



CHAPTER 14

WASTE DISPOSAL AND MANAGEMENT



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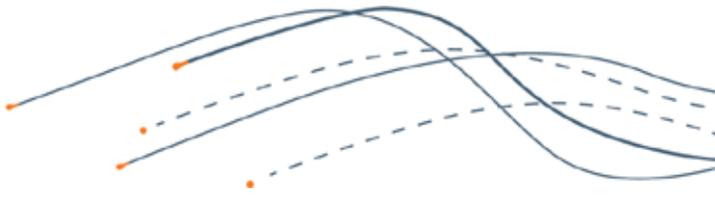
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14 Waste Disposal and Management

This chapter provides an overview of the existing environment relevant to waste disposal and management, including a review of existing waste management facilities in the region and their capacity to accept additional waste streams. Construction, operation and closure of the proposed mine site will result in the generation of significant waste streams. These waste streams will be disposed of in a combination of offsite landfill(s), offsite recycling station(s), licensed hazardous materials centres and an on-site landfill. The scale of effects on existing environmental values as a result of the waste generation is discussed and, where relevant, management and/or mitigation measures that would minimise impacts and risks are identified.

For the purposes of this chapter, waste is considered to include any discarded, rejected, abandoned, unwanted or surplus matter. Examples of waste expected to be generated within the proposed mine site include packaging, construction waste, sewage, organic and putrescible wastes, waste oils, engine fluids and glass. Overburden and topsoil from excavation of the pit and other construction areas have not been considered in this assessment as they will either be disposed of into the integrated waste landform, or will be reused on site for rehabilitation purposes.

14.1 Applicable Legislation and Standards

The relevant legislation relating to waste disposal and management from the proposed mine site is the *Environment Protection Act 1993 (SA)* (EP Act). The EP Act establishes specific Environment Protection Policies which outline enforceable requirements or standards. The *Environment Protection (Waste to Resources) Policy 2010* together with the EP Act forms the legislative framework which regulates activities likely to affect waste disposal and management. The following Standards also provide a range of assessable criteria relevant to waste disposal and management:

- AS 1940-2004: The storage and handling of flammable and combustible liquids
- AS 3500-2: The construction, installation and operation of septic tank systems in South Australia, national plumbing and drainage code

The nominated Australian Standards each specify design criteria that will be incorporated into the design of the mine site to protect the key environmental and stakeholder values relevant to waste disposal and management.

Zero Waste SA is also established under the *Zero Waste SA Act 2004 (SA)*, with the overarching objective of reforming waste management in South Australia. In exercising its functions, Zero Waste SA is to be guided by the waste management hierarchy, which identifies the avoidance of waste generation as most preferable and the disposal of waste to landfill as the least preferable option, as indicated in Figure 14-1.



Figure 14-1 Waste Management Hierarchy (Zero Waste SA 2004)

14.2 Assessment Method

A desktop review of existing waste management facilities and services was undertaken to determine the suitability of existing facilities to support waste arising from the proposed mine site. This was then compared to waste data from comparable mines across South Australia to determine likely volumes of waste arising from the proposed mine site. The following activities were undertaken during the desktop review:

- Review of the Eyre Peninsula Waste Management Strategy (Eyre Peninsula Local Government Association 2004)
- Review of publically available waste management information provided by each of the District Councils (DCs) on the Eyre Peninsula
- Benchmarking of per capita waste generation at comparable mines in South Australia to determine the volume of waste to be generated during construction, operation and closure of the proposed mine site
- Estimation of total waste arising from the proposed mine site based on estimated per capita waste consumption

In addition, studies were undertaken of the biophysical environment of the proposed mining lease as detailed in the relevant chapters of this Mining Proposal.

14.3 Existing Environment

This section provides an overview of the existing environment in relation to waste disposal and management. Existing waste management facilities in the region are identified, including any constraints that may render the facility unsuitable to support the handling of waste arising from the proposed mine site.

14.3.1 Waste on the Eyre Peninsula

Current publically available data regarding waste generation on the Eyre Peninsula is limited. The Eyre Peninsula Local Government Association (2004) indicated that waste generated on the Eyre Peninsula is approximately 250,000 tonnes per annum, however more recent data is not publically available.

Waste Collection Services

Kerbside waste collection is available within a number of townships throughout the DCs of Wudinna, Kimba, Cleve and Elliston. Kerbside waste collection services approximately 1800 properties in the townships of Wudinna, Minnipa, Kimba, Cleve, Arno Bay, Elliston, Lock, Pt Kenny and Venus Bay (Eyre Peninsula Local Government Association 2004). Persons residing outside of these areas are required to dispose of waste on their own accord.

Residents and sources of waste are sparsely distributed throughout the Eyre Peninsula. In addition to the relatively low volumes of waste generation, the collection of waste for all residents, as well as the operation and maintenance of recycling facilities or transfer stations is typically financially unviable on the Peninsula.

Existing Waste Management Facilities

As of 2004, there were a total of 30 operational waste management facilities on the Eyre Peninsula; 29 of which were operated by Councils and one was operated privately. In addition there were also five transfer stations in the region, all located within the DC of Streaky Bay (Eyre Peninsula Local Government Association 2004).

A subsequent desktop review of waste management facilities conducted by Iron Road identified a rationalisation of waste management facilities in the region. A total of 25 operational waste management facilities were identified within the region, incorporating 15 landfills and 10 transfer stations. A summary of the 10 existing waste management facilities located in Local Government areas adjacent to the proposed mine site is provided in Table 14-1.

Table 14-1 Existing Waste Management Facilities

Operator	Location of Facility	Facility Type	Distance to Wudinna	Distance to Mine	Constraints	Suitability
Wudinna DC	Wudinna	Landfill	5 km	21 km	Capacity to support a transfer station for recyclables generated at the proposed mine site.	Identified as the suitable option subject to ongoing discussions with Wudinna DC.
	Yaninee	Transfer Station	23 km	44 km		
	Warrambo	Transfer Station	27 km	1 km		
	Minnipa	Transfer Station	39 km	60 km		
DC Elliston	Venus Bay	Transfer Station	95 km	116 km	Limited additional capacity. No landfill facilities available.	Distance to mine too great.
	Elliston	Transfer Station	160 km	181 km		Distance to mine too great.
	Lock	Transfer Station	50 km	30 km		Not suitable due to lack of landfill facilities.
DC Kimba	Kimba	Transfer Station	100 km	121 km	Not practical due to distance	Distance to mine too great.
DC Cleve	Cleve	Transfer Station	142 km	163 km	Not practical due to distance	Distance to mine too great.
	Arno Bay	Landfill	170 km	191 km	Not practical due to distance	Distance to mine too great.

Waste management facilities have varying capacities to accept waste streams; however the following waste streams were identified as problematic by Local Government due to the lack of cost effective treatment solutions, typically as a result of insufficient volumes of waste generation (Eyre Peninsula Local Government Association 2004):

- Quarantine waste
- Restaurant grease trap waste and bilge water
- Grain dust
- Chemical containers
- Waste tyres
- Asbestos

Wudinna Landfill

As indicated in Table 14-1, the Wudinna landfill (Plate 14-1) was identified as a suitable location for disposal of waste arising from the proposed mine site. The Wudinna landfill utilises engineered cells for disposal of waste. Approximately 2000 m³, or 650 tonnes of waste are currently received at the landfill per annum. Based on the approximate existing volumes of waste received at the Wudinna landfill, the facility is anticipated to have a remaining life of approximately 70 years (Eyre Peninsula Local Government Association 2004). A number of materials cannot be disposed of within Council refuse sites, including asbestos, poisons, chemical containers, dangerous goods, tyres (whole) and waste oil (Wudinna District Council 2014).

The proposed mine site will result in the generation of significant waste streams that (if utilised) would affect the lifespan of the Wudinna landfill and is discussed in Section 14.7.



Plate 14-1 Wudinna Landfill

14.3.2 Summary of Key Environment Values

Waste management facilities are sparsely distributed across the Eyre Peninsula, with kerbside collection of waste limited to a selection of towns in each Local Government area. A rationalisation of waste management facilities has occurred throughout the last 10 years resulting in a reduction of landfills and an increased number of transfer stations throughout the region.

The Wudinna landfill has been identified as the preferred location for disposal of waste arising from the proposed mine site; however capacity is limited, transfer station facilities are not available and expansion of the site may be required to support anticipated waste streams.

A number of waste streams have been identified as problematic for local waste management facilities, such as tyres, chemical containers and grease trap waste streams which will all be generated during construction, operation or closure of the proposed mine site.

The soil, surface water and groundwater resources at the proposed mining lease are described in the relevant chapters of this Mining Proposal.

14.4 Context and Views of Affected Parties

Stakeholders relevant to waste disposal and management include the local land owners, Wudinna DC, Zero Waste SA and the EPA. The key concern identified by stakeholders was the capacity of existing waste facilities to accommodate anticipated waste volumes and waste streams originating from the construction, operation and closure of the proposed mine. In addition, stakeholders have raised the following issues in relation to waste management and disposal:

- Potential for spillage or accidental release of chemicals, hydrocarbons or hazardous materials
- Management and disposal of effluent arising from the onsite employee camp during construction and operation
- Stockpiling of waste products attracting pests and/or mosquitos and representing a visual impact on surrounding landholders
- The commercial opportunities associated with the establishment of new or improved waste management facilities (including recycling facilities or upgraded facilities) in the region to locally accept the waste arising from the proposed mine

Impacts and risks relating to the existing environmental values and the issues identified by relevant stakeholders are discussed in Section 14.7 below.

14.5 Potentially Impacting Events

Considering the views and contexts of affected parties and the issues identified during technical studies, an assessment of Source Pathway Receptor (SPR) has been undertaken, as per the methodology outlined in Chapter 6, to determine which potential impact events are considered applicable to this project. Potential impact events associated with the construction, operation and closure of the proposed mine site that have a confirmed SPR linkage related to waste disposal and management include:

- Increased waste volumes originating from the proposed mine exceeding the capacity of existing facilities (IM_14_01)
- Commercial opportunities associated with the disposal and management of waste arising from the proposed mine (IM_14_02)
- Inappropriate handling of waste materials, including the disposal of hazardous materials, sewerage and/or wastewater, resulting in contamination of soil or water resources (IM_14_03)
- Stockpiling of wastes attracting mosquitos or pest species (IM_11_07-09)

The impact and risk register presented in Appendix C provides further details around source pathway and receptor for each potential impact event considered.

The stockpiling of waste products within the mine site could result in the attraction of a range of pest species or mosquitos if not appropriately managed. Waste stockpiles can provide habitat for pest species and putrescible wastes such as food scraps may attract pests. The risks associated with pest species are discussed further in Chapter 11. Stockpiling of waste could also affect visual amenity from surrounding areas. The impacts of mine development on the visual amenity of sensitive receptors is discussed in Chapter 20.

All other impact events are considered below.

14.6 Control Measures to Protect Environmental Values

This section identifies design measures and management or control strategies which will be implemented to mitigate the level of impact and risk associated with waste disposal and management such that it is considered to be as low as reasonably practicable (ALARP) and therefore acceptable.

14.6.1 Design Measures

The following key design control measures have been incorporated to minimise impacts and risks associated with waste disposal and management involved with the construction, operation and closure of the proposed mine:

- Prefabricated modules are proposed to be utilised for the construction of the majority of plant within the proposed mine site. The use of modules significantly reduces the volume of waste associated with packaging and traditional construction techniques.
- Wastewater and sewage generated within the proposed mine site will be treated on site via an aerobic system and utilised for the watering and maintenance of vegetation and/or landscaping within the proposed mine site.
- The truck fleet proposed to be used during operation of the proposed mine site has been significantly reduced as a result of the use of in-pit crushing and conveying (IPCC) technology. This alteration to the project design will result in significantly less oil and other vehicle servicing wastes, including tyres.
- Food waste from the construction camp kitchen will be composted onsite and utilised as part of ongoing landscaping and revegetation initiatives.
- A design change in tailings management has avoided the need for an additional 80 ML/d of water and also avoided the need for an additional 80 km of large diameter water pipeline, many pumps, liners, valves etc., reducing the total volume of materials consumed at the mine.
- The processing plant has been designed in three identical trains, thus allowing for greater reuse of identical spare parts, reducing the need for stores of multiple, unique items and minimising the generation of associated waste products.

Each of the aforementioned design measures have been developed based on the principles of the waste management hierarchy (Zero Waste SA 2014). As such, avoiding the generation of waste was a key objective in project design, as demonstrated through the use of modular construction techniques which minimise construction-related waste.

14.6.2 Management Strategies and Commitments

In order to minimise and mitigate impacts associated with waste disposal and management during construction, operation and closure activities, control and management strategies will be incorporated into the PEPR and implemented for relevant project phases. Key control and management strategies are outlined in Table 14-2.

Table 14-2 Control and Management Strategies: Waste Disposal and Management

Control and Management Strategies	Project Phase
Implementation of waste management procedures incorporating: <ul style="list-style-type: none"> · All waste and recyclable disposal at appropriately licensed EPA-approved facilities · The provision of rubbish bins and recyclable stockpiles throughout the proposed mine · Regular removal of rubbish bins and recyclable stockpiles to avoid contamination or attraction of pest species · Hazardous wastes stored within designated hydrocarbon and chemical storage facilities prior to disposal · Tyre stockpiling in accordance with EPA guidelines (EPA 2010) · Reuse and recycling of conveyor belts where practicable · Monthly monitoring and inspection of waste stockpiling areas and disposal practices 	Construction Operation Closure

14.7 Impact and Risk Assessment

This section identifies and assesses impact and risk associated with waste disposal and management as a result of the construction, operation and closure of the proposed mine. Impact events (confirmed by presence of a source, pathway and receptor) are those which are predicted to occur as a result of the development, whilst risk events would not be expected as part of the normal operation of the project, but could occur as a result of uncertainty in the impact assessment process. Although the risks may or may not eventuate, the purpose of the risk assessment process is to identify management and mitigation measures required to reduce the identified risks to a level that is as low as reasonably practicable (ALARP) and therefore acceptable to the project. This assessment has been undertaken in accordance with the methodology outlined in Chapter 6.

Impact and risk events were identified through technical studies and stakeholder consultation. Impact events can include multiple sources, pathways or receptors and where practical have been grouped together to minimise duplication of information. Risks are events that would not be expected as part of the normal operation of the project, but could occur as a result of either uncertainties with the impact assessment, or as a result of faults, failures and unplanned events. A summary of impact and risk events relating to surface water is presented in Table 14-6 at the end of this section (with Impact IDs) and a complete register of impact and risk events by source, pathway and receptor is provided in Appendix C.

Impacts and risks are assessed following the application of the design measures outlined in Section 14.6. Where required, management measures are proposed to reduce the impact to a level that is considered to be as low as reasonably practicable and therefore acceptable to the project. Through the adoption of design modification or specific mitigation measures, all identified impacts and were categorised as low (or negligible) and considered ALARP. The key environmental risks would be monitored through the environmental management framework.

14.7.1 Increased Waste Streams

Volumes of waste arising from comparable mine sites in South Australia were reviewed to provide a benchmark for anticipated levels of waste arising from the proposed mine. A comparison of per capita waste generation at Olympic Dam (BHP Billiton 2013), Prominent Hill (Oz Minerals 2009) and Middleback Ranges (One Steel 2010 and Arrium 2013) is provided in Table 14-3.

Table 14-3 Per Capita Waste Generation at Comparable Mine Sites in South Australia

Site	Waste Volumes Per Annum	Approximate Personnel	Per Capita Waste Volume
Olympic Dam	46,000 tonnes	3500	6.3 tonnes
Prominent Hill	1,539 tonnes	580	3.1 tonnes
Middleback Ranges	9,000 tonnes	1700	5.3 tonnes

Utilising per capita waste volumes arising from comparable mine sites in South Australia as a benchmark, 5 tonnes per annum of waste arising per capita is estimated from the proposed mine and is considered a realistic estimate. Based on estimated waste arising per capita, Table 14-4 depicts total waste volumes during construction, operation and closure of the proposed mine site.

Table 14-4 Estimated Waste Arising from Proposed Mine Site

Project Phase	Duration	Personnel	Waste Per Annum	Total Waste
Construction	3 years	1,300 ¹	6,500 tonnes	19,500 tonnes
Operation	25 years	560 (permanent) 46 ² (shutdown)	3,030 tonnes	75,750 tonnes
TOTAL				95,250 tonnes

¹ Incorporates the workforce responsible for the construction of the northern half of the infrastructure corridor which will be accommodated within the proposed mine site.

² The shutdown workforce of 300 persons is not part of the permanent workforce. Work is completed annually over an approximate eight week period. The 46 persons nominated for shutdown is an annual FTE.

A breakdown of the various waste streams generated by the mining industry is provided in the Waste Account of Australia (Australian Bureau of Statistics 2013). The breakdown provides total tonnage of waste arising from mineral extraction operations based on publically available information across Australia. The percentage of overall waste arising has been calculated to provide a representative breakdown of waste streams from the proposed mine and identify the preferred location for disposal of the waste, as indicated in Table 14-5.

Table 14-5 Estimated Waste Streams of the Proposed Mine Site

Waste Stream	Percentage of Total Waste Arising ¹	Cumulative Estimated Mine Waste Arising	Preferred Method of Disposal
Paper and cardboard	0.7%	714 tonnes	Offsite recycling facility
Metals	16.5%	15,697 tonnes	Offsite recycling facility
Tyres and other rubber	0.4%	358 tonnes	Offsite recycling facility
Sub-total	17.6%	16,764 tonnes	Offsite recycling facility
Electrical and electronic	1.1%	1,070 tonnes	Licensed facility (offsite)
Solid hazardous waste	34.1%	32,464 tonnes	Licensed facility (offsite)
Sub-total	35.2%	33,534 tonnes	Licensed facility (offsite)
Masonry	27.7%	26,399 tonnes	Onsite landfill

Waste Stream	Percentage of Total Waste Arising ¹	Cumulative Estimated Mine Waste Arising	Preferred Method of Disposal
Inseparable/unknown	8.6%	8,205 tonnes	Onsite landfill
Sub-total	36.3%	34,604 tonnes	Onsite landfill
Inseparable/unknown	8.6%	8,205 tonnes	Wudinna landfill
Plastics	0.4%	357 tonnes	Wudinna landfill
Organics	0.4%	357 tonnes	Wudinna landfill
Leather and textiles	0.7%	714 tonnes	Wudinna landfill
Timber and wood	0.4%	357 tonnes	Wudinna landfill
Other	0.4%	357 tonnes	Wudinna landfill
Sub-total	10.9%	10,370 tonnes	Wudinna landfill
TOTAL		95,250 tonnes	

¹ Percentage of total waste arising derived from the Waste Account of Australia (Australian Bureau of Statistics 2013)

Waste Disposal into Wudinna Landfill

As detailed by the Eyre Peninsula Local Government Association, the Wudinna landfill had capacity to support a further 70 years of waste (in 2004) based on the receipt of an estimated annual landfill of 650 tonnes. On this basis, the existing Wudinna landfill is anticipated to have capacity of approximately 45,500 tonnes in 2014; sufficient to meet the needs of Wudinna DC for approximately 70 years. Based on the estimated waste arising from the proposed mine site, the utilisation of the existing Wudinna landfill will result in capacity being met in approximately 55 years, 15 years earlier than currently estimated, as indicated by Figure 14-2.

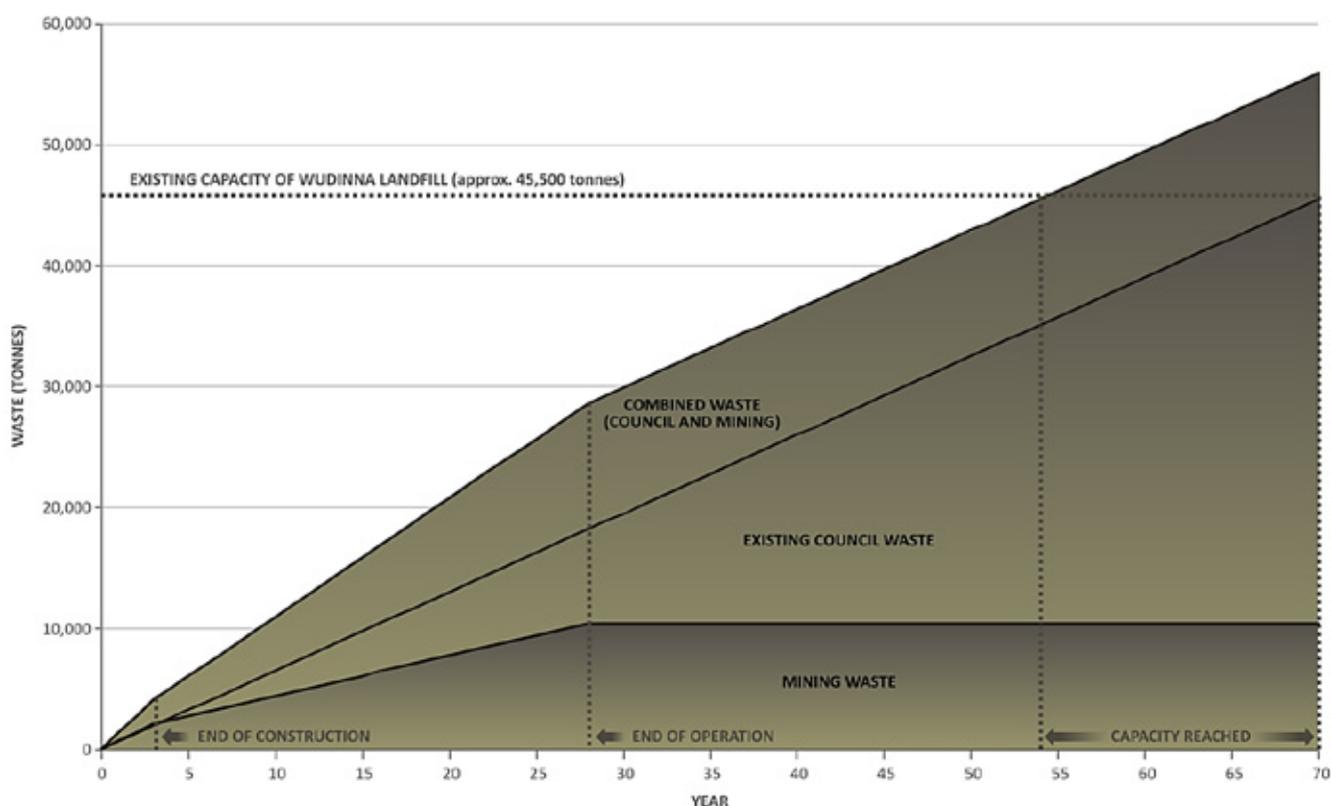


Figure 14-2 Capacity of Existing Wudinna Landfill

Construction, operation and closure of the proposed mine will result in the addition of 10,942 tonnes of waste to the Wudinna landfill, approximately a 25% increase on currently estimated volumes. When considered against existing waste volumes, this represents a strain on the capacity of the existing Wudinna landfill to service the waste disposal needs of the proposed mine. Prior to the commencement of construction, approval will be sought in conjunction with Wudinna DC to expand the existing landfill to support the proposed mine. The expanded facility will have sufficient capacity to accommodate the anticipated volumes of waste arising from:

- Wudinna DC (assuming 650 tonnes per year out to 2084)
- Construction, operation and closure of the proposed mine
- The proposed long-term employee village adjacent Wudinna (subject to EIS approvals process under the *Development Act 1993* (SA))
- Additional capacity (10%) as contingency to support unforeseen waste streams and uncertainty in waste volume estimations

As such, the proposed mine will not result in reduced capacity for users of the existing Wudinna landfill, including Wudinna DC and the local community and is considered to represent a **negligible impact**.

The determined level of impact is dependent on the approval for an expanded landfill facility at Wudinna. With the acceptance of the additional waste arising from the proposed mine, Wudinna landfill is anticipated to have capacity for more than 50 years. It is expected that the remnant 50 year lifespan is more than sufficient to undertake design and obtain relevant approvals for the expansion of the Wudinna landfill such that the Wudinna Council and local community are not disadvantaged in terms of ability to manage waste. Should an expansion of the existing landfill be considered unviable, an alternate location will be identified for establishment of a landfill to offset the lost capacity at the Wudinna landfill and manage the future waste arising from the proposed mine and/or the local community. As such, the consequence of delayed expansion of public landfill facilities is considered to be **minor**. Given the significant amount of time to resolve future waste management issues, it is considered **unlikely** that appropriate facilities will not be established prior to closure of the proposed mine. As such, the overall risk is considered to be **low**.

14.7.2 Commercial Opportunities for the Provision of Waste Management Services

Construction and operation of the proposed mine will result in a range of commercial opportunities for waste management facilities to be established locally that are capable of accepting the anticipated waste streams. As detailed in Table 14-5 an estimated 47.2 % of all waste arising from the proposed mine will be disposed of in the onsite landfill or an existing local landfill.

An estimated 17.6% of waste suitable for off-site recycling, in addition to 35.2% of waste required to be disposed of in an appropriately licensed off-site facility. There are currently no facilities available locally for the disposal of either of these waste streams. As such, significant commercial opportunities for the management of more than half of the total waste arising from the proposed mine (estimated to be in excess of 50,000 tonnes) are available. In addition, higher waste volumes at the existing Wudinna landfill present further employment opportunities associated with the management of the elevated waste streams. Waste arising from the proposed mine will be generated during construction and operation, providing long-term support to an appropriate waste management facility.

A waste management facility may also be able to provide complementary services to other waste producers, as appropriate facilities for the management of chemicals, tyres and wastewater were identified as not being adequately serviced on the Eyre Peninsula (Eyre Peninsula Local Government Association 2004). As such, the commercial opportunities associated with the management of waste arising from the proposed mine will occur throughout the life of the project and can also support the management of waste streams from sources throughout the Eyre region. The establishment of an appropriate waste management facility would result in the generation of a number of local employment opportunities and is therefore considered to represent a **benefit**.

14.7.3 Handling of Waste Materials

The overarching objective in the handling and disposal of waste materials is to minimise the volume of waste entering landfill in accordance with the waste management hierarchy and comply with all relevant environmental obligations. As such, the handling and disposal of waste materials is considered to be a **negligible impact**. As the final methods for handling and disposal of waste will be confirmed during detailed design, there is uncertainty in the assessment of this impact and is therefore discussed as a risk associated with the project below.

Disposal of Hazardous Materials

Improper disposal of chemicals or other hazardous materials could result in the contamination of soil resources. There is also the potential for impacts on groundwater but it is more likely contamination would occur indirectly (e.g. through contaminated soil leaching into groundwater). All hazardous materials will be disposed of via an appropriately licensed EPA facility by approved waste management contractors. Prior to disposal, hazardous materials will be stored within designated hydrocarbon and chemical storage facilities to restrict accidental spills or leaks that may contaminate soil or water resources. As such, the likelihood of contamination resulting from the disposal of hazardous materials is considered to be **unlikely**. Were contamination to occur, the consequences are considered to be **minor**, localised and able to be remediated in the short term. As such, the overall risk is considered to be **low**.

The risk of spills or leakage of hazardous materials resulting in site contamination is further discussed in Chapter 13.

Sewage and Wastewater Management

Inappropriate disposal of sewage and wastewater generated at the proposed onsite employee camp could result in the contamination of local soil resources. Sewage and wastewater will be treated on site by an aerobic system and utilised for the maintenance of landscaping and on-site vegetation. Sewage and wastewater treatment and disposal will occur through a fully automated process, with no human intervention required (with the exception of periodic maintenance). As such, the likelihood of improper disposal of sewage or wastewater is considered to be **unlikely**. If inappropriate disposal of treated water does occur, the consequences would be **minimal** and not result in any significant effects beyond the proposed mine site. As such, the overall risk is considered to be **low**.

14.7.4 Summary of Impacts and Risks

With the implementation of management measures, impacts associated with waste disposal and management are considered to be negligible. The impacts and risks are considered ALARP and do not warrant further specific control measures other than the environmental management controls and measures outlined in Section 14.6. The benefit of the commercial opportunities to support Iron Road in the disposal and management of waste arising for the proposed mine has also been identified. A summary of each of the identified impacts and risks associated with waste disposal and management is presented in Table 14-6.

Table 14-6 Impact and Risk Summary

Impact ID	Impact Event	Level of Impact ¹	Level of Risk ²
IM_14_01	Elevated waste streams affecting the ongoing operation of existing waste management facilities (e.g. Wudinna landfill).	Negligible	Low
IM_14_02	Commercial opportunities for the provision of waste management services to Iron Road.	Benefit	-
IM_14_03	Inappropriate handling of waste materials including: <ul style="list-style-type: none"> Disposal of hazardous materials contaminating soil or water resources. Treatment and/or disposal of sewage or wastewater contaminating soil or water resources. 	Negligible	Low

¹ Impact events are expected to occur are part of the project. Level of impact is assessed post control strategies, as per the impact assessment methodology provided in Chapter 6

² Level of risk reflects the risk that the assessment of impact is incorrect due to uncertainties in the assessment method, the control strategies, or in assumptions uses. Risk is assessed post control strategies, as per the risk assessment methodology provided in Chapter 6

14.7.5 Justification and Acceptance of Residual Impact and Risk

With the implementation of design and operational management measures, all impacts associated with waste management are considered to be **negligible**. Similarly, all risks have been reduced to a level of **low**. The impacts and risks are considered as low as reasonably practicable and are considered to be acceptable to the project.

14.8 Proposed Outcomes

In accordance with the methodology presented in Chapter 6, outcomes have been developed for all impact events with a confirmed linkage between source, pathway and receptor. Each outcome is supported by measurable assessment criteria that will be used to assess compliance against the proposed outcomes during the relevant phases (construction, operation, closure) of the mine. Proposed outcomes and measurement criteria have been developed for each of the impact events identified with a confirmed linkage and these are presented in Table 14-7.

Table 14-7 Outcomes and Assessment Criteria: Waste Disposal and Management

Proposed Outcome	Impact ID	Impact Event	Draft Outcome Measurement Criteria	Draft Leading Indicator Criteria
Wastes are managed in accordance with EPA licence requirements.	IM_14_01	Increased waste stream volumes affecting the ongoing operation of existing waste management facilities (e.g. Wudinna landfill).	Internal review confirms licence conditions are being met.	None Proposed
No adverse impacts on soil quality within the proposed mining lease that could compromise the post mining land use.	IM_14_03	Inappropriate handling of waste materials including the disposal of hazardous materials, sewerage and/or wastewater, contaminating soil and/or water resources.	All chemical and hydrocarbon spills that have the potential to cause environmental harm are remediated to meet EPA standards within 48 hours of the spill, or a longer time agreed by the Director of Mines. Existing contaminated sites are remediated or treated to EPA standards within 14 days of their identification, or within a timeframe agreed by the Director of Mines.	None Proposed

14.9 Findings and Conclusion

This section summarises the impacts and risks identified in relation to waste disposal and management. The impacts and risks are aligned to the outcomes identified in Section 14.7, with draft outcome measurement criteria proposed.

Disposal of selected waste generated during construction, operation and closure of the proposed mine site to the existing Wudinna landfill (estimated 10.9% of total waste arising) will result in the landfill capacity being met 15 years earlier than currently projected. As such, prior to construction of the mine, approval will be sought to expand the existing Wudinna landfill to meet the requirements of the proposed mine site, in addition to the ongoing requirements of Wudinna DC and the local community. The majority of waste arising will be recycled, disposed of on-site, or removed to a licensed facility. As such, no loss of services at the existing Wudinna landfill will occur and impacts are considered to be negligible.

Risks associated with waste disposal and management will be alleviated wherever possible through the implementation of control and management strategies. Low risks identified as a result of waste disposal and management include the possibility of contaminating soil or water resources as a result of improper disposal of hazardous materials or effluent.

The stockpiling of wastes on the proposed mine site may detract from the visual amenity of the surrounding area and could also result in the attraction of a range of pest species of mosquitos if not appropriately managed. The risk associated with stockpiling waste on pest species and visual amenity are discussed in Chapter 11 and 20 respectively.



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