2021

Mortlock Malt

MALTING FACILITY WORKS APPROVAL

Contents

1. Background:

Mortlock Malt was established in 2020 with the aim of malting heritage Western Australian barley varieties for the WA boutique craft beer and spirit industry. Mortlock Malt are proposing to construct a small scale malting plant on a farming property xxkm from Goomalling. This document outlines the proposed operations, construction and equipment details as well as the waste emissions resulting from the malting process and the required management in order to be licenced as a Category 18- Food Processing Premise under the *EPA Act 1993*.

Mortlock Malt has a Development Approval from the Shire of Goomalling; has had several discussions with the Department of Primary Industries and Regional Development (DPIRD) regarding the proposal and is engaging with the Local Government Environmental Health Officer.

2. Location:

The operation is located at 6013 Northam-Pithara Rd Karranadgin. The land is located in the Rural 3 – General Farming zone under the Shire of Goomalling Town Planning Scheme No. 3.

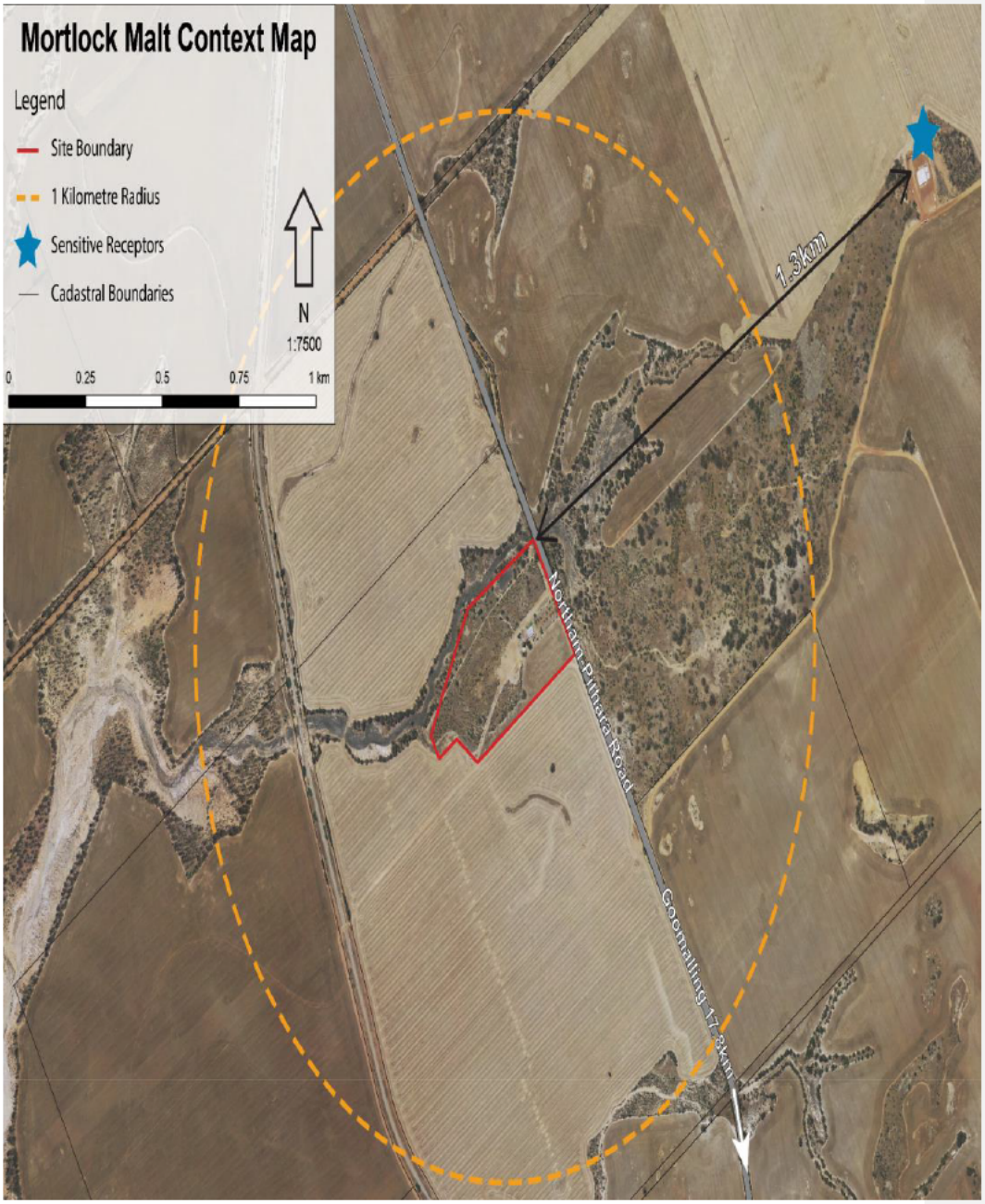
The most appropriate land use classification in the Shire of Goomalling Town Planning Scheme No. 3 is Industry Rural which is defined as, “an industry handling, treating, processing or packing primary products grown reared or produced in the locality, and a workshop servicing plant or equipment used for rural purposes in the locality.” Rural Industry is permissible subject to council discretion in Rural Zone 3.

A malting facility is located on land in the Rural Zone 3 – General Farming is consistent with the objectives of the Rural 3 Zone – General Farming which aims to, “Ensure that the zone contains predominantly rural uses and reserves for various purposes.”

The buildings will require building approval from the Shire. It will require a 50m setback from the road frontage.

A malting facility would be classified as a Class 8 building. This is defined as, “a laboratory, or a building in which a handicraft or process for the production, assembling, altering, repairing, packing, finishing or cleaning of goods or produce is carried on for trade, sale or gain.”

3. Site Map:


Mortlock Malt Context Map
Legend
Site Boundary
1 Kilometre Radius
Sensitive Receptors
Cadastral Boundaries
N
1:7500
0
0.25
0.5
0.75
1 km
1.3km
Northam Pithara Road
Goomalling 17.2km

4. Existing Surrounding Environment:

4.1 Climate

Being located in the Wheatbelt the site has a semi-arid, Mediterranean climate with hot dry summers and wet winters (Beecham, 2001). The Goomalling Weather Station has recorded climate data from 1887 (BOM, 2020).

The station has recorded temperature data since 1967. The station recorded an average yearly maximum temperature of 25.9°C and an average yearly minimum temperature of 11.3°C. The hottest month is January with an average maximum temperature of 34.8°. The coolest month is July which had an average maximum temperature of 17.3° (BOM, 2020).

The station recorded an average of 364.4mm of annual rainfall over 46.3 rainfall days. Rainfall is predominantly recorded in the winter months with June recording the highest average rainfall of 65.9mm. December recorded the lowest average rainfall with 10.6mm (BOM, 2020).

Local winds during the warmer months are typically characterised by easterly winds during the daytime followed by south-westerly winds in the afternoon and evening as the land cools during the evening (BOM, 2020).

4.2 Topography

The proposed operation is sited on land approximately 260m above sea level. The immediately adjacent landscape is gently undulating with higher land (270m) to the south and east of the site. There is a low point of land to the west at 250m which forms part of a creek system (DPIRD, 2020).

The site is currently cleared and levelled.

4.3 Hydrology

The premises is located within the Avon River Catchment. Water from the property drains to the Mortlock River, which discharges into the Avon River (DWER, 2017).

The Department of Primary Industry and Regional Development Interactive groundwater and salinity tool shows a number of hydrological features. There is a creek running through the property east to west. The Department of Primary Industry and Regional Development has identified this area to be affected by dryland salinity as well as be a valley hazard area. A valley hazard is an area in which water can accumulate, and is likely to have a shallow water table with the potential to result in surface salinity (DPIRD, 2020).

The creek is not visible on a Landgate Topographic Map at a 1:50,000 scale. It is also not visible as any category on the Hydrography (Hierarchy) DWER-031 dataset.

4.4 Hydrogeology

The premises is located within the unproclaimed Karri Groundwater Area and is comprised of combined fractured rock aquifers. A review of the DWER's Water Information Network and Water Register indicated that no publicly owned groundwater bores were located on the premises. Water was measured at approximately a 6m depth using a private bore on site.

4.5 Flora and Fauna

Whilst the region has largely been cleared for dryland cropping. The Commonwealth Government Department of Environment and Energy EPBC Act shows that "Eucalypt Woodlands of the Western Australian Wheatbelt" are likely to occur in the area. Beecham (2001) categorises the area as having, "proteaceous scrubheaths, rich in endemics, on residual lateritic uplands and derived sandplains; mixed eucalypt, Allocasuarina huegeliana and Jam York Gum woodlands on Quaternary alluvials and eluvials."

4.6 Indigenous and European Heritage:

According to the relevant publically available databases, there are no Indigenous or European heritage sites on the premise.

4.7 Surrounding Land Use:

The immediate surrounding land-use is extensive agriculture, largely comprised of cropping.

5. Proposed Structural Modifications:

The malting operation is to be comprised of a number of pieces of infrastructure. Water for the malting will be stored in two polyethylene water tanks with a total capacity of 200,000L. Grain will be stored in four 10-metre-high grain silos which are to be constructed of galvanised sheet metal. Processing will occur in a 24mx18mx6m shed which is to be constructed from a steel frame, and galvanised sheet metal panels. The operation will also utilise existing residential housing for staff. The layout is shown in Figure 1.

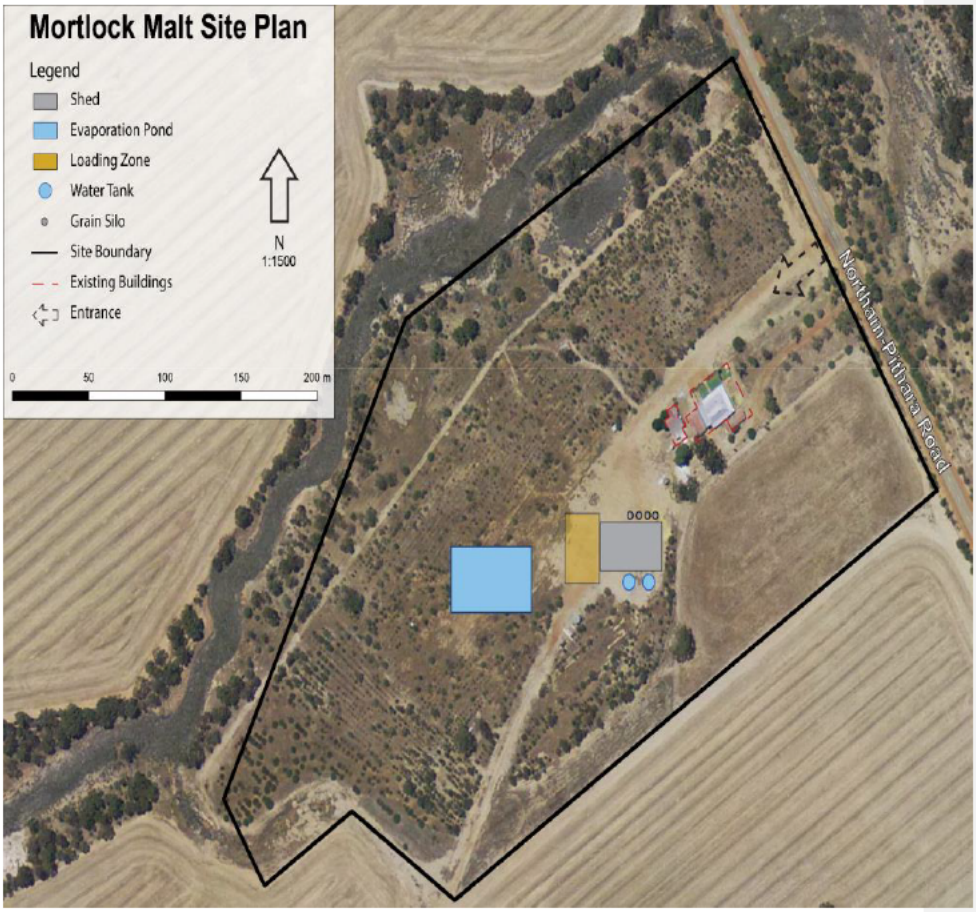


Figure 1 Map showing the malting facility site and proposed building layout.

6. Proposed Operations:

The proposed malting operation is estimated to produce 300-400 tonnes of malt per year. This will equate to approximately one, 7 tonne batch of malt processed per week. malting operation has the capacity to operate 24 hours a day, every day of the year. However, the facility is estimated to operate at 50% capacity in the initial production phase.

At full capacity, malting will use 40,000 litres of water a week, with 10,000 L lost during the steeping and kilning process, giving 30,000 L of wastewater. It is proposed water will be drawn from a combination of scheme water, groundwater and rainwater sources.

Barley is to be sourced from 100% locally and sustainably grown barley. The operation will require 400t of barley storage and 200,000L of water storage. Barley will be stored in grain silos which will be baited appropriately for vermin management.
Barley is to be transported to the premises by trucks with access from Northam-Pithara Road (shown in Figure 1). Barley deliveries will occur approximately 8 times over November and December. The processed malt will be transported by light truck or utility vehicle weekly. Traffic movements will occur between 9am to 5pm during the day.

6.1 Malting Process

The malting process is comprised of three steps: steeping, germination and kilning. Steeping involves immersing grain in aerated water for five to eight hours at a time, with air rests (water is drained from grain) in between. Grain is then transferred from steeping tanks to germination boxes for root and shoot production. Humidity and temperature are controlled in the germination bed. Once the barley shoot is about three quarters the length of the grain (about four days), germination is halted by kilning. Kilning dries the grain and promotes the development of colour and flavour.

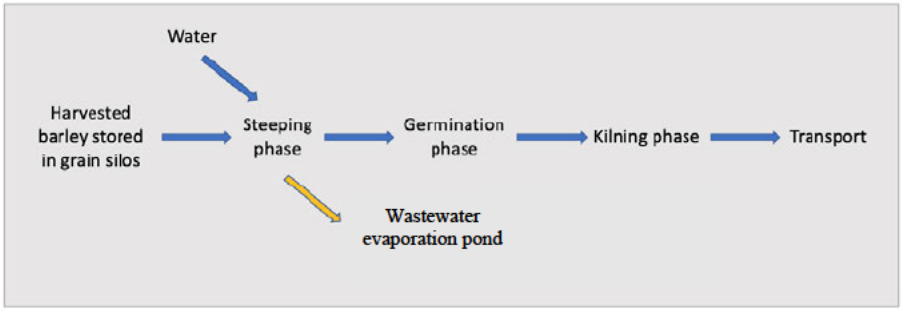


Figure 2 Malting Process flow diagram

The steeping process is the stage of the operation that has the most potential to create emissions. Water used in the steeping process will have to be managed. However, this is of relatively low risk due to the lack of harmful chemicals or pollutants in the wastewater. Wastewater is to be managed through a wastewater evaporation pond. This pond will be used to collect the water used for the steeping phase. The pond will be compliant with Water Quality Protection Note 27 Liners for containing pollutant. The final permeability of the pond will be less than 10^{-9}. Accumulated dry waste will be manually collected as required, and disposed of in general rubbish, as required.

7. Possible Sources of Emissions

7.1 Dust, Noise, Light

Dust and noise emissions will largely occur as a result of the transport of malt and barley to and from the premises. Given the distance to any sensitive receptors there is a low potential for impact of noise and dust emissions.

A steam boiler is used to generate heat for the kilning process. This boiler is heated through the burning of fuel oil. This fuel oil is sourced from licenced fuel waste recycler Cleanaway (Certifications: ISO 9001 (Quality), ISO 14001 (Environment) and AS 4801 (OHS)).

Barley is to be transported to the premises by trucks with access from Northam-Pithara Road (shown in Figure 1). Barley deliveries are to occur 8 times over November and December. The processed malt will be transported by light truck or utility vehicle fortnightly. Traffic movements are to occur between 9am to 5pm during the day.

The sources of emissions and a simple risk analysis has been completed below.

Table 1: Emissions risk assessment Table

Emission Type	Source/s of emission	Risks	Likelihood (Very Low- High), Consequence (Low- Very High)	Mitigation
Dust	Grain dust from malting, dust for vehicle movements	Dust impacts visibility for passing traffic; negatively impacts air quality	Low, Medium	Grain dust will be managed by an extractor fan and directed solids collected in bags that will be directed offsite for animal feed. Vehicle speed will be limited in order to manage disturbance. Should dust become an issue, the road entering the site can be wet down.
Light	Operational lights of malting facility	Light pollution causes negative visual disturbance for surrounding properties	Very Low, Low	Minimal outside lighting will be required as operations will mainly happen during the day. There are no sensitive receptors with in 500m limiting outside exposure to light.
Noise	Malting Plant and kiln operation, traffic	Noise creates disturbance for surrounding properties	Low, Low	There are no sensitive receptors within 500m of the operation, limiting outside exposure to the impact of noise. Traffic noise will be managed through the limit of speed in incoming and outgoing vehicles.
Smoke	Steam Boiler	Smoke from burning of oil in the steam boiler creates a decline	High, low	There are no sensitive receptors within 500m of the operation, limiting outside exposure to the impact of smoke.

		in surrounding air quality		
Oil spillage	Storage area for oil used in kiln	Oil spillage creates a	Low,	Fuel oil is delivered by Cleanaway (ISO 9001 (Quality), ISO 14001 (Environment) and AS 4801 (OHS)). It is stored in 10,000L storage tanks in an area with appropriate bunding to mitigate the risk from oil spillage

Commented [EW1]: TP and Rex to complete

7.2 Liquid and Solid Waste

Liquid waste is likely to come from the steeping phase of the malting operation and general wash down activities. It will be managed by a wastewater evaporation pond. This process is discussed further in the Evaporation Pond Section.

Solid by-products are generated from the germination phase and is in the form of rootlets. Rootlets are germs which appear during the malting process. They are a by-product that is used for animal feed. These rootlets will be captured and transported offsite for use as animal feed.

Other solid waste includes general waste generated from the activities on the premise. This will be captured in bins within the operation and transported offsite to landfill.

Table 2 Waste types and management

Waste Type	Expected Volumes per year	Management	Contingency	Monitoring
Waste water from malting process	30,000L per week	Waste water will be directed a an evaporation pond daily	Should waste water not be able to be directed to the waste water pond, it will be removed from site by a licenced liquid waste contractor	The pond will be visually monitored daily to ensure there is minimal odour and a freeboard of 500mm is maintained.
Rootlets	20t (5% of total maximum malt output)	Rootlets will be packaged into 500kg bags and taken off site weekly for animal feed.	Should the rootlets not be able to be used for animal feed, the will be disposed of in a licenced landfill.	Visual 'housekeeping' inspections of the site will ensure there is no stockpiling of rootlets.
General waste		General waste will be removed from site weekly and disposed of at a licenced landfill and	NA	Visual 'housekeeping' inspections of the site will ensure there is no excess general waste on site.
Domestic liquid waste		Domestic waste will be directed to a septic system	In the unlikely event the septic system fails, the domestic liquid waste will be taken off site by a	NA

Commented [EW2]: Rex/ Tim, please confirm volumes

			licenced liquid waste contractor.	

8. Evaporation Pond

The evaporation pond has been designed with a 10% safety margin, giving it the capacity to evaporate 33 kL/week of waste water generated from the malting process, as well as a 1:20 average recurrence interval (ARI) cumulative wet-winter rainfall. This results in a 1385 m² evaporation area, and a water-level depth of 0.58 m.

Daily SILO data for the location over a 50 year period was used to size the pond, with a monthly water balance over 3 years shown in Attachment A. Risk of overflow has been addressed in the pond water balance, with the first year having a 1:20 wet winter rainfall, and an additional 0.5 m freeboard is used to allow for heavy rain and wave action during storm events.

The pond will be lined with clay sourced from the premise. The clay has been tested (AS1289.6.7.2) for permeability at 95% MDD compaction by Structuerre Consulting has issued a Certificate (Attachment 1). The testing results it meets the standards required at per Water Quality Protection Note 27 at $1.1E^{-9}$. Depth to groundwater on site is 6m, giving the required 2m separation to groundwater from the underside of the lowest pond liner. Pond dimensions are shown in Attachment B. The drainage depression located within the property boundary is not visible on a Landgate Topographic Map at a 1:50,000 scale. It is also not visible on the Hydrography Linear (Hierarchy) (DWER-031 dataset). Thus, it should be considered a drainage depression.

A 1.8mm false-floor mesh inside the germination vessels will retain any solids in the grain, with wastewater gravity-flowing into a collection sump. Location of the evaporation pond is down-gradient of the malting shed with an effective grade-level difference of 2m, allowing wastewater to gravity flow from the collection sump into the evaporation pond.

Any remaining fine solids generated during the malting process will be sent to the evaporation pond, solids build up will be monitored and pond scraped as required.

9. Sensitive Receptors

The EPA recommend a separation distance of 500m between the malting operation and sensitive receptors (EPA, 2015). There are no sensitive receptors within 500m of the proposed operation.

References

Beecham, B. (2001) Avon Wheatbelt 2 (AW2 – Re-juvenated Drainage subregion). Available at: https://www.dpaw.wa.gov.au/images/documents/about/science/projects/waaudit/avon_wheatbelt02_p36-68.pdf

Bureau of Meterology (BOM) (2019) Climate statistics for Australian locations, available at: http://www.bom.gov.au/climate/averages/tables/cw_010111.shtml.

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Department of Primary Industry and Regional Development (DPIRD (2017) Malt Quality Parameters for Malting Barley. Available at: https://www.agric.wa.gov.au/barley/malt-quality-parameters-malting-barley

Department of Water and Environmental Regulation (DWER) (2017) Water Register. Available at: https://www.water.wa.gov.au/maps-and-data/maps/water-register

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Environmental Protection Agency (EPA) (2015) Draft Environmental Assessment Guideline
For Separation distances between industrial and sensitive land uses.

Sawkin, D.N. (2010) Landscapes and soils of the Northam District. Department of Agriculture and Food, Western Australia, Perth. Bulletin 4803.

ATTACHMENT 1

STRUCterre consulting

Material Test Certificate

AS 1289.6.7.2 Determination of permeability of a soil-Falling head method for a remoulded specimen

Client:	MORTLOCK MALT	Job Number:	S1008365
Project:	Evap Pond - #6013 NORTHAM-PITHARA RD KARRANADGIN	Issue Number:	1
Report Number:	S1008365-A	Page:	1 of 1

Laboratory testing carried out at Balcatta Laboratory 1 Erindale Rd Balcatta WA 6021

Sample ID:	Submitted Sample	Date Tested:	25 Feb 2021
Proposed Use	-	Laboratory Number	S1008365-A-1
Material Type:	Clay	Depth of Test:	- mm
Moisture content method	AS 1289.2.1.1	Layer Thickness:	- mm
Sampling Method :	Client	Site Selection Method:	Client

Compaction Data

Compactive Effort Used	AS 1289.5.2.1 Mod MDD
Maximum Dry Density t/m³	2.00
Optimum Moisture Content %	9.5
Required Dry Density Ratio %	95.0
Required Moisture Ratio %	100.0

Compacted Specimen

Dry Density t/m³	1.90
Moisture Content %	9.5
Laboratory Density ratio %	95.0
Laboratory Moisture Ratio %	101.5
Surcharge kPa	3
Sieve Size (mm)	19
Percent material retained on	0
Coefficient of Permeability m/s	1.1E-09

Remarks

Approved Signatory: Laboratory Manager [redacted] Date: 5 March 2021

Permeability Report

WA | QLD | NSW | VIC

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