Government of Western Australia
Department of Water and Environmental Regulation

Works Approval

Works Approval Number	W6301/2019/1
Works Approval Holder	Tronox Management Pty Ltd
ACN	009 343 364
Registered business address	Lot 22, Mason Road KWINANA BEACH WA 6167
DWER file number	DER2019/000467
Duration	9/12/2019 to 8/12/2027
Date of issue	8/11/2022
Prescribed Premises	Category 8: Mineral sands mining or processing
Premises	Chandala Mineral Separation Plant Brand Highway MUCHEA WA 6501 Legal description – Part of Lot M1261 on Diagram 5326

This Works Approval is granted to the Works Approval Holder, subject to the following conditions, on *8 November 2022* by:

Timothy Moran

Digitally signed by Timothy Moran
Date: 2022.11.08 15:54:14 +08'00'

Timothy Moran
A/SENIOR ENVIRONMENTAL OFFICER, INDUSTRY REGULATION
REGULATORY SERVICES

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

Works approval history

Date	Reference number	Summary of changes
09/12/2019	W6301/2019/1	Works approval issued
08/12/2022	W6301/2019/1	Amendment to extend expiry of instrument

Definitions and interpretation

Definitions

In this Works Approval, the terms in Table 1 have the meanings defined.

Table 1: Definitions

Term	Definition
ACN	Australian Company Number
AS 2593-2004	means the Australian Standard AS 2593-2004 *Boilers – Safety management and supervision systems*
AS 4323.1	means the Australian Standard AS 4323.1 *Stationary Source Emissions Method 1: Selection of sampling positions*
Averaging period	means the time over which a limit is measured or a monitoring result is obtained
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
Commissioning	means a period of time to allow for stabilisation and optimisation of the process following input of raw materials under operation conditions (including emissions) on the Works Approval for the limited period of operations required
Condition	means a condition to which this Works Approval is subject under s.62 of the EP Act
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
Department Request	means a request for Books or other sources of information to be produced, made by an Inspector or CEO to the Works Approval Holder in writing and sent to the Works Approval's address for notifications, as described at the front of this Works Approval, in relation to: a) compliance with the EP Act or this Works Approval; b) the Books or other sources of information maintained in accordance with this Works Approval; or c) the Books or other sources of information relating to Emissions from the Premises
Discharge	has the same meaning given to that term under the EP Act
DWER	Department of Water and Environmental Regulation
Emission	has the same meaning given to that term under the EP Act
Environmental Harm	has the same meaning given to that term under the EP Act

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 Works have been constructed in accordance with the Works Approval
EP Act	means the *Environmental Protection Act 1986* (WA)
EP Regulations	means the *Environmental Protection Regulations 1987* (WA)
HMC	Heavy Mineral Concentrate
Implementation Agreement or Decision	has the same meaning given to that term under the EP Act
Inspector	means an inspector appointed by the CEO in accordance with s.88 of the EP Act
Licence	has the same meaning given to that term under the EP Act
Material Environmental Harm	has the same meaning given to that term under the EP Act
NATA	National Association of Testing Authorities, Australia
NATA accredited	means in relation to the analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis
NO_X	means oxides of nitrogen, calculated as the sum of nitric oxide and nitrogen dioxide and expressed as nitrogen dioxide
Pollution	has the same meaning given to that term under the EP Act
Premises	refers to the premises to which this Works Approval applies, as specified at the front of this Works Approval and as shown on the map in Schedule 2 to this Works Approval
Prescribed Premises	has the same meaning given to that term under the EP Act
Professional Engineer	means a person holding current certification from the Institution of Engineers Australia (IEAust)
Serious Environmental Harm	has the same meaning given to that term under the EP Act
Stack test	means a discrete set of samples taken over a representative period at normal operating conditions
STP dry	means standard temperature and pressure (0°Celsius and 101.325 kilopascals, respectively), dry
Time Limited Operational Phase	means full mineral processing operations permitted under this Works Approval, subject to Conditions, whilst an application for licence is being assessed
TSP	Total Suspended Particulates
Unreasonable Emission	has the same meaning given to that term under the EP Act
USEPA Method 5	means the USEPA Method 5 *Determination of Particulate Matter Emissions from Stationary Sources (Using reference temperature 120°C)*
USEPA Method 17	means the USEPA Method 17 *Determination of Particulate Matter Emissions from Stationary Sources (Sample at stack temperature)*
Waste	has the same meaning given to that term under the EP Act
Works	refers to the Works described in Schedule 1, at the locations shown in Schedule 1 of this Works Approval to be carried out at the Premises, subject to the Conditions
Works Approval	refers to this document, which evidences the grant of the works approval by the CEO under s.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

Interpretation

In this Works Approval:

(a) the words 'including', 'includes' and 'include' will be read as if followed by the words 'without limitation';
(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 means the version of the standard, guideline or code of practice in force at the time of granting of this Works Approval and includes any amendments to the standard, guideline or code of practice which may occur from time to time during the course of the Works Approval; and
(e) unless specified otherwise, any reference to a section of an Act refers to that section of the EP Act.

Conditions

Construction phase

1. The Works Approval Holder must install and undertake the Works for the infrastructure:

(a) specified in Column 1; and
(b) to the requirements specified in Column 2;

of Table 2 below.

2. The Works Approval Holder must not depart from the requirements specified in Table 2 except:

(a) where such a departure does not increase risks to public health, public amenity or the environment; and
(b) all other Conditions in this Works Approval are still satisfied.

3. Subject to Condition 4, within 28 days of the completion of the Works for the infrastructure or component of infrastructure specified in Column 1 of Table 2, the Works Approval Holder must provide to the CEO an Environmental Compliance Report from a Professional Engineer that:

(a) lists and describes the completed Works and any associated items of infrastructure and equipment listed in Table 2;
(b) identifies any discharge points listed in Table 4 to be operated;
(c) certifies that each item of infrastructure or component of infrastructure specified in Table 2 has been constructed with no material defects and to the requirements specified in Table 2;
(d) is signed by a person authorised to represent the Works Approval Holder and contains the printed name and position of that person within the company.

4. Where a departure from the requirements specified in Table 2 occurs and is of a type allowed by Condition 2, the Works Approval Holder must provide to the CEO a description of, and explanation for, the departure along with the report required by Condition 3.

Table 2: Infrastructure and equipment requirements table

	Column 1	Column 2
	Infrastructure and equipment	**Requirements (design and construction)**
1	Attritioning circuits	None specified.
2	Leach vessel	None specified.
3	Fluid bed dryer	Vent stack must be fitted with a stack monitoring port in accordance with AS 4323.1 and be of sufficient diameter to accommodate apparatus used for the monitoring method specified in Table 5.
		The bag filter installed on the fluid bed dryer must be: (a) adequately sized to cater for maximum air volume; (b) capable of minimising particulate emissions to less than 50 mg/m^3 during normal operations; (c) fitted with a system for detection and isolation of broken bags, without requiring a bag filter bypass situation to exchange or replace broken bags; and (d) fitted with means for automatically cleaning filter element(s).
4	Boiler system	The boiler system installed to produce steam required for the project must meet the following design requirements: (a) packaged boiler system – model WT 12000 (or similar); (b) maximum design capacity of 60 t/hr; (c) natural gas-fired; (d) capable of minimising NO_X and CO emissions to less than 20 mg/m^3 during normal operations; and (e) must be installed, commissioned and operated in accordance with AS 2593-2004.
5	NaOH storage tank	Must be located on a bunded hardstand area, designed to contain at least 110% of the largest storage vessel and to capture any jetting from the tank.
6	Conveyors	All conveyors external to a building must be fully enclosed.
7	Waste filter cake bunker	Must be constructed as a sealed bunker – fabric-over-steel with concrete floor and retaining walls around two sides.

Commissioning phase

5. The Works Approval Holder must notify the CEO, at least 7 days prior to, the commencement date of Commissioning.

6. The Works Approval Holder may conduct Commissioning of the constructed attritioning circuits for a period not exceeding 3 months.

7. The Works Approval Holder must notify the CEO, within 7 days after, the completion date of Commissioning.

8. The Works Approval Holder must provide to the CEO an Environmental Commissioning Report within 3 months of the completion date of Commissioning.

9. The Works Approval Holder must ensure the report required by Condition 8 of this Works Approval includes:

(a) a summary of the commissioning activities undertaken, including timeframes and the amount of HMC and ilmenite processed;
(b) a summary of the environmental performance of all plant and equipment as installed, including but not limited to:

(i) caustic leach circuit;
(ii) boiler system; and
(iii) fluidised bed dryer;

(c) a review of performance against the manufacturers design specification; and
(d) where they have not been met, measures proposed to meet the manufacturer's design specification and Conditions of this Works Approval, together with timescales for implementing the proposed measures.

Time limited operational phase

10. The Works Approval Holder may conduct full processing operations for a period not exceeding 90 days from the completion date of Commissioning, or until such time as a Licence for the same is granted.

Emissions

11. The Works Approval Holder must not cause any Emissions from the Works authorised through this Works Approval except for specified Emissions and general Emissions described in Column 1 of Table 3, subject to the exclusions, limitations or requirements specified in Column 2 of Table 3.

Table 3: Authorised Emissions table

Column 1	**Column 2**
Emission type	**Exclusions/Limitations/Requirements**
Specified Emissions	
Emissions to air	Subject to compliance with Condition 12
Disposal of process residues	• Clay fines must be managed in accordance with existing waste management procedures, i.e. thickened and pugged with activated carbon, prior to dewatering and filtercake stockpiled in a sealed bunker • Process waste liquid from the caustic leach circuit must be filtered, with waste filter cake stockpiled in a sealed bunker, prior to off-site disposal at Cooljarloo
General Emissions	
Emissions which arise from undertaking the Works	Emissions excluded from General Emissions are: • Unreasonable Emissions; or • Emissions that result in, or are likely to result in, Pollution, Material Environmental Harm or Serious Environmental Harm; or • Discharges of Waste in circumstances likely to cause Pollution; or • Emissions that result, or are likely to result in, the Discharge or abandonment of Waste in water to which the public has access; or • Emissions or Discharges which do not comply with an Approved Policy or a prescribed standard; or • Emissions or Discharges which do not comply with the conditions in an Implementation Agreement or Decision; or • Emissions or Discharges the subject of offences under regulations prescribed under the EP Act, including materials discharged under the *Environmental Protection (Unauthorised Discharges) Regulations 2004*.

Emissions to air

12. The Works Approval Holder must ensure that waste emitted to air during Commissioning and the Time Limited Operational Phase is emitted in accordance with the requirements specified in Table 4.

Table 4: Authorised emission points to air table

Column 1	Column 2	Column 3	Column 4
Emission point reference	**Emission point and source**	**Emission point height (m)**	**Emission limit (mg/m^3)[1]**
A1	Fluidised bed dryer vent stack	20 (minimum)	TSP <50 mg/m^3
A2	Steam boiler flue gas vent stack	16 (minimum)	None specified
A3	Venting from leach vessels	N/A	
A4	Cooling towers	N/A	

Note 1: Determined via stack test (60 minute average).

Monitoring general

13. The Works Approval Holder must ensure that all laboratory samples are submitted to and tested by a laboratory with current NATA accreditation for the parameters being measured, unless indicates otherwise in the relevant table.

14. The Works Approval Holder must ensure that quarterly monitoring is undertaken at least 45 days apart.

15. The Works Approval Holder must record production or throughput data and any other process parameters relevant to any monitoring undertaken.

16. The Works Approval Holder must ensure that all monitoring equipment used on the Premises to comply with Conditions of this Works Approval is calibrated in accordance with the manufacturer's specifications.

Emissions to air monitoring

17. The Works Approval Holder must monitor emissions to air in accordance with the requirements specified in Table 5.

Table 5: Monitoring of point source emissions to air requirements table

Column 1	Column 2	Column 3	Column 4	Column 5	Column 6
Emission point reference	**Parameter**	**Units[1,2]**	**Averaging period**	**Frequency**	**Method**
A1	Particulates (TSP)	mg/m^3 g/s	30 minutes	Two separate sample events separated by at least one week within the first 3 months of operations, and quarterly thereafter	USEPA Method 5 or 17

Note 1: Referenced to STP dry.
Note 2: Monitoring must be undertaken to reflect normal operating conditions.

18. The Works Approval Holder must ensure that all sampling required by Condition 17 is undertaken at sampling locations in accordance with the current version of AS 4323.1.

19. The Works Approval Holder must ensure that all non-continuous sampling and analysis undertaken pursuant to Condition 17 is undertaken by a holder of NATA accreditation for the relevant method of sampling and analysis.

Record-keeping

20. The Works Approval Holder must maintain accurate Books including information, reports and data in relation to the Works and the Books must:

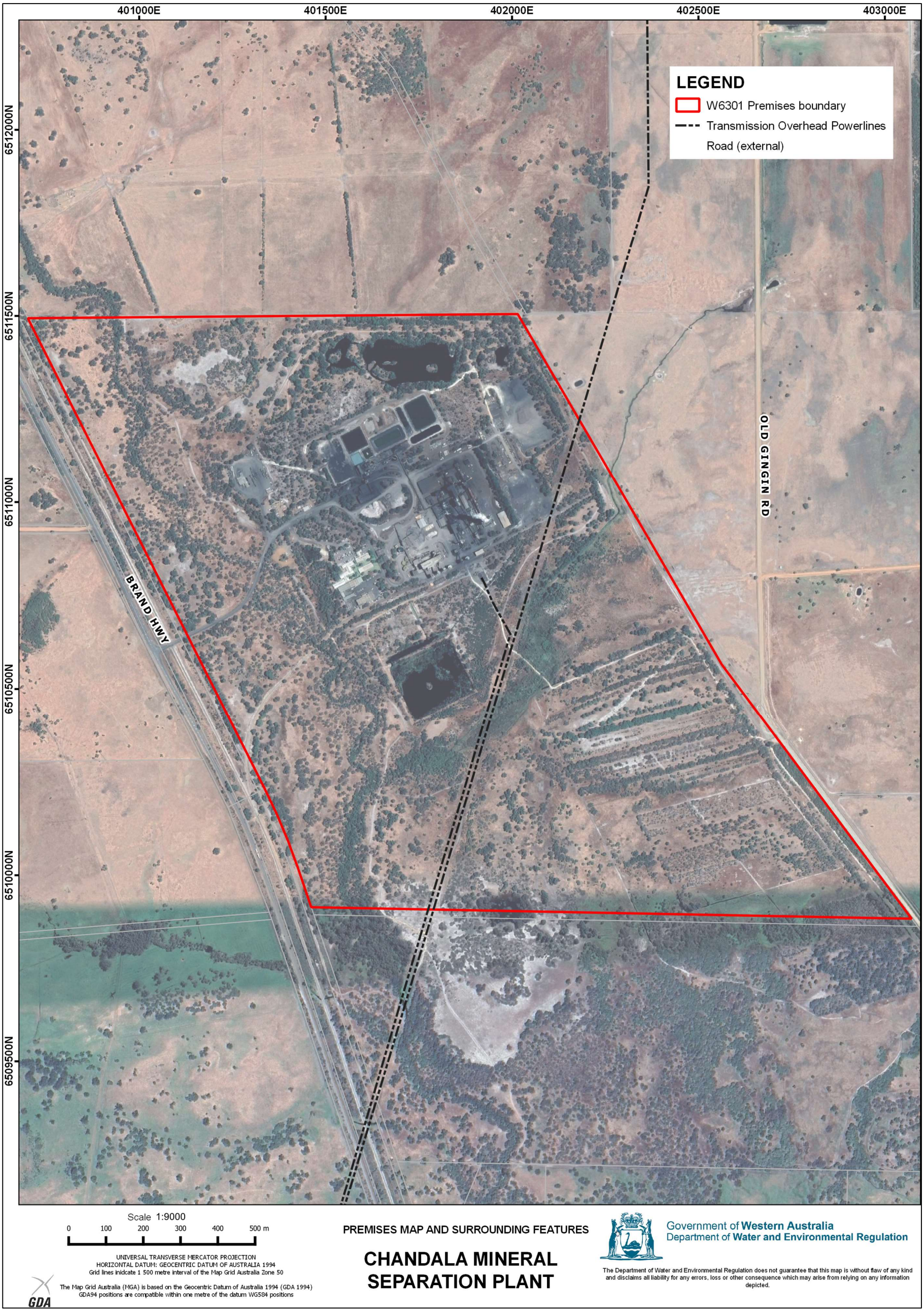
(a) be legible;
(b) if amended, be amended in such a ways that the original and subsequent amendments remain legible or are capable of retrieval;
(c) be retained for at least 3 years from the date the Books were made;
(d) be available to be produced to an Inspector or the CEO.

21. The Works Approval Holder must comply with a Department Request within 14 days from the date of the Department Request or such other period as agreed to by the Inspector or the CEO.

Schedule 1: Maps

Premises map

The Premises is shown in the map below. The red line depicts the Premises boundary.



Schedule 2: Works

At the time of assessment, Emissions and Discharges from the Works listed in Table 6 were considered in the determination of the risk and related Conditions for the Works Approval.

Table 6: Authorised Works

Works
Mechanical attritioning
Relocation of existing attritioner circuit within the dry plant (for zircon attritioning)
Installation of two additional (larger) four cell attritioners
Upgrades to water and slurry pumps and lines, electrical and process control
Installation of new filter units to dewater residual fines
Commissioning of the upgraded circuit
Chemical attritioning
Construction of dedicated process buildings (enclosed, fully bunded)
Construction of leach vessel
Construction of natural gas-fired fluidised bed dryer with baghouse
Construction of filter belt for ilmenite washing
Installation of 100 m^3 NaOH storage tank
Modification to piping and pumping, material transfer equipment (conveyors, hoppers, etc.)
Construction of a natural gas-fired boiler
Temporary use of a diesel-fired boiler during commissioning works
Commissioning of the installed circuit