

9.10 RISK ASSESSMENT

A risk assessment has been prepared to identify the potential emissions from the proposed activities and the potential sources, pathways and receptors of those emissions, and proposed controls to manage potential emissions to determine a risk rating. The risk assessment has been based on the DWER Guidance Statement: *Risk Assessments* (Department of Environmental Regulation (DER) 2017). MinRes applies an accepted risk level based on “As Low as Reasonably Practicable” (ALARP) principles.

The residual risk assessment ratings are consistent with the risk assessment matrix used by DWER as shown in **Table 9-2**.

A summary of the environmental risks relevant to the Works Approval application, and the associated environmental management measures to be implemented to reduce these risks to an acceptable level, are presented in **Table 9-3**. The risk of adverse impacts to the environment from potential emissions and discharges from the prescribed activity are able to be managed with the implementation of management controls detailed in **Table 9-3**, so that no unacceptable risk is posed to the receiving environment.

TABLE 9-2: RISK MATRIX AND CRITERIA

	Consequence				
Likelihood	Slight	Minor	Moderate	Major	Severe
Almost Certain	Medium	High	High	Extreme	Extreme
Likely	Medium	Medium	High	High	Extreme
Possible	Low	Medium	Medium	High	Extreme
Unlikely	Low	Medium	Medium	Medium	High
Rare	Low	Low	Medium	Medium	High
Likelihood					
The following criteria has been used to determine the likelihood of the risk / opportunity occurring					
Almost Certain	The risk event is expected to occur in most circumstances				
Likely	The risk event will probably occur in most circumstances				
Possible	The risk event could occur at some time				
Unlikely	The risk event will probably not occur in most circumstances				
Rare	The risk event may only occur in exceptional circumstances				
Consequence					
The following criteria has been used to determine the consequences of a risk occurring					
	Environment		Public Health and Amenity		
Severe	<ul style="list-style-type: none"> On-site impacts: catastrophic Off-site impacts local scale: high level or above Off-site impacts wider scale: mid-level or above Mid to long term or permanent impact to an area of high conservation value or special significance[^] Specific Consequence Criteria (for environment) are significantly exceeded 		<ul style="list-style-type: none"> Loss of life Adverse health effects: high level or ongoing medical treatment Specific Consequence Criteria (for public health) are significantly exceeded Local scale impacts: permanent loss of amenity 		

Consequence		
Major	<ul style="list-style-type: none"> On-site impacts: high level Off-site impacts local scale: mid-level Off-site impacts wider scale: low level Short term impact to an area of high conservation value or special significance^ Specific consequence criteria (for environment) are exceeded 	<ul style="list-style-type: none"> Adverse health effects: mid-level or frequent medical treatment Specific consequence criteria (for public health) are exceeded Local scale impacts: high level impact to amenity
Moderate	<ul style="list-style-type: none"> On-site impacts: mid-level Off-site impacts local scale: low level Off-site impacts wider scale: minimal Specific consequence criteria (for environment) are at risk of not being met 	<ul style="list-style-type: none"> Adverse health effects: low level or occasional medical treatment Specific consequence criteria (for public health) are at risk of not being met Local scale impacts: mid-level impact to amenity
Minor	<ul style="list-style-type: none"> On-site impacts: low level Off-site impacts local scale: minimal Off-site impacts wider scale: not detectable Specific consequence criteria (for environment) likely to be met 	<ul style="list-style-type: none"> Specific consequence criteria (for public health) are likely to be met Local scale impacts: low level impact to amenity
Slight	<ul style="list-style-type: none"> On-site impact: minimal Specific consequence criteria (for environment) met 	<ul style="list-style-type: none"> Local scale: minimal to amenity Specific consequence criteria (for public health) met

TABLE 9-3 RISK ASSESSMENT AND PROPOSED CONTROLS AND MONITORING

Source / Activities		Potential Emissions	Potential Receptors	Potential Pathway	Potential Adverse Impact	Proposed Controls & Monitoring	Residual Risk			Reasoning for Residual Risk Ranking
							Likelihood	Consequence	Ranking	
Installation / Assembly										
Category 12: Mobilisation, assembly and positioning of Crushing and Screening Plant	Vehicle movements on unsealed access roads; Installation of mobile Crushing and Screening Plant	Dust	Red Hill Pastoral Station is located 23 km from the Premises boundary.	Air / wind dispersion	Health and amenity impacts	Management Controls <ul style="list-style-type: none"> Control / lower vehicle speed limits during dust prone climatic conditions where practicable. Routine maintenance and housekeeping practices to prevent dust build up. Water will be applied to any roads or cleared areas that pose a dust risk. Proposed Monitoring <ul style="list-style-type: none"> Opportunistic inspections for dust emissions during installation and assembly of the mobile Crushing and Screening Plant If visible dust emissions are noted then an assessment of the source will be made and additional water will be applied to key source areas, or alternative treatments applied. The potential for high risk weather conditions for dust emissions (i.e. windy conditions) will be monitored and extra water applied in preparation. An incident reporting system will be maintained to assist in managing environmental incidents such as excessive dust emissions. 	Unlikely	Slight	Low	<ul style="list-style-type: none"> Dust emissions during installation/assembly will be very minimal. Existing approved cleared areas will be used, the borrow area will be the primary location for the Crushing and Screening Plant, as well as the work front in the vicinity of the airstrip. Due to the location of the premises in a remote pastoral and mineral exploration area, with no residences in the immediate vicinity (the nearest receptor is the Red Hill Homestead, located approximately 23 km to the northwest of the Premises) and the short assembly timeframe, like likelihood of this event is reduced.
		Noise				Management Controls <ul style="list-style-type: none"> Noise emissions will comply with the <i>Environmental Protection (Noise) Regulations 1997</i>. Equipment will be regularly serviced and maintained. Proposed Monitoring <ul style="list-style-type: none"> An incident reporting system will be maintained to assist in managing environmental incidents such as excessive dust emissions. 				Rare

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Source / Activities		Potential Emissions	Potential Receptors	Potential Pathway	Potential Adverse Impact	Proposed Controls & Monitoring	Residual Risk			Reasoning for Residual Risk Ranking
							Likelihood	Consequence	Ranking	
Non prescribed Activity	Generation of waste	Solid waste	Terrestrial ecosystems	Discharge to Land from inappropriate disposal, windblown litter	Amenity impacts / adverse impacts to local fauna	Management Controls <ul style="list-style-type: none"> Maintain good housekeeping practices and store waste in dedicated waste receptacles Manage waste in accordance with Mining Proposal RED ID 35959, all waste generated during Project construction will be removed from site by licensed carriers and disposed offsite to a licensed waste disposal facility. 	Rare	Slight	Low	<ul style="list-style-type: none"> Waste generated during installation and assembly of the mobile Crushing and Screening Plant will be minimal as the plant is modulated and will arrive on site partially assembled.

Source / Activities		Potential Emissions	Potential Receptors	Potential Pathway	Potential Adverse Impact	Proposed Controls & Monitoring	Residual Risk			Reasoning for Residual Risk Ranking
							Likelihood	Consequence	Ranking	
Commissioning, TLO and Operations										
Category 12: Crushing and Screening of material	Operating of Crushing and Screening Plant, loading of stockpiling product Movement of mobile machinery and vehicles.	Dust	Red Hill Pastoral Station is located 23 km from the Premises boundary. Native vegetation in the local area.	Air / wind dispersion	Health and amenity impacts. Deposition of dust on native vegetation affecting photosynthesis	Management Controls <ul style="list-style-type: none"> As required, feed material will be conditioned by the water cart prior to being fed into the screens. Operating water carts will dampen work areas and surface mining equipment running tracks Operate dust suppression systems on strategic points of the crusher and screener to dampen material. Minimise drop heights on stockpile. Dust covers/suppression on conveyors. Shut down of plant if wind conditions are generating negative impacts off-site. Proposed Monitoring <ul style="list-style-type: none"> Visual monitoring for generation of dust An assessment/inspection prior to the commencement of each work shift (and throughout the day) on the potential for dust generation, considering the nature of activities on site and predicted weather conditions. If visible dust emissions are noted outside of the area where the prescribed activity is located then an assessment of the source will be made and additional water will be applied to key source areas, or alternative treatments applied. An incident reporting system will be maintained to assist in managing environmental incidents such as noise complaints. 	Unlikely	Slight	Low	<ul style="list-style-type: none"> Dust emissions from commissioning, TLO and operations of the mobile Crushing and Screening Plant, could potentially migrate in an easterly direction to the PEC. It is considered such an event may cause low level effects to vegetation from dust deposition. The likelihood of this event is reduced due to the separation distance from the premises boundary to the PEC (approx. 900m), and measures to manage dust emissions at the premises Dust emissions from the premises are not expected to migrate to sensitive receptors due to the separation distance between the Premises and the nearest receptor and the controls implemented (Red Hill approximately 23 km to the northwest of the Premises).

Source / Activities		Potential Emissions	Potential Receptors	Potential Pathway	Potential Adverse Impact	Proposed Controls & Monitoring	Residual Risk			Reasoning for Residual Risk Ranking
							Likelihood	Consequence	Ranking	
<p>Category 12: Crushing and screening of material</p>	<p>Operating of Crushing and Screening Plant.</p> <p>Movement of mobile machinery and vehicles</p>	Noise	<p>Red Hill Pastoral Station is located 23 km from the Premises boundary.</p> <p>Significant species (P4 species Western Pebble-mound Mouse, Australia Bustard and Northern Quoll (EN))</p>	Air / wind dispersion	<p>Amenity impacts</p> <p>Impacts of anthropogenic noise to fauna (behavioural, displacement from foraging habitat)</p>	<p>Management Controls</p> <ul style="list-style-type: none"> Noise emissions will comply with the <i>Environmental Protection (Noise) Regulations 1997</i>. Machinery used to support the mobile Crushing and Screening Plant will be fitted with appropriate mufflers and regularly serviced to reduce noise emissions. Noise attenuating equipment will be used where practicable to minimise noise during operation. Works will be carried out on accordance with Australian Standard AS2436-1981 "Guide to Noise control on Construction, Maintenance and Demolition Sites" whilst the WPIOP is within the construction phase. In accordance with the Northern Quoll Management Plan and Pilbara Olive Python Management Plan <p>Proposed Monitoring</p> <ul style="list-style-type: none"> An incident reporting system will be maintained to assist in managing environmental incidents such as noise complaints. Monitoring in accordance with Northern Quoll Management Plan 	Rare	Minor	Low	<ul style="list-style-type: none"> No residences in the immediate vicinity, the nearest receptor is the Red Hill Homestead, located approximately 23 km to the northwest of the Premises Noise emissions from commission, TLO and operations are not expected to have an adverse impact on sensitive receptors Due to the typically mobile nature of fauna, the potential impacts are likely to be minor, with the conservation status unlikely to be altered by the proposed activities.
<p>Category 12: Crushing and screening of material</p>										

Source / Activities		Potential Emissions	Potential Receptors	Potential Pathway	Potential Adverse Impact	Proposed Controls & Monitoring	Residual Risk			Reasoning for Residual Risk Ranking
							Likelihood	Consequence	Ranking	
Category 12: Crushing and screening of material	Stockpiling of crushed / screened material	Dust	Red Hill Pastoral Station is located 23 km from the Premises boundary. Native vegetation in the local area (PEC).	Air / wind dispersion	Amenity impacts. Deposition of dust on adjacent native vegetation affecting photosynthesis.	<p>Management Controls</p> <ul style="list-style-type: none"> Dust suppression will be used on product stockpiles as required to minimise dust lift off during storage and handling of borrow material. Operating water carts will dampen work areas, access road and stockpiles to minimise dust lift off during storage and handling of borrow material. Minimise drop heights on stockpile. Limit height of stockpiles <p>Proposed Monitoring</p> <ul style="list-style-type: none"> Visual monitoring for generation of dust by visual monitoring to include a daily inspection of all stockpiles and a weekly inspection outside the premises boundary An assessment/inspection prior to the commencement of each work shift (and throughout the day) on the potential for dust generation, considering the nature of activities on site and predicted weather conditions. If visible dust emissions are noted then an assessment of the source will be made and additional water will be applied to key source areas, or alternative treatments applied. An incident reporting system will be maintained to assist in managing environmental incidents such as noise complaints. 	Unlikely	Slight	Low	<ul style="list-style-type: none"> Dust emissions from commissioning, TLO and operations of the mobile Crushing and Screening Plant could potentially migrate in an easterly direction to the PEC. It is considered such an event may cause low level effects to vegetation from dust deposition. The likelihood of this event is reduced due to the separation distance from the premises boundary to the PEC (approx. 900m), and measures to manage dust emissions at the premises Dust emissions from the premises are not expected to migrate to sensitive receptors due to the separation distance between the Premises and the nearest receptor and the controls implemented (Red Hill Homestead, located approximately 23 km to the northwest of the Premises).

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Source / Activities		Potential Emissions	Potential Receptors	Potential Pathway	Potential Adverse Impact	Proposed Controls & Monitoring	Residual Risk			Reasoning for Residual Risk Ranking
							Likelihood	Consequence	Ranking	
Category 12: Crushing and screening of material	Stockpiling of crushed / screened material	Discharge of stormwater or potentially hydrocarbon contaminated and / or sediment laden	Surface water bodies - Cane River intersects Premises boundary	Discharge of sediment or hydrocarbon from surface water runoff following heavy rainfall events	Contamination of surface water bodies (sediment / hydrocarbons), increase of sediment loads within Cane River Contamination of terrestrial environment (riparian vegetation – decline of vegetation health).	Management Controls <ul style="list-style-type: none"> Mobile Crushing and Screening Plant will be positioned within existing disturbance areas with stormwater management infrastructure, within the borrow pit area and airstrip area Following significant rainfall events any sediment laden surface water runoff will be directed into temporary earthen sediment collection pond and retained within the confines of the approved borrow pit area or other work area in the vicinity of the airstrip. No planned discharge of water from the work front / premises Potentially contaminated waters retained within the work front via culverts, levees and surface diversions around the Borrow Area Maintenance of culverts or sedimentation pond as required during operation of the mobile Crushing and Screening Plant Proposed Monitoring <ul style="list-style-type: none"> Regular inspections of drainage controls (culverts, diversion bunds and sedimentation pond) around the borrow pit area and the airstrip area where the mobile plant will be located. 	Rare	Minor	Low	<ul style="list-style-type: none"> High rainfall and natural runoff events occur in the region, typically during the cyclone season. Such events present a pathway for sediments to be discharged from the premises to ephemeral rivers and creeks within and downstream of the premises, potentially increasing sediment loads within the Cane River, located approximately 250 m to the north of the proposed borrow pit area where the mobile Crushing and Screening Plant will predominately be situated Due to the infrequent occurrence of high rainfall and runoff events in the region, sediment discharges and associated impacts are expected to be rare events. Additionally, any sediment transport attributed to prescribed activities are not expected to contribute more sediment than what naturally occurs during incidental rainfall events, given proposed drainage controls and the crushing and screening activities are for a short period of time (approximately 19 months, one wet season), .

Source / Activities		Potential Emissions	Potential Receptors	Potential Pathway	Potential Adverse Impact	Proposed Controls & Monitoring	Residual Risk			Reasoning for Residual Risk Ranking
							Likelihood	Consequence	Ranking	
Non prescribed Activity	Fuel storage and refuelling	Unauthorised / unplanned discharge of hydrocarbons	Surface water bodies - Cane River intersects the Premises boundary. Local groundwater Local soils and native vegetation in the local area (PEC).	Discharge to land / soil Discharge to surface water from overland flow Infiltration to groundwater	Contamination of surface water bodies. Contamination of terrestrial environment (soils and vegetation – decline of vegetation health).	Management Controls <ul style="list-style-type: none"> Operate in accordance with the <i>Dangerous Goods Safety Act 2004</i> and Fuel storage and handling will be in accordance with Australian Standards (AS 1940) Refuelling restricted to dedicated refuelling areas Mobile refuelling truck / service truck will be fitted with a spill kit and mobile spill tray Any fuel spills to be cleaned immediately with fuel affected material stored in appropriate waste receptacles in a bunded area pending removal offsite Spill kits will be checked on a regular basis and maintained in good order. The total volume of fuel or other chemicals carried by a mobile refuelling vehicle not to exceed 10,000 L. Implement spill response procedures. Proposed Monitoring <ul style="list-style-type: none"> Regular inspections of hydrocarbon storage and refuelling area. 	Possible	Slight	Low	<ul style="list-style-type: none"> Fuel and oil spills associated with crushing and screening operations are expected to be minor and seldom events. Impacts from such spills are expected to be localised and restricted to soils within the premises. Additionally, PEC is located over 900 m from the proposed indicative location of the prescribed activity. Depth to groundwater ranges from 17 mBGS to 25 mBGS, it is unlikely that spills will vertically migrate through soils and contaminate groundwater with the implementation of management controls.
	Generation of waste	Solid waste/liquid	Terrestrial ecosystems	Discharge to Land from inappropriate disposal and storage	Amenity impacts / adverse impacts to local fauna, soils and surface water	Management Controls <ul style="list-style-type: none"> Maintain good housekeeping practices and store waste in dedicated waste receptacles Manage waste in accordance with Mining Proposal RED ID 35959, all waste generated during Project construction will be removed from site by licensed carriers and disposed offsite to a licensed waste disposal facility 	Rare	Slight	Low	<ul style="list-style-type: none"> Waste generated during commissioning, TLO and operations of the mobile Crushing and Screening Plant will be minimum. If there is a breach of procedures and inappropriate storage or disposal of waste occurs, it is expected to be localised and restricted to soils within the premises area.

Source / Activities		Potential Emissions	Potential Receptors	Potential Pathway	Potential Adverse Impact	Proposed Controls & Monitoring	Residual Risk			Reasoning for Residual Risk Ranking
							Likelihood	Consequence	Ranking	
Non prescribed Activity	Temporary operation of Asphalt Plant	Odour Combustion gases, particulates, and VOCs Dust Noise Solid/liquid waste/	Red Hill Pastoral Station is located 23 km from the Premises boundary.	Air/windborne pathway causing impacts on amenity and health Discharge to Land/surface water from inappropriate disposal and storage	Health and amenity impacts. Contamination of surface water bodies. Contamination of terrestrial environment (soils and vegetation – decline of vegetation health).	Management Controls <ul style="list-style-type: none"> Dust suppression will be used on aggregate stockpiles as required to minimise dust lift off during storage and handling. Noise emissions will comply with the <i>Environmental Protection (Noise) Regulations 1997</i>. Pollution control on the temporary plant will be operated and maintained in accordance with manufacturing specifications. Any liquid/slurry waste produced will be contained and dried within the work area and removed from site by licensed carriers and disposed offsite to a licensed landfill facility. Sold waste from the asphalt plant is classified Type 1 Inert waste in accordance with the <i>DWER Landfill Waste Classification and Waste Definitions 1996 (as amended 2019) (DWER 2019)</i>, will be disposed offsite to a licensed landfill facility. 	Rare	Slight	Low	<ul style="list-style-type: none"> Odour and combustion of gases/particulates and VOC emissions from commissioning, TLO and operations are not expected to have an adverse impact on sensitive receptors. No residences in the immediate vicinity, the nearest receptor is the Red Hill Homestead, located approximately 23 km from the Premises boundary

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10. ATTACHMENT 7 – SITING AND LOCATION

10.1 SENSITIVE RECEPTORS AND ENVIRONMENTALLY SENSITIVE AREAS

There are no sensitive land use areas within 5 km of the proposed Prescribed Premises boundary. The nearest sensitive premise is the Red Hill Homestead, approximately 23 km to the northwest of the Premises boundary. The predominant land use in the area is for pastoral purposes (cattle grazing) and mineral exploration. The proposed premises area intersects a portion of the Cane River in the southern portion. The nearest mapped Priority Ecological Community (PEC) is located approximately 900 m to the east of the proposed Prescribed Premises boundary. Further detail is provided in **Table 10-1**.

The location/s of sensitive land uses and receptors with respect to the premises are shown in **Figure 12**.