



# **Doral Mineral Sands**

Keysbrook Mineral Sands Project

## **Mosquito Management Plan**

February 2020

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## 1 Introduction

### 1.1 Overview of report

Keysbrook Leucoxene Pty Ltd (KLPL), a subsidiary of Doral Mineral Sands is required to prepare a Mosquito Management Plan in response to Condition (d) of the Shire of Serpentine Jarrahdale Development Approval for Lot 57 for the extraction and processing of mineral sands.

KLPL have prepared a second, separate Development Application seeking approval to develop blocks 101, 103, 104 and 105 Diagram 92169.

This amended version of the Mosquito Management Plan has been produced to satisfy condition (d) as well as mosquito management objectives for blocks 101, 103, 104 and 105.

The site is located due west of South Western Highway, 3km north of North Dandalup town site. Figure 1 below indicates the site's location.

The site is bounded by local roads, and extraction will only occur in part of the site. The approved mining area is detailed in Figure 2.

# Mosquito Management Plan



Author: D. O'Hara ~ Drawn: CAD Resources ~ Tel 9246 3242 ~ URL www.cadresources.com.au ~ Date October 2019 ~ A4 ~ CAD Ref.g2510F100\_01.dgn

Figure 1: Site Location



## 2 Mosquito Management

### 2.1 Objectives

The objectives of this Mosquito Management Plan are to:

- Prevent increases in the number of new mosquito breeding sites as a result of mineral sands mining and processing operations.
- Prevent the transmission of mosquito-borne diseases as a result of mineral sands mining and processing operations.

### 2.2 Environmental Conditions

The environmental conditions that contribute to the breeding generally include the following:

- Stagnant freshwater pools
- Marshes
- Tall grasses and weeds
- Ground that is wet for at least part of the year

The majority of land within the extractive area is cleared and used for beef or dairy cattle grazing. Remnant native vegetation occurs in pockets and as scattered trees over pasture. Long term grazing has resulted in removal of the understorey in the remnant areas within the approved mining footprint and consequently the vegetation condition within the mine footprint is predominantly degraded.

The extractive area is slightly undulated from east to west, with minor seasonal ephemeral drainage lines traversing the area. Waterflow associated with the drainage lines is seasonal with flows limited to the winter months. Post winter months, standing water bodies are limited to isolated pools within the ephemeral drainage lines. These pools dry up rapidly post winter.

### 2.3 Site Conditions

#### 2.3.1 Process Water

The primary processing of mineral sands is relatively simple, using water, spirals and gravity separation, the heavy mineral concentrate (HMC) product is separated from sand. Water utilised for the Process Water Management Circuit is sourced from multiple sources including groundwater bores and tailings pits. The water is returned to the Process Water Pond (PWP) via pumps and pipelines. From here the water is pumped from the PWP into the Wet Concentrator Plant (WCP). Post processing, the water is then utilised to transport the tails sand from the WCP to the mine voids. Tailings water then reports to a sump where it is pumped back to the PWP. The water within the circuit is constantly moving and therefore is not considered a breeding habitat for mosquitos. The Process Water Management Circuit is represented graphically in Figure 3.

No standing water bodies associated with the processing of mineral sands will be present onsite with the exception of plant shutdowns. During plant shutdowns processing water pumps are shutoff to undertake routine maintenance. During shutdowns the water circuit ceases to flow for approximately 12 to 24 hours.

#### 2.3.2 Emergent Vegetation

No emergent vegetation is located within the Process Water Management Circuit, with all vegetation cleared prior to the areas being mined. Routine weed control of the Process Water Pond banks occurs to ensure vegetation growth does not occur. This is undertaken to ensure the integrity of the pond liner and to increase the water flows within the Process Water Pond.

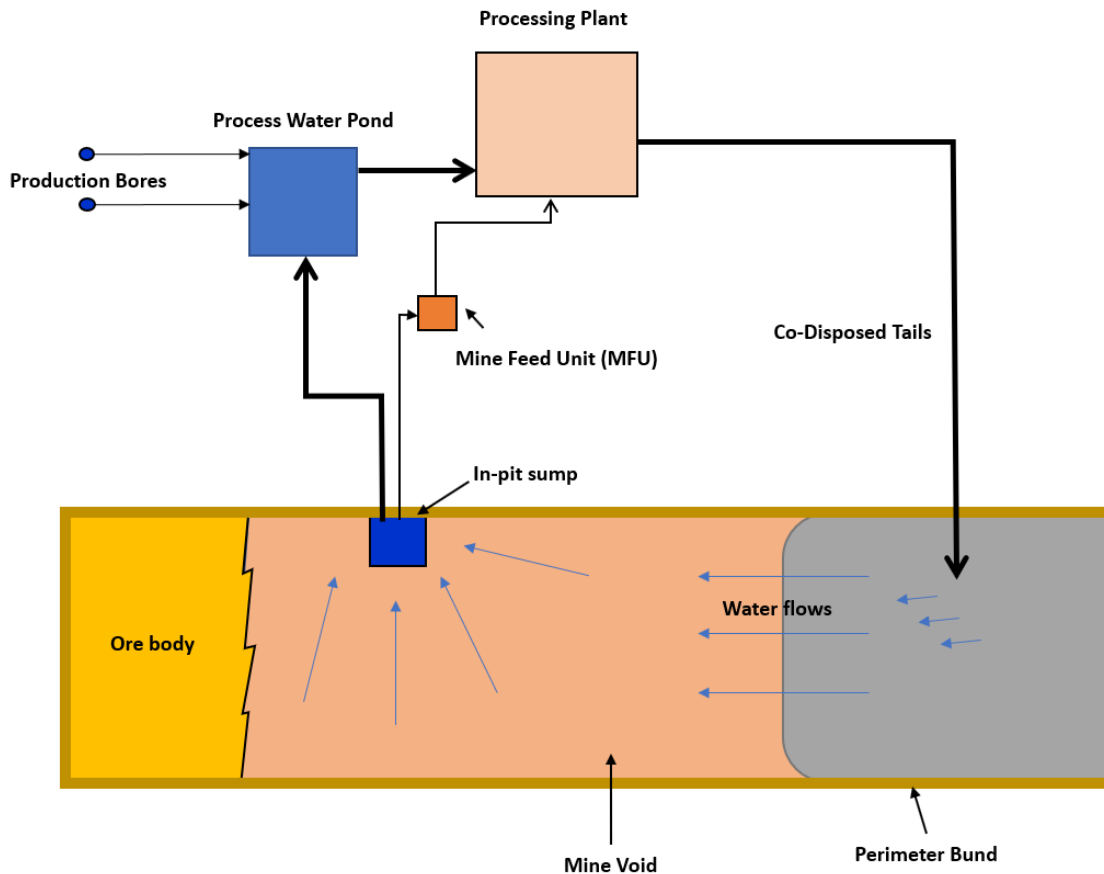


Figure 3: Process Water Management Circuit

## 3 Management Actions to Minimise Mosquito Breeding Habitat

### 3.1 Biological

- On-site facilities will be screened and air conditioned.
- Lights will be fitted where practicable with yellow bulbs to discourage mosquitoes.

### 3.2 Chemical

- All crib facilities are equipped with mosquito repellent.

### 3.3 Physical

- As detailed in Section 2.3, no standing water associated with the extraction and processing of mineral sands will be present onsite with the exception of plant shutdowns
- Any depressions created in the ground surface will be filled or drained as soon as reasonably practicable to prevent the ponding of water
- Inspections will be undertaken of the PWP and mined out tails voids for the presence of mosquito larvae. If significant presence of larvae are detected, the ponds or excavations shall be filled or drained and if required the Medical Entomology Branch of the Department of Health will be consulted on what actions should be taken
- Rehabilitation of mining areas in a manner that will prevent the creation of new mosquito breeding sites
- Drainage channels/spoon drains will be kept as shallow as possible to prevent ponding.

## 3.4 Cultural

- Storage containers capable of ponding water will be managed to reduce the risk and duration of ponded water by discarding after use or storing in an inverted position. Attention will be given to ensure that ponding does not occur in rubbish storage areas
- Staff and contractors will be made aware of the potential risk of mosquito borne diseases and the high risk periods
- Staff and contractors will be advised to wear long sleeved shirts and trousers, avoid risk periods where possible (i.e. sundown), and to use insect repellent. Insect repellent will be provided at work sites
- Workers will be educated about the early symptoms associated with exposure to mosquito-borne arbovirus and will be instructed on the need to report any symptoms to their direct supervisor.

## 4 Monitoring

Daily visual inspections will be undertaken on tails pits (mined out voids), water courses and the Process Water Pond as part of normal operations. During these visual inspections, voids and the process water pond will be inspected for evidence of mosquito breeding in the form of larvae and adults. The daily Tails Inspection Checklist is provided in Appendix 1.

Staff are encouraged to report excessive numbers of mosquito bites, utilising KLPL's online Hazard Reporting System. The hazard reporting system provides an efficient way for hazards to be reported directly to the appropriate personnel via email, allowing for management actions to be employed rapidly.

## 5 Non Compliances

During monitoring or as a result of the submission of hazard reports, if any of the following are identified they will be documented as a non-compliance and corrective action will be implemented:

- Mosquito breeding sites are identified and determined to be created by mining activities
- Excessive numbers of larvae and/or mature mosquitoes are evident on-site
- Significant incidences of mosquito bites are reported
- Confirmed infection by Ross River or other mosquito-borne disease which is likely to be attributable to the KLPL site.

## 6 Corrective actions

The following corrective actions will be implemented in the event of any non-compliance:

- All incidents will be reported and managed through to resolution via KLPL's incident reporting system
- Management actions will be reviewed to minimise mosquito breeding habitat detailed in Section 3 and to ensure the controls are adequate and are being implemented
- Staff will be re-educated on the importance of Mosquito Management at prestart meetings
- Controls in Section 3 will be reviewed and changed where necessary.

## 7 Reporting

The results of KLPL's Mosquito Monitoring and Management Program will be documented in KLPL's Annual Report of Performance against the Compliance Assessment Plan. Any significant mosquito activity will be reported to KLPL's Mine Manager.

## 8 Appendices

### Appendix 1 – Tails Inspection Checklist

Appendix 1 – Tails Inspection Checklist

## TAILINGS INSPECTION CHECKLIST

Tailings Storage Area:			
Inspected by:		Date:	

General Item	Specific Criteria	Comments	Actions
Embankment, Bunds, Roads & Perimeter	General condition		
	Available storage capacity		
	Erosion or damage		
	Evidence of seepage		
	Evidence of spillage		
	Presence of wet areas		
	Condition of pipes & valves		
	Evidence of mosquito breeding (e.g. larvae / adults)		
Tails Voids	Erosion		
	Sediment within drains		
	Excess vegetation in drains		
	Evidence of mosquito breeding (e.g. larvae / adults)		
Creek crossings	Pipes crossing creeks adequately contained in culverts		
	Pipe corridor adequacy banded at creek crossings to prevent spills into creeks		
Process Water Ponds	Evidence of mosquito breeding (e.g. larvae / adults)		

Sign off			
	Dewatering Team Leader		Mining Superintendent
Name:		Name:	
Signature:		Signature:	