

APPENDIX A3

TERRAMIN POLICIES

ANGAS PROCESSING FACILITY

MISCELLANEOUS PURPOSES LICENSE APPLICATION

2019/0826



ABN | 67 062 576 238

Unit 7 / 202-208 Glen Osmond Road | Fullarton SA 5063

WASTE MANAGEMENT PLAN

Angas Processing Facility

2018 DRAFT



TERRAMIN AUSTRALIA LIMITED
Focus on Zinc

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Master Document Information			
Doc. Number	File Name	Format	Last Modified
MPL - Version 1	Angas Processing Facility Waste Management Plan	Word	14/02/2018

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1 Introduction

This Waste Management Plan outlines the administrative and procedural activities that will take place to manage waste at Terramin Australia Limited's Angas Zinc Mine. The objectives of this plan are in line with those in Terramin's Environment Policy.

The purpose of the Plan is to ensure all waste products from the operation are handled in a way that minimises impact on the environment through a hierarchical approach (see Figure 1). The waste management hierarchy is a nationally and internationally accepted guide for prioritising waste management practices with the objective of achieving optimal environmental outcomes. It sets out the preferred order of waste management practices, from most to least preferred (Zero Waste SA Act, 2004).



Figure 1: Hierarchy of control to minimise waste production and impact on the environment (Zero waste SA, 2012).

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2 Responsibilities

The *General Manager* has accountability for development and implementation of the Plan.

The *Environment Superintendent* shall be responsible for the day-to-day operation, monitoring and compliance to the Plan.

Area Managers will be responsible for performance in their areas.

All personnel will be responsible for complying with this plan and alerting management to non-compliance or suggesting improvement.

3 Compliance

In order to be compliant with the Mining and Rehabilitation Compliance Report (MARCR) Terramin must ensure that no contamination and pollution is caused by waste products and hazardous materials used in the mine operations. This is in line with;

- The PEPR (Program for Environmental Protection and Rehabilitation)
- DMITRE Mineral License ML6229 and;
- EPA License 16743

Any breaches of the Waste Management Plan will be raised through the site incident/accident reporting system. All incident/accident reports are detailed in the monthly, quarterly and annual reports.

3.1 De-Contamination

As per Mineral Lease condition 48;

The lessee must ensure that no lead contaminated items (clothing, tools and equipment) are taken off the mine site.

All tools and equipment must be cleaned and inspected for contamination prior to dispatching from site.

3.2 Inspections and Audits

On-site waste inspections are required to be conducted weekly by Environmental staff and reported to the Environmental Superintendent. Any arising issues will be reported to the appropriate area managers to rectify. Inspections involve identifying;

- General rubbish/housekeeping
- Waste requiring appropriate disposal
- Adequate bunding of chemicals and oils
- Chemical and oil spills

3.3 Chemical and Oil Spills

All oil and chemical spills **MUST** be reported to the Environmental Department and an incident report raised. If a spill of fuel, oil or hazardous chemical occurs outside a bunded area, the

area requires remediation, and sampling will be conducted to demonstrate soil quality comparable to background levels.

3.4 Waste Tracking

A waste tracking form **MUST** be completed for all waste removed from site for disposal or recycling including the following;

- General rubbish
- Recyclables
- Scrap metal
- Soft plastic
- Bottles & cans
- Electrical
- Silt / sludge
- Waste oil / grease
- Oil / water mixture
- Hydraulic hoses / oil filters / rags
- Tyres

A waste tracking form includes information on type of waste, volume, disposal location and company disposing of waste. A copy must be forwarded to the Environmental Department through the front desk, as all information requires reporting through the internal monthly reporting system as well as the Quarterly and Annual Environmental Reports.

4 Waste Management Practices

Waste management requires consideration from purchasing of the product up until when the product is no longer required to ensure all waste products are handled in a way that minimises impact on the environment.

4.1 Purchasing

In order to limit the amount of waste that requires to be sent to landfill it is important that when purchasing products, preference is given to;

- Products which are reusable
- Products which are recyclable
- Suppliers which recycle their products and packaging
- Suppliers who offer return of unused product
- Suppliers of products with packaging minimisation programs
- Suppliers willing to enter into agreement to remove used products when a replacement is purchased, eg tires or mill liners

4.2 Operations

All tasks at the mine should be planned prior to commencement to allow for correct ordering of resources and a reduction in waste through rework. All additional waste management procedures should be addressed and organised prior to task commencement. Good housekeeping to minimise waste generation should be promoted.

4.3 Waste Handling and Storage

Sufficient and suitable collection facilities are currently in place on-site to comply with this Plan. These facilities are located in areas which promote use and will be emptied as required to ensure inappropriate storage does not occur. A current map of these facilities is located in Appendix 1

There are a number of signposted, fenced bays to collect different waste streams, these include;

- Hydrocarbon waste located behind the mill – waste grease, used grease drums, hydraulic hose, plastic bags containing grease, oil filters
- Empty pods
- Recycling laydown area east of the TSF – bins for scrap steel, manganese, copper and vehicle batteries
- Front entrance laydown area - drill rods and drill bits;
- General rubbish, steel bins and recycling bins are located around site (refer to Appendix 1).

Monitoring of on-site waste management will be carried out weekly by the Environmental Department.

Potential Acid Forming (PAF) Material

Potential Acid Forming Material (PAF) such as waste rock, ore, concentrate, scats or tails poses serious environmental hazard to soils and waterways. When these materials are exposed to water and oxygen, acids are formed mobilising metals which in turn can lead to contamination of water and soils.

The Angas Zinc Mine, as part of the gold processing operation has been divided into two zones, the operational zone and the clean zone (Figure 2). The operational zone is the area consisting of the majority of the gold processing operation including the ROM Pad, Mill, Tailings Storage Facility (TSF), concentrate shed, access driveway and workshop and identified as a potentially contaminated area. Any surface water from the dirty zone has been designed to be directed to the stormwater drainage system, including the raw water pond and subsequently enter the swale and sediment dam system. Any surface water that has not contacted the ROM or Mill zones will be directed to bypass contaminated areas to ensure the integrity of natural waters.

PAF material is only to be placed within the operational zone in specific locations, eg the ROM pad, mill areas; NO PAF material is to be stored in the clean zone due to the potential of contamination to waterways.

4.3.1 Bunding

Terramin are required to ensure that fuel and liquid chemical storage is adequately bunded to capture spillage and to prevent the mitigation or infiltration of any spillage or leakage to the surrounding environment in conformance with relevant Environmental Protection Authority Guidelines.

EPA 080/12 Liquid storage guidelines (Appendix 2) states;

Bunding should be used for the storage of all liquids except rainwater.

Chemical and oil storage will be inspected weekly, coinciding with the waste inspection.

4.3.2 Tyre storage

When storing tyres they need to store in compliance with the EPA guidelines (Appendix 3) which state;

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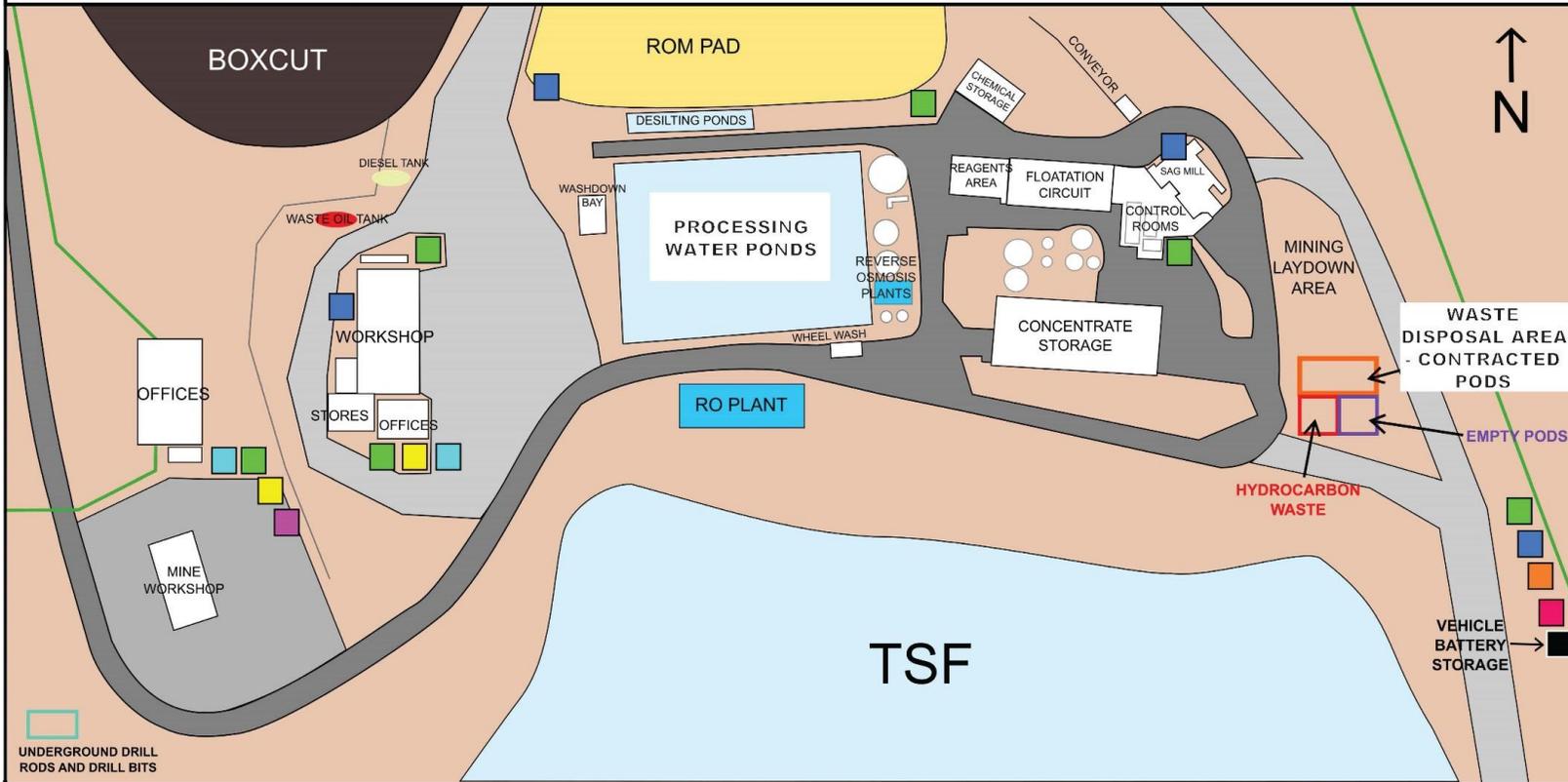
Tyres should be stored on a level site away from surface watercourses, flood zones and groundwater recharge points. The site should be securely fenced and have access gates wide enough to allow the entry of emergency vehicles. Flammable or combustible liquids, hazardous wastes or other ignitable materials should not be stored close to tyre stockpiles.

The South Australian Fire Services *General guidelines for the Outdoor Storage of Used Tyres* outlines pile size limits of used tyres for different sized storage sites (Appendix 4).



TERRAMIN AUSTRALIA LIMITED

ANGAS ZINC WASTE MANAGEMENT SITE PLAN



UNDERGROUND DRILL
RODS AND DRILL BITS

Legend

- | | | | |
|----------------------------|-----------------------|--------------------|-----------------|
| = GENERAL WASTE BINS | = PAPER/CARDBOARD BIN | = AEROSOL CAN CAGE | = MANGANESE BIN |
| = PLASTIC RECYCLABLE CAGES | = STEEL BIN | = COPPER STEEL BIN | |

Figure 2: Location of Waste Areas

5 Waste Streams

Below describes the different waste streams found on the Angas Zinc Mine and a description of where and how the waste is stored and how it will be appropriately disposed. The locality of all storage sites are mapped in Appendix 1.

5.1 General Waste

All general waste is to be disposed of in **GREEN** bins located around site.

Allocated Terramin staff are to empty wheelie bins and fork bins into the Roll On Roll Off (RO RO) bins when required. All-Bulk Waste empty all RORO bins every Wednesday. If additional emptying of these bins is required contact the Environmental Department.

Materials that must not be placed into the general waste bins are;

- Tyres,
- Liquid waste,
- Chemicals,
- Asbestos.

5.2 Metals

5.2.1 Scrap Steel

Scrap steel is to be placed in the dedicated steel bins located at the ROM Pad, workshop and recycling laydown area. Empty steel drums which contained liquid **MUST** be triple rinsed, punctured prior to being compacted and placed in steel bins.

Steel drums which contained oil must be emptied in the waste oil tank (located at the workshop), crushed and placed into steel bins.

5.2.2 Drill Rods and Drill Bits

Drill rods are to be placed dedicated bin located in the top laydown area. Drill bits are to be placed into the 44 gallon steel drums located next to the drill rod bin.

5.2.3 Manganese (White Metal)

Manganese metal includes loader bucket teeth and mill manganese plates. These are to be placed in the dedicated bin located in the recycling laydown area.

5.2.4 Copper

Unserviceable copper cabling, electric motors and other copper products are to be placed into the dedicated bin located in the recycling laydown area.

5.3 General Recyclables

5.3.1 Paper and Cardboard

Paper and cardboard can be disposed of in all **BLUE** bins. Used paper bins are located in the admin office, maintenance office and the crib area. Paper and cardboard recycling fork bins are located at the administration and maintenance areas and are emptied as required.

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5.3.2 Bottles and Cans

Bottles and cans are to be disposed of in the **YELLOW** wheelie bins or appropriately labelled containers located around site.

5.3.3 Plastic Chemical Drums (15/20 and 200 litre)

All empty small chemical drums **MUST** be triple rinsed with clean water (raw water is acceptable) prior to recycling. Once clean they can be placed in the plastic **YELLOW** recycling fork bins located at the maintenance and administration areas.

Triple rinsing is to be undertaken in the operational zone only, either at the workshop wash down bay, or in the mill/water treatment area where the water reports to the process water drain.

Nitric acid or other 200 litre plastic drums must be triple rinsed in the mill area and placed into the 'used pods' bay for recycling.

5.3.4 Pods

Pods containing hydrocarbons must be drained completely into the waste oil tank and then placed into the 'used pods' signposted bay behind the mill. These can also be used to store hydraulic hoses and waste grease containers prior to being sent to an approved EPA disposal company.

Pods containing water based chemicals **MUST** be triple rinsed with clean water (raw water is acceptable) and stored at the same laydown 'used pod' area behind the mill prior to collection for recycling.

Pods containing shotcrete accelerator should be placed into 'used pod' bay and reused to transport or temporary store waste that is to be disposed of on site, or recycled.

Triple rinsing is to be undertaken in the dirty zone only, either at the workshop wash down bay, or in the mill/water treatment area where the water reports to the process water drain.

5.3.5 Aerosol Cans

Empty Aerosol cans (paint spray cans) are to be placed in the cage bin located at the mining lay down area.

5.3.1 Toners/Cartridges/Electricals/Small Batteries

Printer cartridges, mobile phones and their accessories can be recycled at the Cartridge 4 Planet Ark collection box located opposite the photocopier, in the Administration office.

5.4 Hydrocarbons

5.4.1 Waste Oil

All waste oil must report to the maintenance workshop to be pumped into the waste oil tank. If the waste oil cannot be pumped immediately, it must be stored near the workshop in an appropriately bunded area.

Once the waste oil tank is full, waste oil will be removed by an EPA approved company.

5.4.2 Waste Grease

Pods that contained grease are managed differently to drums (whether steel or plastic) that contained grease, as pods are recycled to a different company than drums. Hence all grease

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supplied in pods are removed by the supplier when new grease is supplied to site. The used pods are to be stored at the 'used pods' bay, behind the mill, until removed from site.

Used grease drums are to be stored in the hydrocarbon waste bay. The plastic liners from steel grease drums must be removed once used and placed in a pod located in this bay. These pods must be appropriately banded, sealed with black plastic to prevent ingress of rainwater and stored in the hydrocarbon waste bay behind the mill where they will be removed to an appropriate off-site facility. Large amounts of waste grease in unlined drums must be placed in the hydrocarbon waste bay.

5.4.3 Water/Oil Mixture

Oil is to be decanted from the top of the mixture into the workshop waste oil storage tank. The remaining water is to be removed to the process water drain

5.5 Wood

Any CCA treated pallets to be placed in the **GREEN** general rubbish bins. These pallets tend to have a slight greenish tinge to them.

Un-treated intact pallets can be reused and are stored in the maintenance yard.

Damaged, un-treated CCA pallets can be placed into the GREEN general rubbish bins, or used for fire training so can be stored at the signposted top laydown area.

5.6 Rubber

5.6.1 Liners/Lifters

Mill lifters and liners replaced during the mill shutdown are to be placed on pallets, securely strapped and taken to the laydown area behind the mill. Environmental personnel, during the weekly waste inspections, will arrange recycling.

5.6.2 Tyres

Used tyres are to be stored at the top laydown area and are collected for re-treading for every new tyre bought to site. These tyres must be thoroughly cleaned prior to storage at the top laydown area (refer to section 3.1).

Storage must be in compliance with EPA and Southern Australian Fire Services guidelines (refer to section 4.3.2).

Any contract for supply of tyres must include removal and recycling of used tyres in accordance with EPA legislation upon delivery of new stock.

5.7 Mill Waste (Acid Forming Material)

5.7.1 Trash (plastic/slurry)

All trash must be placed in pods and then taken to the waste laydown area (refer to Figure 2) and sorted into the appropriate labelled pod for disposal.

5.7.2 Scats

Scats (waste from the SAG mill) must be placed in the TSF as they are considered PAF material. A magnetic belt will ensure the steel balls are removed for recycling prior to disposal of scats.

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5.7.3 Rock and Concentrate samples

All concentrate samples when no longer required must be placed in the TSF as they are considered PAF material. If recycling is possible, either back through the mill or by providing to a metallurgical processing facility this should be undertaken.

5.7.4 De-silting pond and RO sludge

All sludge created from the de-silting ponds, water treatment plants and the sludge cleared from the RO culverts is to be placed at the Tailings Storage Facility (TSF).

5.8 Workshop Waste

5.8.1 Oily Rags

To be placed in the allocated container located in the maintenance workshop. To be emptied by EPA approved contractor. A waste tracking form is required to be completed and forwarded to the Environmental Department.

5.8.2 Air filters, Oil filters and Hydraulic Hose

To be placed into a bunded pod or drum stored at the 'hydrocarbon waste bay', behind the mill, until removed from site by an EPA approved contractor.

5.8.3 Coolant

Vehicle coolant is to be placed into the waste oil tank.

5.8.4 Car Batteries

Used car batteries are to be stored in the sign posted shipping container in the eastern laydown area, to the east of the mill. Batteries must be placed into cut off pods that have the valves closed.

5.9 Pipes

5.9.1 Paste lines

All used paste lines must be temporarily stored in the mining pipe laydown area to be recycled.

5.9.2 Water lines

Used water piping must be flushed with clean water (raw water is acceptable) and temporarily stored in the clean zone pipe laydown area to be recycled. If recycling is not an option they must be cut into 4 metre lengths and placed into general waste bins for disposal.

5.9.3 Mill pipework

All used mill pipework must be flushed with clean water (raw water is acceptable), assessed for contamination by the Environmental Department and placed in either the clean zone or mining pipe laydown area depending on the outcome of the assessment.

5.10 ANFO bags

All empty ANFO bags are to be adequately and securely placed in the pod located next to the magazine for re-use.

5.11 Redundant equipment

Redundant equipment includes both light and heavy vehicles as well as other plant machinery. Once the vehicles are no longer of use they are to be stored at the eastern laydown area near the metal recycle bins (refer to Appendix 1) and recycled for scrap steel. Prior to storage all hydrocarbons, batteries, tyres, air-condition gasses must be removed to reduce the potential of environmental damage.

6 Waste Collection Contractors

Below is a current list of contractors used to dispose of or recycle on-site waste to approved EPA facilities (Table 1). Use of local recycling facilities occurs where possible, to minimise carbon emission footprint.

Table 1: Current list of contractors

Company	Waste Items	Contact Details
To be updated when contracts awarded		

7 Responsible Areas

A map of Angas Zinc mine displays the demarcation of the areas of responsibility of the different departments on site (Appendix 5).

8 Reporting and Review

8.1 Compliance reporting

Mining and Rehabilitation Compliance Report
 Quarterly Environmental Report

8.2 Internal Reporting

Monthly Internal

8.3 Waste management program review

Annual review, area audits (SWP)

9 Training

All personnel will undergo waste management awareness training. Waste Management will be a component of the site induction program and also topic specific training packages will be developed. The following areas will be covered in such training programs:

- Importance of reducing and recycling waste;
- Minimum requirements for avoiding/ minimising, recycling/ reusing and disposing of waste from the mining lease;
- Environmental risks and effects of products from the time that they are made and purchased to the time that they are disposed
- PAF material, operational zone and clean zone