CHAPTER 8
PUBLIC SAFETY

ANGAS PROCESSING FACILITY

MISCELLANEOUS PURPOSES LICENSE APPLICATION

2019/0826

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All maps presented in this chapter are in GDA94 / MGA zone 54 (EPSG: 28354) and authored by Terramin unless otherwise stated.

8 PUBLIC SAFETY

This chapter provides an overview of the existing environment relevant to public safety including a review of the identified potentially impacting events which have the potential to impact public safety if not adequately managed.

Refurbishment, operation and closure of the proposed Project has the potential to create hazardous situations for the public through increased traffic movements, the introduction of additional ignition sources, emissions to air and water and site security. The scale of effects on public safety is discussed and, where relevant, management and/or mitigation measures that would minimise impacts and risks are identified.

8.1 APPLICABLE LEGISLATION AND STANDARDS

The relevant legislation relating to public safety at the proposed mine is as follows:

- *Mine and Works Inspection Act 1920*
- *Work Health and Safety Act 2012*
- *South Australian Environmental Protection (Air Quality) Policy 2016* (Air Quality EPP)

Further information regarding the requirements and relevance of the legislation is provided in Chapter 4. Specifically, the following standards provide a range of criteria relevant to public safety:

- SafeWork Australia *Workplace Exposure Standards for Airborne Contaminants*
- National Environment Protection (Assessment of Site Contamination) Measure 1999
- National Environment Protection (Ambient Air Quality) Measure 2003
- NSW Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales
- AS 2187.2-2006: Explosives: Storage and use – Use of explosives
- AS 1692-2006: Steel tanks for flammable and combustible liquids
- AS 1940-2004: The storage and handling of flammable and combustible liquids
- AS 1725-2003: Chain-link fabric security fences and gates

The National Environment Protection Council's (1999) National Environment Protection (Assessment of Site Contamination) Measure 1999 (NEPM) was established to provide a nationally consistent approach to identifying and managing site contamination. The NEPM refers to three different types of investigation levels: Ecologically-based Investigation Levels (EILs), Health-based Investigation Levels (HILs) and Groundwater Investigation Levels (GILs) which provides criteria (concentrations of contaminants) to guide the assessment of risks to human health and the environment. This approach ensures sound environmental management practices are adopted by all stakeholders when managing site contamination.

The National Environment Protection (Ambient Air Quality) Measure 2003 outlines the ambient air quality standards for PM_{10} emissions, however the *National Environment Protection (Ambient Air Quality) Measure* is not relevant to this proposal since the requirements of the Air EPP 2016 covers the South Australian criteria.

Predicted levels of emissions and the implications to air quality are discussed in detail in Chapter 16.

The nominated Australian standards each specify specific design criteria that will be incorporated into the design of the mine to protect the key environmental and stakeholder values relevant to public safety.

8.2 ASSESSMENT METHOD

A desktop review of existing public safety hazards from ML 6229 records and data was undertaken to determine positive or negative effects resulting from the construction, operation or closure of the mine. The desktop investigations were supplemented with site-based investigations undertaken by various technical experts to verify findings. The following information sources were utilised:

- Adelaide and Mount Lofty Ranges Bushfire Management Plan and Fleurieu Management Plan (Bushfire Management Plan Committee, 2016).

8.3 EXISTING ENVIRONMENT

This section provides an overview of the existing environment within the area covered by the proposed MPL in relation to public safety. Specifically, this includes site security and fire hazard.

Detailed descriptions of the existing environment in relation to air quality, earthquakes and seismicity, and contaminated land are provided in Chapters 16, 15 and 13, respectively.

8.3.1 SITE SECURITY

Terramin have erected 2.9 kilometres of security fencing that encompasses the entire above ground footprint of the operation. This fence complies with AS1725-2003. Regular inspections and maintenance of the site fence is undertaken.

The front entrance gate is remotely controlled from the mine office during day shift. Only authorised personnel have access to the front entrance gate remote control during night shift.

8.3.2 FIRE HAZARD

Bushfire is a natural part of the South Australian landscape. Research undertaken indicates that South Australia can expect serious fires somewhere in the State in 6 or 7 years out of every 10 (R. H. Luke, 1978). South Australians should be alert to the possibility of bushfire, particularly during the summer months and on days with high temperatures, wind and low humidity. During the Fire Danger Season, generally from 15 November to 30 April, there are strict conditions for lighting any fires. On Total Fire Ban Days all fires are banned (Bushfire Management Plan Committee, 2016).

Strathalbyn is divided between the Mount Lofty Ranges Fire Ban District (region 1) and the Murraylands region (region 3), as defined by the South Australian Country Fire Service. Region 1 covers an area of 10 000 square kilometres of the Adelaide Hills, Fleurieu Peninsula and Kangaroo Island, while region 3 includes the Murraylands and Riverland, covering 54 000 square kilometres. The Angas Processing Facility (APF) is located within a “medium” fire risk area, as defined by the Adelaide and Mount Lofty Ranges Bushfire Management Plan and Fleurieu Management Plan (Bushfire Management Plan Committee, 2016).

Table 8-1 outlines significant bushfire events within the Mount Lofty Ranges and Fleurieu district’s history (Bushfire Management Plan Committee, 2016).

TABLE 8-1 | SIGNIFICANT BUSHFIRES WITHIN THE MOUNT LOFTY RANGES AND FLEURIEU DISTRICTS (BUSHFIRE MANAGEMENT PLAN COMMITTEE, 2016).

Year	Location	Notes
Mount Lofty Ranges		
1938-1939	Adelaide Hills	£650 000, 90 houses
1943-1944	Adelaide Hills	
1948-1949	Bridgewater, Mount barker	
1950	Mount Lofty	
1951	Adelaide Hills, Woodside, Stirling, Lenswood	
1955	Adelaide Hills	Black Sunday - 40,000ha, 2 firefighters, $4,000,000
1980	Adelaide Hills	Ash Wednesday I - 3,770ha, 50 homes
1983	Adelaide Hills	Ash Wednesday II - 12 deaths, 120 homes, historic buildings.
1985	Adelaide Hills	
1987	Morialta	300 Ha
1988	Kersbrook	400 Ha
1995	Heathfield	450 Ha
2000	Brownhill Creek	1000 Ha
2001	Hillbank	350 Ha
2003	Morphett Vale	300 Ha
2005	Mount Osmond	120 ha, 3 buildings, 4 vehicles, 4 km fencing.
2007	Mount Bold	2,000ha, numerous sheds, livestock and equipment fire damaged.
2014	Eden Valley	25,000ha, 4 houses, multiple sheds, livestock, native fauna, 100s x km fencing
2015	Sampson Flat	12 600ha, 24 houses, 103 sheds, 62 firefighter injuries, $13 million.
Fleurieu		
1987	Strathalbyn	6,000ha
1995	Delamere Fire	100ha
	Rapid Bay	300ha
2001	Rapid Bay	1,200ha
	Port Elliot	200ha
2003/2004	Yankalilla	300ha due to lightning strikes
	Delamere Valley	30 ha
2005/2006	Louds Hill Fire	105 ha
2006/2007	Cox Scrub	119 ha
2008/2009	Waitpinga	6.6 ha
	Clayton Bay	60 ha
2009/2010	Kangarilla	16.7 ha
	Delamere	28 ha
2010/2011	Kangarilla	2.5 ha
2013	Finniss	332ha
2014	Rapid Bay	300ha
	Delamere	100ha
2015	Mosquito Hill	300ha
	Kyeema	65 ha

Various ignition sources exist within the local area based on the current land use (predominately agricultural activity). These ignition sources include:

- Burn offs (both vegetation and rubbish);
- Harvester fires through material collecting on hot engine parts;
- Hay cutting and carting through hot exhaust on dry grass or spontaneous combustion;
- Ignition of heavy machinery used in quarrying and recycling nearby;

- Cutting, welding and grinding equipment;
- Powerlines not appropriately cleared of vegetation; and
- Electric fencing in the presence of dry vegetation.

8.4 SENSITIVE RECEPTORS

Identified sensitive receptors are summarised in Table 8-2.

TABLE 8-2 | IDENTIFIED SENSITIVE RECEPTORS

Sensitive Receptor	Summary	Impact ID
Unauthorised persons	Unauthorised persons who enter the security fenced area during operations	PIE_8_1
Local community (operations)	Local community who could be affected from a fire originating from the operating site.	PIE_8_2
Local community (post-closure)	Members of the community accessing the former operational site post-closure.	PIE_8_2

8.5 POTENTIALLY IMPACTING EVENTS

Potentially impacting events relating to public safety are included in Table 8-3.

Potentially impacting events relating specifically to traffic and public safety are addressed within the impact assessment described in Chapter 9: Traffic.

TABLE 8-3 | S-P-R OF POTENTIALLY IMPACTING EVENTS

Potentially Impacting Events	Source	Potential Pathway	Sensitive Receptors	Confirmation of S-P-R	Impact ID
Fatality/injury of unauthorised persons due to inadequate site security	Access of unauthorised persons	Operational site including heavy vehicles, processing plant and TSF	Unauthorised persons	Yes	PIE_8_1
Fire caused by processing activities causes third party property damage / injury fatality impacting local community	Fire caused by processing activities	Uncontrolled travelling fire	Local community	Yes	PIE_8_2

8.6 CONTROL MEASURES TO PROTECT PUBLIC SAFETY

8.6.1 DESIGN MEASURES

Design measures that mitigate the potential public safety impact events presented above are summarised in TABLE 8-4.

Air quality design measures are located in Chapter 16.

8.6.1.1 SITE SECURITY

Terramin have erected 2.9 kilometres of security fencing that encompasses the entire above ground footprint of the operation. This fence complies with AS1725-2003 *Chain-link fabric security fences and gates*. Regular inspections and maintenance of the site fence is undertaken. Post closure, the site will not pose any risks regarding site security associated with the preceding mining/processing infrastructure.

The front entrance gate is remotely controlled from the mine office during day shift. Only authorised personnel have access to the front entrance gate remote control during night shift.

The surface explosives magazine is fenced in a separate security compound. Access to this compound is restricted to authorised persons holding SafeWork SA Blasting permits or permits to handle explosives. Regular auditing of the magazine records and non-cuttable keys are used to ensure all explosives, detonators and magazine keys are accounted for. In addition a cycling recordable CCTV has been fitted to a pole such that all activity in the explosives compound is visible at the mine/mill control centre and recorded.

8.6.1.2 FIRE PREVENTION AND MANAGEMENT

A preventative approach to fire is adopted at the site. There are several potential ignition sources from the operation. These include hot works such as welding, cutting and grinding, vehicle fires and smoking. The site has in place a hot work procedure that includes evaluating the risk of fire and taking corrective actions prior to commencing the task. Similarly as part of the preventative maintenance program, regular fire hazard audits are carried out on all mobile plant, as this is a high-risk occurrence for and underground mining operation. As the site will be complying with lead protocols, it will be a smoking free site.

In addition regular site slashing and where required pre-fire season burn offs will be carried out. The design and placement of noise bunds and site access roads has been undertaken cognisant of the risk of bushfire and should assist in reducing the ability of a fire to either enter or leave the site.

A fire pump, booster box and hydrants have been established through the processing plant, workshops and offices to facilitate suitable firefighting services in these areas. Training in the operation of these facilities is incorporated in the site emergency response program. The site water truck and earthmoving equipment are setup so they can respond to surface fires as required. Familiarisation and ongoing training with the Strathalbyn CFS occurs on site.

All heavy underground machinery is fitted with fire suppression systems which are maintained and serviceable at all times. 9kg dry chemical fire extinguishers are fitted to all vehicles as well as located around the surface facilities and at specific points underground. These are maintained by a designated subcontractor on a monthly basis.

The site has positive pressure breathing apparatus to assist in the response to confined space fires and hazmat incidents. The Emergency Response Team (ERT) will maintain the equipment and undergo

regular training in its use so that it will be ready if such an event should occur. The team also has a high expansion foam generator to assist in liquid fuel fires both on the surface and underground. The ERT are called to all fires on site. If a fire does occur and as long as personnel are not put at risk the fire shall be extinguished as soon as possible to minimise environmental pollution.

TABLE 8-4 | PROPOSED DESIGN MEASURES

Design Measures	Impact ID
Fire hydrants and tanks located onsite	PIE_8_2
Fire access tracks located around operating area and vegetation	PIE_8_2
Emergency access on Callington Road (secondary access) and Hillside road	PIE_8_2
Fire suppressant systems in magazine	PIE_8_2
Management of explosive types underground in line with AS 2187.2-2006: Explosives: Storage and use – Use of explosives	PIE_8_2
Bunding and storage of hazardous chemicals as per AS standards	PIE_8_2
Security fencing as per AS1725-2003: *Chain-link fabric security fences and gates*	PIE_8_1
Remote controlled access gate to operational area	PIE_8_1
Magazine security compound	PIE_8_1
CCTV around site including magazine	PIE_8_1

8.6.2 MANAGEMENT STRATEGIES

Management measures to further mitigate potential public safety impact events with a confirmed Source-Pathway-Receptor are summarised in Table 8-5.

Air quality management strategies are located in Chapter 16.

TABLE 8-5 | PROPOSED MANAGEMENT STRATEGIES

Management Strategies	Impact ID
Equipment maintenance schedule to reduce fire risk associated with equipment	PIE_8_2

Management Strategies	Impact ID
Fire suppression equipment located within all LVs and HVs and at points onsite	PIE_8_2
Dig/land disturbance permits to be signed off by Environment Superintendent	PIE_8_2
Hot Work Permits to reduce bushfire risk	PIE_8_2
Fuel reduction strategies included in the Biodiversity Management Plan	PIE_8_2
Site based water truck for rapid response	PIE_8_2
Training of personnel for emergency situations including bushfire	PIE_8_2
Emergency Response Plan	PIE_8_2
Regular site fencing inspection	PIE_8_1
Annual review of safety systems	PIE_8_1

8.7 IMPACT ASSESSMENT

8.7.1 UNAUTHORISED ACCESS

Unauthorised access to the operational area has been reduced to as low as is reasonably practical (ALARP), as all reasonable steps have been undertaken regarding security fencing, remote controlled access gates, and security cameras (CCTV) in higher risk areas. There are no vertical openings from the underground workings accessible, as they are covered by the mine boxcut pond, which exists as part of the mine void recharge plan approved as part of the mine closure / care and maintenance planning for ML 6229.

If the mine void was to be dewatered for any reason, the security fencing around vertical shafts (ventilation raise/emergency egress) would be re-fenced and the access to the decline gated off and locked preventing access to unauthorised persons.

Regarding unauthorised persons and heavy vehicles, all vehicles onsite prior to being allowed on site are inspected by the maintenance department, procedures are in place to ensure that all vehicles are safe, fit for purpose and fitted with reversing alarms to alert any person in the vicinity of the machinery, whether authorised or not. All operators (including contractors and site visitors must undergo inductions (all as per the sites Safety Management System) prior to entry.

Overall, the expected impact of unauthorised persons accessing the site is **negligible**, however, as it is an industrial site, and with no control over the actions of unauthorised persons, although considered **rare**, the consequence could still be **major**. As such, with the design measures and management strategies employed, the risk has been reduced to as low as reasonably practical.

8.7.2 Fire Risk

Owing to the unpredictable nature of bushfires, the consequence of a bushfire could be considered **major to catastrophic**, however, the most credible worst case likelihood of the fire originating onsite is considered **rare**. Management strategies are imperative in preventing fire risk, however, design measures are in place for rapid response in the unlikely event of fire. These design measures include fire hydrants and extinguishers, the water truck onsite, and operational fire suppressant systems. The training of personnel for emergency response and to be members of an emergency response team would also be implemented. An annual public safety review of the site and management strategies further reduces this risk.

8.8 PROPOSED OUTCOME(S) AND MEASUREMENT CRITERIA

In accordance with the methodology presented in Chapter 6, an outcome has been developed for public safety impact events with a confirmed link between source, pathway and receptor (see Table 8-6).

All outcomes are supported by proposed measurable criteria which will be used to assess compliance against the proposed outcomes during the relevant phases (operation, closure and post-closure).

Public safety related outcomes and criteria are presented in Table 8-6. Outcomes for the entire project are presented in Appendix D1.

Table 8-6 | Proposed outcomes, measurement criteria and leading indicated criteria (Operations and Closure phases)

Proposed Outcome	Proposed Measurement Criteria	Proposed Leading Indicator Criteria
No public injuries and/or deaths to members of the public caused by mining operations	Independent investigation of all incidents that result in injury or death of the public are completed within 14 days, or as agreed with the Chief Inspector of Mines and demonstrate that the mine operator could not have reasonably prevented the incident from occurring.	Annual public safety review does not identify additional actions that could reasonably be taken to reduce risks to the public.
No public injuries and/or deaths to members of the public caused by mining operations	All unauthorised entries to the operating site are investigated completed within 14 days, or as agreed with the Chief Inspector of Mines and demonstrate all reasonable and practical measures were in place to prevent entry (and injury, if applicable).	Monthly check of perimeter security fencing around operating site.

8.9 FINDINGS AND CONCLUSIONS

Refurbishment, operation and closure of the proposed Project has the potential to create hazardous situations for the public. The scale of effects, or impacts on public safety regarding fire and site security have been assessed to be **negligible**, if managed in line with the proposed design measures and management strategies and considered to be as low as reasonably practical.