



**NARRABRI MINE
ENVIRONMENTAL
MANAGEMENT SYSTEM**

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WHC_PLN_NAR_WASTE MANAGEMENT PLAN

WASTE MANAGEMENT PLAN

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ACRONYMS USED THROUGHOUT THIS DOCUMENT

AEMR	-	Annual Environmental Management Report
AR	-	Annual Review
CCC	-	Community Consultative Committee
CHPP	-	Coal Handling and Preparation Plant
DP&E	-	Department of Planning and Environment
DRE	-	Division of Resources and Energy (part of Department of Trade and Investment, Regional Infrastructure and Services (DTIRIS)) (formerly Industry and Investment NSW (I&I NSW))
EA	-	Environmental Assessment
EPA	-	Environment Protection Authority
EPL	-	Environment Protection Licence
Mtpa	-	Million tonnes per annum
NCOPL	-	Narrabri Coal Operations Pty Ltd
NSC	-	Narrabri Shire Council
OEH	-	Office of Environment and Heritage (formerly Department of Environment, Climate Change and Water (DECCW))
PA	-	Project Approval



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1 INTRODUCTION

Narrabri Mine ("the mine") is located approximately 30km south-southeast of Narrabri, and 10km north-northwest of Baan Baa (see Figure 1). The mine is operated by Narrabri Coal Operations Pty Ltd (NCOPL) as an underground mining operation.

The mine lies within a 5,298ha area covered by mining lease ML 1609 ("the mine site"), with an indicative mining area of approximately 3,630ha and a surface facilities area of approximately 465ha. The mine operates under Environment Protection Licence (EPL) 12789.

The site operates under Project Approval (PA) 08_0144 MOD2, which was granted by the Minister for Planning on the 21st December 2011 and incorporates:

- Underground longwall mining with an annual production rate of 8Mtpa;
- Mine ventilation and gas drainage;
- Mine dewatering;
- Processing, stockpiling and loading of coal via a Coal Handling and Preparation Plant (CHPP);
- Emplacement of processing reject and storage of saline water;
- Construction and use of a water pipeline from the Namoi River;
- Transportation of the coal from the mine site to the Port of Newcastle via train;
- Final rehabilitation of surface disturbance following completion of the project; and
- All ancillary and related activities.

The Mine recognises that poor waste management practices have the potential to impact on the local environment. These impacts include:

- The potential for waste, or leachate from waste storage areas, to contaminate land and water;
- Possible offensive odours produced from waste storage areas; and
- Ineffective recycling and/or over-ordering of stock leading to wastage of resources.

This document applies to all activities conducted at the site and should be read in conjunction with other environmental management plans.

Information regarding waste management to date is available in the site's Annual Environmental Management Report (AEMR)/Annual Review (AR).



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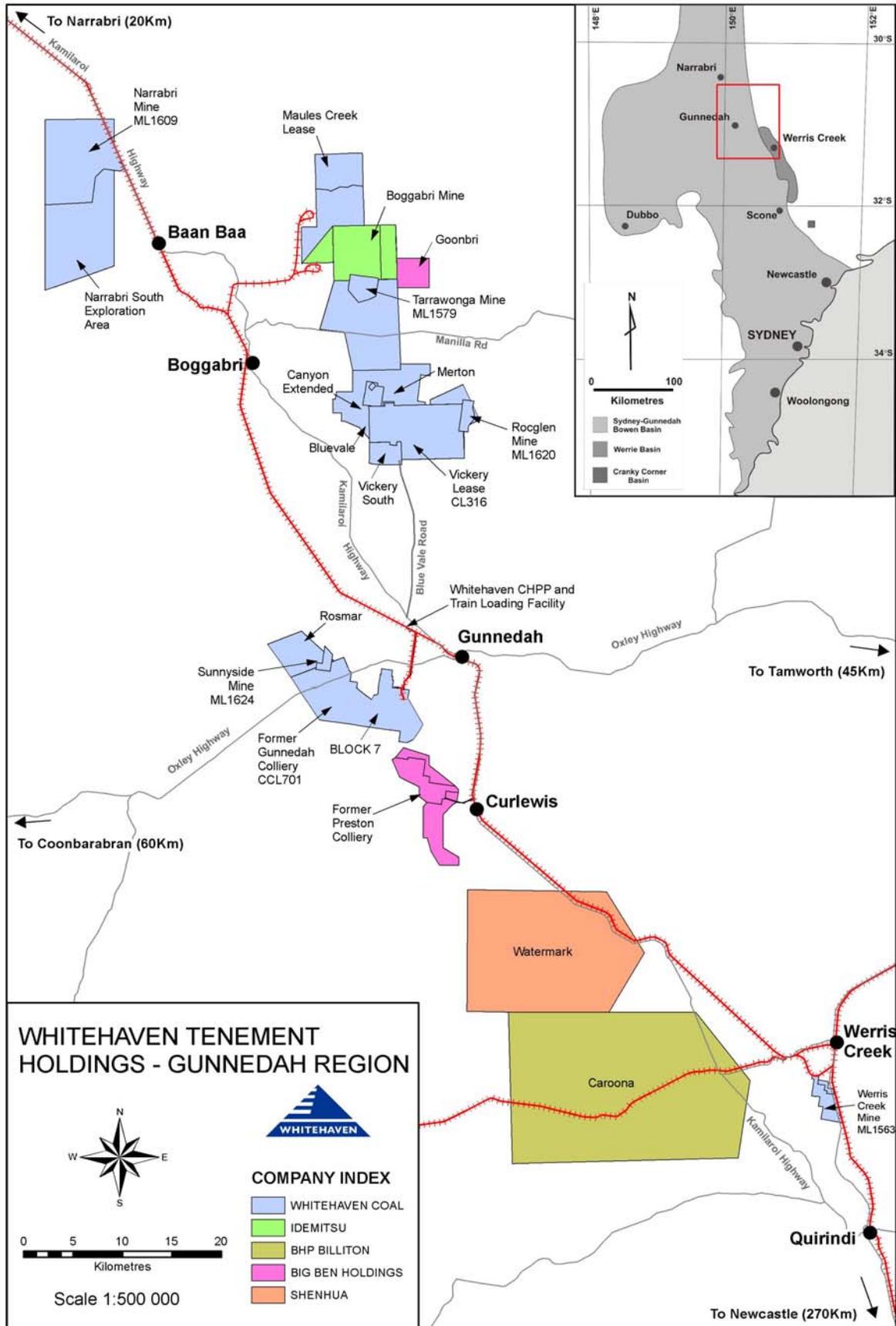


Figure 1: Narrabri Mine Location



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2 STATUTORY REQUIREMENTS

This Waste Management Plan has been prepared in recognition of the impact that poor waste management could have on the environmental performance of the mine. The plan follows the management plan requirements specified in Condition 2 Schedule 6 of PA 08_0144 MOD2 and complies with the requirements of Condition 33 Schedule 4 which states:

Waste Minimisation

The Proponent shall revise the Waste Management Plan for the Stage 1 project to encompass all proposed mine activities and potential impacts associated with waste management for the site (Stages 1 and 2) and subsequently implement this revised version of the Waste Management Plan to the satisfaction of the Director-General. The plan must:

- (a) be submitted to the Director-General for approval prior to 30 June 2011;*
- (b) identify the various waste streams of the project;*
- (c) describe what measures would be implemented to reuse, recycle, or minimise the waste generated by the project;*
- (d) ensure irrigation of treated wastewater is undertaken in accordance with Environmental Guidelines: Use of Effluent by Irrigation (DEC, 2004), or its latest version; and*
- (e) include a program to monitor the effectiveness of these measures.*

The following Acts, Regulations and Guidelines are applicable to this plan:

- Waste Classification Guidelines (DECCW, 2009);
- Environmental Guidelines: Use of Effluent by Irrigation (DEC, 2004);
- *Protection of the Environment Operations Act 1997;*
- *Waste Avoidance and Resource Recovery Act 2001;* and
- *Protection of the Environment Operations (Waste) Regulation 2014.*



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3 WASTE STREAMS

The principal wastes that will be generated throughout the life of the longwall project can be categorised as production and non-production wastes.

The following production wastes will be generated:

- Mined rock from the development of the ventilation shafts;
- Drill cuttings from gas drainage boreholes and exploration drilling activities;
- Coarse and fine reject generated by the CHPP and underground areas;
- Brine generated by the Water Conditioning Plant; and
- Drill cuttings from surface to in-seam (SIS) and underground in-seam (UIS) drilling.

Non-production wastes will include:

- General domestic wastes from the onsite buildings and routine maintenance consumables;
- Hydrocarbons, including by-products recovered from dirty water from the maintenance workshop, wash down pad and fuel storage areas; and
- Treated Waste Water.

Included in **Appendix 1** is a schedule of wastes that are likely to be generated on the mine site during the operation of the mine.



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4 WASTE MANAGEMENT

The objectives of waste management at the mine are as follows:

- To minimise waste production;
- To identify waste types and quantities on site;
- To maximise the beneficial use of production waste and excavated material for site construction and rehabilitation activities;
- To identify potential re-use or recycling opportunities and ensure appropriate handling and collection procedures are in place;
- To investigate methods to minimise waste generated by the mine and implement reasonable and feasible measures to minimise waste;
- To ensure the disposal of wastes conforms with applicable guidelines or licences;
- To ensure storage areas for fuels, oils or other potential contaminants are appropriately banded; and
- To ensure irrigation with treated waste water is undertaken in accordance with Environmental Guidelines.

The following subsections detail general measures to be adopted for waste management including waste minimisation, recycling, re-use and disposal. Waste streams identified in Section 3 that are not dealt with under general waste management are addressed separately at the end of this section.

4.1 General Site Waste Management

The following actions/strategies will be put into practice to minimise the accumulation/generation of waste at the mine:

- All personnel working on the mine site will undergo a site induction which will include the site's waste management practices;
- All waste storage areas will be clearly identified with appropriate signage. Bins and other receptacles will be marked according to the type of waste accepted (e.g. scrap metal, oil filters, waste oil, cardboard, other recyclables, general waste);
- Clear written instructions will be erected at appropriate locations detailing recycling and waste separation information; and
- There will be no long term storage of any non-production waste on the mine site.



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4.2 Waste Minimisation

The following methods will be used to minimise waste production:

- Specifications of construction material quantities for contractors will be as accurate as possible to avoid the over-ordering of materials and the potential for excess waste;
- The ordering of stock during the operation of the mine will be regularly reviewed to ensure efficient stock control and to avoid wastage; and
- Alternate products or bulk storages will be considered in an effort to reduce the volume of packaging.

4.3 Recycling

The mine will provide appropriate storage areas for all non-production waste materials that are suitable for recycling. The main recyclable waste materials that will be generated by the mine and their primary source(s), storage and collection requirements are as follows:

- Paper and cardboard: will be primarily generated within the administration and stores facilities but also in lesser quantities from contractor offices and workshops. General paper and cardboard recycling bins are located in close proximity to site offices and the store. Paper and cardboard will be collected by licensed waste contractors on a regular basis.
- Scrap metal: will be generated on a continuing basis from the workshop (mostly 20L drums) and the underground mine. The scrap metal will be placed into large skip bins, which will be collected by a metal recycler as sufficient quantities are available. A compactor is located onsite to ensure recycling operations are as efficient as possible.
- Oil filters and oily rags: will be generated at the maintenance workshop, with oil filters collected in designated, banded 1000L pods for recycling and oily rags disposed of in general waste skip bins. Oil filters will be collected by a licensed waste oil contractor during the collection of waste oil.
- Waste oil and grease: will be generated at the maintenance workshop. The waste oil and grease will be stored temporarily in banded areas prior to being relocated to the banded waste oil depot for collection by a licensed waste oil contractor.
- Batteries: will be removed from site for delivery to a facility able to despatch them to an appropriate recycling facility.
- Timber: timber products such as cable drums and pallets will be recycled where possible. If recycling or reuse is not feasible, waste timber products will be disposed of in general waste.
- Miscellaneous recyclables: such as printer cartridges will be stored at appropriate locations prior to collection by, or delivery to, appropriate recycling facilities.



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The mine's Environmental Officer will undertake regular inspections of the all waste storage locations to ensure that the appropriate separation and collection of waste is being undertaken.

4.4 Reuse of Waste Materials

Opportunities for the re-use of materials on site will be evaluated on an as needed basis.

Reuse of treated waste water is discussed in Section 4.6 whilst the possible use of salt from the Brine Storage Ponds is discussed in Section 4.9.

4.5 Waste Disposal

Disposal will be viewed as the last option in the management of waste, only if the avoidance, re-use or recycling of the waste in question is not practical. The following systems will be implemented at the mine in regard to waste disposal:

- Only transport operators or companies that are licensed by the appropriate authorities will be contracted to remove waste from the mine site.
- Waste materials which cannot be either re-used or recycled will be sent to a landfill licensed to accept that category of waste.
- Wastes, which are required to be tracked, will be done so, in accordance with the relevant legislation.
- Waste tyres will be appropriately disposed of via the tyre fitting contractor engaged to supply tyres for the site.
- Sharps collected in approved storage containers from the First Aid room and bath house will be collected and disposed of by an approved handling agent.
- Sanitary Waste will be collected by a licensed Sanitary Waste Disposal agent.

4.6 Waste Water

Waste water from the site offices, bathhouse and other amenities is treated using a self-irrigating eco-cycle septic sewage system and re-used as irrigation water on grassed areas within the Pit Top Area in accordance with *Environmental Guidelines: Use of Effluent by Irrigation* (DEC, 2004) (Effluent Guideline). The Effluent Guideline outlines environmental performance objectives that apply to the use of effluent by irrigation. These objectives and the how they are met by Narrabri Mine are outlined in Table 1. Specific procedures addressing inspection, maintenance and monitoring requirements have been implemented at the mine and include the following inspection forms: WHC_FRM_NAR_SEWAGE TREATMENT PLANT – DAILY; WHC_FRM_NAR_SEWAGE TREATMENT PLANT – MONTHLY; WHC_FRM_NAR_SEWAGE TREATMENT PLANT – 3 MONTHLY; and WHC_FRM_NAR_SEWAGE TREATMENT PLANT – 12 MONTHLY.



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Table 1: Narrabri Mine's Controls to Meet the Effluent Guidelines' Environmental Performance Objectives

Environmental Performance Objective	Narrabri Mine's Approach
<p>Protection of surface waters: Effluent irrigation systems should be located, designed, constructed and operated so that surface waters do not become contaminated by any flow from irrigation areas, including effluent, rainfall runoff, contaminated sub-surface flows or contaminated groundwater.</p>	<p>The Narrabri Mine sewage treatment system is designed to treat sewage to a potable state. All effluent irrigated land within the Pit Top Area is managed within Narrabri Mine's dirty water management system.</p>
<p>Protection of groundwater: Effluent irrigation areas and systems should be located, designed, constructed and operated so that the current or future beneficial uses of groundwater do not diminish as a result of contamination by the effluent or runoff from the irrigation scheme or changing water tables.</p>	<p>The Narrabri Mine sewage treatment system is designed to treat sewage to a potable state. The effluent irrigated land is within the Pit Top Area of the Narrabri Mine which has a comprehensive groundwater monitoring network and monitoring includes nutrients and salinity parameters.</p>
<p>Protection of lands: An effluent irrigation system should be ecologically sustainable. In particular, it should maintain or improve the capacity of the land to grow plants, and should result in no deterioration of land quality through soil structure degradation, salinisation, waterlogging, chemical contamination or soil erosion.</p>	<p>The Narrabri Mine sewage treatment system is designed to treat sewage to a potable state. The land on which the effluent is discharged is relatively flat with good grass cover. Inspections are undertaken to manage the soak discharges from the plant.</p>
<p>Protection of plant and animal health: Design and management of effluent irrigation systems should not compromise the health and productivity of plants, domestic animals, wildlife and the aquatic ecosystem. Risk management procedures should avoid or manage the impacts of pathogenic micro-organisms, biologically active chemicals, nutrients and oxygen depleting substances.</p>	<p>As outlined above, the sewage treatment system is designed to treat sewage to a potable state. In addition, the irrigated area is within the active areas of the Narrabri Mine which will be subject to rehabilitation and mine closure planning prior to the completion of operations, which will include the irrigated areas.</p>
<p>Prevention of public health risks: The effluent irrigation scheme should be sited, designed, constructed and operated so as not to compromise public health. In this regard, special consideration should be given to the provision of barriers that prevent human exposure to pathogens and contaminants.</p>	<p>As outlined above, the sewage treatment system is designed to treat sewage to a potable state. In addition, the irrigated area is within the active areas of the Narrabri Mine and access is restricted to authorised personnel only. The irrigated area will be subject to rehabilitation and mine closure planning prior to the completion of operations, which will include the irrigated areas.</p>
<p>Resource use: Potential resources in effluent, such as water, plant nutrients and organic matter, should be identified, and agronomic systems developed and implemented for their effective use.</p>	<p>The irrigated effluent is used onsite for general watering. In future reviews of the existing management plans, including this Waste Management Plan, options for additional uses will be investigated.</p>
<p>Community amenity: The effluent irrigation system should be located, designed, constructed and operated to avoid unreasonable interference with any commercial activity or the comfortable enjoyment of life and property off-site. In this regard, special consideration should be given to odour, dust, insects and noise.</p>	<p>The sewage treatment plant is located within the Pit Top Area of the Narrabri Mine and shielded from surrounding residences by an amenity bund that surrounds the Pit Top Area. There is no unreasonable interference associated with the location and operation of the plant.</p>



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4.7 Mined Rock

Waste rock removed during drilling of ventilation shafts will be stockpiled within the spoils handling area. This material will be used in conjunction with subsoil to backfill the water and drill cuttings settlement ponds. Drilling cuttings from exploration, gas drainage and service boreholes will be excavated from sumps and disposed of in the area designated for reject emplacement, or consolidated with excavated soil to backfill the sump (where minor amounts of cuttings are present).

4.8 Fine and Coarse Reject

Fine and coarse reject will be mixed prior to conveying and stockpiling within the Reject Stockpile and Underground Rejects Stockpile. The reject will then be transported to the Reject Emplacement Area (REA), located immediately west of the box cut, via truck and loader. It is expected that 8.2 million tonnes (or approximately 5.7 million m³) will be managed within the REA over the 30 year mine life. Analysis of the reject material found it to be non-saline and non-acid forming requiring no specific management measures to be implemented in regard to acid generation or salinity. Sampling and analysis of the reject material will be undertaken over the life of the mine.

The REA will be constructed as a series of elongated (north-south orientated) cells in a westerly direction with a permeability of 1 x10⁻⁹ m/sec or less. Water management associated with reject management is addressed in the Water Management Plan (WMP).

4.9 Brine

Brine generated by the Water Conditioning Plant will be initially stored in lined ponds located within the rail loop and then within the Brine Storage Area, located north of the Pit Top Area, when storage capacity in these ponds is exceeded (after approximately 5 years). It is estimated that almost 6,500ML of brine will be generated throughout the life of the longwall project.

Due to the saline nature of the brine, the evaporation/storage ponds will be constructed to be effectively impermeable (1 x 10⁻¹⁴ m/sec). Water management associated with brine storage is addressed in the WMP.

At this stage, it is expected that at the completion of mining the brine stored within the Brine Storage Area will be pumped into the goaf and retained gate roads of the completed mine through re-use of the cased goaf gas drainage drill holes. The Mine is also investigating the potential to progressively re-inject the brine solution into the completed goaf areas of the mine as the direction of mining progresses up-dip (west to east, i.e. LW14 to LW26). It is intended that all remaining brine will be transferred to the underground workings by the cessation of mining in approximately 30 years. The groundwater model developed for the site is required to be calibrated throughout the life of the mine as required by Schedule 4, Condition 9 of PA 08_0144. Future model re-calibrations will also take into consideration the reinjection of the brine into the mined areas including an assessment of geochemistry and density, as recommended in the 2014 Independent Audit undertaken at the mine.



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Alternative or beneficial uses of the brine will continue to be investigated throughout the life of the mine. Condition 21, Schedule 4 of PA 08_0144 requires the mine to engage suitably qualified experts to review brine management and any beneficial use options.



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5 MONITORING, REPORTING AND REVIEW

As far as practical, the mine will maintain records of all recycled material and general waste removed from the mine site. The records will include the quantities and type of waste removed offsite for recycling or disposal, the contractor engaged to remove the wastes, the date the waste or recyclables were removed from site, the final destination for all waste products and any other relevant information. All waste receipts will be retained by store personnel. The records will enable the mine to review waste generation and recycling volumes on an ongoing basis.

Waste management information will be documented and reported in each AEMR/AR, where applicable. Details will be provided on the implementation success of the Waste Management Plan and any areas that require improvement.



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6 MANAGEMENT OF INCIDENTS, COMPLAINTS AND NON-COMPLIANCES

6.1 Incidents and Non-Compliances

Any incidents relating to waste management will be managed via the Whitehaven incident management process.

The EPA and the DP&E will be notified of all reportable instances (i.e. significant incidents or project approval non-compliances) relating to waste management either after the incident/non-compliance has occurred or via the AEMR/AR and/or EPL Annual Return (for minor issues).

6.2 Complaints

Any complaints received in relation to waste management will be managed in accordance with the complaints management protocol described as follows:

- A publicly advertised telephone complaints line will be in place to receive complaints during operating hours and record complaints at other times.
- Each complaint received will be recorded on a Complaints Register, which will include the following details:
 - The date and time of complaint.
 - Any personal details the complainant wishes to provide or if no such details are provided a note to that effect.
 - The nature of the incident that led to the complaint, including the time of the dispersal and its duration.
 - The action taken by the mine in relation to the complaint, including any follow-up contact with the complainant.
 - If no action was taken by the mine, the reason why no action was taken.
- The Environmental Officer will be responsible for ensuring that an initial response is provided within 24 hours of receipt of a complaint (except in the event of complaints recorded when the mine is not operational or outside of usual business hours).
- Additional measures will be undertaken as required to address the complaint. This may include visiting the complainant, or inviting the complainant to the mine site.
- Once the identified measures are undertaken, the Environmental Officer will sign off on the relevant complaint within the Complaints Register.
- If necessary, follow-up monitoring or will take place to confirm the source of the complaint is adequately mitigated.
- A copy of the Complaints Register will be kept by the mine and made available to the Narrabri Mine Community Consultative Committee (CCC) and the



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complainant (on request). A summary of complaints received every 12 months will be provided to DP&E, NSC, EPA, DRE and the CCC through the AEMR/AR.

Based on the nature of individual complaints, specific contingency measures may be implemented to the (reasonable) satisfaction of the complainant. The Environmental Manager retains ultimate responsibility to ensure that complaints received are properly recorded and addressed appropriately.

6.3 Unpredicted Impact Protocol

It is considered unlikely that operation of the Narrabri Mine will result in any unpredicted or unforeseen impacts in relation to waste generation and management. In the event that unpredicted impacts do occur, these will be managed in accordance with the incidents, non-conformances and complaints management measures outlined in Sections 6.1 and 6.2.



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7 DOCUMENT REVIEW AND CONTINUOUS IMPROVEMENT

Within 3 months of the submission of an Annual Review (AR), incident report, audit or any modification to the conditions of PA 08_0144 MOD 2, this Waste Management Plan will be reviewed and if necessary revised. This document will also be reviewed at least every three years. Each revision will be undertaken in consultation with relevant stakeholders and will be submitted to the Director-General for approval. Each review will be undertaken in consultation with relevant stakeholders and will be submitted to the Director-General for approval.

The mine will investigate and implement ways to improve the environmental performance of the project over time. This will be achieved by keeping abreast of best practice in the industry for waste management and recycling options and reporting on outcomes of waste management in the AEMR/AR.



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8 RESPONSIBILITIES AND ACCOUNTABILITIES

During the operational phase of the development, the mine will be managed by the General Manager who will have overall responsibility for ensuring contractors, employees and service providers comply with all laws, regulations, licences, approvals and conditions of the project approval. The General Manager and Environmental Officer will be responsible for the following activities described in this plan:

- recording sources and destinations of recyclable wastes;
- ensuring that all waste contractors are appropriately licensed;
- ensuring that all materials are separated appropriately and recycled where possible;
- maintaining a record of the quantities and types of non-recyclable waste removed from the site; and
- conducting regular audits around the mine site to inspect waste management practices.

All employees and contractors will be responsible for:

- ensuring that all wastes are placed into the appropriate storage areas or receptacles;
- ensuring they comply with all onsite regulations; and
- undertaking work practices that comply with this plan.



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Waste Type	Source	Management/Disposal
Paper	Office/Workshop areas	Sensitive documents to be placed into secure recycling bins within office buildings for collection. General waste paper to be placed in paper and cardboard recycling bins.
Cardboard	Used as packaging for various items	Cardboard to be compacted and placed into recycling bins located adjacent to the administration office and store for collection and recycling.
Plastic Packaging	Shrink wrap or general packaging	Placed into general rubbish bins and skips for disposal to landfill. Recycling opportunities to be investigated.
Putrescibles Waste	Food and general waste	Placed into general rubbish receptacles bins and skips for disposal to landfill.
Timber	Wooden pallets and cable drums	Reused or returned where possible. Otherwise stockpiled onsite for collection by timber recycling contractors (where feasible) or disposal in landfill.
Metal	General materials including emptied and compacted 20L drums	Metals to be stored in designated skip bins and removed from site for recycling.
Hydrocarbons	Used in workshop and servicing areas	Any excess oil and grease which is collected during maintenance activities or through the separator will be stored in bunded areas within the workshop or at the waste oil depot prior to removal by a licensed waste oil recycler.
Oil filters	Removed from equipment	Stored in 1000L pods within a bunded area and collected by the waste oil contractor.
Rags	Used in workshop and servicing areas	Rags will be placed into general waste receptacles and taken by a licensed contractor
Batteries	Expendable batteries from vehicle fleet	Will be removed from site for collection by a licensed contractor
Tyres	Expendable tyres from vehicle fleet	All tyres from the mine vehicle fleet are disposed of via the tyre supply company. Solid fill tyres on underground vehicles are repaired or replaced by a tyre company.
Diesel particulate and air filters	Underground and surface equipment	Disposed of as general waste.
Printer cartridges	From administration buildings	Collected in designated receptacles located adjacent to printers and recycled via Planet Ark.
Sanitary Waste	From Bath house facilities	Collected in designated receptacles and disposed of via a licensed waste contractor
Sharps	From the bathhouses and First Aid room	Collected in sharps containers in the bathhouses and First Aid room and disposed of via a licensed waste contractor
Waste Water	From bathhouse, office areas and underground	Effluent will be treated by a water treatment facility on site. Treated effluent will then be applied to grassed areas within the Pit Top Area.

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WHC_PLN_NAR_WASTE MANAGEMENT PLAN			

Waste Type	Source	Management/Disposal
Drill cuttings	From exploration, gas drainage and other drilling activities	Excavated from sumps and disposed of within the area designated for reject emplacement.
Fine and coarse rejects	CHPP or underground operations	Disposed of within the area designated for reject emplacement.