Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works approval number	W6711/2022/1
Works approval holder	EcoMag Dampier Pty Ltd
ACN	622 727 208
Registered business address	106 Maddington Road, Maddington WA 6109
DWER file number	DER2022/000212
Duration	28/11/2022 to 30/11/2027
Date of issue	19/08/2025
Premises details	Karratha Demonstration Magnesium Recovery Plant Part of Lot 267 on deposited plan 93179 City of Karratha As defined by the coordinates in Schedule 2

Prescribed premises category description **(Schedule 1, *Environmental Protection Regulations 1987*)**	**Assessed production capacity**
Category 61: premises on which liquid waste produced on other premises (other than sewerage waste) is stored, reprocessed, treated or irrigated.	34,000 tonnes per year

This works approval is granted to the works approval holder, subject to the attached conditions, on 19 August 2025, by:

Jarrod Abrahams
Digitally signed by Jarrod Abrahams
Date: 2025.08.19 08:37:04 +08'00'

MANAGER, RESOURCE INDUSTRIES

an officer delegated under section 20 of the *Environmental Protection Act 1986* (WA)

Works approval history

Date	Reference number	Summary of changes
28/11/2022	W6711/2022/1	Works approval for the construction of a demonstration magnesium plant.
19/08/2025	W6711/2022/1	Works approval duration extended from 27/11/2025 to 30/11/2027

Interpretation

In this works approval:

(a) the words 'including', 'includes' and 'include' in conditions mean "including but not limited to", and similar, as appropriate;

(b) where any word or phrase is given a defined meaning, any other part of speech or other grammatical form of that word or phrase has a corresponding meaning;

(c) where tables are used in a condition, each row in a table constitutes a separate condition;

(d) any reference to an Australian or other standard, guideline, or code of practice in this works approval:

  (i) if dated, refers to that particular version; and

  (ii) if not dated, refers to the latest version and therefore may be subject to change over time;

(e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act; and

(f) unless specified otherwise, all definitions are in accordance with the EP Act.

NOTE: This works approval requires specific conditions to be met but does not provide any implied authorisation for other emissions, discharges, or activities not specified in this works approval.

Works approval conditions

The works approval holder must ensure that the following conditions are complied with:

General Conditions

1. The works approval holder must manage dust generation at the premises by:

(a) wetting down or applying suppressant to unsealed roads and exposed areas;

(b) utilising dust collection and baghouse filter methods at the Demonstration Plant; and

(c) ceasing dust-generating activities during strong wind conditions.

2. The works approval holder must take all reasonable and practicable measures to prevent stormwater run-off becoming contaminated by the activities and operations undertaken at the premises.

Construction phase

Infrastructure and equipment

3. The works approval holder must:

(a) construct and/or install the infrastructure and/or equipment;

(b) in accordance with the corresponding design and construction/installation requirements; and

(c) at the corresponding infrastructure location

as set out in Table 1.

Table 1: Design and construction/installation requirements

	Infrastructure	Design and construction/installation requirements	Infrastructure location
1.	Enclosed chemical storage building	• Concrete pad; and • Bunded concrete slab on grade, with floor drains leading to a sump in the corner of the chemical building. Spillages to be pumped to a process tank or to the waste liquor evaporation pond. Excess solution to overflow into another sump which gravity feeds into the waste liquor evaporation pond via pipeline or concrete channel.	Schedule 1: Maps
2.	Temporary waste (spent bitterns) evaporation and storage pond	• 1 ML capacity Pump(s) which is able to connect to and fill a tanker. • Earthen liner between 1.0×10^{-8} and 1.0×10^{-9} $m.s^{-1}$. • 100 mm freeboard with overflow directed to Rainstorms HDPE lined bitterns pond.	Schedule 1: Maps Figure 2
3.	Rotary kiln/dryer and CCM calciner.	• No specific requirements	Schedule 1 Figure 3

	Infrastructure	Design and construction/installation requirements	Infrastructure location
4.	Storage solution tanks	Tanks include: • Bitterns holding tank (27,500 L polyethylene heavy duty tank). Level sensor to prevent overfilling. Overflow pipe to concrete sloped floor. • Soda ash preparation (6,000 L carbon steel tank). Level sensor. Overflow outlet. • Precipitation x 3 (3,000 L polyethylene heavy duty tank). Overflow outlet • Filtrate tanks x 2 (6,000 L polyethylene heavy duty tank). Overflow outlet • Waste liquor holding tank (27,500 L polyethylene heavy duty tank). • 500,000 L lined panel tanks for holding seawater, process water and fire water. Positioned on concrete ring beams, with an internal sand base. Level sensors will be installed to prevent overfilling.	Schedule 1 Figure 3 Tank farm and processing building areas.
5.	Baghouse filters	• Filtration of dust particles down to 2 microns. • Automatic process air dump cycle.	N/A
6.	Stormwater drainage	• Stormwater drainage design to be submitted at least 30 days prior to construction commencing. • Contaminated stormwater to be collected and stored in the spent bitterns evaporation pond.	N/A

Compliance reporting

4. The works approval holder must within 30 calendar days of an item of infrastructure or equipment required by condition 3 being constructed and/or installed:

(a) undertake an audit of their compliance with the requirements of condition 3; and

(b) prepare and submit to the CEO an Environmental Compliance Report on that compliance.

5. The Environmental Compliance Report required by condition 4, must include as a minimum the following:

(a) certification by a suitably qualified engineer that the enclosed chemical storage building at the Demonstration Plant, and pumps at the storage pond, as specified in condition 3, have been constructed or installed in accordance with the relevant requirements specified in condition 3;

(b) as constructed plans and a detailed site plan for each item of infrastructure or component of infrastructure specified in condition 3; and

(c) be signed by a person authorised to represent the works approval holder and contains the printed name and position of that person.

Environmental commissioning phase

Environmental commissioning requirements and emission limits

6. The works approval holder may only commence environmental commissioning of an item of infrastructure listed in condition 7 once the Environmental Compliance Report has been submitted for that item of infrastructure in accordance with condition 7 of this works approval.

7. Any environmental commissioning activities undertaken for an item of infrastructure specified in Table 2 may only be carried out:

(a) in accordance with the corresponding commissioning requirements; and

(b) for the corresponding authorised commissioning duration.

Table 2: Environmental commissioning requirements

	Infrastructure	Commissioning requirements	Authorised commissioning duration
Dry Commissioning			
1.	Dryer and kiln	• Turn on dryer and kiln to test for correct combustion.	For a period not exceeding 28 calendar days in aggregate.
Wet Commissioning Part 1			
2.	Tanks, pipes, pumps, and ponds.	• Test for leaks in tanks, pipes, pumps and ponds.	For a period not exceeding 28 calendar days in aggregate.
Wet Commissioning Part 2			
3.	Reagent and product handling and distribution	• Verify transport systems for the delivery of chemical reagents. • Bulk bags to be stored in the chemical shed and liquid reagents to arrive in tankers and stored in dedicated silos which incorporate dust filters. • Magnesium product will be stored in silos before being packaged in bulk bags or 20 kg bags.	For a period not exceeding 28 calendar days in aggregate.
4.	Dryer and kiln	• Verify dust collection performance.	For a period not exceeding 28 calendar days in aggregate.
Other Commissioning			
5.	Demonstration Plant	• Plant continuous operation to verify quality and quantity of waste liquor in steady-state.	For a period not exceeding 28 calendar days in aggregate.
6.	Spent bitterns evaporation pond	• Evaporation of brine waste in ponds to verify evaporated waste liquor characteristics.	To be stored until a disposal agreement has been finalised.

Monitoring during environmental commissioning

8. During environmental commissioning, the works approval holder must ensure that the emission(s) specified in Table 3, are discharged only from the corresponding discharge point(s) and only at the corresponding discharge point location(s).

Table 3: Authorised discharge points during commissioning

	Emission	Discharge Point	Discharge Point Location
1.	Discharge brine	Spent bitterns evaporation pond.	As shown in Schedule 1: Figure 3: Plant general layout and discharge points.
2.	Waste liquor in steady-state		
3.	Flue gas (CO_2) and water vapour	Rotary kiln/dryer, generator and calciner.	Figure 4

9. During environmental commissioning, the works approval holder must ensure that the emissions from the discharge point listed in Table 4 do not exceed the corresponding targets(s) when monitored in accordance with condition 10.

Table 4: Emission and discharge targets during environmental commissioning

Discharge Point	Parameter	Target	Units
Spent bitterns evaporation pond.	pH	10.5	pH units
	Conductivity	135	µS/cm
	Oxidation Reduction Potential	263	mV
	Turbidity	227	NTU
	Ammonia as N	30,000	mg/L
	Arsenic (III)	140	
	Arsenic (IV)	275	
	Cadmium	36	
	Chromium	8.5	
	Copper	11	
	Lead	134	
	Mercury	1.4	
	Nickel	427	
	Zinc	419	

10. The works approval holder must monitor emissions during environmental commissioning in accordance with Table 5.

Table 5: Emissions and discharge monitoring during environmental commissioning

Discharge Point	Parameter	Frequency	Averaging Period	Unit	Method
					Analysis
Spent bitterns evaporation pond.	pH	At least once	Spot sample	-	NATA accredited ISO/IEC 170250.
	Conductivity			mS/cm	
	Oxidation Reduction Potential			mV	
	Turbidity			NTU	
	Ammonia as N			µg/L	
	Arsenic (III/IV)				
	Cadmium				
	Chromium				
	Copper				
	Lead				
	Mercury				
	Nickel				
	Zinc				

11. The works approval holder must record the results of all monitoring activity required by condition 10.

12. The works approval holder must submit to the CEO an Environmental Commissioning Report within 30 calendar days of the completion date of environmental commissioning for each item of infrastructure specified in Table 2.

13. The works approval holder must ensure the Environmental Commissioning Report required by condition 11 of this works approval includes the following:

(a) a summary of the environmental commissioning activities undertaken, including timeframes and amount of waste liquid bitterns processed;

(b) the point-source emissions monitoring results recorded in accordance with condition 11;

(c) a summary of the environmental performance of each item of infrastructure or equipment as constructed or installed, which at minimum includes records detailing the:

(i) Dry commissioning of dryer and kiln for correct combustion;

(ii) hydro-testing of tanks, pipes, pumps, and ponds;

(iii) verification of transport systems for delivery and handling of chemical reagents;

(iv) dust collection performance of the dryer and kilns;

(v) quality and quantity of waste liquor in steady-state; and

(vi) characteristics of the evaporated waste liquor.

(d) a review of the works approval holder's performance and compliance against the conditions of this works approval; and

(e) where they have not been met, measures proposed to meet the manufacturer's design specifications and the conditions of this works approval, together with timeframes for implementing the proposed measures.

Records and reporting (general)

14. The works approval holder must record the following information in relation to complaints received by the works approval holder (whether received directly from a complainant or forwarded to them by the Department or another party) about any alleged emissions from the premises:

(a) the name and contact details of the complainant, (if provided);

(b) the time and date of the complaint;

(c) the complete details of the complaint and any other concerns or other issues raised; and

(d) the complete details and dates of any action taken by the works approval holder to investigate or respond to any complaint.

15. The works approval holder must maintain accurate and auditable books including the following records, information, reports, and data required by this works approval:

(a) the works conducted in accordance with condition 3;

(b) monitoring programmes undertaken in accordance with conditions 11; and

(c) complaints received under condition 14.

16. The books specified under condition 15 must:

(a) be legible;

(b) if amended, be amended in such a way that the original version(s) and any subsequent amendments remain legible and are capable of retrieval;

(c) be retained by the works approval holder for the duration of the works approval; and

(d) be available to be produced to an inspector or the CEO as required.

Definitions

In this works approval, the terms in Table 6 have the meanings defined.

Table 6: Definitions

Term	Definition
annual period	a 12 month period commencing from 1 January until 31 December of the same year.
brine waste	Also known as spent bitterns and liquor wash
books	has the same meaning given to that term under the EP Act.
CEO	means Chief Executive Officer. CEO for the purposes of notification means: Director General Department administering the *Environmental Protection Act 1986* Locked Bag 10 Joondalup DC WA 6919 info@dwer.wa.gov.au
Department	means the department established under section 35 of the *Public Sector Management Act 1994* and designated as responsible for the administration of Part V Division 3 of the EP Act.
discharge	has the same meaning given to that term under the EP Act.
emission	has the same meaning given to that term under the EP Act.
environmental commissioning	means the sequence of activities to be undertaken to test equipment integrity and operation, or to determine the environmental performance, of equipment and infrastructure to establish or test a steady state operation and confirm design specifications.
Environmental Commissioning Report	means a report on any commissioning activities that have taken place and a demonstration that they have concluded, with focus on emissions and discharges, waste containment, and other environmental factors.
Environmental Compliance Report	means a report to satisfy the CEO that the conditioned infrastructure and/or equipment has been constructed and/or installed in accordance with the works approval.
EP Act	*Environmental Protection Act 1986* (WA).
EP Regulations	*Environmental Protection Regulations 1987* (WA).

Term	Definition
monthly period	means a one-month period commencing from [day X] of a month until [day (X-1)] of the immediately following month. *e.g. "means a one-month period commencing from the seventh day of a month until the sixth day of the immediately following month."*
premises	the premises to which this licence applies, as specified at the front of this licence and as shown on the premises map (Figure 2) in Schedule 1 to this works approval.
prescribed premises	has the same meaning given to that term under the EP Act.
waste	has the same meaning given to that term under the EP Act.
works approval	refers to this document, which evidences the grant of the works approval by the CEO under section 54 of the EP Act, subject to the conditions.
works approval holder	refers to the occupier of the premises being the person to whom this works approval has been granted, as specified at the front of this works approval.

END OF CONDITIONS

Schedule 1: Maps

Premises map

The boundary of the prescribed premises is shown in blue outline within the Rainstorm Lease (red) in the map below (Figure 1).

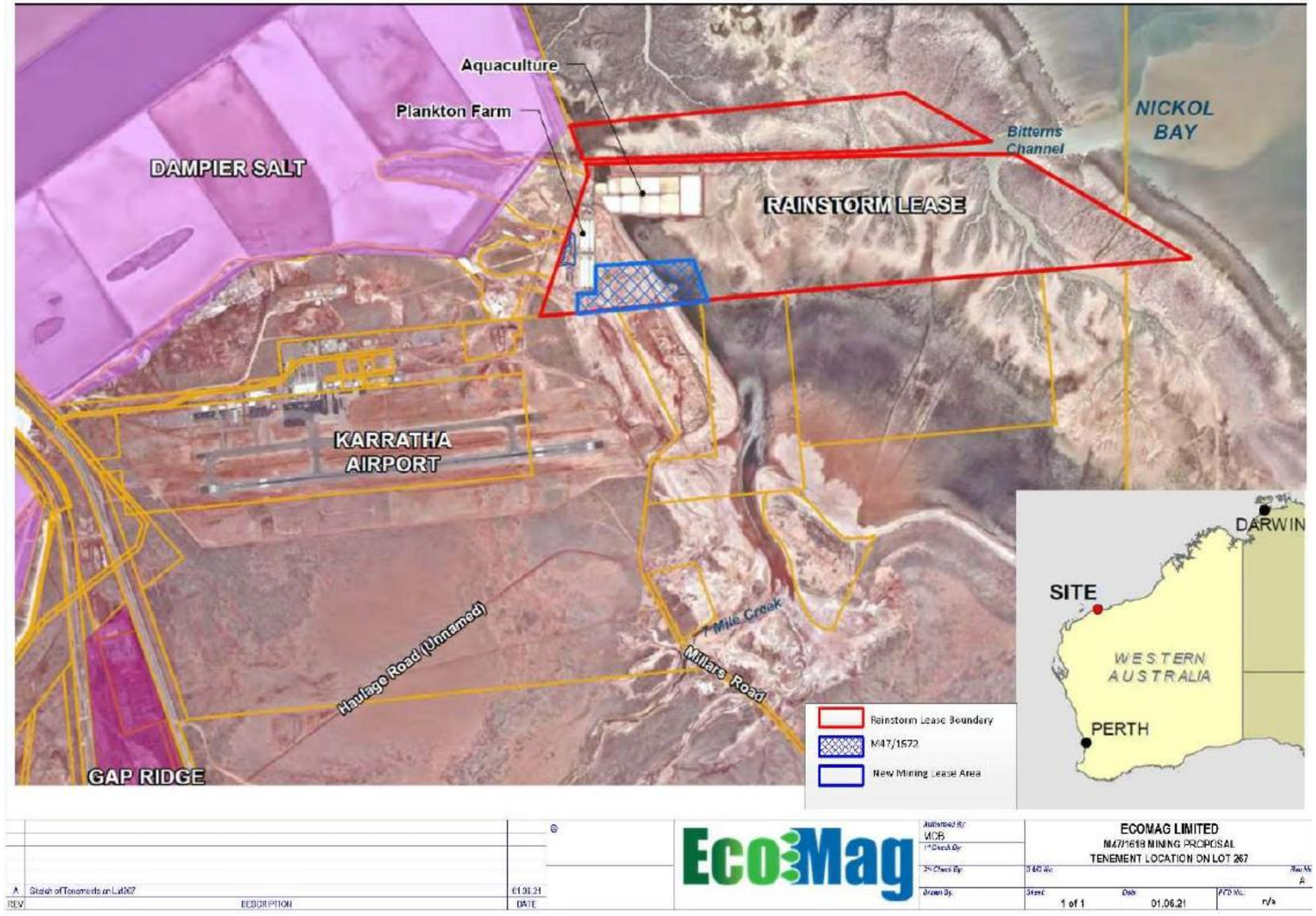

Figure 1: Map of the boundary of the prescribed premises

The Prescribed Premises Boundary and site accommodation is shown below in Figure 2.

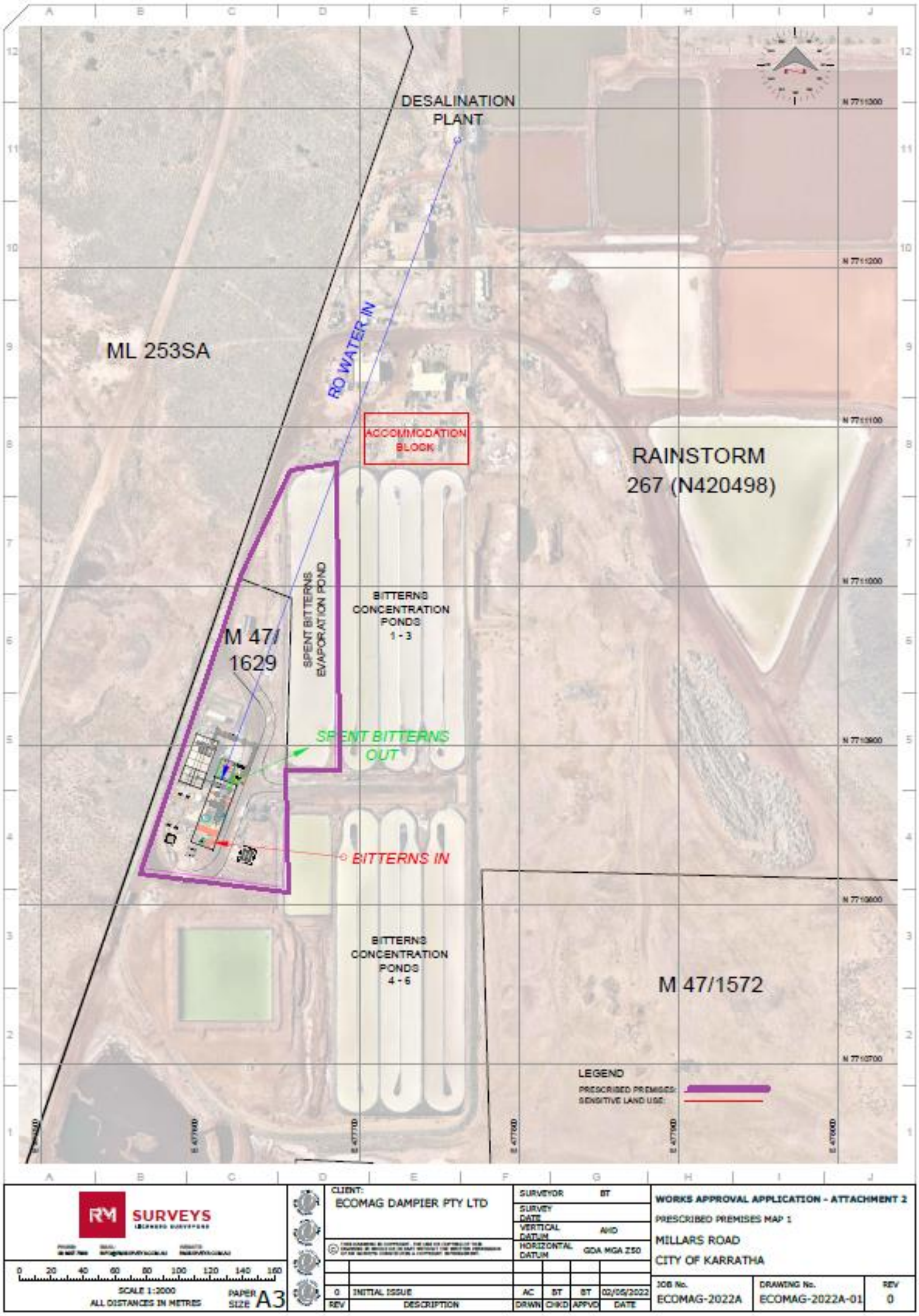

Figure 2: Prescribed Premises Boundary Map, site accommodation and discharge points.

The general layout of the plant and discharge points are shown in Figure 3 below.

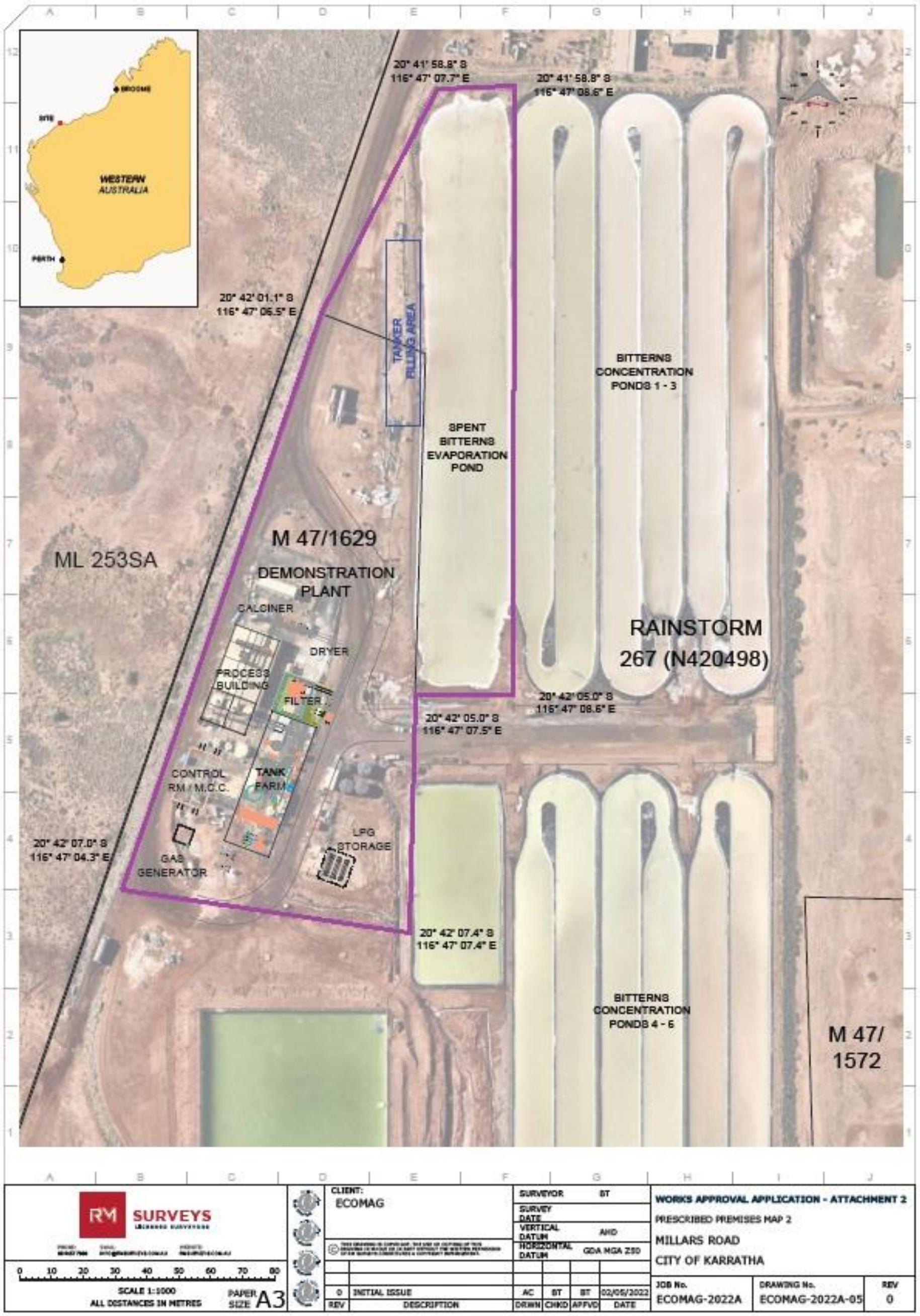

Figure 3: Plant general layout and premises boundary coordinates.

The point source emission locations from the Rotary Dryer/Kiln and the CCM Calciner are shown below in Figure 4.

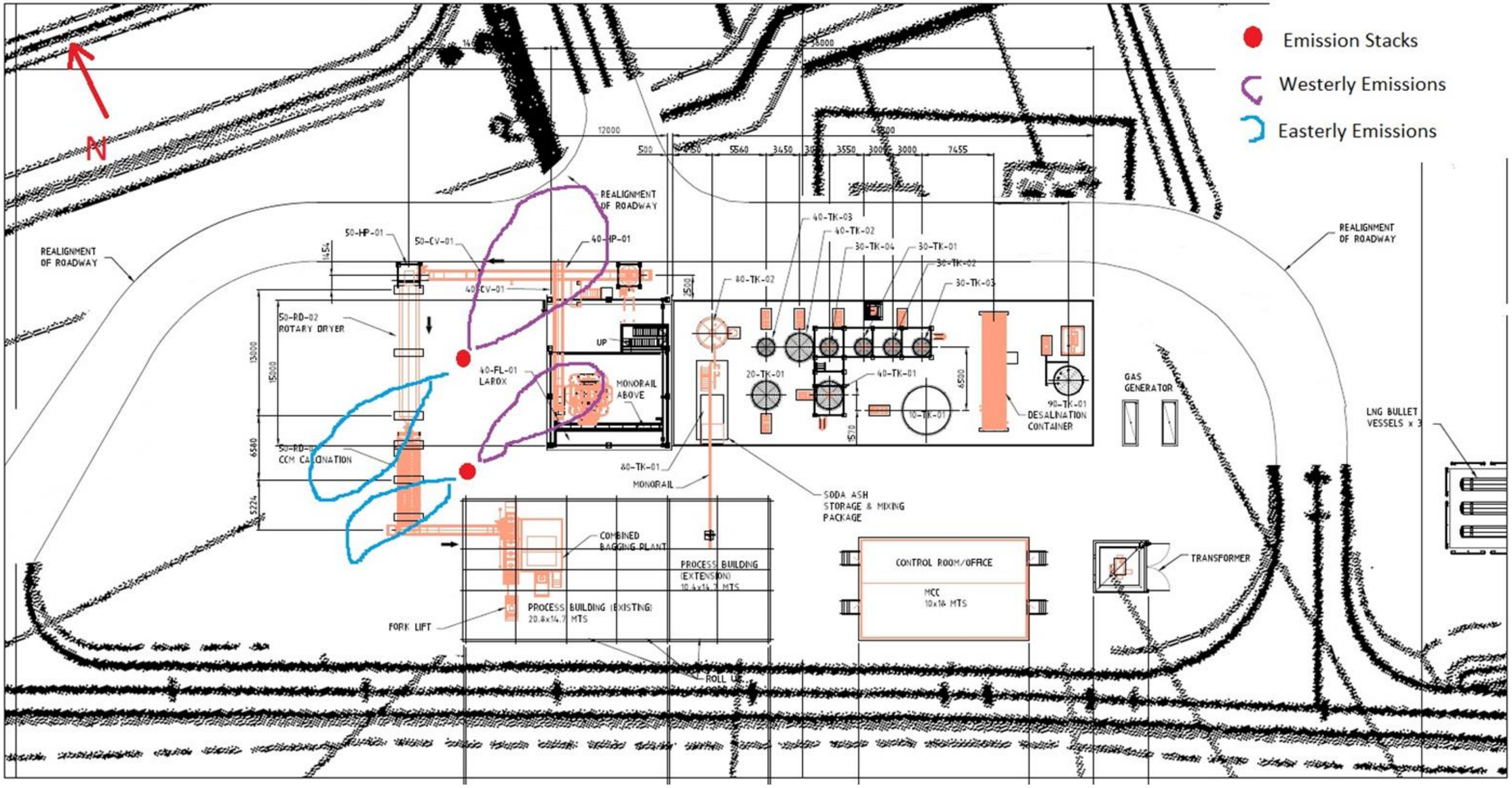

Figure 4: Point source emission locations from the Rotary Dryer/Kiln and the CCM Calciner.

Schedule 2: Premises boundary

The premises boundary is defined by the coordinates in Table 7.

Table 7: Premises boundary coordinates

Easting	Northing
116° 47’ 07.7” E	20° 41’ 58.8” S
116° 47’ 06.5” E	20° 42’ 01.1” S
116° 47’ 04.3” E	20° 42’ 07.0” S
116° 47’ 07.4” E	20° 42’ 07.4” S
116° 47’ 07.5” E	20° 42’ 05.0” S
116° 47’ 08.6” E	20° 42’ 05.0” S
116° 47’ 08.6” E	20° 41’ 58.8” S