4A of the EP Act.

### **Key environmental factors and principles**

The EPA decided that the following key environmental factors relevant to the proposal required detailed evaluation in the report:

- (a) Flora and vegetation;
- (b) Human health;
- (c) Marine environmental quality; and
- (d) Closure and rehabilitation.

There were a number of other factors which were relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

The following principles were considered by the EPA in relation to the proposal:

- (a) The precautionary principle;
- (b) The principle of intergenerational equity;
- (c) The principle of the conservation of biological diversity and ecological integrity;
- (d) Principles related to improved valuation, pricing and incentive mechanisms; and
- (e) The principle of waste minimisation.

## **Conclusion**

The EPA has considered the proposal by Sorby Management Pty Ltd to develop a silver, lead and zinc mine with infrastructure and processing facilities approximately 50 km north of Kununurra with the concentrate transported by road and shipped through Wyndham Port

### ***Flora and vegetation***

The proposal would have a direct impact on flora and vegetation through the clearing of 573 hectares (ha) of vegetation which ranges in condition from excellent to completely degraded.

Flora surveys identified five Priority species. The distribution of each of the five priority species extends outside the development area and into the Northern Territory. The largest impact to a local population is 23 per cent loss and the proponent has taken measures to reduce the impact where possible.

In addition, potential new flora species were identified in the Project Development Envelope during the surveys. The original project design would have seen some disturbance of these new flora species, however the proposed disturbance area has been reduced and there will no longer be any direct impacts to the potential new flora species identified.

The location and authorised extent of clearing will be limited to a total disturbance area of 573 ha within the Project Development Envelope as described and spatially defined in Schedule 1 of the recommended conditions under which the proposal can be implemented. Condition 6 has been recommended as a precautionary measure to ensure that groundwater dependent vegetation is not impacted by the proposal.

### ***Human health***

The EPA considers that the transport method proposed is appropriate for the concentrate and the risk of impacts to human health is low. The EPA took into account the comments provided by the Department of Health (DoH) and the requirements to comply with the *Dangerous Goods Safety Act 2004* when reaching this conclusion.

Given that the proponent is required to comply with *Dangerous Goods Safety Act 2004*, no specific conditions are proposed to regulate the transport of the concentrate from the mine to the port. The use of sealed Rotabox containers as the method of transport is included in Schedule 1 of the recommended conditions to ensure that this is the method used to transport the concentrate.

### ***Marine environmental quality***

Port operations are required to comply with Dangerous Goods regulations and the port will also require licensing under Part V of the EP Act as a prescribed premise. Through the Part V licensing process the Department of Environment Regulation

(DER) can place conditions on the storage, handling and transport of the silver, lead and zinc at the port as well as monitoring.

The EPA considers that the management strategies proposed by the proponent will reduce the likelihood of impacts on the marine environment from concentrate storage, handling and transport.

The EPA has recommended condition 7 so that a monitoring program is implemented to confirm that the concentrate is not contaminating the marine environment and accumulating in the sediment to a level that exceeds the recommended sediment quality guidelines in the ANZECC *Australian and New Zealand Guidelines for Fresh and Marine Water Quality*.

### **Closure and rehabilitation**

The Sorby Hills proposal involves the disturbance of 573 ha of vegetation, therefore effective mine closure planning and rehabilitation will be required. Matters that will require careful management during decommissioning and closure include the tailings storage facility; any pit voids, and the evaporation ponds, once mining ceases.

The EPA considers that potential risks of long-term management requirements associated with the use of a mine void as a wetland are likely to outweigh the benefits of providing habitat for any birds species displaced by closure of the artificial wetland. The EPA therefore considers that the final mine void should be designed to discourage use by waterbirds and other fauna. In Section 5 'Other advice' in this Report, the EPA has provided advice to the Department of Mines and Petroleum (DMP) on this position.

The EPA considers that closure and rehabilitation can be managed by the DMP under the provisions of the *Mining Act 1978*. The Mine Closure Plan should be developed in accordance with the *Guidelines for Preparing Mine Closure Plans (DMP/EPA 2011)*.

The EPA has therefore concluded that the project can be managed to meet the EPA's objectives provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4 of this report.

### **Recommendations**

That the Minister for Environment:

1. notes that the proposal being assessed is for a silver, lead and zinc mine, infrastructure and processing facilities approximately 50 km north of Kununurra, with the concentrate produced transported by road and shipped through Wyndham Port.
2. considers the report on the key environmental factors as set out in Section 3;

3. notes that the EPA has concluded that the project can be managed to meet the EPA's objectives, provided there is satisfactory implementation by the proponent of the recommended conditions set out in Appendix 4 and summarised in Section 4;
4. imposes the conditions and procedures recommended in Appendix 4 of this report; and
5. notes the EPA's other advice presented in Section 5 in relation to closure and rehabilitation of the proposed mine.

## **Conditions**

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the proposal by Sorby Hills Pty Ltd to develop a silver, lead and zinc mine with infrastructure and processing facilities approximately 50 km north of Kununurra with the concentrate transported by road and shipped through Wyndham Port is approved for implementation. These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- a) ensuring that storage and loading of the concentrate is managed to ensure no lead, silver or zinc escapes into the environment; and
- b) monitoring groundwater vegetation to ensure that drawdown associated with the proposed mine does not cause a reduction in its health.

# Contents

	<b>Page</b>
<b>Summary and recommendations .....</b>	<b>i</b>
<b>1. Introduction and background.....</b>	<b>1</b>
<b>2. The proposal .....</b>	<b>2</b>
<b>3. Key environmental factors and principles .....</b>	<b>7</b>
3.1 Flora and vegetation .....	8
3.2 Human health.....	11
3.3 Marine environmental quality .....	13
3.4 Closure and rehabilitation .....	15
3.5 Environmental principles.....	17
<b>4. Conditions.....</b>	<b>17</b>
4.1 Recommended conditions .....	17
4.2 Consultation.....	18
<b>5. Other advice.....</b>	<b>18</b>
<b>Tables</b>	
Table 1: Summary of key proposal characteristics .....	6
Table 2: Percentage of each priority flora species sample population within the proponent's tenements.....	9
<b>Figures</b>	
Figure 1: Regional location .....	3
Figure 2: Sorby Hills Project Development Envelope, Development Exclusion Boundary and conceptual layout.....	4
Figure 3: Sorby Hills facilities at Wyndham Port .....	5
<b>Appendices</b>	
1. List of submitters	
2. References	
3. Summary of identification of key environmental factors	
4. Recommended Environmental Conditions and nominated Decision-Making Authorities	
5. Summary of submissions and proponent's response to submissions	





# 1. Introduction and background

This report provides the advice and recommendations of the Environmental Protection Authority (EPA) to the Minister for Environment on the key environmental factors and principles for the proposal by Sorby Management Pty Ltd to develop a silver, lead and zinc mine with infrastructure and processing facilities approximately 50 km north of Kununurra with the concentrate transported by road and shipped through Wyndham Port.

The proposal includes below water table mine pits, processing facility, infrastructure including temporary waste dumps, tailings and evaporation ponds, and other associated infrastructure.

The Sorby Hills proposal was referred to the EPA on 14 December 2011. On 13 February 2012 the level of assessment for the proposal was determined as Public Environment Review (PER) with a review period of four weeks. The proponent prepared the Environmental Scoping Document (ESD), which was approved by the EPA on 19 September 2012. The proponent prepared the final PER document and the public review period ran from 11 March 2013 to 8 April 2013.

The proposal was originally referred containing an artificial wetland however, in August 2013 prior to the EPA considering the PER document, the proposal was modified via section 43A of the EP Act to replace the proposed artificial wetland with an evaporation basin.

Further details of the proposal are presented in Section 2 of this report. Section 3 discusses the key environmental factors and principles for the proposal. The conditions to which the proposal should be subject, if the Minister determines that it may be implemented, are set out in Section 4. Section 5 provides other advice by the EPA.

Appendix 5 contains a summary of submissions and the proponent's response to submissions. It is included as a matter of information only and does not form part of the EPA's report and recommendations. Issues arising from this process, and which have been taken into account by the EPA, appear in the report itself.

## 2. The proposal

The Sorby Hills Silver Lead Zinc Project will involve the construction and operation of a silver, lead and zinc mine, infrastructure and processing facilities approximately 50 km north of Kununurra, with the concentrate produced transported by road and shipped through Wyndham Port. The project is adjacent to the Ord River Irrigation Area (ORIA) Stage 2 project.

The expected mine life is 10 years and will involve the disturbance of up to 573 ha. The location of the project, the Project Development Envelope, and the conceptual mine layout are shown in Figures 1, 2 and 3.

The key components of the proposal include:

- below water table mine pits;
- processing facility;
- mine infrastructure, including run-of-mine (ROM) pad, haul roads, laboratory, two evaporation ponds, an evaporation basin, temporary waste dumps, access road, power generation facilities; hardstand area, diesel storage and refuelling area, workshop, site office, explosives magazine, potable water storage tank, bioremediation facility, landfill site, firebreaks and a perimeter fence;
- above ground paddock-style Tailings Storage Facility (TSF); and
- hardstand area and wash-down facilities at Wyndham Port.

Dewatering of the pits will be required at a rate of up to 1 gigalitre per annum (GL/a). Excess water is proposed to be discharged to an evaporation basin.

The concentrate will be road transported from the mine to Wyndham Port using sealed Rotabox containers. The containers are locked as soon as they are filled with the concentrate from the processing facility and only unlocked again during the final stage of tipping the concentrate into the ship's hold. The lead in the concentrate is in the form of lead sulphide.

The main characteristics of the proposal are summarised in Table 1 below. A detailed description of the proposal is provided in Section 2 of the PER (Sorby Management Pty Ltd, 2013).

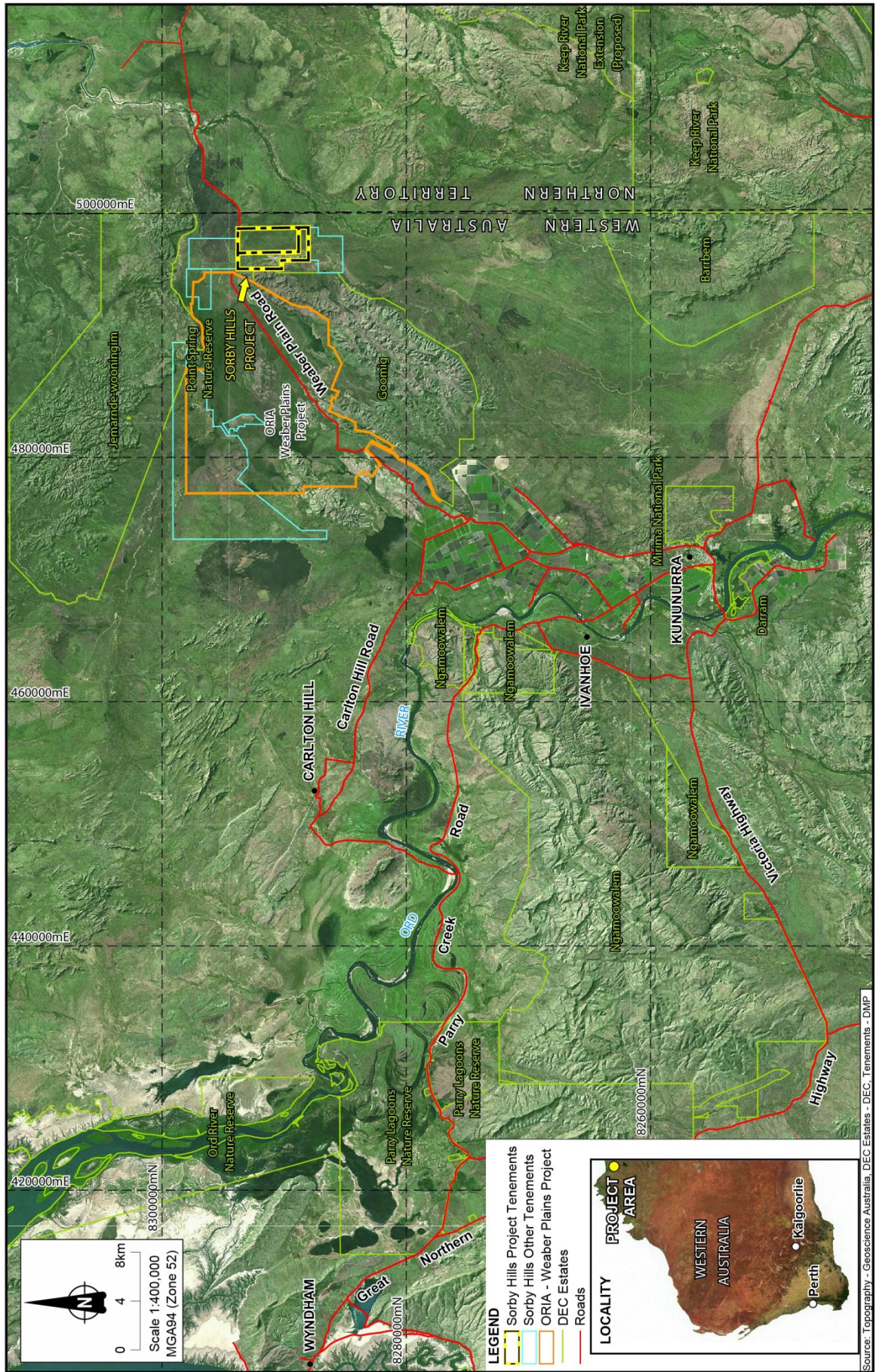
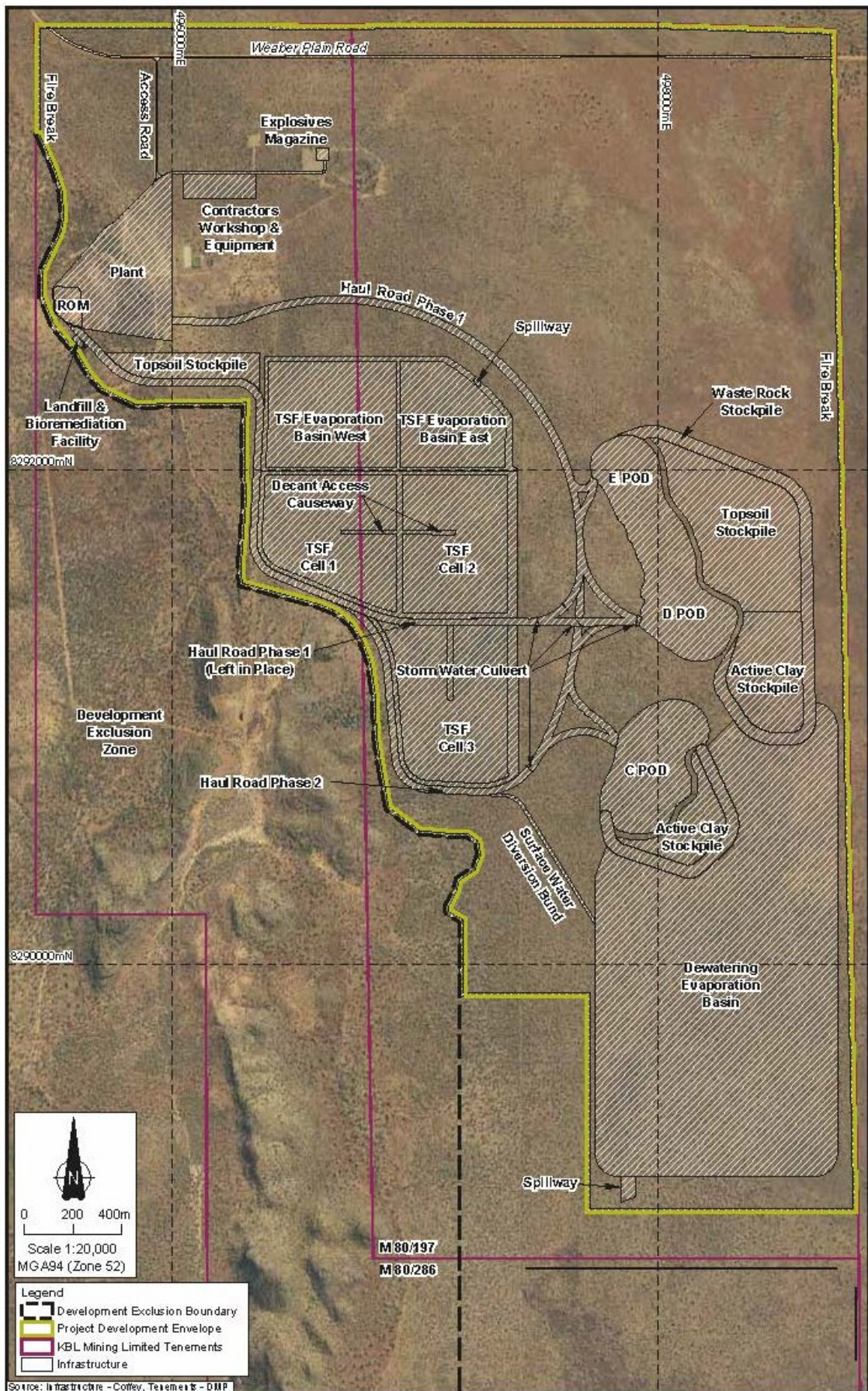


Figure 1: Regional location



**Figure 2: Sorby Hills Project Development Envelope, Development Exclusion Boundary and conceptual layout**



Figure 3: Sorby Hills facilities at Wyndham Port

**Table 1: Summary of key proposal characteristics**

<b>Summary of the Proposal</b>		
Proposal Title	Sorby Hills Silver Lead Zinc Project	
Proponent Name	Sorby Management Pty Ltd	
Short Description	The proposal is to develop a silver, lead and zinc mine and processing facility approximately 50 km north of Kununurra, including construction of associated mine infrastructure (ROM pad, haul roads, laboratory, two evaporation ponds, evaporation basin, access road, power generation, hardstand area, diesel storage and refuelling area, workshop, site office, explosives magazine, potable water storage tank, bioremediation facility, landfill site, fire breaks and perimeter fence), discharge of waste to a TSF and road train transport of the concentrate produced to Wyndham Port for export.	
<b>Physical Elements</b>		
<b>Element</b>	<b>Location</b>	<b>Proposed Extent Authorised</b>
Mine and associated infrastructure	Figure 2	Clearing of not more than 573 ha within a 1,045 ha development envelope.
Mineralised waste materials		No permanent waste dumps.
Dewatering		Up to 1.0 GL/a of uncontaminated waste water not used for operations discharged to evaporation basin.
Concentrate transport method to Wyndham Port		Sealed 'Rotabox' (or equivalent standard) containers
Moisture content of concentrate.		A minimum of 7 per cent

Table 1 incorporates modifications to the proposal made by the proponent following release of the PER. These include:

- replacement of the artificial wetland with an evaporation basin requiring an expansion of the clearing from 480 ha to 573 ha and the expansion of the Project Development Envelope from 957 ha to 1,045 ha.

The potential impacts of the proposal initially predicted by the proponent in the PER document (Sorby Management Ltd, 2013) and their proposed management are summarised in the Summary of Key Preliminary Factors and Environmental Management (Executive Summary) of the proponent's document.

### 3. Key environmental factors and principles

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and the conditions and procedures, if any, to which the proposal should be subject. In addition, the EPA may make recommendations as it sees fit.

The identification process for the key factors selected for detailed evaluation in this report is summarised in Appendix 3. The reader is referred to Appendix 3 for the evaluation of factors not discussed below. A number of these factors, such as terrestrial fauna, subterranean fauna, hydrological processes, inland waters and environmental quality, air quality, amenity, and heritage are relevant to the proposal, but the EPA is of the view that the information set out in Appendix 3 provides sufficient evaluation.

It is the EPA's opinion that the following key environmental factors for the proposal require detailed evaluation in this report:

- (a) Flora and vegetation;
- (b) Human health;
- (c) Marine environmental quality; and
- (d) Closure and rehabilitation.

The above key factors were identified from the EPA's consideration and review of all environmental factors generated from the PER document and the submissions received, in conjunction with the proposal characteristics set out in Table 1.

Details on the key environmental factors and their assessment are contained in sections 3.1 - 3.5. The description of each factor shows why it is relevant to the proposal and how it will be affected by the proposal, taking into consideration proposed environmental impact management by the proponent. The assessment of each factor is where the EPA decides whether or not a proposal meets the environmental objective set for that factor.

The following principles were considered by the EPA in relation to the proposal:

- (a) The precautionary principle;
- (b) The principle of intergenerational equity;
- (c) The principle of the conservation of biological diversity and ecological integrity;
- (d) Principles related to improved valuation, pricing and incentive mechanisms; and
- (e) The principle of waste minimisation.

## 3.1 Flora and vegetation

### Description

The proposal would have a direct impact on flora and vegetation through the clearing of 573 ha of vegetation. All direct vegetation disturbance for the proposal is at the mine site with no clearing required at Wyndham Port, where existing facilities and cleared areas will be utilised for laydown and washdown areas. The proposal may also have indirect impacts through dewatering of the pits, dust smothering plants, altered fire regimes, introduction and spread of weeds and the use of saline water for dust suppression.

### Flora

Level 2 flora surveys were carried out in 2011 and 2012 in accordance with EPA Guidance Statement No. 51 *Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia*. The area that was surveyed extended beyond the Project Development Envelope of the Sorby Hills project. The 2012 survey was a follow-up to the 2011 survey and was a targeted survey for conservation significant flora species. Historical surveys over project area and surrounds have also been undertaken for the Ord River Irrigation Area Stage 2 Project.

The surveys recorded a species richness that was generally consistent with previous surveys in the area, with a total of 334 taxa from 69 families and 201 genera identified in the project area (Sorby Management Pty Ltd, 2012).

The surveys did not record any taxon gazetted as Declared Rare Flora (DRF) under the *Wildlife Conservation Act 1950* or listed as 'Threatened' under the *Environment Protection and Biodiversity Conservation Act 1999*. Five species of listed priority flora were identified, being:

- *Croton arnhemicus* (P1);
- *Fimbristylis pachyptera* (P1);
- *Goodenia malvina* (P1);
- *Fimbristylis laxiglumis* (P2); and
- *Minuria macrorhiza* (P2).

*Fimbristylis* sp. E Kimberley Flora was identified in initial surveys; however samples sent to the State Herbarium were identified as *F. punctata*, a relatively common species, widespread throughout the northern Kimberley.

Table 2 shows the percentage impact to each species of the local population.

The total sample population refers to individuals recorded by Animal Plant Mineral (APM) during the 2011 and 2012 surveys and does not include all



known populations in WA. As such the percentage impact represents the impact to the local population and not the species as a whole.

**Table 2: Percentage of each priority flora species sample population within the proponent's tenements**

Number of Target Taxa and the respective percent of the total sample population located in the Project Development Envelope									
<i>Croton arnhemicus</i> (P1)		<i>Fimbristylis pachyptera</i> (P1)		<i>Goodenia malvina</i> (P1)		<i>Fimbristylis laxiglumis</i> (P2)		<i>Minuria macrorrhiza</i> (P2)	
No of Plants	% of Sample Pop	No of Plants	% of Sample Pop	No of Plants	% of Sample Pop	No of Plants	% of Sample Pop	No of Plants	% of Sample Pop
5581	15.3	3513	23	95527	14.09	61643	7.73	2919	17.05

Section 6.1.8.6 of the PER (Sorby Management Pty Ltd, 2013) gives detailed information about the known regional distribution of the priority flora species, including population mapping obtained from the Department of Parks and Wildlife's (DPaW) FloraBase. Populations of all species have been recorded elsewhere in the Kimberley.

The distribution of each of the five species extends outside the Project Development Envelope and into the Northern Territory. The largest impact to a local population is 23 per cent loss and the proponent has taken measures to reduce the impact as far as possible.

In addition, potential new flora species were identified in the Project Development Envelope during the surveys. The original project design would have seen some disturbance of these new flora species. However since then the proposed disturbance area has been reduced and there will no longer be any direct impacts to the potential new flora species identified.

### **Vegetation**

The 2011 and 2012 vegetation surveys identified eight vegetation units within the Project Development Envelope, comprising one forest, one shrubland and six woodland units. The vegetation units have been described in detail in the PER. The vegetation units are considered part of a widespread association that extends across the Kimberley and other parts of Northern Australia. None of the vegetation units correspond to any known Threatened Ecological Communities (TECs). Two areas of the Priority 1 Priority Ecological Community (PEC) 'Monsoon vine thickets of limestone ranges' were identified. The PEC falls within an area identified by the proponent as a Development Exclusion Zone and is not expected to be impacted by the proposal.

Overall the vegetation condition ranges from excellent to completely degraded, with pastoral activities contributing to the degraded nature of the vegetation. Although lowland parts of the survey area are subject to quite heavy grazing, the vegetation showed some resilience as the majority was rated in very good condition. The area is still subject to active grazing and will need to be destocked should the Sorby Hills project be developed.

To provide regional context on the level of clearing for the Sorby Hills project, the adjacent Ord River Irrigation Area Stage 2 project is approved to clear 33,500 ha within a 76,000 ha project area (with the remaining 42,500 ha managed as a conservation buffer).

The proponent will be producing up to one gigalitre of dewater per annum, as part of the mine operations, which will result in a drawdown of the groundwater around the mine. This has the potential to impact on groundwater dependent ecosystems (GDEs). The proponent has modelled this and is confident that there will be no impacts on GDEs as a result of this activity.

## **Submissions**

Submissions on this factor related to:

- minimising the impacts on priority flora species; and
- managing weeds to prevent impacts on surrounding conservation areas.

## **Assessment**

*The EPA's environmental objective for this factor is to maintain representation, diversity, viability, and ecological function at the species, population and community level.*

The percentage impact to the five priority species that would be impacted by this proposal ranges from 7.73 to 23 per cent of the local population. The proponent has attempted to site infrastructure to avoid impacting priority flora, however, as the project is bounded by flood prone land on one side and the elevated areas of the Sorby Hills on the other, the geotechnical constraints mean some impact to priority flora is considered unavoidable should this project go ahead.

The proponent is avoiding the two areas of the Priority 1 PECs 'Monsoon vine thickets of limestone ranges' that were identified in the vegetation surveys.

The proponent has developed separate management plans for construction and operation of the project. These plans have been provided as appendices to the PER document. They include management measures to ensure that the area of clearing does not exceed the area approved, including flagging of areas approved to be cleared through an internal approvals process. Included

in these management plans are measures to prevent weeds from impacting on the surrounding conservation estate.

The dewatering of the mine pits has the potential to impact on any surrounding vegetation that is groundwater dependent. As a precautionary measure, the EPA has recommended condition 6 'Vegetation' to ensure that no vegetation, in excess of the proposed clearing of 573 ha, is impacted by the proposal.

## **Summary**

Having particular regard to:

- (a) the distribution of the identified priority species found outside the proposal area;
- (b) the widespread nature of the impacted vegetation types across the Kimberley;
- (c) the avoidance of impacts on the Priority 1 Priority Ecological Community (PEC) 'Monsoon vine thickets of limestone ranges'; and
- (d) the application of condition 6 'Vegetation' to ensure GDEs are not impacted by the proposal,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor

## **3.2 Human health**

### **Description**

The project will produce a concentrate which contains chemicals that have the potential to impact on human health, with lead being of particular concern. The project may have a significant impact on human health if fugitive emissions of the concentrate occur during transport. The most likely method by which this could occur is spillage from a container during an accident or windblown dust emanating from the port.

The concentrate is predicted to contain 64 per cent lead, derived from lead sulphide (also known as galena) in the ore. Lead sulphide, while still toxic, is considered to have lower toxicity than other forms of lead due to lower bioavailability in the environment.

Based on an independent classification by toxicology consultants Toxikos, the concentrate will be transported as a Class 6.1 lead compound, soluble, N.O.S (UN 2291, packaging group III) dangerous good. Storage, handling, transport and port operations will need to comply with the *Dangerous Goods Safety Act 2004*.

The Department of Health (DoH) reviewed the PER documents for the proposal and acknowledged that the use of sealed Rotabox containers to transport the concentrate will minimise the health risks to the residents of Wyndham and to Aboriginal communities along the route. The DoH's primary concern related to the protection of the health of employees.

In response to these concerns the proponent reiterated its commitment to minimise impacts on port personnel and to minimise the potential for concentrate emissions at the port through appropriate planning and management in line with relevant legislation such as the *Mines Safety and Inspection Act 1994* and *Occupational Health and Safety Act 1984*. The use of a mechanised system for loading will reduce the need for direct handling and protect workers from exposure to the concentrate.

As detailed in the Port Operations Environmental Management Plan (POEMP) appended to the PER, similar Rotabox container systems have been used for different concentrate types at other ports around Australia with minimal dust being produced, especially when compared to conventional bulk loading conveyor systems.

Management measures proposed for the handling, storage and transport of concentrate are outlined in the PER document. Management measures relating to safety and to prevent loss of concentrate during transport include:

- maintaining a seven per cent minimum moisture content of the concentrate to prevent the formation of dust during transport;
- washdown of containers before leaving the site (washdown water collected and transferred to the processing facility);
- individual inspections of containers before leaving the mine and on arrival at the port; and
- soil and dust monitoring along the transport route at three-monthly intervals.

## **Submissions**

Submissions received on this factor included matters relating to:

- the potential for dust exposure to workers at the port; and
- the use of 'Rotabox' containers.

## **Assessment**

*The EPA's environmental objective for this factor is to ensure that human health is not adversely affected.*

The EPA considers that the transport method proposed is appropriate for the concentrate and the risk of impacts to human health is low. The EPA took into

account the comments by the DoH and the requirements to comply with the *Dangerous Goods Safety Act 2004* when reaching this conclusion.

Given that the proponent is required to comply with *Dangerous Goods Safety Act 2004*, no specific conditions are proposed to regulate the transport of the concentrate from the mine to the port. The use of sealed Rotabox containers, with a minimum seven per cent concentrate moisture content, as the method of transport is included in Schedule 1 of the recommended conditions to ensure that this is the method used to transport the concentrate.

## **Summary**

Having particular regard to the:

- (a) nature of the concentrate being produced and transported;
- (b) the need for the storage, handling and transport of the concentrate to comply with the *Dangerous Goods Safety Act 2004*; and
- (c) the use of sealed Rotabox containers being included in Schedule 1 of the recommended conditions to ensure that this is the method used to transport the concentrate,

it is the EPA's opinion that the proposal can be managed to meet the EPA's environmental objective for this factor.

## **3.3 Marine environmental quality**

### **Description**

The potential significant impact to the marine environment is the accidental loss of concentrate during operations at Wyndham Port. The proposed transport method is the use of rotating containers that are sealed from processing up until the final moment of loading into the ships, where the lid is removed and the container tipped into the hold. This final unlocking and tipping of the container creates the potential for dust to contaminate the marine environment. A minimum concentrate moisture level of seven per cent is proposed to prevent dust escaping during tipping.

Wyndham Port is located on the West Arm Estuary of the Cambridge Gulf. The Gulf is highly turbid and experiences large tidal movements and strong tidal currents. The port sits amongst mangroves and mudflats of the intertidal zone. Undisturbed vegetation exists around the edge of the port but most vegetation within the port area has been disturbed.

Wyndham Port is operated by Cambridge Gulf Limited (CGL) under licence from the Department of Transport (DoT). It is a declared port under the

*Shipping and Pilotage Act 1967*. Wyndham Port is proposed to fall under the jurisdiction of the Kimberley Ports Authority to be created following the DoT Ports Review. The port is currently not licensed by the Department of Environment Regulation (DER) to handle lead, silver and zinc. The proponent is working with CGL to have the licence amended. The DoT is also currently carrying out major upgrade works on the port.

The port is currently listed as a contaminated site under the *Contaminated Sites Act 2003*. There is historical contamination at the port from previous transport of nickel, lead and zinc as well as other port activities (e.g. hydrocarbon storage).

Baseline monitoring is being undertaken to determine existing levels of lead and other metals in the sediment at the port. This will help to determine if any future elevated readings in the sediment can be attributed to the implementation of the Sorby Hills proposal or are the result of historical activities. Testing to determine the lead isotope signature of the Sorby Hills deposit would also aid in determining if any elevated readings of lead are attributable to the Sorby Hills proposal.

Based on the results of testing the proponent has detailed a number of management measures and contingency actions in the PER (section 7.2.9.4) and the POEMP should elevated levels of silver, lead or zinc be detected. These include providing baseline data on current levels of contamination, ongoing soil and sediment sampling throughout the life of the operation, and operating procedures that take into account wind direction and velocity.

## **Submissions**

There were no submissions received on this factor.

## **Assessment**

*The EPA's objective for this factor is to maintain the quality of water, sediment, and biota so that the environmental values, both ecological and social, are protected.*

Due to the high tidal movements, any fugitive concentrate is unlikely to be detected in the water column, however it could settle and accumulate within the sediment. Therefore a sediment monitoring program is proposed by the proponent. Monitoring will be undertaken at six points around the port. Should the sediment monitoring show elevated levels of lead, silver or zinc, then ecotoxicological testing of marine fauna, particularly mussels and mud crabs, will be undertaken to determine the risk of consumption of seafood. The proponent has indicated that sampling methodology will be in line with methods currently used at the port and in consideration of the *State Environmental (Cockburn Sound) Policy 2005*.

Port operations are required to comply with Dangerous Goods regulations and the port will also require licensing under Part V of the EP Act as a prescribed premise. Through the Part V licensing process DER can place conditions on the storage and handling of the lead at the port as well as monitoring.

The EPA considers that the management strategies proposed by the proponent will reduce the likelihood of impacts to the marine environment from concentrate handling.

The minimum moisture content for the concentrate in the Rotabox containers is specified in Schedule 1 of the Recommended Conditions.

As a precaution, the EPA has recommended condition 7, 'Concentrate handling, storage and transport', to ensure that no concentrate is discharged to the marine environment. As part of this condition, the EPA has recommended a monitoring program to determine whether concentrate discharges and accumulates in the sediment to a level that exceeds the recommended sediment quality guidelines in the ANZECC *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (Table 3.5.1 of the ANZECC Guidelines). Condition 7 'Concentrate handling, storage and transport' also specifies that the lead isotope signature of the Sorby Hills deposit be established to aid in determining if any lead detected above background levels at the port is due to implementation of the Sorby Hills proposal.

Having regard to the:

- specification of the use of sealed 'Rotabox' containers for the transport of concentrate and the minimum concentrate moisture content in Schedule 1 of the draft recommended conditions;
- proponent's proposed measures to prevent concentrate discharge at Wyndham Port and the EPA's recommended condition 7, 'Concentrate handling, storage and transport' to ensure the necessary monitoring and management are implemented; and
- port operating under a DER licence as a prescribed premise,

it is the EPA's opinion that the proposal can be managed to meet its environmental objective for this factor, providing that condition 7 'Concentrate handling, storage and transport' is imposed.

### **3.4 Closure and rehabilitation**

The Sorby Hills proposal involves the disturbance of 573 ha of vegetation, so effective mine closure planning and rehabilitation will be required. Other issues that will require careful management during decommissioning and closure include the TSF, pit voids, evaporation ponds and evaporation basin.

There are no permanent waste rock dumps proposed for the project; all waste material not used in project construction would be used for backfilling of pit

voids. There is not enough available waste rock to fill all of the mine voids and one pit void (C-pod) will be partially backfilled, resulting in the formation of a shallow pit lake.

The proponent engaged Soil Water Consultants to model and predict the water quality for the pit lake (C-Pod), as well as the voids that are proposed to be completely backfilled, for a period of 500 years. The modelling indicates that the pit lake, being only nine metres deep with a large surface area, is likely to be oxidised all year round, and that water quality is unlikely to exceed the *Long Term Irrigation Guidelines* (2000) for all measured contaminants.

Water quality predictions from the proponent indicate that the pit lake will not become acidic over time due to the natural buffering capacity of the host rock around the mine void (e.g. limestone and dolomite). The studies undertaken have indicated that there is a suitable level of buffering capacity in the limestone and dolomite present at Sorby Hills that will prevent the pit lake becoming acidic. In response to comments by the DER, the proponent has committed to undertaking kinetic testing to further refine predictions about how the pit lake will behave after closure.

The mine voids which will be completely backfilled with waste rock may be used for the storage of Potentially Acid Forming (PAF) materials excavated during mining. The proponent has committed to placing host rock with a high acid buffering capacity around the PAF to ensure any acid generated is neutralised.

On completion of mining, stockpiled Non Acid Forming (NAF) waste will be used to cap the TSF during rehabilitation. On eventual decommissioning the TSF will remain as a permanent feature of the landscape. The proponent has concluded that most of the tailings material will be non-acid forming and that the potential for acid rock or metalliferous drainage is low. The NAF waste rock layer will minimise dust generation from the dried tailings, provide a growth support medium and create a capillary break that will prevent upward migration of saline water from the tailings surface.

## **Submissions**

Submissions received on this factor included matters relating to:

- further kinetic testing to characterise waste rocks;
- management and design of TSF; and
- encapsulation of PAF material.

## **Assessment**

*The EPA's environmental objective for rehabilitation and closure is to ensure that premises can be closed, decommissioned and rehabilitated in an ecologically sustainable manner, consistent with agreed outcomes and land uses, and without unacceptable liability to the State.*



The EPA considers that the greatest risk to pit lake water quality is acid generation. For many acid sulfate soil investigations it has been found that armouring of larger carbonate fragments in soil (e.g. shell fragments) and limestone can lead to the acid-buffering capacity of materials reducing. For this reason, further refinement of the acid-buffering capacity of material used to surround the PAF needs to be undertaken. The EPA notes that there are suitable quantities of host rocks on the site with a high buffering capacity, so this work is able to be undertaken through the mine closure planning process with the Department of Mines and Petroleum (DMP).

The large evaporation basin (approximately 100 ha), which is proposed to replace the previously intended artificial wetland, is to be constructed with vegetation left *in situ* in order to reduce potential impacts from dust that may be generated from the pond. The EPA notes that the dust from the pond can be managed appropriately through the development of a mining proposal and mine closure plan with the DMP.

Having particular regard to:

- there being no permanent waste rock dumps;
- all waste material not used in project construction being used for backfilling of pit voids; and
- the ability of the DMP to manage Closure and Rehabilitation using the DMP/EPA *Guidelines for preparing Mine Closure Plans*,

it is the EPA's opinion that the proposal can be managed to meet its objective for this factor. It has therefore not recommended a condition for closure and rehabilitation.

### **3.5 Environmental principles**

In preparing this report and recommendations, the EPA has had regard for the object and principles contained in s4A of the EP Act. Appendix 3 contains a summary of the EPA's consideration of the principles.

## **4. Conditions**

Section 44 of the EP Act requires the EPA to report to the Minister for Environment on the key environmental factors relevant to the proposal and on the conditions and procedures to which the proposal should be subject, if implemented. In addition, the EPA may make recommendations as it sees fit.

### **4.1 Recommended conditions**

Having considered the information provided in this report, the EPA has developed a set of conditions that the EPA recommends be imposed if the

proposal by Sorby Management Pty Ltd to develop a silver, lead and zinc mine with infrastructure and processing facilities approximately 50 km north of Kununurra with the concentrate produced and transported by road and shipped through Wyndham Port, is approved for implementation.

These conditions are presented in Appendix 4. Matters addressed in the conditions include the following:

- (a) ensuring that storage and loading of the of the concentrate is managed to ensure no lead, silver or zinc escapes into the environment; and
- (b) monitoring groundwater vegetation to ensure that drawdown associated with the proposed mine does not cause a reduction in health.

It should be noted that other regulatory mechanisms relevant to the proposal are:

- *Dangerous Goods Safety Act 2004*
- Part V of the *Environmental Protection Act 1986*
- *Contaminated Sites Act 2003*
- *Mining Act 1978*
- *Mines Safety and Inspection Act 1994*
- *Occupational Health and Safety Act 1984*

## 4.2 Consultation

In developing these conditions, the EPA consulted with the proponent, the DER, the DMP, the Department of Parks and Wildlife (DPaW), and the Department of Water (DoW), in respect of matters of fact and matters of technical or implementation significance. Minor changes, which did not change the intent or scope, were made to conditions 6 and 7.

## 5. Other advice

The EPA has noted that the proposed management of the mine void at closure is fundamental to successful long-term management of the site post-closure.

The EPA notes that closure and rehabilitation is able to be managed by the DMP under the provisions of the *Mining Act 1978* and advises the DMP that there is a need for further testing of materials (kinetic testing) and progressive development of a pit lake model in order to refine predictions about how the pits will behave after closure.

The EPA notes acid generation has the greatest potential to impact on pit lake and groundwater quality and accurate assessment of the acid-buffering

capacity of material used to surround the PAF is required, to ensure a suitable quantity of material with a high acid-buffering capacity is placed around the PAF.

In addition to this, the EPA advises that more detailed modelling of the lake that will form in the void of C-Pod is required. This is to ensure that it meets water quality requirements of the area, e.g. birds and irrigation water. The development of the model should occur progressively during operations with the incorporation of geochemical and monitoring data, such as those from kinetic testing of geological units and waste rock, wall fractures and water washed from pit walls, water collected at the bottom of the pit, groundwater and water sampled during dewatering, to ensure there is a suitable model for calibration with the monitoring of the pit lake after mine closure.

The EPA advises the DMP that the proposed large evaporation basin has the potential to generate dust and will need to be managed in line with the *DMP/EPA Guidelines for Preparing Mine Closure Plans*.



# **Appendix 1**

**List of submitters**

**Organisations:**

Department of Water

Department of Environment and Conservation (Now DPaW and DER)

Department of Mines and Petroleum

Department of Health

Department of Indigenous Affairs (now DAA)

# Appendix 2

## References

Sorby Management Pty Ltd (2013) *Public Environmental Review Sorby Hills Silver Lead Zinc Project, Tenements M80/197 & M80/286* September 2013

EPA (1993) *Draft Western Australian Water Quality Guidelines for Fresh and Marine Waters*. Environmental Protection Authority Bulletin 711, October 1993.

Department of Mines and Petroleum/Environmental Protection Authority (2011) *Guidelines for Preparing Mine Closure Plans*. Department of Mines and Petroleum and Environmental Protection Authority, June 2011.

Environmental Protection Authority (2004) *EPA Guidance Statement 51: Guidance for the Assessment of Environmental Factors – Terrestrial Flora and Vegetation Surveys for Environmental Impact Assessment in Western Australia*. June 2004.



# **Appendix 3**

**Summary of identification of key environmental factors and principles**

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
<b>Land</b>			
<p>Flora and Vegetation</p>	<p>The proposal requires clearing of 573 hectares (ha) of native vegetation for mine pits, mine infrastructure, ore processing facilities, and tailings storage facility.</p> <p>Level 2 flora surveys were undertaken in 2011 and 2012. The surveys recorded 334 taxa, representing 69 families and 201 genera.</p> <p>The project supports eight vegetation units, the health ranking of which ranges from excellent to completely degraded. Previous pastoral grazing in the area has contributed to the degraded nature of some of the vegetation.</p>	<p><b>Department of Environment and Conservation (DEC) (now the Department of Parks and Wildlife - DPaW)</b></p> <ul style="list-style-type: none"> <li>• That the proponent clarifies the impacts of the project on priority listed flora. It is unclear what impact the proposal will have on priority flora. The proponent needs to clarify what the actual percentage impacts are on priority species.</li> <li>• Proponent needs to discuss planting requirements for conservation significant species with DEC before any translocation is undertaken.</li> <li>• Weeds need to be managed to avoid impacts on the adjacent Goomig conservation park.</li> </ul>	<p>As the clearing of 573 ha of native vegetation includes priority flora species <b>Flora and Vegetation is considered to be a Key Environmental Factor. See Section 3.1</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>The surveys did not record any Threatened Ecological Communities (TECs) or listed Declared Rare Flora (DRF).</p> <p>The project tenements support two areas of a Priority 1 Priority Ecological Community (PEC) being 'Monsoon vine thickets of limestone ranges'. The proponent has committed to a self-imposed Development Exclusion Boundary (DEB) to avoid impacts on the PEC.</p> <p>Baseline surveying in 2011 identified ten priority flora species and four potential new species. Following additional survey work in 2012, the delineation of the development exclusion zone and further definition of the Project Development Envelope (PDE) it was determined that five priority flora species and no potential new species would be directly impacted by the proposal.</p>		

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>For the five priority flora species the Public Environmental Review (PER) document discusses the regional distribution, including distributions as shown on the DEC's FloraBase database. All species have been recorded at other sites in the Kimberley.</p> <p>The proponent indicates that there is unlikely to be any impacts on Groundwater Dependent Ecosystems or Vegetation.</p>		
Terrestrial Fauna	<p>The proposal would involve the clearing of 573 ha of fauna habitat which has the potential to impact on fauna species. Fauna mortality is also expected to occur from collisions as a result of vehicle movement. Potential indirect impacts on fauna are from noise and light spill, increased feral animal populations and altered fire regimes.</p> <p>A Level 2 fauna survey was</p>	<p><b>DEC (now DPaW)</b></p> <ul style="list-style-type: none"> <li>The Gouldian Finch Management Plan indicates that the proponent intends to create nest boxes that will be strategically placed around the site, adjacent to the PDE. The DEC considers that this strategy is inconsistent with the national recovery plan for this species.</li> </ul>	<p>The Department of Sustainability, Environment, Water, Population and Communities (SEWPaC, now the Department of the Environment - DotE) is satisfied with the proponent's approach to managing the impacts on fauna and does not consider this a controlled action, provided the</p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>carried out for the Sorby Hills project in 2011. Other surveys have been carried out in the area between 1996 and 2009, principally associated with Ord River Irrigation Scheme.</p> <p>Based on previous studies, database searches and known habitat requirements, 134 species of reptiles, amphibians and non-flying mammals are expected to occur in the project area. Of these 48 species were trapped or collected during the 2011 survey, being 25 reptiles, 15 amphibian and eight non-flying mammals. Ten bats species and 113 bird species were also observed during the 2011 survey.</p> <p>State or Federally listed conservation significant species identified as occurring or likely to occur in the project area include the Freshwater Crocodile, Gouldian Finch, Rainbow Bee-</p>		<p>project was carried out in a manner specified by SEWPaC.</p> <p><b>Terrestrial Fauna is not considered to be a Key Environmental Factor.</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>eater, Cattle Egret, Eastern Great Egret and the Magpie Goose.</p> <p>Priority fauna species recorded are Short-tailed mouse, <i>Noble Snake-eyed Skink</i>, Australian Bustard and Bush Stone-curlew.</p> <p>The proponent considered the likelihood of Short Range Endemic (SRE) species occurring in the project area in accordance with EPA Guidance Statement No. 20 <i>Sampling of Short Range Endemic Invertebrate Fauna for Environmental Impact Assessment in Western Australia</i>. There are two broad habitat types in the project area, upland sandstone of Sorby Hills and the cracking clay floodplain of the Knox Creek Plain. The direct disturbance for the project will occur on the cracking clay floodplain and this habitat type is continuous and extends beyond the project area. The proponent determined that due to</p>		

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>a lack of discontinuous or disjunct habitat types that may promote endemism, surveying for SRE species was not required. The DEC approved of this approach.</p> <p>Whilst vine thickets are known to support SRE species. The Monsoon vine thickets adjacent to the proposal area have been included in a self-imposed DEB and are not expected to be impacted.</p>		
Subterranean Fauna	<p>The Sorby Hills project may impact on subterranean fauna through the excavation of ore and through water abstraction associated with the project.</p> <p>A desktop analysis of previous troglofauna records in the area identified a moderately rich array of troglofauna species, none of which are currently listed as specially protected under State or Federal legislation. The desktop</p>	<b>No submissions were received on this factor.</b>	<p>As the habitat for subterranean fauna is likely to be well connected with other habitat outside the impact area</p> <p><b>Subterranean fauna is not considered to be a Key Environmental Factor.</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>study indicated that no species had previously been collected from within the project tenements.</p> <p>The lack of troglofauna records, together with the occurrence of very fine grained alluvial sediments unlikely to contain extensive interconnected voids, and the generally shallow water table and likely seasonal inundation, suggest that significant troglofauna communities are unlikely to occur in the area of proposed mining.</p> <p>A desktop analysis for stygofauna indicated the potential presence of stygobitic species. As a result a survey was conducted in accordance with EPA guidance statements. Ten species were identified during the survey, all of which are considered new to science. All but one of the species was collected outside of the impact footprint of the project.</p>		



Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>The single species collected from within the impact area is an Ostracoda species. Another Ostracoda species was amongst the ten species collected during the surveying. The collection of this second species outside the project footprint demonstrates habitat continuity for ostracod species outside the area of impact.</p>		
<b>Water</b>			
Hydrological Processes	<p>The project has the potential to impact on the hydrology and hydrogeology of the area through changed flooding patterns as a result of altered surface water flow, dewatering impacting on aquifers and discharge of water from the project.</p> <p>The project sits within the upper portions of the Knox Creek and Keep River catchments. The project is located on an area of floodplain which is seasonally inundated with water. No</p>	<p><b>Department of Water (DoW)</b></p> <ul style="list-style-type: none"> <li>The proposal is located within the Canning-Kimberley groundwater area, the Ord River and Tributaries surface water area and the Ord Irrigation District, all of which are proclaimed under the <i>Rights in Water and Irrigation Act 1914</i>. Therefore a 5C license to take water is required for the project. The PER has not included enough information for a thorough assessment of the dewatering related impacts. However based on the information that has been included, the DoW considers that dewatering can be</li> </ul>	<p>As the DoW can adequately manage the dewatering from the project and the hydrological impacts of the project on surface water flows are not expected to be significant given the project design and unlikely significant downstream impacts <b>Hydrological processes is not considered to be a Key Environmental Factor.</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>significant drainage lines occur within the project area. Surface drainage from the project area flows away from the nearby Ord River Irrigation Area Stage II project. Alterations of surface water flow patterns due to the Sorby Hills project should not impact on the Ord Stage II project.</p> <p>Hydrogeological investigations have determined that two fractured rock aquifers are found within the project area. These are two separate confined aquifers within dolomite units.</p> <p>The project will require dewatering of up to 1 gigalitre per annum. Modelling of the drawdown indicated an area of influence of 500 metres (m), which will limit the impacts on aquifers to the vicinity of the pits. Groundwater flow direction is also away from the Ord Stage II project and the drawdown of groundwater from dewatering is</p>	<p>adequately assessed and managed through the DoW licensing process.</p> <ul style="list-style-type: none"> <li>The DoW is satisfied with the proposed construction and management measures which consider a 1 in 100 year, 72 hour flood event. It is important to note that with the development of the Ord Stage 2, the hydrology of the Weaber Plain will change. The hydrological impacts of this will need to be considered by the proponent.</li> </ul>	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>not predicted to impact on the irrigation area.</p> <p>Discharge of excess water from the project will be to an evaporation pond. No discharge to natural waterways is proposed.</p> <p>It is expected that further expansion of the Ord River Irrigation Area will have a larger impact on hydrological processes in the area compared to the Sorby Hills project.</p>		
Inland Waters Environmental Quality	<p>The project has the potential to impact on surface water quality through an increase in sediment loads as a result of surface disturbance, contamination of water due to hydrocarbon and other chemical use, and geochemical changes in pit voids.</p> <p>Surface water in the area has naturally shown elevated levels of aluminium, cobalt, chromium,</p>	<p><b>DoW</b></p> <ul style="list-style-type: none"> <li>The DoW considers that the project has the potential to impact on groundwater quality. The DoW recommended a number of sites for establishing groundwater monitoring bores. These bores should be constructed as soon as possible to allow establishment of baseline conditions.</li> <li>The location of groundwater monitoring bores within the mine site needs to be</li> </ul>	<p><b>Inland waters environmental quality is not considered to be a Key Environmental Factor.</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>copper and zinc. In addition thallium has been recorded during testing, but at levels below the United States EPA safe limit (there is no guideline value in Australia at present).</p> <p>Groundwater in the area also shows elevated levels of some parameters, including aluminium, arsenic, cadmium, cobalt, chromium, copper, lead, zinc and thallium. Given the mineralised nature of the aquifer, naturally elevated levels are not unexpected.</p>	<p>reviewed to ensure their location and numbers are adequate for a mine site monitoring project.</p> <ul style="list-style-type: none"> <li>The DoW considers the parameters in the surface water modelling program are adequate but recommended additional monitoring requirements at Knox Creek and Keep River.</li> </ul>	
<b>Sea</b>			
Marine Environmental Quality	The project involves the shipping of concentrate from Wyndham Port. No new infrastructure will be required at the port to facilitate the Sorby Hills project or change in current dredging schedules. The principal potential impacts are the loss of concentrate into the marine	<b>No submissions were received on this factor</b>	The measures taken to protect humans from being impacted by fugitive concentrate escaping into the environment, will also reduce the likelihood of impacts on the marine environment. Particularly

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>environment.</p> <p>Wyndham Port is located on the West Arm Estuary of the Cambridge Gulf. The Cambridge Gulf is highly turbid and experiences large tidal movements and strong tidal currents.</p> <p>Wyndham Port is currently listed as a contaminated site under the <i>Contaminated Sites Act</i>. There is historical contamination at the port from previous transport of nickel, lead and zinc as well as other port activities.</p> <p>Due to the high tidal movements any fugitive concentrate are unlikely to remain in the water column, however it could settle and accumulate within the sediment.</p> <p>A sediment monitoring program has been proposed at sites around the port. Should sediment</p>		<p>as one of the main exposure pathways for humans is consumption of contaminated seafood. Therefore the assessment of Human Health as a key environmental factor reduces the risk of impacts to the marine environment. However, given the potential for significant impacts on the marine environment through discharge of concentrate at the port facility <b>Marine Environmental Quality is considered to be a Key Environmental Factor. See Section 3.3</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>monitoring indicate the presence of lead, silver or zinc in the sediment then testing of marine fauna, particularly mussels and mud crabs, will be undertaken. Additional management measures and contingency actions are detailed in the PER and the Port Operations Environmental Management Plan.</p>		
<b>Air Quality</b>			
Air quality	<p>The project is expected to result in air emissions, particularly dust from construction and operations. Sources of dust include vegetation clearing and topsoil removal, wind erosion of cleared areas, drilling and blasting activities, vehicle movement and ore handling.</p> <p>Due to the remote location and prevailing wind conditions, dust is not predicted to have an impact on sensitive receptors. With the nearest sensitive receptors being agricultural land and conservation</p>	<p><b>DEC (these comments are from the part of the DEC that now sits within the Department of Environment Regulation (DER))</b></p> <ul style="list-style-type: none"> <li>The standards for dust monitoring specified in the PER are incorrect and not in accordance with the DEC 2011 dust guideline <i>A Guideline for Managing the Impacts of Dust and Associated Contaminants from Land Development Sites, Contaminated Sites Remediation and Other Related Activities</i>.</li> </ul>	<p>The proponent has committed to monitoring the impacts of dust as per the DER's guidelines. Dust would be controlled by implementation of a range of management measures as listed in the PER.</p> <p><b>Air quality is not considered to be a Key Environmental Factor.</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>reserves. The mostly likely impact of dust will be on the employees of the company.</p> <p>The proponent has installed dust monitors onsite to allow collection of baseline data for its proposed dust monitoring program. Standard industry dust management procedures are proposed to control the amount of dust.</p> <p>The proponent will need to comply with the <i>Mines Safety and Inspection Act 1994</i> in order to safeguard employees from dust impacts. The proponent has also recognized that it will need to comply with the dust related provisions of the <i>Environmental Protection Act 1986 (EP Act)</i>.</p>		
<b>People</b>			
Amenity	Principal amenity impacts from the proposal will be due to noise and light and from visual impacts.	<b>No submissions were received on this factor</b>	Given that the proponent is required to comply with Part V of the EP Act and the Environmental

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>Noise will be generated from construction and operation of the project, with the largest potential impact, based on the location of sensitive receptors, is the increased truck movements through the town of Wyndham.</p> <p>The DEC provided comment during the preparation of the PER document that it considered the noise impacts could be managed to meet noise regulations as the number of truck movements will be minimal (12 per week) and restricted to daylight hours.</p> <p>Mobile and fixed lighting will be located to reduce light emissions outside the project area where practicable and lights will be shrouded to limit light spill. It is anticipated that impacts from lighting can be managed such that impacts on amenity are not significant.</p>		<p>Protection (Noise) Regulations 1997 distance to any sensitive receptors. <b>Amenity is not considered to be a Key Environmental Factor.</b></p>



Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>The proponent proposes to use vegetation screens to minimise the visual impacts of the proposal as well as utilizing areas that are already disturbed. No permanent waste rock dumps or other stockpiles are proposed that will impact on the landscape post closure.</p>		
Heritage	<p>The Sorby Hills Project lies within the traditional lands of the Miriwung Gajerrong (MG) people. The tenements for the project were granted before native title existed. However previous owners of the tenements negotiated a Heritage Protection Agreement between the owners of the tenements and the MG Corporation. As part of this agreement the proponent has committed to developing an Memorandum of Understanding with the MG Corporation for the operation of the Sorby Hills project.</p>	<p><b>Department of Indigenous Affairs (DIA) (now the Department of Aboriginal Affairs – DAA)</b></p> <ul style="list-style-type: none"> <li>It is noted in the PER document that there is no registered Aboriginal heritage sites within the project area. The major risk to Aboriginal heritage within the project area appears to be the disturbance of unknown heritage sites. The proponent should give consideration to the risk that cross-cultural education may not enable staff to readily identify potential heritage sites. It may be necessary to employ Traditional Owners or other appropriately qualified person to monitor ground disturbing activities.</li> <li>Miriwung Gajerrong representatives</li> </ul>	<p>Given the results of heritage surveys, the alteration of the project footprint to avoid disturbing a limestone hill and commitment to develop an MOU with Traditional Owners. <b>Heritage is not considered to be a Key Environmental Factor.</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>Desktop and on-ground archaeological and ethnographic assessments have been carried out for the Sorby Hills Project, with input from the MG people.</p> <p>The archaeological surveys did not record any archaeological material.</p> <p>As a result of the ethnographic survey the project footprint was altered to exclude a small limestone hill. The MG Corporation indicated in writing (Appendix 34 of the PER) that there was no heritage issues with the works proposed in the draft Mining Proposal for the project.</p> <p>The proponent has developed an Aboriginal Cultural Heritage Management Plan for the proposal which contains management measures to be adopted should previously unidentified sites of significance be encountered. The</p>	<p>have previously expressed concern about the potential effects water drawn from the site may have on the Keep River. The PER document indicates that there will be no impact to indigenous water sources. The DIA does not have the expertise to assess the impacts of the dewatering on the immediate environment and the Keep River. The EPA assessment should ensure that water drawn from the site will not have any negative impacts on the immediate environment and the Keep River.</p>	

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>proponent is aware of their obligations to obtain clearance under section 18 of the <i>Aboriginal Heritage Act 1972</i> if any sites are to be disturbed.</p>		
Human Health	<p>There is potential for the significant impacts to human health through the loss of the concentrate produced by the project, with lead being of particular concern.</p> <p>Potential exposure pathways are through direct escape of the concentrate during shipping, road transportation, and storage of the concentrate or from consumption of seafood that has become contaminated through loss of concentrate during activities at Wyndham Port.</p>	<p><b>Department of Health (DoH)</b></p> <ul style="list-style-type: none"> <li>The DoH has reviewed the PER document and acknowledges that the use of sealed Rotabox containers to transport the concentrate will not adversely affect the amenity and health of the residents of Wyndham and Aboriginal communities along the route.</li> </ul> <p>The DoH remains concerned with the dust exposure of workers at the port. It is noted however that the PER includes additional environmental management strategies indicating that personal protective equipment requirements will be adopted and enforced for work areas where dust is not managed to an acceptable level and that visual monitoring of dust will be regularly conducted and activities will be halted if</p>	<p>Due to the potential for exposure to lead concentrate to cause significant health impacts, <b>Human Health is considered to be a Key Environmental Factor. See Section 3.2</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
		<p>adverse conditions result in excessive dust generation.</p> <p>It is the proponent's responsibility to ensure fugitive dust emissions are minimised and managed appropriately. A log of observations and subsequent actions should be kept to ensure ongoing monitoring.</p>	
<b>Integrating factors</b>			
Rehabilitation and closure	<p>As the proposal involves the disturbance of 573 hectares of vegetation, effective mine closure planning and rehabilitation will be required.</p> <p>Other issues that will require careful management during decommissioning and closure include the TSF; any pit voids once mining ceases.</p> <p>Waste characterisation for the project has indicated that there is low potential to produce acid and</p>	<p><b>Department of Mines and Petroleum (DMP)</b></p> <ul style="list-style-type: none"> <li>The Department for Mines and Petroleum has confirmed that it can manage closure under the provisions of the <i>Mining Act 1978</i>.</li> </ul> <p><b>DEC (comment from the now DER)</b></p> <p>The DEC has previously provided advice on waste characterisation and many of the issues raised have been taken into consideration. However tailings materials are expected to contain thallium, lead and zinc. Thallium is of particular concern due to its specific mobility and high environmental</p>	<p>It is considered that mine closure can be managed by the DMP through the requirements to develop a mine closure plan under the Mining Act. However given the PER document still refers to the artificial wetland, there is a need to inform the public that this element of the proposal has been modified to reduce impacts.</p> <p><b>Rehabilitation and</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>metalliferous drainage (AMD). Whilst there is high sulphur content in some of the sedimentary units, these units contain a high buffering capacity due to the presence of limestone and dolomite. There is localised presence of potentially acid forming (PAF) materials in the pit areas. This PAF material is proposed to be managed through encapsulation in D Pod. The encapsulation cell is predicted to be covered with water within 6 months of dewatering ceasing, which will prevent ongoing oxidation of the PAF material. The proposal does not involve the creation of any permanent waste rock dumps.</p> <p>Poor closure of the tailings storage facility (TSF) may cause long term environmental impacts if poor closure techniques are employed. Particularly due to the presence of some environmentally harmful</p>	<p>toxicity. Static tests described in Appendix 5 are not sufficient to demonstrate that thallium will remain immobile. The DEC reiterates previous advice that kinetic leaching tests are required.</p> <ul style="list-style-type: none"> <li>• The proponent has proposed that the C Pod void be turned into an artificial lake at mine closure. DEC's preference is for all mine voids to be backfilled to a level that prevents the formation of permanent lakes.</li> <li>• Given the proximity of the proposal to the Goomig conservation park, the DEC requests the opportunity to review the mine closure plan to ensure any residual risks to and impacts on the proposed conservation park are adequately avoided or minimised.</li> </ul>	<p><b>closure is considered to be a Key Environmental Factor. See Section 3.4</b></p>

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>metals in the tailings materials, including thallium, lead and zinc.</p> <p>The proponent has carried out static test work on the tailings. However kinetic testing is required to fully characterise the leachate from the tailings. The proponent has committed to carrying out kinetic testing during operations to ensure that management measures for the TSF are appropriate and do not create lasting issues post-closure.</p> <p>The proponent has predicted that the risk of metal leaching from the TSF in the long term is low, as the metals will not be mobile in the leachate and the clays at the base of the TSF base have a low permeability. Appendix 9, Volume 3 of the PER document contains detailed design and management information for closure of the TSF.</p> <p>The proposal is to backfill D and E</p>		

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>Pod above water table and partially backfill C Pod to a level that is still below water table. C Pod will not be able to be entirely backfilled due to a lack of available waste material and will have a pit void.</p> <p>A mine closure plan to the satisfaction of the DMP is required to be prepared for this project in accordance with the DMP/EPA <i>Guidelines for preparing mine closure plans</i>. The proponent has committed to consulting the DPaW and DER when preparing the mine closure plan.</p>		
Offsets	The clearing of 573 hectares of vegetation does not include any TECs or DRF. There is a PEC (Monsoon vine thickets of limestone ranges) adjacent to the project. However the proponent has committed to a self-imposed Development Exclusion Boundary	<b>No submissions were received on this factor</b>	Given the measures taken to avoid, minimise, rectify and reduce impacts from the proposal, no significant residual impacts are expected to remain that would require offsets.

Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	<p>that will prevent impacts to the PEC.</p> <p>Vegetation condition ranges from completely degraded to excellent. Where possible the proponent has sited infrastructure in areas of vegetation of lower condition such as areas previously cleared for pastoral activities.</p> <p>The nationally protected Gouldian Finch has been recorded in the project area. The proponent referred the project to the SEWPaC and it was deemed not a controlled action, provided the project was carried out in a manner specified by SEWPaC. The area covered by the DEB also includes Gouldian Finch habitat. In addition the proponent is working with the Save the Gouldian Fund and installing 100 artificial nest boxes and carrying out further targeted surveys.</p>		<p><b>Offsets is not considered to be a key environmental factor</b></p>



Preliminary Environmental Factors	Proposal Characteristics	Government Agency and Public Comments	Identification of Key Environmental Factors
	In accordance with EPA Guidance Statement No. 19 <i>Environmental Offsets – Biodiversity</i> the proponent has completed the environmental offsets reporting form.		

PRINCIPLES		
Principle	Relevant Yes/No	If yes, Consideration
<p>1. The precautionary principle  <i>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.</i>  <i>In application of this precautionary principle, decisions should be guided by –</i>  <i>(a) careful evaluation to avoid, where practicable, serious or irreversible damage to the environment; and</i>  <i>(b) an assessment of the risk-weighted consequences of various options.</i></p>	YES	<p>In considering this principle, the EPA notes the following:</p> <ul style="list-style-type: none"> <li>• Investigations of the biological and physical environment have provided background information to assess risks and identify measures to avoid or minimise impacts.</li> <li>• The assessment of these impacts and management is provided in Section 3 of this report.</li> <li>• Conditions have been recommended as considered</li> </ul>

		necessary.
<p>2. The principle of intergenerational equity  <i>The present generation should ensure that the health, diversity and productivity of the environment is maintained and enhanced for the benefit of future generations.</i></p>		
	YES	The proposal would result in the loss of vegetation and alteration of landforms that require rehabilitation. Flora and Vegetation are relevant environmental factors discussed in this report and conditions have been recommended to ensure minimal impact. Mine closure and rehabilitation for the project will be managed according to DMP and EPA guidelines.
<p>3. The principle of the conservation of biological diversity and ecological integrity  <i>Conservation of biological diversity and ecological integrity should be a fundamental consideration.</i></p>		
	YES	The proposal would result in impacts on priority flora species. These impacts have the potential to affect biological diversity/integrity. The proponent has taken steps to reduce the footprint of the proposal, including a self-imposed Development Exclusion Boundary that protects high value habitat. Flora and vegetation is the key environmental factor discussed in this report.
<p>4. Principles relating to improved valuation, pricing and incentive mechanisms  <i>(1) Environmental factors should be included in the valuation of assets and services.</i>  <i>(2) The polluter pays principles – those who generate pollution and waste should bear the cost of containment, avoidance and abatement.</i>  <i>(3) 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 waste.</i>  <i>(4) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structure, including market mechanisms, which enable those best placed to maximize benefits and/or minimize costs to develop their own solution and responses to environmental problems.</i></p>		
	YES	The proposal would require decommissioning and

		rehabilitation. The proponent should bear the cost of any potential pollution, containment, monitoring, management, decommissioning, rehabilitation and closure.
<p>5. The principle of waste minimisation  <i>All reasonable and practicable measures should be taken to minimize the generation of waste and its discharge into the environment.</i></p>		
	YES	<p>In considering the proposal, the EPA notes that waste from the proposal is proposed to be used to backfill pits and no permanent waste rock landforms will be created.</p> <p>Other waste products would be created as a result of implementation of the proposal, and would be disposed of according to relevant regulations and legislation.</p>

# **Appendix 4**

## **Identified Decision-making Authorities and Recommended Environmental Conditions**

## Identified Decision-making Authorities

Section 44(2) of the *Environmental Protection Act 1986* (EP Act) specifies that the EPA's report must set out (if it recommends that implementation be allowed) the conditions and procedures, if any, to which implementation should be subject. This Appendix contains the EPA's recommended conditions and procedures.

Section 45(1) requires the Minister for Environment to consult with decision-making authorities, and if possible, agree on whether or not the proposal may be implemented, and if so, to what conditions and procedures, if any, that implementation should be subject.

The following decision-making authorities have been identified for this consultation:

<b>Decision-making Authority</b>	<b>Approval</b>
1. Minister for Water	<i>Rights in Water and Irrigation Act 1914</i> Water extraction licence
2. Minister for Aboriginal Affairs	<i>Aboriginal Heritage Act 1972</i> s18 approval
3. Minister for Environment	<i>Wildlife Conservation Act 1950</i> Taking of protected flora and fauna
4. Director Environment Division, Department of Mines and Petroleum	<i>Mining Act 1978</i> Approval of mining proposal
5. Director General, Department of Mines and Petroleum	<u>Dangerous Goods</u> <i>Dangerous Goods Safety Act 2004</i> ; Storage and handling of hazardous materials <b>Chief Dangerous Goods Officer</b>  <u>Mine Safety</u> <i>Mines Safety and Inspection Act 1994</i> <b>District Inspector, Resources Safety Branch</b>
6. Director General Department of Environment Regulation	Part V EP Act Works approval and licence
7. Executive Director, Public Health, Department of Public Health	<i>Health Act 1911</i>  Health (Treatment of Sewage and Disposal of Effluent and Liquid Waste) Regulations

	Drains, sanitary conveniences, and any apparatus for the treatment of sewage intended to serve a building that is not a single dwelling or any other building that produces more than 540 litres of sewage per day
8. Shire of Wyndham East Kimberley (the permit authority under the <i>Building Act 2011</i> )	<i>Building Act 2011</i> Any building

Note: In this instance, agreement is only required with DMAs 1, 2 & 3 since these DMAs are Ministers.

RECOMMENDED ENVIRONMENTAL CONDITIONS

**STATEMENT THAT A PROPOSAL MAY BE IMPLEMENTED  
(PURSUANT TO THE PROVISIONS OF THE  
ENVIRONMENTAL PROTECTION ACT 1986)**

Sorby Hills Silver Lead Zinc Project

**Proposal:** The proposal is to develop a silver, lead and zinc mine, associated infrastructure and processing facilities approximately 50 kilometres north of Kununurra, with the concentrate produced transported by road and shipped through Wyndham Port.

The Proposal is further documented in Schedule 1 of this statement

**Proponent:** Sorby Management Pty Ltd  
Australian Company Number 145 292 486

**Proponent Address:** Level 3  
2 Elizabeth Plaza  
NORTH SYDNEY NSW 2060

**Assessment Number:** 1920

**Report of the Environmental Protection Authority Number:** 1491

This Statement authorises the implementation of the Proposal described and documented in Columns 1 and 2 of Table 2 of Schedule 1. The implementation of the Proposal is subject to the following implementation conditions and procedures and Schedule 3 details abbreviations and definitions of terms and phrases used in the implementation conditions and procedures.

**1 Proposal Implementation**

1-1 When implementing the proposal, the proponent shall not exceed the authorised extent of the proposal as defined in Column 3 of Table 2 in Schedule 1, unless amendments to the proposal and the authorised extent of the Proposal has been approved under the EP Act.

**2 Contact Details**

2-1 The proponent shall notify the CEO of any change of its name, physical address or postal address for the serving of notices or other correspondence within 28 days of such change. Where the proponent is a corporation or an association of persons, whether incorporated or not, the postal address is that of the principal place of business or of the principal office in the State.

### **3 Time Limit for Proposal Implementation**

- 3-1 The proponent shall not commence implementation of the proposal after the expiration of 5 years from the date of this statement, and any commencement, within this 5 year period, must be substantial.
- 3-2 Any commencement of implementation of the proposal, within 5 years from the date of this statement, must be demonstrated as substantial by providing the CEO with written evidence, on or before the expiration of 5 years from the date of this statement.

### **4 Compliance Reporting**

- 4-1 The proponent shall prepare and maintain a compliance assessment plan to the satisfaction of the CEO.
- 4-2 The proponent shall submit to the CEO the compliance assessment plan required by Condition 4-1 at least six months prior to the first compliance assessment report required by Condition 4-6, or prior to implementation, whichever is sooner.

The compliance assessment plan shall indicate:

- (1) the frequency of compliance reporting;
  - (2) the approach and timing of compliance assessments;
  - (3) the retention of compliance assessments;
  - (4) the method of reporting of potential non-compliances and corrective actions taken;
  - (5) the table of contents of compliance assessment reports; and
  - (6) public availability of compliance assessment reports.
- 4-3 The proponent shall assess compliance with conditions in accordance with the compliance assessment plan required by Condition 4-1.
  - 4-4 The proponent shall retain reports of all compliance assessments described in the compliance assessment plan required by Condition 4-1 and shall make those reports available when requested by the CEO.
  - 4-5 The proponent shall advise the CEO of any potential non-compliance within seven days of that non-compliance being known.
  - 4-6 The proponent shall submit to the CEO the first compliance assessment report 15 months from the date of issue of this Statement addressing the 12 month period from the date of issue of this Statement and then annually from the date of submission of the first compliance assessment report.

The compliance assessment report shall:

- (1) be endorsed by the proponent's Managing Director / General Manager / Chief Executive Officer or a person delegated to sign on the Managing Director's / General Manager's / Chief Executive Officer's behalf;
- (2) include a statement as to whether the proponent has complied with the conditions;



- (3) identify all potential non-compliances and describe corrective and preventative actions taken;
- (4) be made publicly available in accordance with the approved compliance assessment plan; and
- (5) indicate any proposed changes to the compliance assessment plan required by Condition 4-1.

## **5 Public Availability of Data**

5-1 Subject to Condition 5-2, within a reasonable time period approved by the CEO of the issue of this statement and for the remainder of the life of the proposal the proponent shall make publicly available, in a manner approved by the CEO, all validated environmental data (including sampling design, sampling methodologies, empirical data and derived information products (e.g. maps)) relevant to the assessment of this proposal and implementation of this Statement.

5-2 If any data referred to in Condition 5-1 contains particulars of:

- (1) a secret formula or process; or
- (2) confidential commercially sensitive information;

the proponent may submit a request for approval from the CEO to not make this data publically available. In making such a request the proponent shall provide the CEO with an explanation and reasons why the data should not be made publically available.

## **6 Vegetation**

6-1 The proponent shall ensure that groundwater abstraction associated with implementation of the proposal does not cause the loss of vegetation in excess of the 573 hectares clearing approved within the 1045 ha Project Development Envelope as shown in Figure 2 of Schedule 1 and defined by geographic coordinates in Schedule 2.

6-2 To verify that condition 6-1 is being met, the proponent shall develop a Groundwater Dependent Vegetation Monitoring and Management Plan in consultation with the DoW and DPaW to the requirements of the CEO.

The Groundwater Dependent Vegetation Monitoring and Management Plan shall include:

- (1) identification of potential impact monitoring and control sites;
- (2) the design of a survey to acquire baseline data, including groundwater dependent vegetation health and abundance parameters;
- (3) definition of groundwater dependent vegetation health and abundance parameters;
- (4) definition of environmental parameters to be monitored, including groundwater drawdown;
- (5) definition of monitoring frequency and timing;

- (6) identification of criteria to measure decline in groundwater dependent vegetation health; and
  - (7) details of management actions and strategies to be implemented should the criteria defined pursuant to condition 6-2 (6) indicate a decline in groundwater dependent vegetation health that is attributable to the extraction of groundwater for the Sorby Hills Mine.
- 6-3 The proponent shall implement the Groundwater Dependent Vegetation Monitoring and Management Plan required by condition 6-2 prior to the start of dewatering until advised otherwise by the CEO.
- 6-4 Prior to the commencement of dewatering, the proponent shall implement the baseline monitoring survey required by condition 6-2 (2) for all sites identified in condition 6-2 (1) and submit the results to the CEO.
- 6-5 In the event that monitoring required by condition 6-3 indicates a decline in groundwater dependent vegetation health compared with the control sites identified in condition 6-1, the proponent shall provide a report to the CEO within 21 days of the decline being identified which:
- (1) describes the decline or change;
  - (2) provides information which allows determination of the likely root cause of the decline or change; and
  - (3) if considered likely to be the result of activities undertaken in implementing the proposal, proposes the actions and associated timelines to remediate the decline or change.
- 6-6 The proponent shall implement the actions identified in condition 6-5 (3) until the CEO determines that the remedial actions may cease.
- 6-7 The proponent may review and revise the Groundwater Dependent Vegetation Monitoring and Management Plan, to the requirements of the CEO.
- 6-8 The proponent shall review and revise the Groundwater Dependent Vegetation Monitoring and Management Plan as and when directed by the CEO
- 6-9 The proponent shall implement revisions of the Groundwater Dependent Vegetation Monitoring and Management Plan approved under condition 6-7 or required by Condition 6-8.

## **7 Concentrate handling, storage and transport**

- 7-1 The proponent shall ensure that lead, zinc, and/or silver does not discharge to the surrounding environment during unloading, loading, or storage at Wyndham Port.
- 7-2 Prior to the commencement of concentrate production the proponent shall prepare a Wyndham Port Heavy Metals Survey Plan to the requirements of

the CEO with the objective of establishing a pre-development baseline. The Wyndham Port Heavy Metals Survey Plan shall:

- (1) identify sampling sites at Wyndham Port;
- (2) specify the profile depth to be sampled at each site;
- (3) specify the levels of analytical detection required;
- (4) establish the current levels of lead (including the lead isotope signature of the Sorby Hills lead sulphide deposit), silver and zinc present in the sediment at monitoring sites required by Condition 7-2(1) at the time of sampling; and
- (5) be in accordance with ANZECC Guidelines for sediment sampling and the Cockburn Sound Standard Operating Procedures.

7-3 Prior to the commencement of concentrate production the proponent shall implement the approved Wyndham Port Heavy Metals Survey Plan and submit the results of that survey to the CEO.

7-4 Prior to the commencement of concentrate production the proponent shall prepare a Heavy Metals Monitoring Plan to the requirements of the CEO. The Heavy Metals Monitoring Plan shall:

- (1) when implemented, substantiate whether Condition 7-1 is being met;
- (2) detail a sediment sampling program for lead, silver and/or zinc (including the lead isotope specifically attributable to the Sorby Hills lead sulphide deposit), silver and/or zinc which shall include the following:
  - (a) location of sample sites;
  - (b) frequency of sampling;
  - (c) the profile depth to be sampled;
  - (d) the level of analytical detection required;
  - (e) the methodology for evaluating the data to determine whether lead, silver or zinc from the Sorby Hills project has been detected, including the statistical power for detecting the presence of lead, silver or zinc attributable to the proposal.
  - (f) the number of replicate samples required; and
  - (g) be in accordance with ANZECC Guidelines for sediment sampling and the Cockburn Sound Standard Operating Procedures.

7-5 In the event that monitoring required by condition 7-4 detects the presence of lead, silver or zinc attributable to implementation of the proposal, the proponent shall:

- (1) immediately cease loading operations; and
- (2) provide a report to the CEO within 3 days of the lead, zinc or silver being detected which identifies management and/or contingency measures to be implemented to prevent further loss of lead, silver

and/or zinc to the environment and remediate previous contamination attributed to implementation of this proposal.

- 7-6 The proponent shall implement the actions identified in condition 7-5 (2) until the CEO determines that the remedial actions may cease.
- 7-7 Prior to the commencement of concentrate production the proponent shall implement the Heavy Metals Monitoring Plan required by Condition 7-4.
- 7-8 The proponent may review and revise the Heavy Metals Monitoring Plan, to the requirements of the CEO.
- 7-9 The proponent shall review and revise the Heavy Metals Monitoring Plan as and when directed by the CEO.
- 7-10 The proponent shall implement revisions of the Heavy Metals Monitoring Plan approved under Condition 7-8 or required by Condition 7-9.

## Schedule 1

**Table 1: Summary of the Proposal**

<b>Proposal Title</b>	Sorby Hills Silver Lead Zinc Project
<b>Short Description</b>	The proposal is to develop a silver, lead and zinc mine and processing facility approximately 50 kilometres north of Kununurra, including construction of associated mine infrastructure (ROM pad, haul roads, laboratory, two evaporation ponds, evaporation basin, access road, power generation, hardstand area, diesel storage and refuelling area, workshop, site office, explosives magazine, potable water storage tank, bioremediation facility, landfill site, fire breaks and perimeter fence), discharge of waste to a TSF and road train transport of the concentrate produced to Wyndham Port for export.

**Table 2: Location and authorised extent of physical and operational elements**

<b>Column 1</b>	<b>Column 2</b>	<b>Column 3</b>
<b>Element</b>	<b>Location</b>	<b>Authorised Extent</b>
Mine and associated infrastructure	Figure 2 and geographic coordinates of the Project Development Envelope detailed in Schedule 3.	Clearing of not more than 573 ha within a 1045 ha development envelope.
Mineralised waste materials		No permanent waste dumps.
Dewatering		Up to 1.0 gigalitre per annum of uncontaminated waste water not used for operations discharged to an evaporation basin.
Concentrate transport method to Wyndham Port		Sealed 'Rotabox' (or equivalent standard) containers
Moisture content of concentrate		A minimum of 7%

**Figures (attached)**

**Figure 1 Regional location**

**Figure 2 Sorby Hills Project Development Envelope, Development  
Exclusion Boundary and conceptual layout**

**Figure 3 Sorby Hills facilities at Wyndham Port**

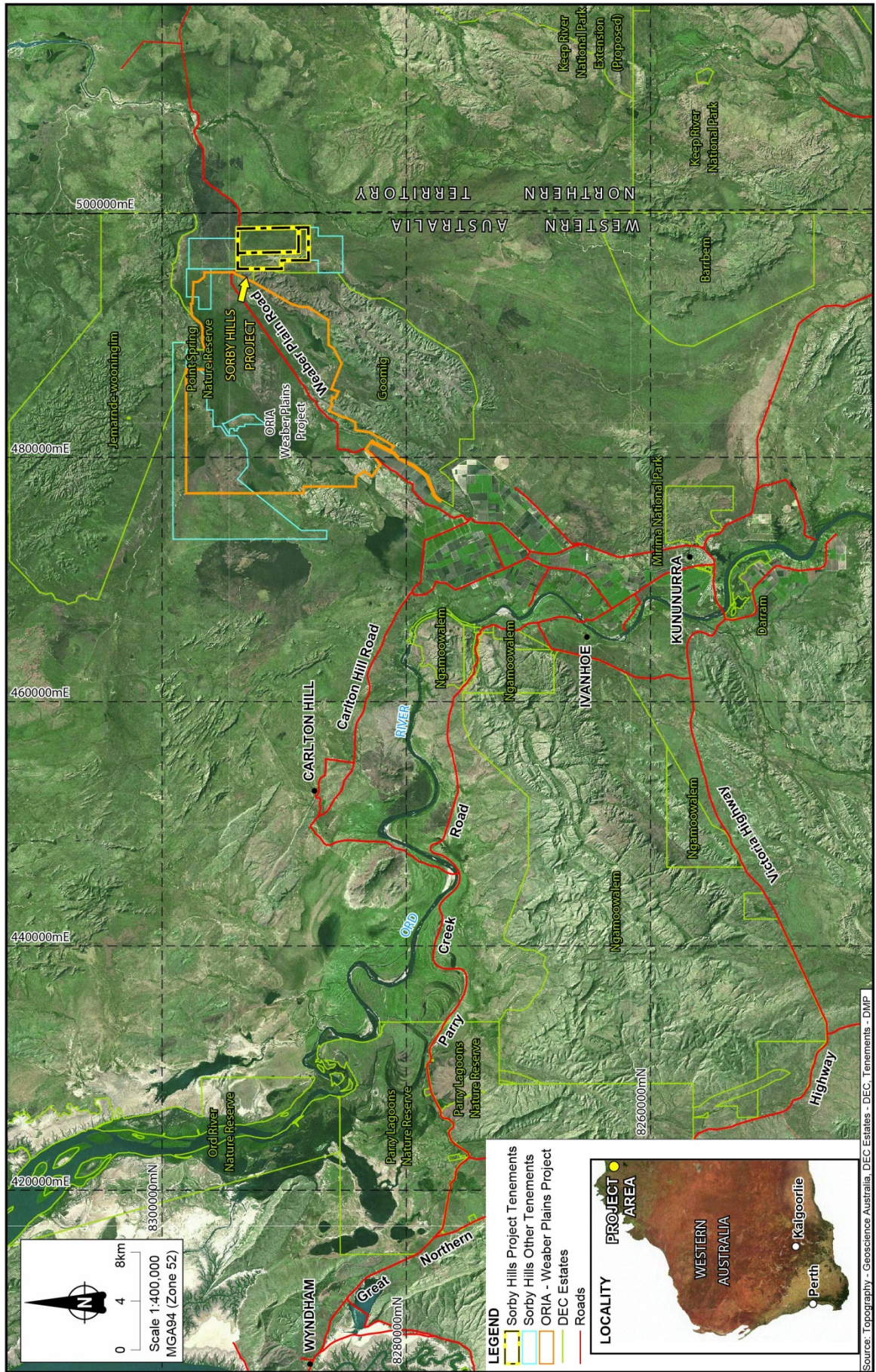
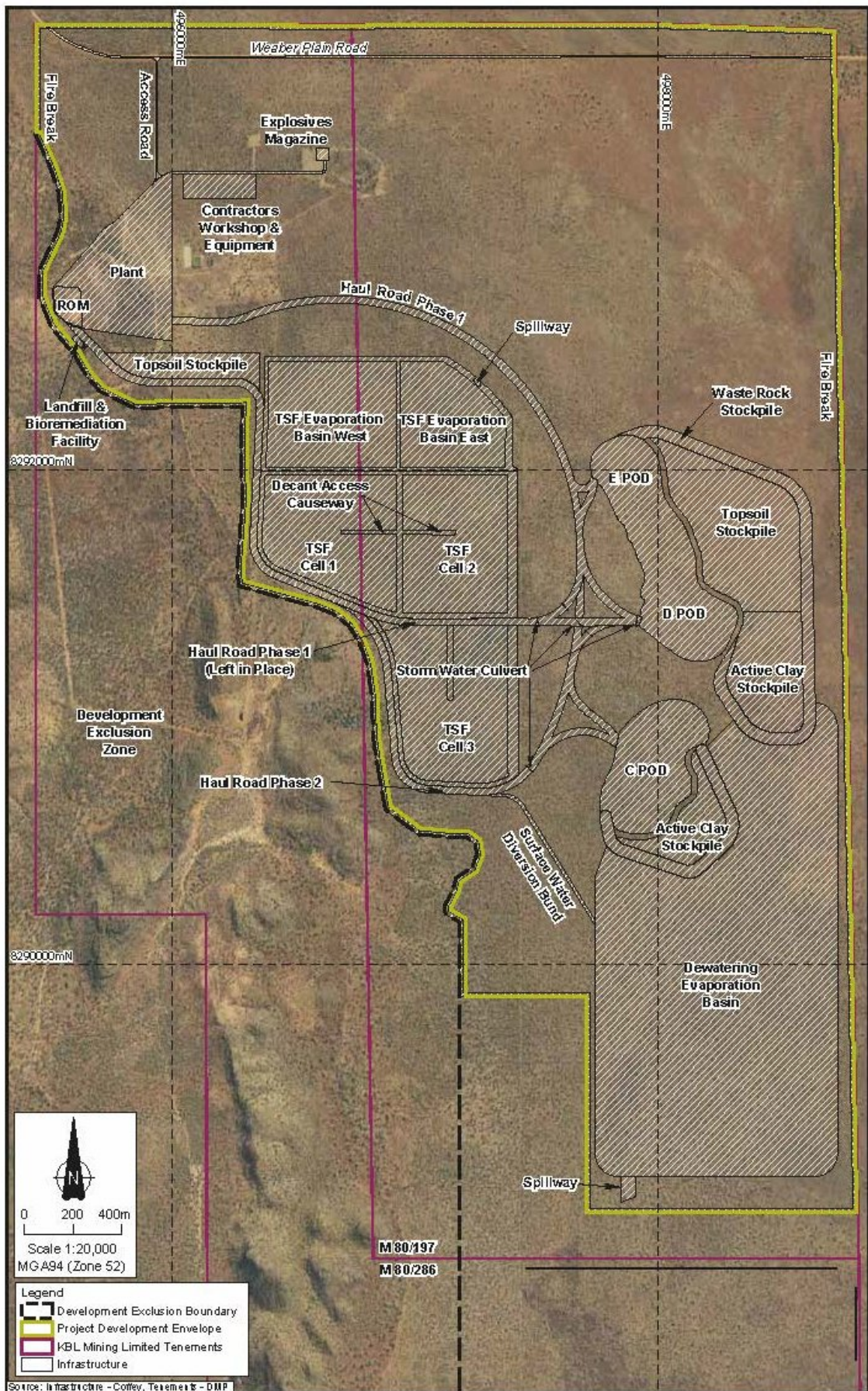


Figure 1: Regional location



**Figure 2: Sorby Hills Project Development Envelope, Development Exclusion Boundary and conceptual layout**





**Figure 3: Sorby Hills facilities at Wyndham Port**

## Schedule 2

Term or Phrase	Abbreviations and definitions
ANZECC Guidelines for Sediment Sampling	The Australian and New Zealand Environment and Conservation Council and Agricultural and Resource Management Council of Australia <i>Australian Guidelines for Water Quality Monitoring and Reporting 2000</i>
CEO	The Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the <i>Environmental Protection Act 1986</i> , or his delegate.
DoW	Department of Water
DPaW	Department of Parks and Wildlife
EPA	Environmental Protection Authority
EP Act	<i>Environmental Protection Act 1986</i>
ha	hectare
TSF	Tailings Storage Facility
ROM	Run-of-mine

## Notes

The following notes are provided for information and do not form a part of the implementation conditions of the Statement:

- The proponent for the time being nominated by the Minister for Environment under section 38(6) of the *Environmental Protection Act 1986* is responsible for the implementation of the proposal unless and until that nomination has been revoked and another person is nominated.
- If the person nominated by the Minister, ceases to have responsibility for the proposal, that person is required to provide written notice to the Environmental Protection Authority of its intention to relinquish responsibility for the proposal and the name of the person to whom responsibility for the proposal will pass or has passed. The Minister for Environment may revoke a nomination made under section 38(6) of the *Environmental Protection Act 1986* and nominate another person.
- To initiate a change of proponent, the nominated proponent and proposed proponent are required to complete and submit *Post Assessment Form 1 – Application to Change Nominated Proponent*.
- The General Manager of the Office of the Environmental Protection Authority was the Chief Executive Officer of the Department of the Public Service of the State responsible for the administration of section 48 of the *Environmental Protection Act 1986* at the time the Statement was signed by the Minister for Environment.

**SORBY HILLS SILVER LEAD ZINC MINE**

**Coordinates that define the Project Development Envelope**

Coordinates defining the Project Development Envelope are held by the Office of the EPA, dated 19 September 2013.

# **Appendix 5**

**Revised Environmental Review,  
Summary of Submissions and  
Proponent's Response to Submissions**