



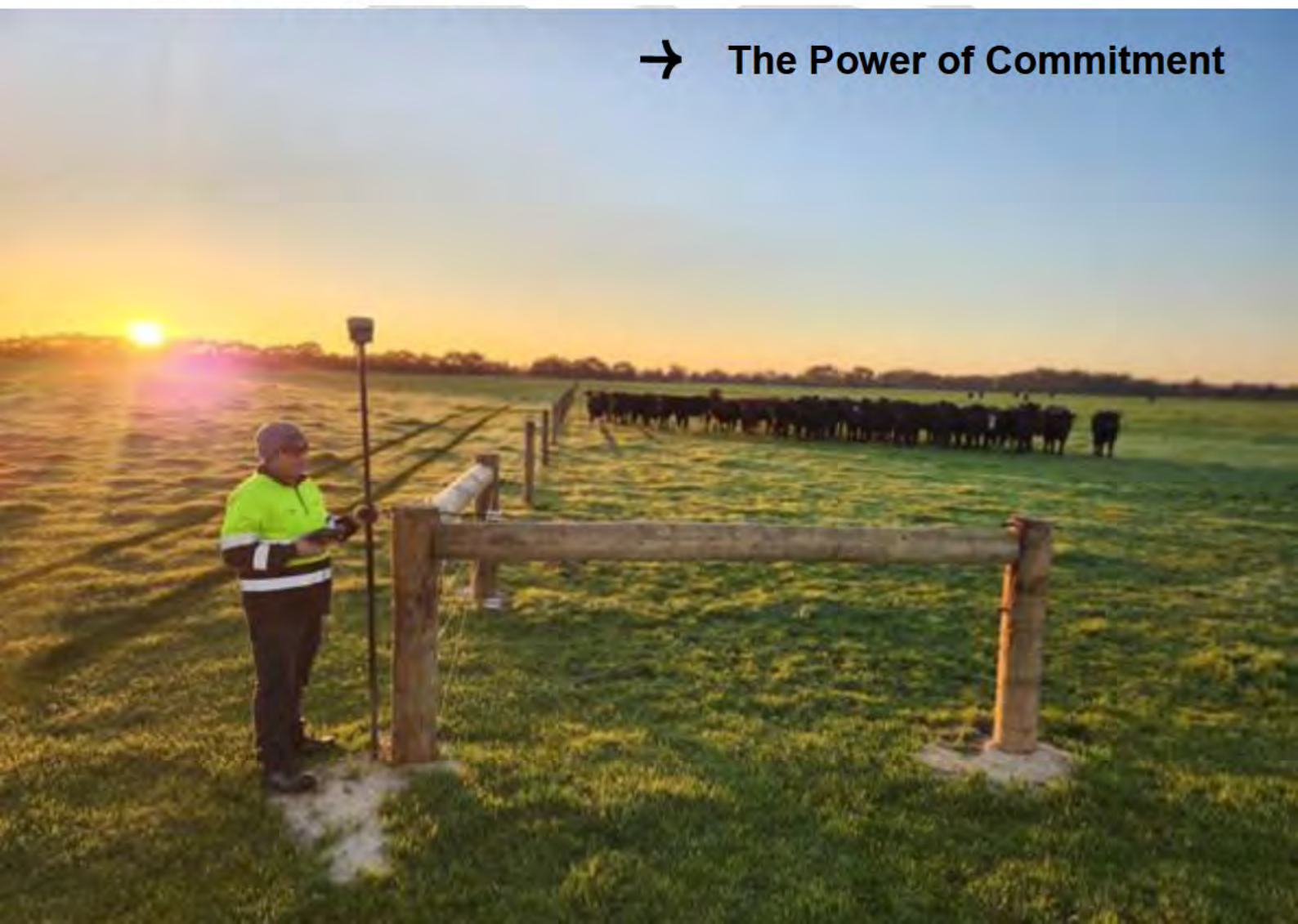
Wonnerup North Mineral Sands Mine Stage 3

**Supporting Document for Part V Licence
Amendment:**

Tronox Mining Australia Ltd.

07 November 2024

→ **The Power of Commitment**



Project name	Tronox Stage 3 Works Approval
Document title	Wonnerup North Mineral Sands Mine Stage 3 Supporting Document for Part V Licence Amendment:
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Executive summary

Tronox Mining Australia Ltd (Tronox) is proposing to develop and operate the Wonnerup North Stage 3 Mineral Sands Project on M70/1396, located approximately 8 km east of Busselton in the South West region of Western Australia.

The purpose of this supporting document is to provide the required additional information to the Licence Amendment Application for Tronox Mining Australia Ltd (Tronox) for licence L8739/2013/1.

The existing operational Wonnerup Mineral Sands Mine includes the Wonnerup, Wonnerup North Stage 1 and Stage 2 located on mining tenements M70/360 and M70/569 immediately adjacent to the Proposed Stage 3 area. Active mining commenced in 2013 and is ongoing. The premises operates under existing *Environmental Protection Act 1986* (EP Act) Licence L8739/2013/1 for Category 6 (mine dewatering) and Category 8 (mineral sands mining or processing). There are no proposed changes to the prescribed premises categories or production design capacity as a result of the amendment.

This application has been prepared to provide information describing the Proposed Stage 3 change to the Prescribed Premises to include mining tenement M70/1396 and the potential environmental impacts resulting from that expansion. The document also outlines the environmental management measures which will be implemented to manage the potential impacts.

Information required for the Department of Water and Environmental Regulation (DWER) Application for Licence Amendment is listed in Table 1.

Table ES1 also provides the location of the information within this supporting document to meet these requirements.

Table ES1 Reference to Licence Amendment Application Form requirements.

Licence Amendment form requirement	Page number in this document
Part 1 – Application type	Page 6
Part 2 – Applicant details	Page 6
<i>Proof of occupier status</i>	Appendix A
<i>ASIC company extract</i>	Appendix A
<i>Authorisation to act</i>	Appendix A
Part 3 – Premises details	Page 7
<i>Premises maps</i>	Page 5
Part 4 – Proposed activities	Page 9
Part 5 – Index of Biodiversity Surveys for Assessment and Index of Marine Surveys for Assessment	NA
Part 6 – Other DWER approvals	Page 15
Part 7 – Other approvals and consultation	Page 16
Part 8 – Applicant history	NA
Part 9 – Emissions, discharges and waste	Page 19
Part 10 – Siting and location	Page 37
Part 11 – Submission of any other relevant information	NA
Part 12 – Category checklist	NA
Part 13 – Proposed fee calculation	Page 42
Part 14 – Commercially sensitive or confidential information	NA
Part 15 – Submission of application	Appendix D

Licence Amendment form requirement	Page number in this document
Part 16 – Declaration and signature	Appendix D

Contents

Terms	1
Limitations and assumptions	2
1. Introduction	3
1.1 Background	3
1.2 Purpose of this report	3
1.3 The premises	4
2. Applicant details	6
3. Premises details	7
4. Proposed activities	9
4.1 Proposed Boundary	9
4.2 Infrastructure	9
4.2.1 Infrastructure and Equipment	9
4.3 Mining process	10
5. Other DWER approvals	15
6. Other approvals and consultation	16
6.1 Other approvals	16
6.2 Consultation	16
7. Emissions, discharges, and waste	19
7.1 Current DWER licence	19
7.2 Water storage	19
7.3 Surface Water	19
7.3.1 Monitoring of point source emissions to surface water	19
7.4 Noise	21
7.4.1 Noise Modelling	21
7.4.2 Noise monitoring	22
7.4.3 Noise management measures	23
7.5 Air Quality	29
7.5.1 Recent air quality results	29
7.5.2 Air Quality monitoring	29
7.5.3 Air Quality management	30
7.6 Waste	31
7.6.1 Emissions to land	32
8. Siting and location	37
8.1 Environmental site context details	37
8.2 Sensitive receptors	38
8.3 Nearby environmentally sensitive receptors and aspects	39
9. Proposed fee calculation	42
10. References	43

Table index

Table ES1	Reference to Licence Amendment Application Form requirements.	i
Table 1	Prescribed Premises information	3
Table 2	Applicant details	6
Table 3	Wonnerup Mine land holdings	7
Table 4	Proposed infrastructure	9
Table 5	Works, Infrastructure and equipment associated with Stage 3 in M70/1396	9
Table 6	Current DWER approvals	15
Table 7	Other approvals	16
Table 8	Approvals not required	16
Table 9	Engagement with State and Federal Departments / Agencies	16
Table 10	Engagement with other key stakeholders	17
Table 11	Emissions	19
Table 12	Emission points to surface water (L8739/2013/1)	20
Table 13	Point source emission limits to surface water	20
Table 14	Monitoring of point source emissions to surface water	20
Table 15	Monitoring of ambient noise levels	22
Table 16	Management measures for environmental noise	23
Table 17	Monitoring of ambient air quality	30
Table 18	Management measures for air quality	30
Table 19	Emission points to land	32
Table 20	Environmental site context	37
Table 21	Environmental receptors and distance from boundary	39
Table 22	Calculation of Licence Amendment fee L8739/2013/1	42

Figure index

Figure 1	Regional Location	4
Figure 2	Project Boundary and staging	5
Figure 3	Wonnerup Mine land holdings	8
Figure 4	Proposed boundary for Prescribed premises	11
Figure 5	Proposed mining infrastructure including pits, service corridors and topsoil stockpiles	12
Figure 6	Proposed solar evaporation ponds	13
Figure 7	Stage 3 noise and dust monitoring sites	14
Figure 8	Stage 3 Noise risk areas (from NMP)	25
Figure 9	Night time buffer zone	26
Figure 10	Noise management measures – bunds	27
Figure 11	Typical Cross Sections -Service Corridors and Bunds	28
Figure 12	Controlled discharge locations including detail on W1 relocation	33
Figure 13	Controlled Discharge Locations Wonnerup Mine	34
Figure 14	Dust Monitoring Wonnerup Mine	35
Figure 15	Noise Monitoring Wonnerup Mine	36
Figure 16	Sensitive Receptors – Nearby Residents	40
Figure 17	Sensitive Receptors – Environment	41

Appendices

Appendix A	Proof of occupier status, ASIC company extract, Authorisation to act as a representative of the occupier
Appendix B	Noise EMP, Noise Assessment, Waste Management Plan
Appendix C	Air Quality EMP
Appendix D	Application Form Works Approval / Licence Renewal / Amendment Registration)

Terms

Term	Description
annual period	the inclusive period beginning 1 January and ending on 31 December in the same year
ASS	Acid Sulfate Soils, being soils or sediments which contain iron sulfides and/or other sulfuric minerals that have previously been oxidised to produce sulfuric acid
AS 3580.1.1	Australian Standard AS 3580.1.1 Methods for sampling and analysis of ambient air – Guide to siting air monitoring equipment
AS 3580.9.3	Australian Standard AS 3580.9.3 Methods for sampling and analysis of ambient air - Determination of suspended particulate matter –Total suspended particulate matter (TSP) – High volume sampler gravimetric method
AS 4282	Australian Standard AS 4282-1997 Control of the obtrusive effects of outdoor lighting
AS/NZS 5667.1	Australian Standard AS/NZS 5667.1 Water Quality – Sampling – Guidance of the Design of sampling programs, sampling techniques and the preservation and handling of samples
AS/NZS 5667.6	Australian Standard AS/NZS 5667.6 Water Quality – Sampling – Guidance on sampling of rivers and streams
averaging period	means the time over which a limit or target is measured or a monitoring result is obtained
AQEMP	Air Quality Environmental Management Plan
CEO	Chief Executive Officer of the Department of Water and Environmental Regulation
CNMP	Construction Noise Management Plan
dB(A)	noise reading in decibels obtained using the “A” frequency-weighting characteristic
Directional system	multi-microphone sound measuring equipment compliant with the relevant sections of Schedule 4 of the <i>Environmental Protection (Noise) Regulations 1997</i> and capable of recording directional overall and one-third octave band equivalent A-weighted levels (LAeq)
ENMP	Environmental Noise Management Plan
Freeboard	distance between the maximum water surface elevations and the top of retaining banks or structures at their lowest point
LAS90,30min' and 'LAS10,30min	A-weighted level exceeded for more than 90% and 10%, respectively, of the time over 30 minutes with the meter set to 'Slow' time weighting
LAeq(20Hz-500Hz),30min	A-weighted equivalent noise level between 20 Hz and 500 Hz (one-third octave bands inclusive) averaged over 30 minutes
Licence	Licence numbered L8739/2013/1 and issued under the Act (this licence)
Mining Operations	removal of overburden and excavation of ore, and subsequent in-pit screening, slurring and processing of mined ore
NATA	National Association of Testing Authorities, Australia
NATA accredited	analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis
Non-directional system	single microphone sound measuring equipment compliant with Schedule 4 of the <i>Environmental Protection (Noise) Regulations 1997</i> and capable of recording overall and one-third octave band statistical noise levels based on the A-weighted sound pressure level with 'Slow' time weighting (LAS)
North Shore Tails	Mineral tailings from secondary processing at the company's licensed mineral separation plant at North Shore
NSR	Noise Sensitive Receiver
PM	total particulate matter including both solid fragments of material and miniscule droplets of liquid
PM ₁₀	particles with an aerodynamic diameter of less or equal to 10 µm
Premises	area defined in the Premises Map in Schedule 1 and Premises address in the Licence

Term	Description
quarterly	4 inclusive periods from 1 January to 31 March, 1 April to 30 June, 1 July to 30 September and 1 October to 31 December in the same year
SEP	Solar Evaporation Pond
TSP	total suspended particles each having an equivalent aerodynamic diameter of less than 50 micrometres
$\mu\text{g}/\text{m}^3$	micrograms per cubic metre
$\mu\text{S}/\text{cm}$	micro siemens per centimetre

Limitations and assumptions

This supporting document has been prepared by GHD for Tronox Mining Australia Ltd and may only be used and relied on by Tronox Mining Australia Ltd for the purpose agreed between GHD and Tronox Mining Australia Ltd as set out here.

GHD otherwise disclaims responsibility to any person other than Tronox Mining Australia Ltd arising in connection with this supporting document. GHD also excludes implied warranties and conditions, to the extent legally permissible.

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1. Introduction

1.1 Background

Since acquiring Cristal operations in 2019, Tronox has embarked on a process of integrating WA operations to create efficiencies. Tronox's Wonnerup Mine is owned and operated by their subsidiary Cable Sands Pty Ltd (Cable Sands). Wonnerup is proposed for expansion into Stage 3 to provide feedstock for the North Shore mineral separation plant and Pigment Plants in Kemerton and Australind. The existing operational Wonnerup Mineral Sands Mine includes Wonnerup, Wonnerup North Stage 1 and Stage 2 located on mining tenements M70/360 and M70/569 which adjoin the Proposed Stage 3 project area (Figure 2).

Tronox Mining, through this Application to Amend Operating Licence L8739/2013/1, is seeking approval for the Wonnerup North Stage 3 expansion, whereby mining is proposed to progress onto the new tenement M70/1396. The expansion is a continuation of current operations. The expansion will not increase throughput or production, instead it is a move from mining at the Stage 1 and Stage 2 areas to mining at Stage 3. The Stage 1 area has been backfilled and is scheduled for landform contouring and rehabilitation back to agricultural pasture. Stage 2 Phase A backfill is partially complete. The primary emissions and discharges of noise, dust and surface water will continue to be effectively managed under existing provision and management strategies. Since mining commenced at Wonnerup in 2013 there have been no major environmental incidents, attesting the strength of the site's Environmental Management Systems.

The premises operates under the existing *Environmental Protection Act 1986* (EP Act) Licence for the categories outlined in Table 1. This supporting document has been prepared to describe Stage 3 and the potential environmental impacts resulting from the proposed expansion. This document also outlines the environmental management measures which will be implemented to minimise the potential impacts.

Table 1 Prescribed Premises information

Category	Description of Category	Production or design capacity	Premises design capacity
6	Mine dewatering: premises on which water is extracted and discharged into the environment to allow mining of ore.	50 000 tonnes or more per year	600,000 tpa
8	Mineral sands mining or processing: premises on which mineral sands ore is mined, screened, separated or otherwise processed.	5 000 tonnes or more per year	2,500,000 tpa

1.2 Purpose of this report

This supporting document has been prepared by GHD Pty Ltd (GHD) on behalf of Tronox Mining Australia Ltd (Tronox). Tronox is proposing to develop and operate Stage 3 of the Wonnerup Mineral Sands Project onto tenement M70/1396.

An Application for a Licence Amendment is required for L8739/2013/1 to amend the boundary for the prescribed premises and update any management and monitoring details which are relevant. This supporting document provides additional information for consideration of the Application under Part V, Division 3 of the *Environmental Protection Act 1986* and Environmental Protection Regulations 1987.

This supporting document has been reviewed and approved by Tronox.



Figure 1 Regional Location

1.3 The premises

The Project is located approximately 8 km east of Busselton, in the South West region of Western Australia (Figure 1). It is located at 109 Sues Road, Yalyalup and on mining leases M70/360, M70/569 and M70/1396. The Wonnerup Mine has been operational since 2013. The Project boundary is shown in Figure 2.

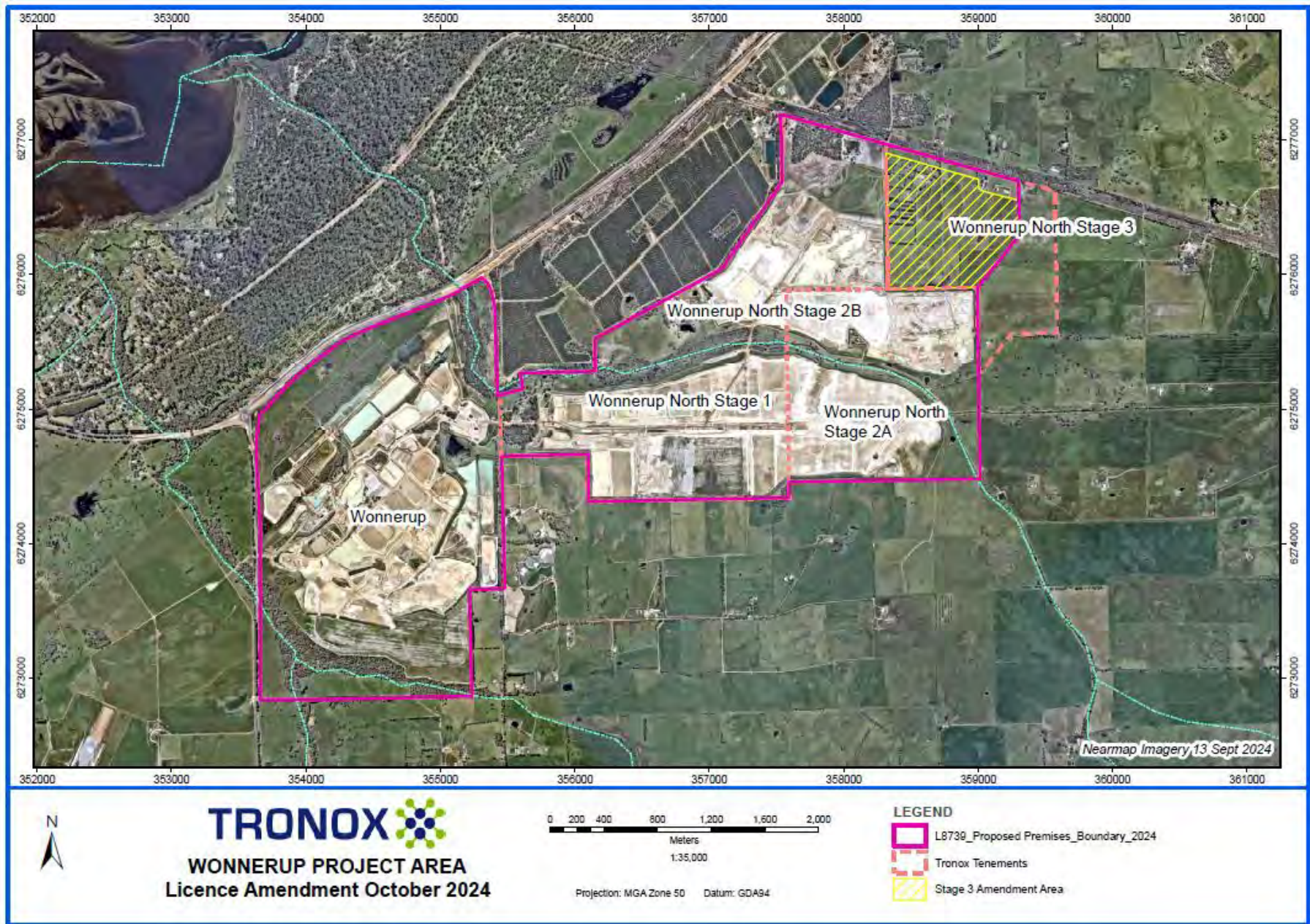


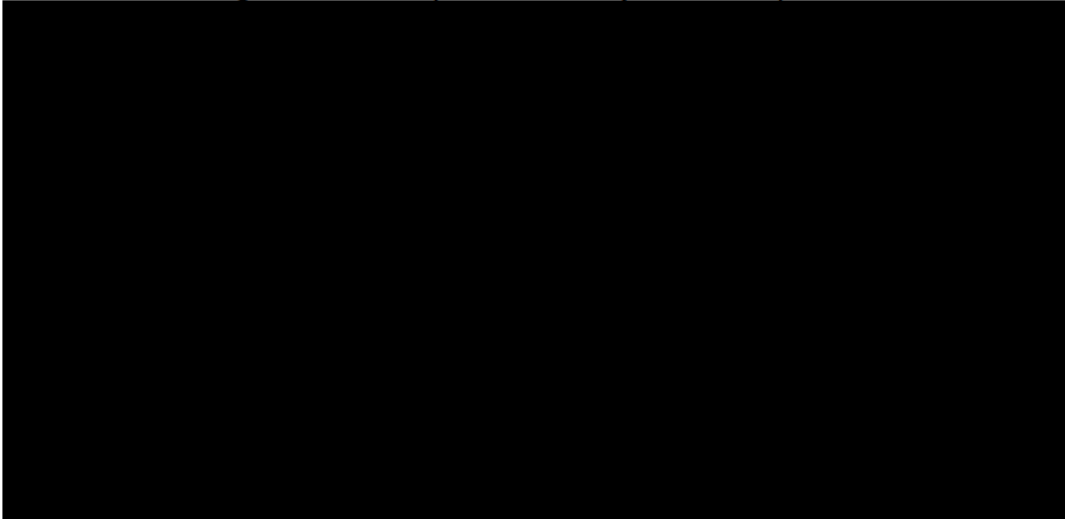
Figure 2 Project Boundary and staging

2. Applicant details

GHD has prepared this Licence Amendment on behalf of Tronox. Applicant details are provided as per Part 2 of the Licence Amendment form. In addition, Attachments 1A, 1B and 1C (**Error! Reference source not found.**) provide Proof of Occupier status, ASIC company extract and the Authorisation to act as representatives of the occupier, respectively.

Contact details for both Tronox organisations are listed below:

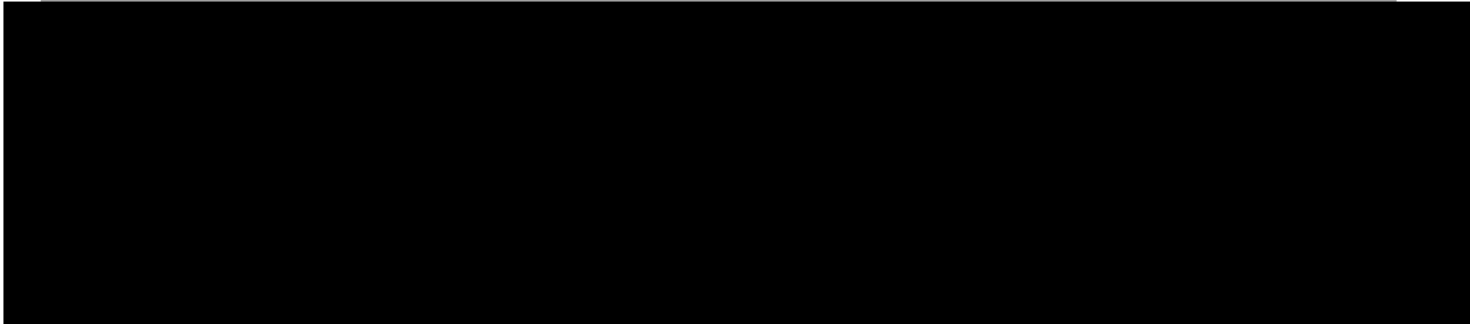
Tronox Mining Australia Ltd (Authorised Representative)



Applicant details and contact information for the Licence Amendment Form and this supporting document are outlined in Table 2. Tronox operates the Wonnerup Mine, North Shore Mineral Separation Plant, Kemerton Pigment Plant which it acquired from Cristal operations in WA in July 2019, along with the Australind Pigment Plant.

Table 2 Applicant details

Applicant details	
Applicant name	Tronox Mining Australia Ltd



3. Premises details

The Project is located approximately 8 km southeast of Busselton, in the South West region of Western Australia. It is located on mining leases M70/360, M70/596, L70/161 and M70/1396 and on 109 Sues Road Yalyalup. The Wonnerup Mine has been operational since 2013.

The Wonnerup Mine land holdings are outlined in Table 3 and Figure 3 shows the location of these leases.

Table 3 *Wonnerup Mine land holdings*

Landgate Property Description	Mining Lease	Property Size	Owner	Access Status
109 Sues Road, Yalyalup	N/A	464 ha	Cable Sands (WA) Pty Ltd	N/A
117 Wonnerup South Road, Ruabon	M70/360	40 ha	Private land owner	Access permitted by landowner
109 Lyle Road, Ruabon	M70/360	179 ha	Private land owner	Access permitted by landowner
Lot 10 on Plan 037187	M70/360	94 ha	Private land owner	Access permitted by landowner
50 Ruabon Road, Ruabon	M70/360	34 ha	Private land owner	Access permitted by landowner
Lot 850 Ruabon Road, Ruabon	M70/360	64 ha	Private land owner	Access permitted by landowner
Lot 1124 Ruabon Road, Ruabon	M70/360	25 ha	Private land owner	Access permitted by landowner
90 Teale Road, Ruabon	M70/569	201 ha	Private land owner	Access permitted by landowner
172 Ruabon Road, Ruabon	M70/1396	42 ha	Tronox	N/A
212 Ruabon Road, Ruabon	M70/1396	43 ha	Private land owner	In negotiation

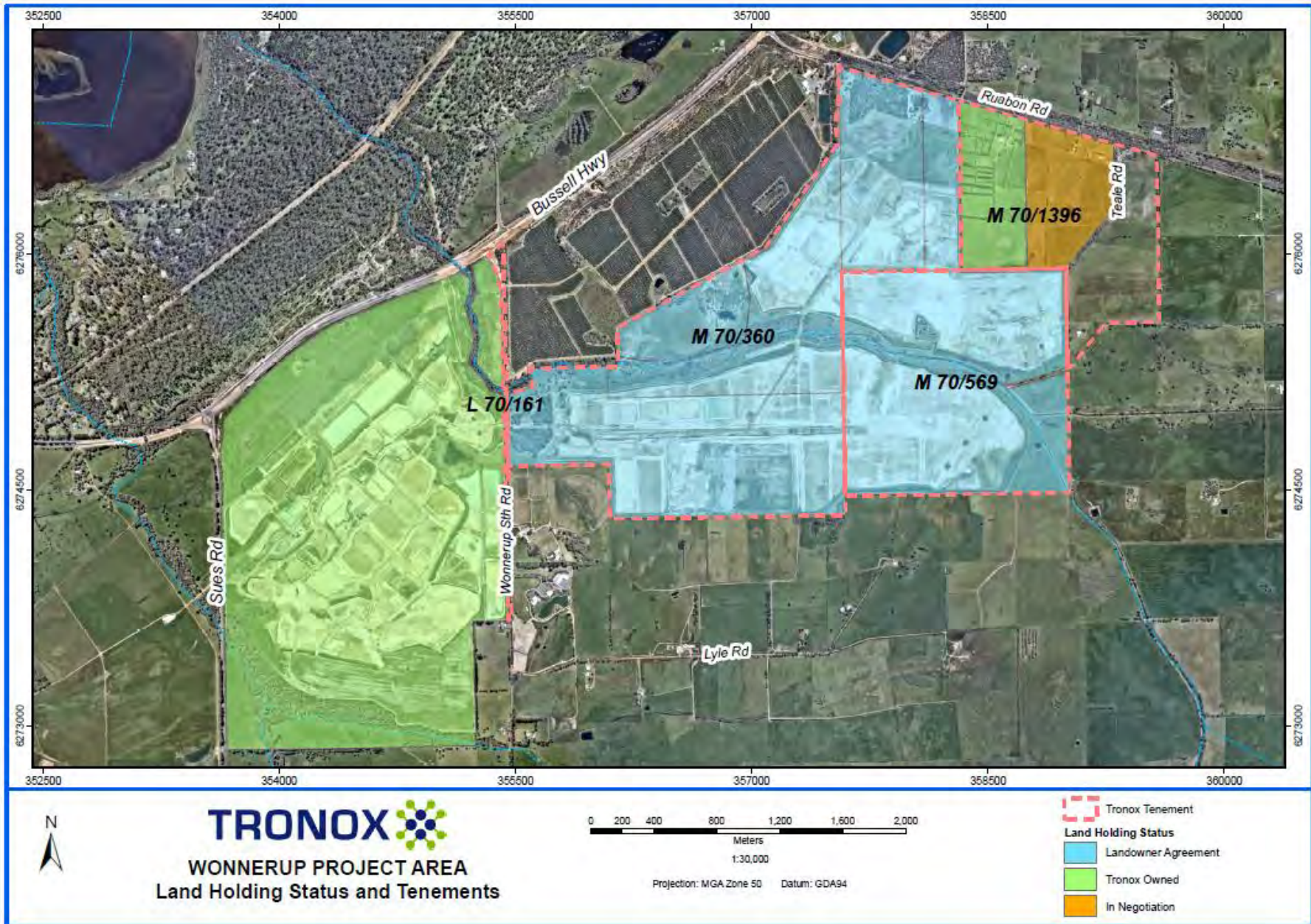


Figure 3 Wonnerup Mine land holdings

4. Proposed activities

4.1 Proposed Boundary

The expansion into Stage 3 will require an eastward amendment to the Prescribed Premises boundary as shown in Figure 4. There are two minor amendments to the boundary due to the current construction of the Bussell Highway duplication by Main Roads WA. Two small portions of land along Tronox's property at 109 Sues Road (Wonnerup Central) were acquired by Main Road WA to accommodate the road construction at the junction of Sues and Wonnerup South Roads. The opportunity to exclude a portion of Wonnerup South Road from the latter is also proposed.

4.2 Infrastructure

Tronox is proposing to extend the mining operations into M70/1396 and increase the disturbance footprint by 76.4 ha. The ore slurry will be pumped to the existing Wonnerup Central wet plant. The non-ore process residue (sand tails and clay fines) will be pumped back to the mine pit for use as in-pit backfilling. Process water will continue to be captured, stored, treated and managed in accordance with existing site management strategies. Tronox proposes to retain the current arrangement, including:

- Volume of process water required
- Number and location of discharge points
- Fuel storage location and volume
- Size and location of wet concentrator plant
- Number and size of mobile in-pit units (2)
- Number of process water dams.

The expansion into Stage 3 will not increase annual production for the Project. Table 4 summarises new components proposed to be located on M70/1396 as part of Stage 3.

Table 4 Proposed infrastructure

Operational aspect	Licence amendment requested
Construction of Mining Infrastructure	Amend to allow for construction of new mine pits, new access roads and new noise walls.
Noise and Dust monitoring sites	Amend to include new noise and dust monitoring sites commensurate with the risks of the Stage 3 mining area. Includes two new ambient air quality monitoring station (AQ11 and AQ12) and three new ambient noise monitoring stations (AN7B, AN9 and AN10). Site AN7B is a relocation of prior site AN7A ~ 40m to north..
Mine pits	Amend to describe the number and location of new mine pits.
Services corridor	Amend to include new temporary services corridor for transport, pipelines, pumps, power and water.
Solar evaporation ponds	Amend to include new solar evaporation ponds (SEP's) in the extension area. These will be located within mined pits.

4.2.1 Infrastructure and Equipment

Include the installation of the infrastructure and equipment as described in Table 5.

Table 5 Works, Infrastructure and equipment associated with Stage 3 in M70/1396

Infrastructure / Equipment	Requirements (design and construction)	Site Plan Reference
Installation of initial pipelines carrying clay slimes, sand tails and return water Wonnerup North Stage 3	Constructed with: <ul style="list-style-type: none"> – Automatic cut-outs in the event of a pipe failure OR 	NA

	<ul style="list-style-type: none"> – Secondary containment sufficient to contain any spill for a period equal to the time between routine inspections OR – Telemetry systems and pressure sensors along pipelines to allow detection of leaks and failures. 	
Ambient air quality monitoring station AQ11 and AQ12	<p>Must be established:</p> <ul style="list-style-type: none"> – Prior to commencing earthworks on M70/1396 and – Sited in accordance with AS 3580.1.1. 	AQ11 and AQ12 monitoring points shown on Figure 7
Ambient noise monitoring station AN7B, AN9 and AN10	<p>Must be established:</p> <ul style="list-style-type: none"> – Prior to commencing earthworks on M70/1396 and – Sited in accordance with AS 3580.1.1. 	AN7B, AN9 and AN10 monitoring points shown on Figure 7
Noise bunding and location of mining unit – Wonnerup North Stage 3 (on M70/1396)	<p>Must construct the Stage 3 boundary bunds to a minimum height of 4 m prior to commencing mining in the western side of mining area (172 Ruabon Road block). This is to be increased to a minimum of 6m, prior to commencement of other earthmoving activities, other than topsoil stripping and stockpiling, on the northern side of internal noise bund separating the night time restricted area and mining area to south.</p> <p>An effective 6 m high internal noise bund, measured from the base of the active mining unit, must be constructed and maintained, in order to maintain a minimum of 100 m of bund in advance of and 30 m behind the mining unit, between it and residences to the north, during mining operations on M70/1396.</p> <p>The internal noise bund separating the night time restricted area and mining area to the south must be 8 m (not 6 m) measured from the base of the active mining unit and maintained as above, during mining operations on M70/1396.</p>	Typical cross section for internal noise bunds and topsoil bunds (Figure 11). Locations of proposed bunds

4.3 Mining process

Construction works for mining are progressive, whereby land is cleared, stripped of topsoil and all topsoil stockpiled ahead of mining. The ore-bearing sands at Wonnerup are relatively shallow (less than 6 m below the surface) and there is no overburden, resulting in efficient mining progress through the landscape. Once the ore is mined, the void is progressively backfilled with combined sand tails and clay fines.

Figure 5 shows the proposed layout of Stage 3 infrastructure including service corridor, mining pits and topsoil stockpiles.

Figure 6 shows the proposed location of solar evaporation ponds implemented after mining and backfill with sand tails¹

Initial construction activities for the Wonnerup North Stage 3 expansion include:

- Initial topsoil stripping and stockpiling formed into boundary noise walls
- Initial internal temporary noise walls/ barriers constructed alongside and in advance and behind the mining unit
- Installation of access and services to mining unit via internal corridor
- Installation of new noise monitoring stations AN7B, AN9 and AN10
- Allocation of new dust monitoring stations AQ11 and AQ12 (including the placement of portable monitoring equipment) as shown in Figure 7

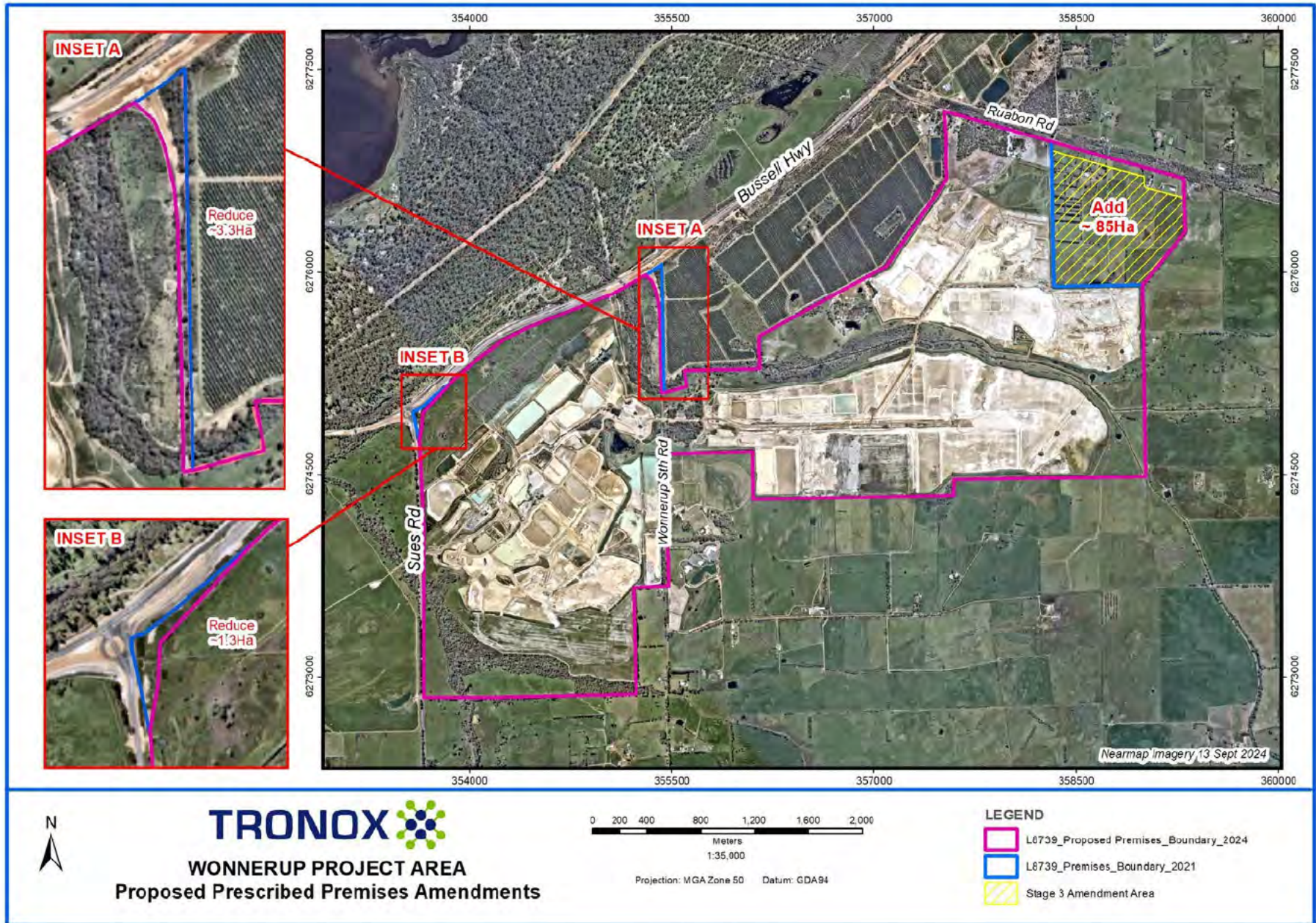


Figure 4 Proposed boundary for Prescribed premises

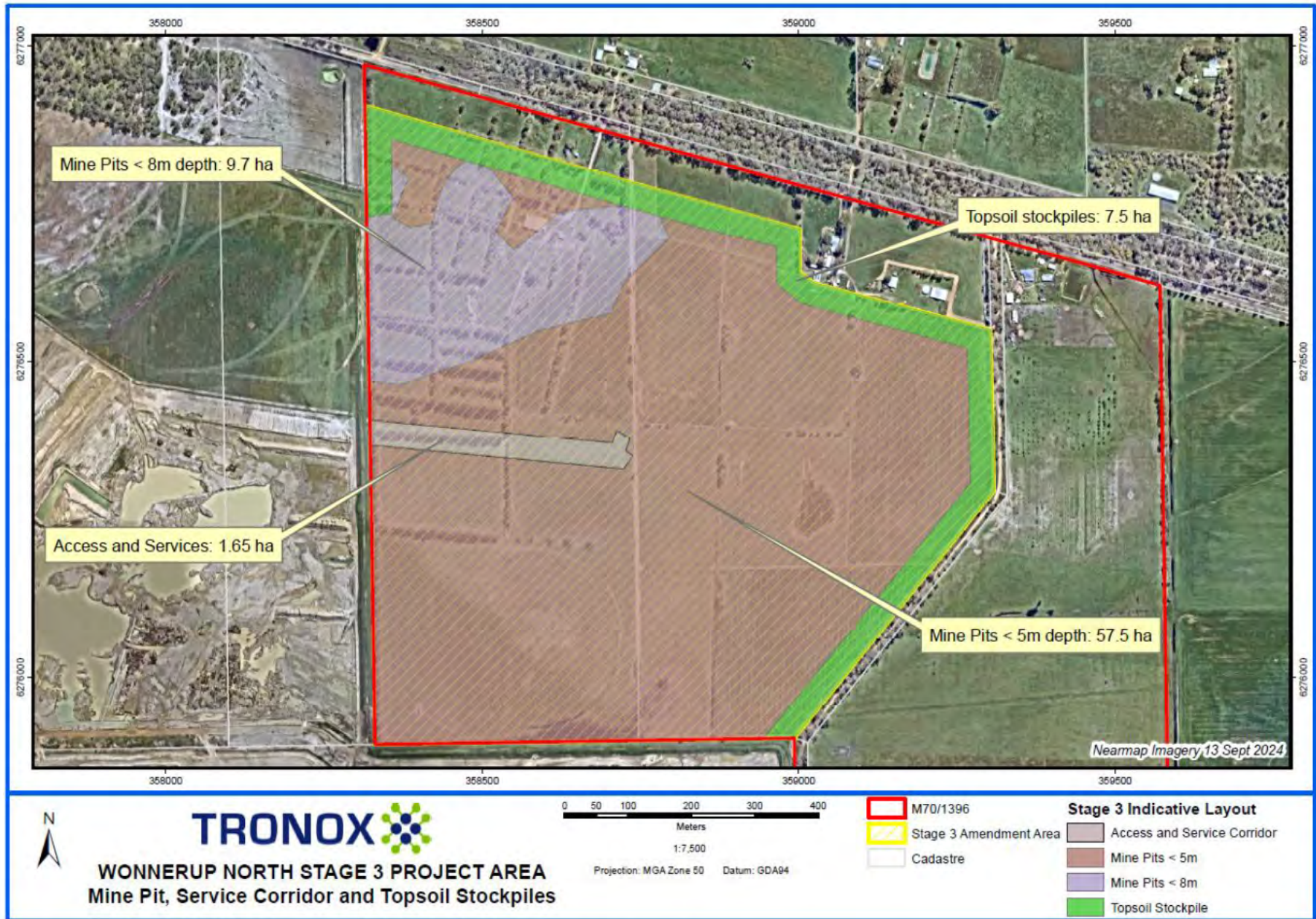


Figure 5 Proposed mining infrastructure including pits, service corridors and topsoil stockpiles

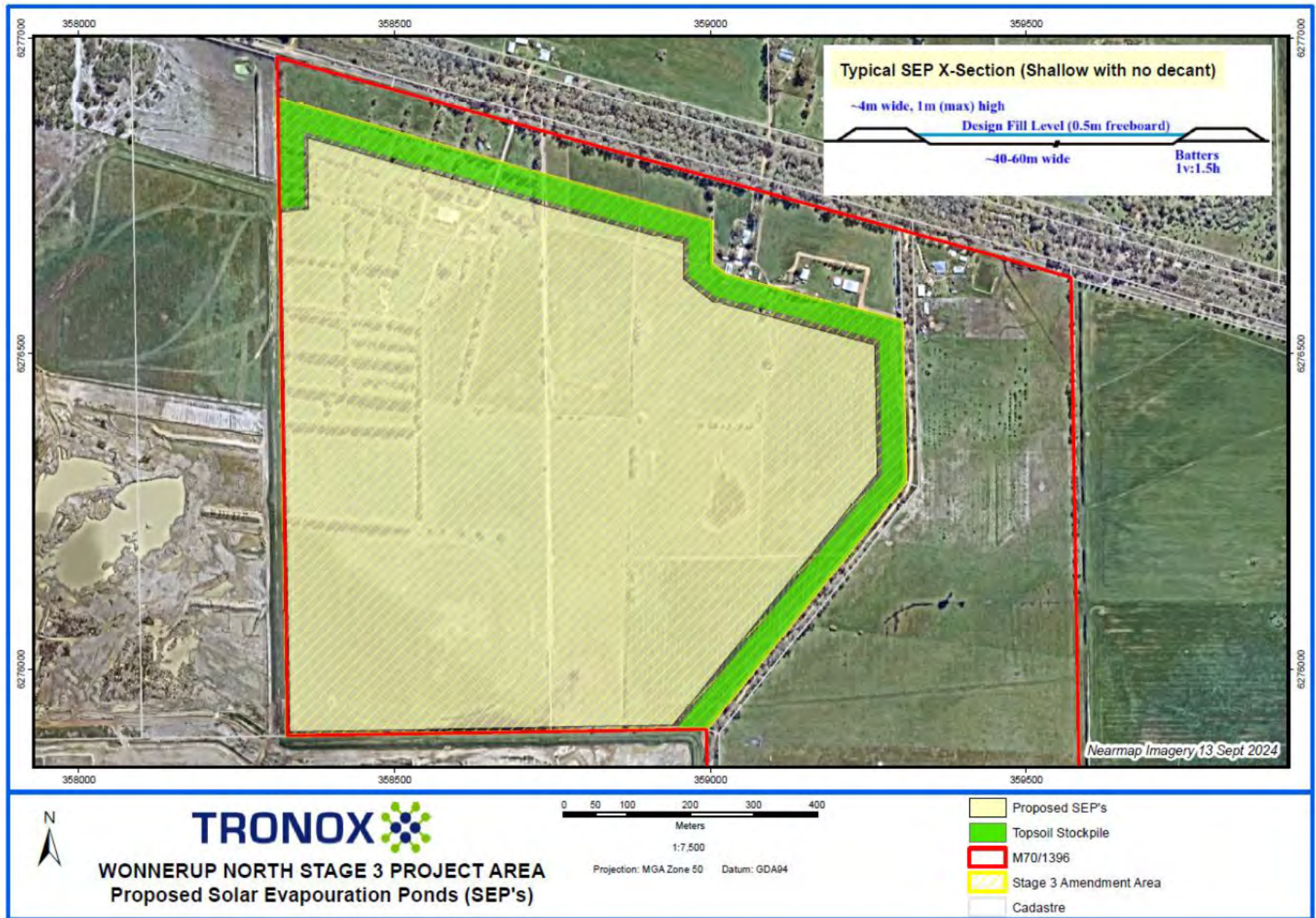


Figure 6 Proposed solar evaporation ponds

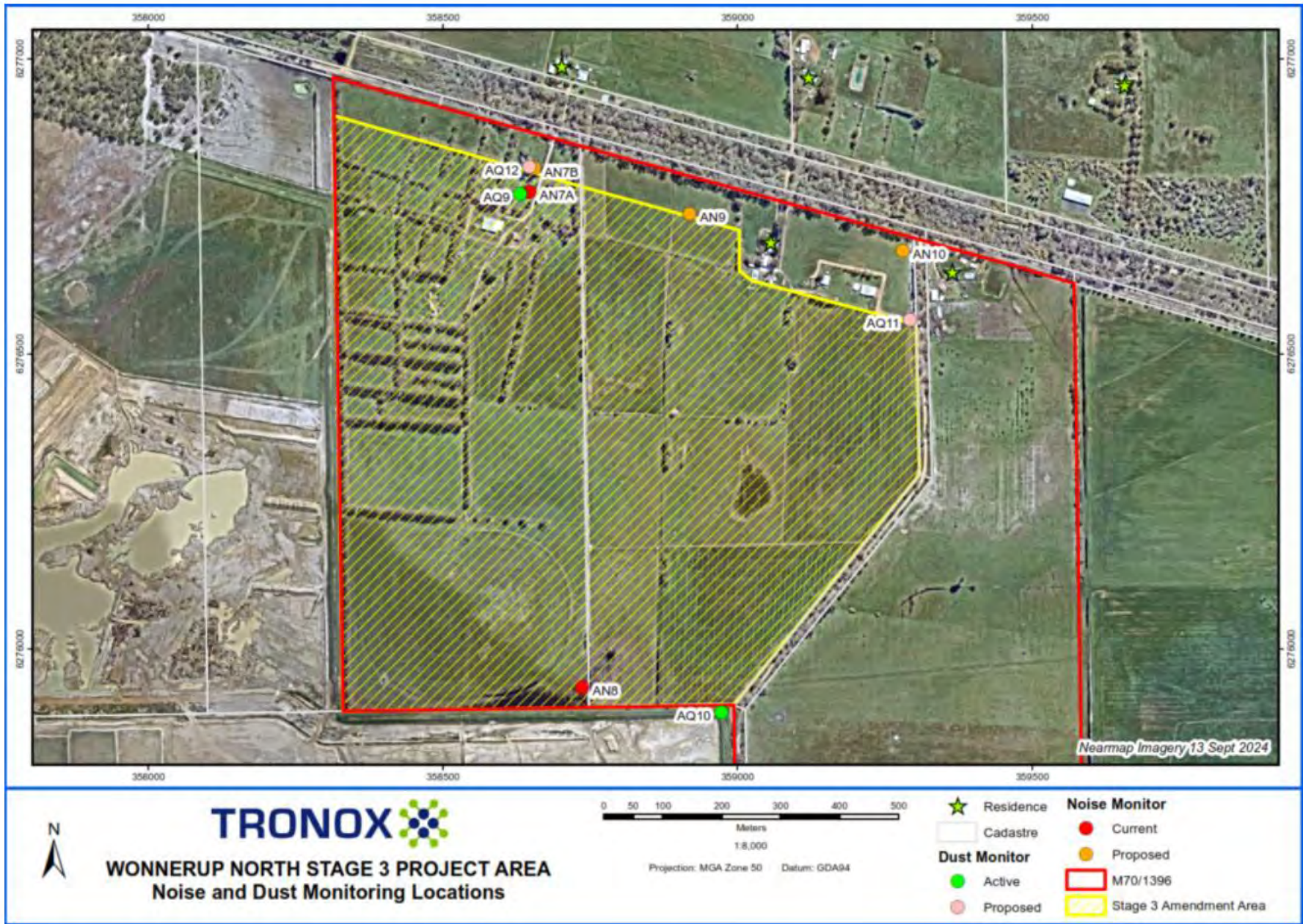


Figure 7 Stage 3 noise and dust monitoring sites

5. Other DWER approvals

The Wonnerup Mineral Sands Mine currently operates as a prescribed premises under the *Environmental Protection Act (1986)* (EP Act). There are no proposed changes to the prescribed premises categories or production design capacity from this amendment.

The Wonnerup Mineral Sands Mine currently holds three groundwater licences under the *Rights in Water and Irrigation (RiWI) Act 1914*. There are no proposed changes to the groundwater licences from this amendment.

The existing DWER approvals for the Prescribed Premises are shown in Table 6.

Table 6 Current DWER approvals

Document type	Document number	Details	Expiry date
Operating Licence	L8739/2013/1	Prescribed premises Categories 6 & 8	19/05/2036
Groundwater licence (dewatering)	GWL202089	Allocation of 1 400 000 kL	29/08/2028
Groundwater licence (Yarragadee)	GWL161841	Allocation 3 900 000 kL, with 2 900 000 available for Tronox use (as 1 GL of the allocation used by Doral)	22/08/2028
Groundwater licence (dewatering, mineral ore processing and other mining purposes)	GWL173523	Allocation 400 000 kL	31/12/2027

6. Other approvals and consultation

6.1 Other approvals

Environmental approvals other than those issued by Department of Water and Regulation (DWER) are outlined in Table 7 and Table 8.

Table 7 Other approvals

Activities	Type of approval	Regulatory Agency	Legislation regulating the activity	Status	Environmental factor(s) regulated
Clearing of potential MNES Habitat	EPBC Approval	DCCEEW	<i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act)	EPBC Act referral for Stage 3 (2023/09713) determined not a controlled action (19 September 2024) No further assessment required	N/A
Mine Development	Ministerial Approval	DEMIRS	<i>Mining Act 1978</i>	Mining Proposal Submitted for assessment on 27 September 2024	Land and Soils / Rehabilitation and Mine Closure

Table 8 Approvals not required

Approval	Status	Reason
<i>Biodiversity Conservation Act 2016</i> (BC Act)	Not required.	There is no requirement for the taking of Threatened flora or fauna species or for modification of TECs through implementation of the proposal. No authorisations are required.
<i>Environmental Protection Act 1986</i> (Part V, Division 2): Clearing Permit	Not required.	There is no native vegetation (as defined for the purposes of the EPA Act) located within the Proposal area.
s.18 Approval under <i>Aboriginal Heritage Act</i>	Not required.	No sites of ethnographic or archaeological significance recorded during a December 2022 survey (Ethnoscience, 2022).
<i>Heritage Act 2018</i>	Not required	

6.2 Consultation

Consultation with external stakeholders regarding the mine expansion has been undertaken since 2022. Table 9 summarises key consultation undertaken with State and Federal Departments and Agencies since the approval of the previous license.

Table 9 Engagement with State and Federal Departments / Agencies

Date	Description of Engagement	Stakeholders	Stakeholder comments / issue	TRONOX response and / or resolution	Stakeholder response
21 June 2023	Meeting	DWER	Proposal briefing: Groundwater management	Overview of Stage 3 project.	No significant issues highlighted at this meeting
19 September 2023	Email	DCCEEW	Federal referral	Submitted.	EPBC Act referral for Stage 3 (2023/09713)

Date	Description of Engagement	Stakeholders	Stakeholder comments / issue	TRONOX response and / or resolution	Stakeholder response
					determined not a controlled action (19 September 2024) No further assessment required
23 July 2024	Stage 3 Scoping Meeting via Teams	Christine Pustkuchen and Katherine Beatty, DWER	Queries regarding noise controls, ASS, dewatering and discharge points. They agreed a tour of the operations may be beneficial for new staff.	Licence Amendment application is being prepared	Christine asked to be cc'd into the email when we submit our licence amendment.
March – August 2024	Email correspondence	Brenin Presswell and Lisa Hogan, DCCEEW	Queries regarding water balance	Provided information as requested	No further assessment required.
March 2024	Email correspondence	DWER	No issues	Groundwater Operating Strategy updated to include Stage 3.	Groundwater Operating Strategy approved and GWL202089(2) issued on 28 March 2024.

Tronox engages on an ongoing basis with relevant officers from Department of Energy, Mining, Industry Regulation and Safety (DEMIRS) and the South West regional branch of DWER regarding regulation of the Project.

Tronox has also undertaken consultation with neighbouring landowners of M70/1396 regarding the Stage 3 expansion. Details of key consultation undertaken is provided in Table 10.

Table 10 Engagement with other key stakeholders

Date	Description of Engagement	Stakeholders	Stakeholder comments/issue	Tronox response and/or resolution	Stakeholder response
2023	Purchase of land	Landowner of Lot 172 Ruabon Road within the Proposal Area (~50% of area)	Agreed to land purchase with a premium added due to mineral resource.	Purchased land.	Satisfied. Vacated property.
2023-2024	Purchase or Compensation Agreement	Landowner of 212 Ruabon Rd within the Proposal Area (~50% of Area)	Discussions / negotiations to purchase or compensate for gaining access to mine property.	On-going	On-going

2022 - 2024	Discussions regarding amenity agreements or access to explore / monitor	Local landholders	Land access and amenity agreements; exploration drilling programs; environmental surveys and monitoring equipment installation. Community updates delivered to letterboxes around the mine site perimeter at least bi-annually. Informal engagement ongoing. Agreements signed with individual landowners.	Amenity Payments or other made according to agreements.	Ongoing liaison as required or by agreements.
December 13 2022	Proposal briefing and Heritage surveys of the Proposal area	Aboriginal groups - Ethnoscience facilitated a heritage survey and Aboriginal engagement on our behalf.	Proposal briefing and heritage surveys of the project area. No sites of archaeological potential were found.	As recommended by the Aboriginal consultants, a healing ceremony will be conducted after mining concludes.	The consultants recommended that subject to other relevant approvals, the mining operation proceeds.

7. Emissions, discharges, and waste

7.1 Current DWER licence

Tronox operates the Wonnerup Mineral Sands Mine as a prescribed premises under licence L8739/2013/1. The current licence is valid until May 2036, requiring no change to the expiry as part of this amendment. An Application for a Licence Amendment is required to describe the change in area for the Prescribed Premises, potential environmental impacts and proposed management measures. Additional monitoring locations are proposed to support the amendment to the licence, with the proposed noise and dust monitoring locations included in Figure 7, and across the whole site in Figures 15 and 16.

Table 11 Emissions

Emission type	Exclusions/Limitations/Requirements
Specified Emissions	
Disposal of mine tailings	Only to solar drying ponds or mine voids, and subject to compliance with Condition 1.3.1
Discharges to Air – fugitive dust	Subject to compliance with Conditions 2.4.1 – 2.4.3
Ambient noise	Subject to compliance with Condition 2.5.1
General Emissions	
Emissions which arise from undertaking the Works	<ul style="list-style-type: none"> – Unreasonable Emissions; or – Emissions that result in, or are likely to result in, Pollution, Material Environmental Harm or Series 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, prescribed standard, or 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 <i>Environmental Protection (Unauthorised Discharges) Regulations 2004</i>

7.2 Water storage

The Project water supply bore(s) would be used to extract up to approximately 1.4 GL per annum to meet the Project make-up water demand. Water extracted from the Yarragadee aquifer would be transferred to the process water dam (located at the Wonnerup mine infrastructure area) then reticulated by pumps and pipeline systems via service corridors to processing infrastructure such as the in pit dry mining units (trommels) and the wet separation plant. The location of pump and pipeline systems would be adjusted as necessary during the mine life as the active mining area advances.

Tronox will implement an on-site water management system to the Proposal area which will aim to keep uncontaminated water separate from contaminated water or potentially contaminated storm water. In compliance with the existing licence for the Wonnerup Mineral Sands Mine (L8739/2013/1), Tronox will manage SEP's, water management dams and sand tail deposition to pits, to maintain a minimum freeboard of 0.5 m.

7.3 Surface Water

7.3.1 Monitoring of point source emissions to surface water

There is one change to the current emission points described in Table 12 and shown in Figure 12 for the emission limits described in Table 13.

There is a proposed change to location of W1 due to Main Roads acquisition of Tronox land. W1 will move to match the new cadastral boundary, approximately 220 m to the south.

Table 12 Emission points to surface water (L8739/2013/1)

Emission point reference	Description	Source including abatement
W1	Primary off-site discharge point to the Sabina River. Water is allowed to overflow via gravity from the process water ponds into an on-site drainage channel, which then flows off-site through a culvert under Sues Rd and into the river	Production water and contaminated stormwater, treated with flocculating and neutralising agent (where required to achieve discharge criterion listed in Table 2.2.2 of the operating licence)
W2	Off-site discharge point to the Abba River. Water is pumped from the process water ponds through a lined overland flow path, which flows down a modified natural creek into the Abba River.	

Table 13 Point source emission limits to surface water

Emission point reference	Parameter	Limit (including units)	Averaging period
W1 – W2	pH	5.5 (lower) 8.5 (upper)	Spot sample
	Electrical conductivity @ 25°C	2,500 µS/cm	
	Total dissolved solids	1,500 mg/L (upper)	
	Total suspended solids	80 mg/L (upper)	
	Total titratable acidity	65 mg/L (upper)	
	Total alkalinity	10 mg/L (lower)	

Tronox will continue to undertake the required monitoring outlined in Table 14, according to the Licence requirements.

Table 14 Monitoring of point source emissions to surface water

Monitoring point reference	Parameter	Units	Frequency ¹
SW1 & SW2 – weir boxes on process water dams (magflow meters)	Volumetric flow rate	m ³ /d	Continuous whilst discharging ²
W1 - W2	pH ³	No unit	Weekly whilst discharging
	Total dissolved solids	Mg/L	
	Total suspended solids		
	Total titratable acidity		
	Total alkalinity		
	Sulfate		
Metals and metalloids: Aluminium, arsenic, chromium, copper, lead, manganese, nickel, zinc, total recoverable hydrocarbons, ammonium		Monthly, whilst discharging	

¹ Sampling shall occur on the first day of discharge for the season, then weekly/monthly thereafter

² Availability ≥90% of the measurement intervals on a monthly basis

³ In-field non-NATA accredited analysis permitted

7.4 Noise

Noise is regulated under *Part V of the EP Act: Category 5 prescribed premise licence (L8739/2013/1)* for processing or beneficiation of metallic or non-metallic ore.

Tronox applies noise management measures as described in the (2023) Environmental Noise Management Plan (ENMP) to:

- Make sure that noise emissions from the premises, both individually and cumulatively, meet appropriate criteria and do not cause an environmental or human health problem, and
- Use all reasonable and practical measures to minimise noise emissions from the premises.

Tronox will continue to apply the measures outlined in the ENMP for operational works undertaken in Stage 3.

Tronox will apply noise management measures as described in the Construction Noise Management Plan (CNMP) to:

- Minimise noise generated during the development of the project sites and construction of noise abatement bunds and topsoil stockpiles
- Minimise noise during the construction of solar evaporation ponds and other structures

Construction activities would be limited to daylight hours (7.00 am to 7.00 pm) between Monday and Saturday and affected neighbours will be notified ahead of significant construction activities.

The ENMP is included in **Error! Reference source not found.**, alongside the Noise modelling report (Wood, 2023). The CNMP can be provided if required.

7.4.1 Noise Modelling

The project involves dry mining of the mineral sands deposit using conventional mobile equipment and mineral processing infrastructure and has the potential to impact nearby Noise Sensitive Receivers (NSRs). Noise modelling has been undertaken to predict the risk of non-compliance with the noise limits imposed under the *Environmental Protection (Noise) Regulations 1997* at the closest NSRs during daytime and night-time operations. Noise modelling (Wood, 2023) indicate that noise emissions from the project have the potential to exceed the assigned levels under worst-case meteorological conditions. Through iterative modelling, mining zones have been defined where the risk of exceedance is high. In the high risk zones, management measures have been proposed to minimise the risk to sensitive receptors (see Table 16)

A summary of the noise modelling is provided below from Wood (2023).

During daytime mining the predictive noise model concluded that:

- Assuming no tonality, mining noise is predicted to be compliant with the regulations when mining anywhere within the tenement during the day, using the existing mining fleet.
- Assuming tonality, mining noise is predicted to be compliant when mining up to 350 m of R10⁴ using a standard fleet.
- Assuming tonality, mining noise is predicted to be compliant when mining up to 260 m of R10 using an attenuated fleet.

During the daytime, background noise levels are typically higher and more likely to mask any emerging tonal noise emissions, decreasing the likelihood of tonality.

During night-time mining the fleet is reduced to use minimal equipment. The predictive noise model concluded that:

- Mining noise is predicted to be non-compliant when using a standard fleet at night time.
- Assuming no tonality, mining noise is predicted to be compliant when mining up to 100 m from R10 only when an attenuated fleet is used; and

⁴ R10 refers to Receiver ID 10

- Assuming tonality, mining noise is predicted to be non-compliant when mining up to 450 m from R10 when an attenuated fleet is used.

A noise management plan has also been developed to minimise noise exceedances in high-risk areas (**Error! Reference source not found.**). Figure 8 shows higher noise risk areas identified from the modelling and included in the noise management plan.

Ongoing modelling, monitoring and measurements of noise sources is currently underway to refine the noise management plan and further reduce any noise impacts.

7.4.2 Noise monitoring

Monitoring of environmental noise is carried out across the Wonnerup and Wonnerup North project areas for the purposes of:

- Gauging the effectiveness of the management plan
- Assessing and demonstrating adherence to noise targets.

There are currently no active operations at Wonnerup South, accordingly the noise monitor AN4 has been decommissioned. AN1, AN2, AN3, AN5 and AN6 are currently inactive but will be re-activated if required to monitor noise in their location.

The environmental noise monitoring program proposed is set out in Table 15. Tronox has a network of noise monitoring sites established along the project boundaries. Not all monitoring sites are activated at once. The focus is on intensive monitoring at select locations based on risk of excessive emissions affecting sensitive premises. Typically, noise monitoring locations within 1.5 km of any active mining unit are the focus of the noise monitoring program and are activated. The methodology applied in the current stages of the Wonnerup Mine will be applied for noise monitoring and management in Stage 3 and will comply with conditions in DWER Operating Licence L8739/2013/1.

Table 15 Monitoring of ambient noise levels

Monitoring point reference	Parameter	Sound measuring equipment	Units	Frequency
Existing Monitoring points				
AN1 – AN3, AN5 – AN8	LAS90, 30min LAS10, 30min LAeq (20Hz-500Hz), 30min	Non-directional system	dB	Continuous
	Audio recording		-	
AN2 – AN3, AN5 – AN6	LAeq, 1min one-third octave spectral data		dB	
Proposed monitoring points				
AN9 – 10	LAS90, 30min LAS10, 30min LAeq (20Hz-500Hz), 30min	Non-directional system	dB	Continuous
	Audio recording		-	

Existing monitoring operating requirements:

- Monitoring at AN1 only required when an operating mining unit is located west of AN5
- Monitoring at AN2 – AN3 only required when an operating mining unit is located the Wonnerup Central site (109 Sues Road).
- Monitoring at AN5 only required whilst an operating mining unit is located on the Wonnerup North site (M70/360), west of AN6
- Monitoring at AN6 only required whilst an operating mining unit is located on the Wonnerup North site (M70/360 and M70/569), south of the Abba River

- Monitoring at AN7A or AN7B only required whilst an operating mining unit is located north of the Abba River, on M70/360.
- Monitoring at AN8 only required whilst an operating mining unit is located north of the Abba River, on M70/569

Proposed monitoring operating requirements:

- Monitoring at AN9 and AN10 will be required whilst an operating mining unit is located on M70/1396
- The non-directional noise monitors will include a 1/3 octave requirement

7.4.3 Noise management measures

Tronox will continue to undertake the noise management measures summarised in Table 16, which have been successfully implemented since 2013. One of the notable additions for Stage 3 is the adoption of a night time buffer zone for the areas identified as higher noise risk. This buffer zone is demarcated with a higher than typical noise bund (plus 2m).

Table 16 Management measures for environmental noise

Management aspect	Action
Modified night shift work (7 pm - 7 am)	<ul style="list-style-type: none"> – No site development activities (topsoil stripping, noise wall construction) during night shift – Active mining unit limited to one – In-pit front end loader limited to two vehicles – No dozers – No water carts (unless excessive dust warrants water cart usage) Contingency Actions: <ul style="list-style-type: none"> – Tronox will reduce the number of active mining vehicles and equipment until compliance with Noise Regulations can be ensured, for example operate with one front end loader relocate to other mining unit further away or shut down.
Placement and positioning	<ul style="list-style-type: none"> – Position feed hoppers so that FEL noise is directed away from residences. – Minimise the number of out-of-pit pumps and generators. – Placement of a noise wall between the mining unit and sensitive premises
Night-time buffer zone	<ul style="list-style-type: none"> – No heavy vehicle or plant use will be undertaken within the night-time buffer zone, in the proposed Stage 3 mining area (Figure 9 and Figure 10). – Night time buffer zone will be demarcated with a higher than typical noise bund (plus 2m). – Only undertake tails and clay fines disposal, dewatering (with electric/equivalent pumps) and light vehicle inspection within the buffer zone during night-time, with activities managed to comply with noise requirements.
Site development works	<ul style="list-style-type: none"> – Works associated with site development (eg topsoil stripping, stockpiling and noise wall construction) will be limited to the hours of 7.00 am to 7.00 pm between Monday and Saturday.
Mobile equipment noise reduction	<ul style="list-style-type: none"> – Where practical, ensure mobile equipment (not haul trucks) are fitted with standard noise reduction measures including engine housings, suitable mufflers, baffles for cooling fans and that reversing beepers are replaced with 'quackers' or similar, if safe to do so. – Ensure mobile equipment and plant are in good working order or removed from operation – Audible reversing alarm in pit machinery replaced with light during night-time operations
Dewatering pumps	<ul style="list-style-type: none"> – Electric pumps to be used within the proposed Stage 3 mining area. Diesel pumps will not be permitted (unless excessive flooding requires mitigation pumping) in the night-time exclusion zone unless proven to be equivalent or lower in noise than electrical alternative.
Workforce training and awareness	<ul style="list-style-type: none"> – All employees and contractors will undergo induction and periodic awareness training on noise management responsibilities.
Noise walls	<ul style="list-style-type: none"> – Install and maintain noise bunds as reviewed in the original environmental noise modelling studies for each site. Bunds may be added if considered necessary or varied according to block layout to maintain close proximity to mining unit and activity (Figure 10). Noise wall typical sections are shown in Figure 11.
Maintenance	<ul style="list-style-type: none"> – Routine maintenance checks are to include an assessment of noise performance.

Management aspect	Action
Community relations	<ul style="list-style-type: none"> - Tronox will continue to liaise with near neighbours and landowners, and to consult with the wider community as per its wider consultation strategy.
Complaint response	<ul style="list-style-type: none"> - Tronox will ensure that all noise complaints received from members of the public are dealt with appropriately and the outcomes of the complaint response process documented and reviewed by the Mine Manager. A formal record will be kept of all complaints received and the associated investigations.
Continuous monitoring with automated alerts	<ul style="list-style-type: none"> - A network of multiple noise monitors will report 24/7 real-time noise data to the site project office and alert key site personnel if triggers or limits are being exceeded. - Tronox will seek to deploy solar powered with battery noise monitoring units where appropriate to avoid down time association with main power outages. - Tronox Mine site managers to receive automated notification when a monitor is no longer transmitting to ensure timely response. - Licence conditions currently require all active units be online and transmitting > 90% availability each month. This allows for down time for power outages, calibrations and maintenance.

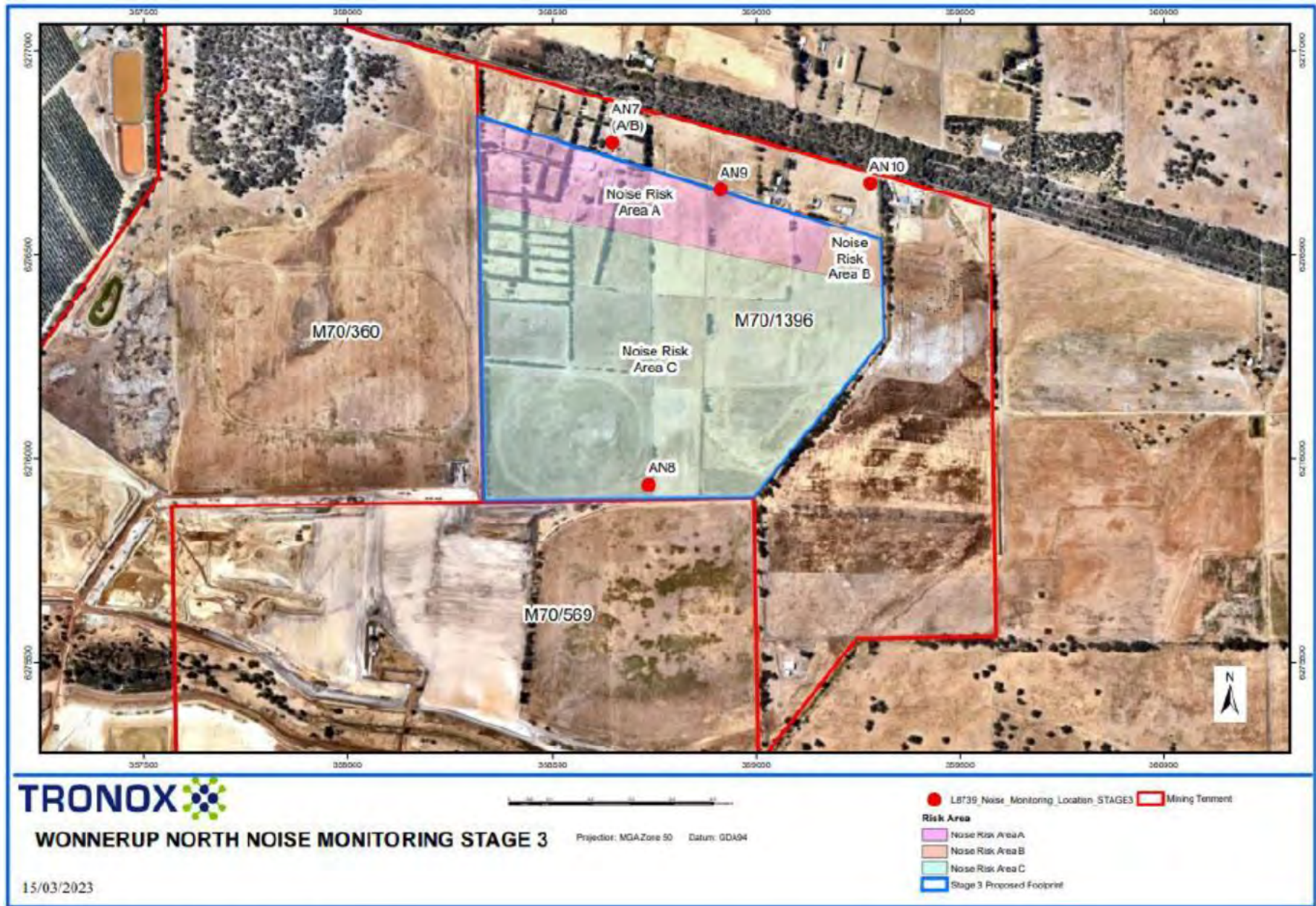


Figure 8 Stage 3 Noise risk areas (from NMP)

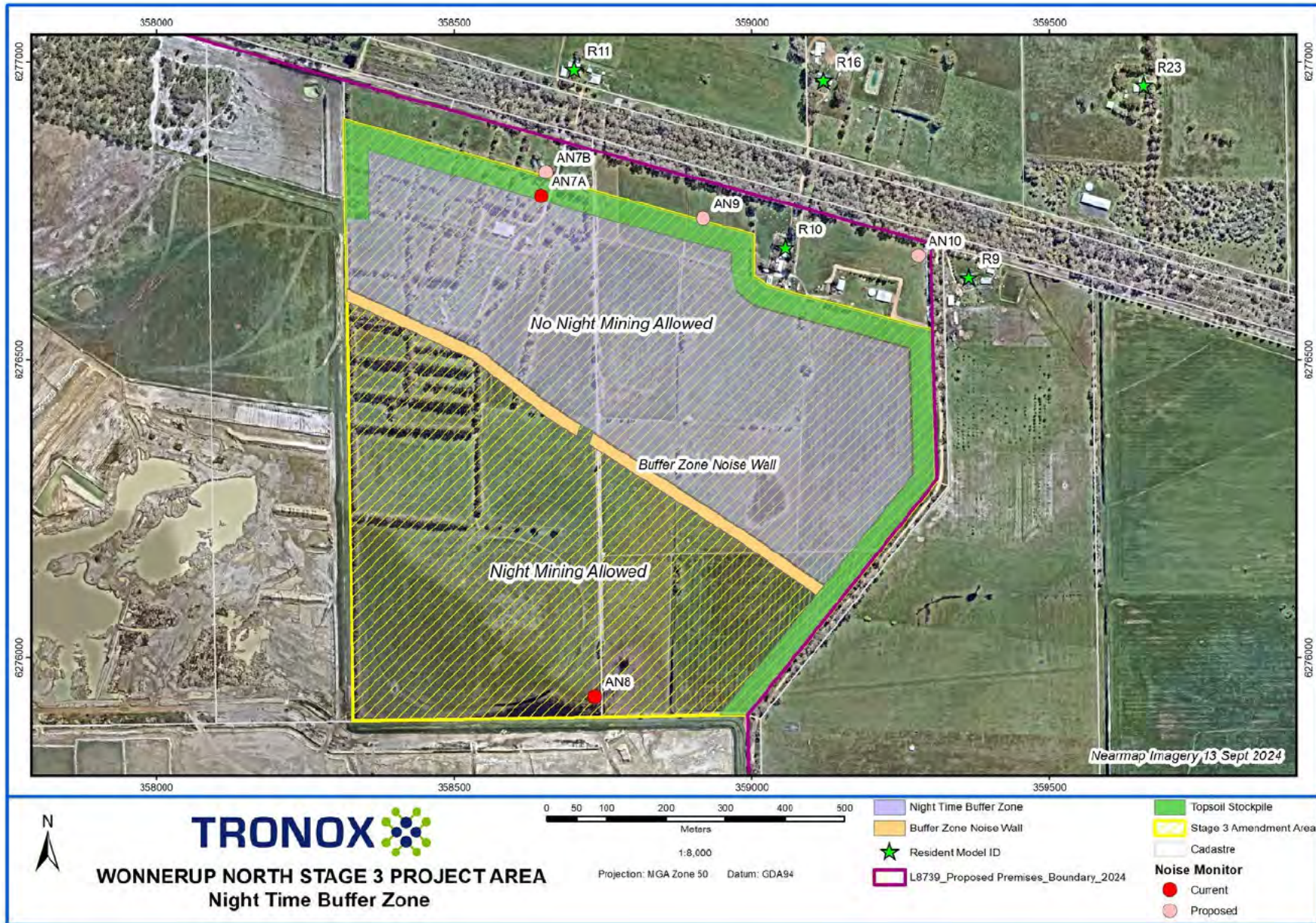


Figure 9 Night time buffer zone

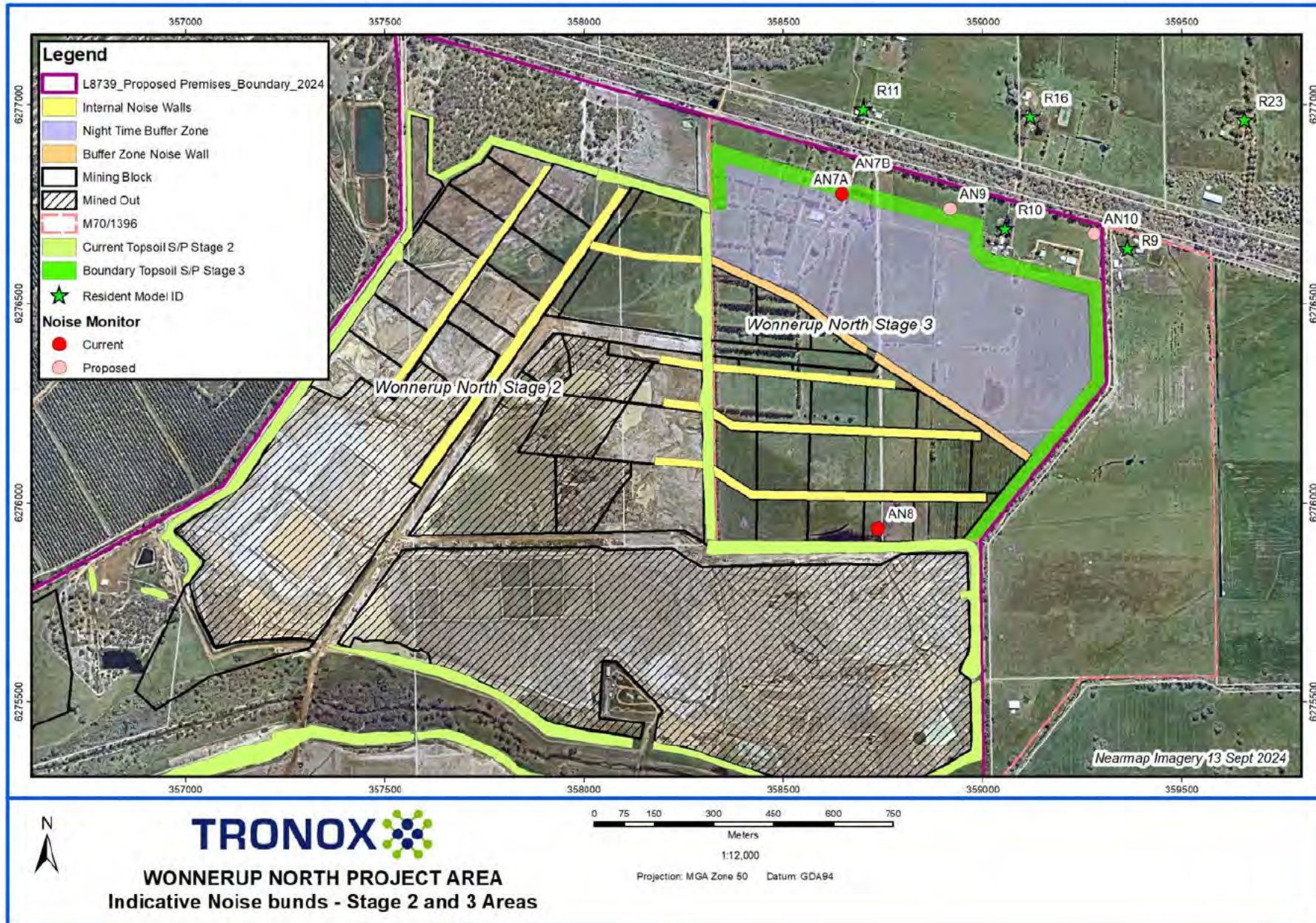
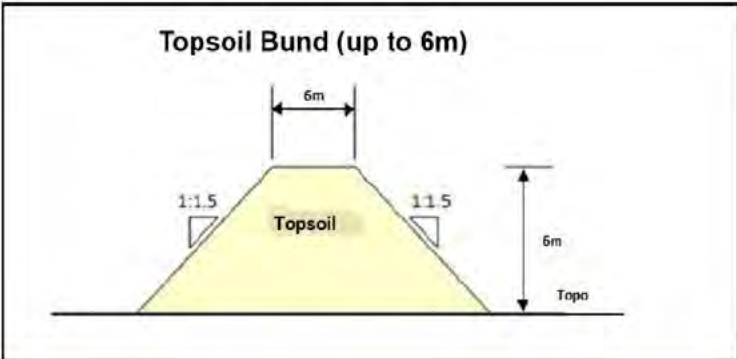
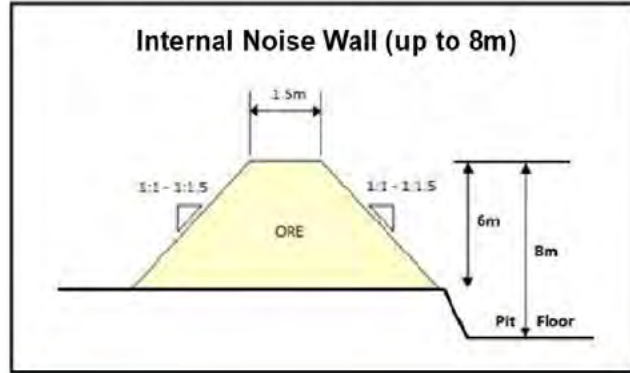
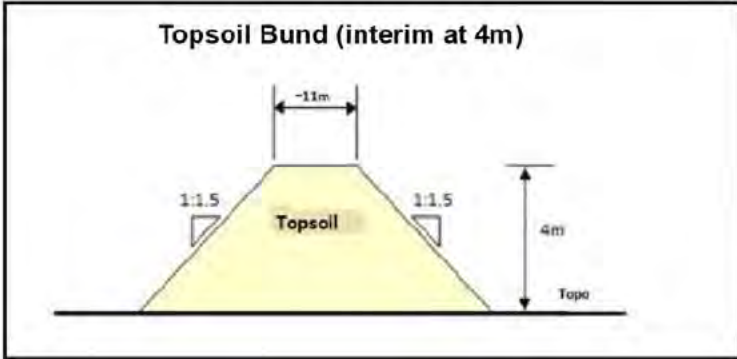
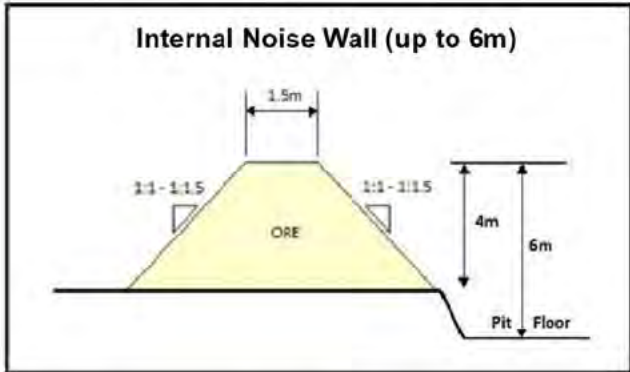
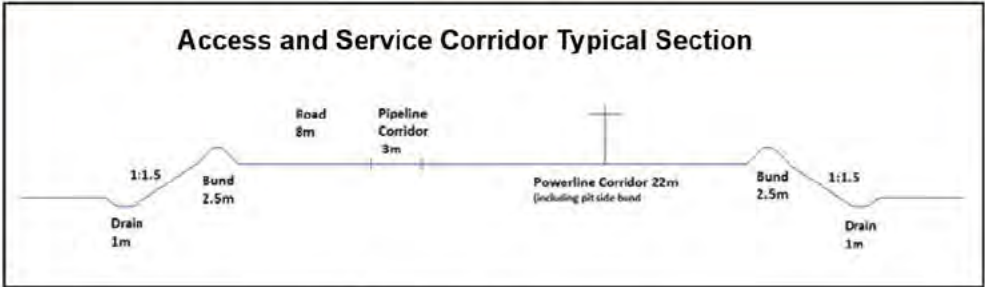


Figure 10 Noise management measures – bunds



WONNERUP PROJECT AREA
Typical Cross Sections - Service Corridor and Bunds

Figure 11 Typical Cross Sections -Service Corridors and Bunds

7.5 Air Quality

Air Quality is regulated under *Part V of the EP Act*: Category 5 prescribed premise licence (L8739/2013/1) for processing or beneficiation of metallic or non-metallic ore.

Tronox applies the management measures described in the Air Quality Environmental Management Plan (AQEMP) (Tronox, 2023). The AQEMP describes how Tronox will manage airborne particulate matter (PM) emissions generated from the Wonnerup projects, (i.e. generally dust and smoke) to:

- Fulfil Tronox's relevant legal obligations
- Be consistent with the objectives of the company's Environmental Policy
- Meet or exceed industry leading practice and satisfy relevant guidelines
- Be responsive to changes in conditions and performance requirements.

The management principles described in the AQEMP are supported by specific air quality (particulates) management objectives, namely:

- To make sure that airborne particulate emissions from the premises, both individually and cumulatively, meet appropriate criteria and do not cause significant negative impacts on amenity, human health or environmental values.
- To use all reasonable and practical measures to minimise the discharge of particulate emissions.

The AQEMP is included in **Error! Reference source not found.**, the management measures are summarised in Section 7.4.3 below.

7.5.1 Recent air quality results

TSP monitoring within the Wonnerup mine area provided the following average results for the 2021-23 monitoring periods.

- The average TSP result across all monitoring sites combined, for the period 1st January 2021 to 29th May 2023 is calculated as 47.24 $\mu\text{g}/\text{m}^3$;
- Monitoring site WODo01 (DWER Ref AQ1) had the highest average TSP with 118.21 $\mu\text{g}/\text{m}^3$;
- Monitoring site WODu07 (DWER Ref AQ7) had the lowest average TSP with 3.27 $\mu\text{g}/\text{m}^3$;
- No samples exceeded the cross-boundary limit of 260 $\mu\text{g}/\text{m}^3$ during the averaging period;
- No environmental field notices were received for dust or smoke emissions.
- Four dust complaints from local residents were received in 2023 from topsoil stripping activities with notifications made as per licence conditions.

7.5.2 Air Quality monitoring

As detailed in Table 17 Tronox undertakes monitoring of environmental air quality (PM) is carried out across the Premises for the purposes of:

- gauging the effectiveness of the AQEMP
- providing an early indication of high risk conditions
- assessing and demonstrating compliance with emissions targets and limits for PM.

The air quality monitoring program for the mining projects is based on the monitoring requirements as prescribed in the DWER prescribed premises licence and internal requirements.

Table 17 Monitoring of ambient air quality

Monitoring point reference	Parameter	Units	Frequency	Sampling duration	Limit	Method
Existing monitoring points						
AQ1 – AQ3, AQ5 – AQ7	TSP	µg/m ³	Monthly	24 hours	260 µg/m ³ (24 hour average)	AS3580.9.3
AQ1-AQ3, AQ5-AQ8	PM ₁₀	µg/m ³	Minimum 2 samples between 1 October and 31 May the following year	Minimum of 14 days continuous logging with 15 minute samples averages	Target only: 50 µg/m ³ (24 hour average)	None specified
AQ9			Continuous logging with 15 minute samples averages, while mining or earthmoving occurs north of the Abba River.			
AQ10			Continuous logging with 15 minute samples averages, while mining or earthmoving occurs north of the Abba River on M70/569.			
AQ7-10	Dust deposition	g/m ² /day Also reported as g/m ² /30 days	Continuous (replaced monthly)		Target only: 4 g/m ² /month	AS/NZS 3580.10.1
Proposed monitoring points						
AQ11-12	Dust deposition	g/m ² /day	Continuous (replaced monthly)		Target only: 4 g/m ² /day	AS/NZS 3580.10.1
AQ11-12	PM ₁₀	µg/m ³	Continuous logging with 15 minute samples averages, while mining or earthmoving occurs on M70/1396. This station will be fitted with an electronic, solar powered, continuous online unit to measure PM ₁₀		Target only: 50 µg/m ³ (24 hour average)	

7.5.3 Air Quality management

Tronox will continue to undertake the air quality management measures summarised in Table 18, which have been successfully implemented since 2013.

Table 18 Management measures for air quality

Management aspect	Action	Work instruction
To minimise dust generated by internal traffic movements	<ul style="list-style-type: none"> – Mine site speed limits on the main access haulage road and unformed tracks will be restricted to no more than 30 km/h for light vehicles and HMC haulage trucks. – Heavy earthmoving equipment will drive to soil conditions with water applied to working areas as needed. Speed limits for heavy earthmoving equipment are a contingency available during adverse conditions, based on the Mine Supervisor's assessment. – Management of dust from the haulage road is to be controlled by using well formed roads. – HMC will be covered when being transported between the mine site and the processing plant. 	<p>WI201 Minesite Traffic Management and Vehicle Control</p> <p>WI097 Bulk Haulage by Contractor</p>

Management aspect	Action	Work instruction
	<ul style="list-style-type: none"> Haulage roads will be dampened through water application such as water carts. 	
To minimise dust from clearing activities and open areas	<ul style="list-style-type: none"> Clearing areas will be restricted or staged to the minimum requirement for continued operation. Outside of winter months, sealing agents, such as clay slurry, may be applied to any disturbed areas that are not to be immediately utilised. Soil will be dampened by utilising water carts in high activity, disturbed areas that cannot be stabilised using traditional sealing agents or areas that are awaiting application of sealing agents. Access will be restricted to any areas that have been stabilised using sealing agents. Sprinkler systems will be used in areas where dust control is not achieved by the other control measures outlined above. 	WI225 Management of Clearing Operations
To minimise smoke impacts from burning	<ul style="list-style-type: none"> Consider alternative uses for vegetation rather than burning. Prior to and during burning operations an assessment of the weather conditions will be made and burning will only occur if the weather conditions are low risk Adjacent landowners will be notified before the commencement of any burning activities. 	WI225 Management of Clearing Operations
To minimise dust from topsoil stripping activities	<ul style="list-style-type: none"> Topsoil stripped outside summer months (i.e. between March to November) may need reduced or no wetting). Topsoil will be stripped on a progressive basis (staged) so the disturbed area is the minimum required for continued operation. Weather conditions will be assessed before commencing topsoil stripping and re-assessed on a daily basis during stripping. Equipment for stripping should be fit for purpose and minimise dust generation. 	WI223 Topsoil Management
To minimise dust from stockpiles	<ul style="list-style-type: none"> Stabilising agents will be applied progressively to the batters of stockpiles At the completion of stockpiles an appropriate soil stabilisation treatment will be applied. Appropriate stockpiles will be seeded with a vegetative crop in winter. Access to stabilised stockpiles for purposes other than stabilisation will be restricted. HMC stockpiles will be wetted down. 	WI223 Topsoil Management

7.6 Waste

Waste material types generated directly from operations undertaken within the Project area are expected to be minimal due to the satellite nature of the operation. Wastes expected to be generated include:

- Recyclable and non recyclable general wastes generated from implementation of the Project; and
- Other wastes generated from mining operations and workshop activities (e.g. used tyres, scrap metal, waste hydrocarbons and oil filters) associated with implementation of the Project.

General waste minimisation principles (i.e. reduce, re-use and recycle) would be applied.

All general domestic waste and general recyclable products would be collected by an appropriately licensed contractor. Waste tyres would be stockpiled (and/or re-used as delineators on-site), prior to collection by contractors and removal from site. Scrap metal produced at the workshops during the life of the mine would be collected by a scrap metal merchant for recycling.

Waste hydrocarbons and oil filters would be collected by licensed contractors. Workshop hydrocarbon spills and leaks, and truck washdown areas would be contained by purpose-built oil/water separator systems which would be inspected and maintained regularly. Liquid wastes from hydrocarbon/chemical spills and leaks, and

heavy vehicle wash down areas would be contained in purpose-built oil/water separator systems which would be inspected and maintained regularly.

All substances classified as dangerous goods or hazardous substances would be stored in accordance with the relevant requirements of the *Dangerous Goods Safety Act 2004* (DG Act) and the *Dangerous Goods (Storage and Handling of Non-explosives) Regulations 2007* (DG Regs).

No material change to production of general waste is expected as this is a continuation of the current mining effort into a different area.

7.6.1 Emissions to land

Waste production is not expected to increase as a result of this revised Prescribed Premises boundary, as there is no proposed increase in mining throughput and change to the waste characteristics. The mine voids will change in location, to match the progress of mining Stage 3, and the mine locations are included in Figure 5.

Table 19 Emission points to land

Emission point reference	Description	Source including abatement
Mine voids (as shown in updated boundary for Prescribed Premises)	Disposal of mineral sands processing residue to mine voids	Sand tails from the wet concentrator plant
		Dried clay slimes from solar evaporation ponds
		North Shore tails, blended with minesite concentrator sand tails for return to the mine void

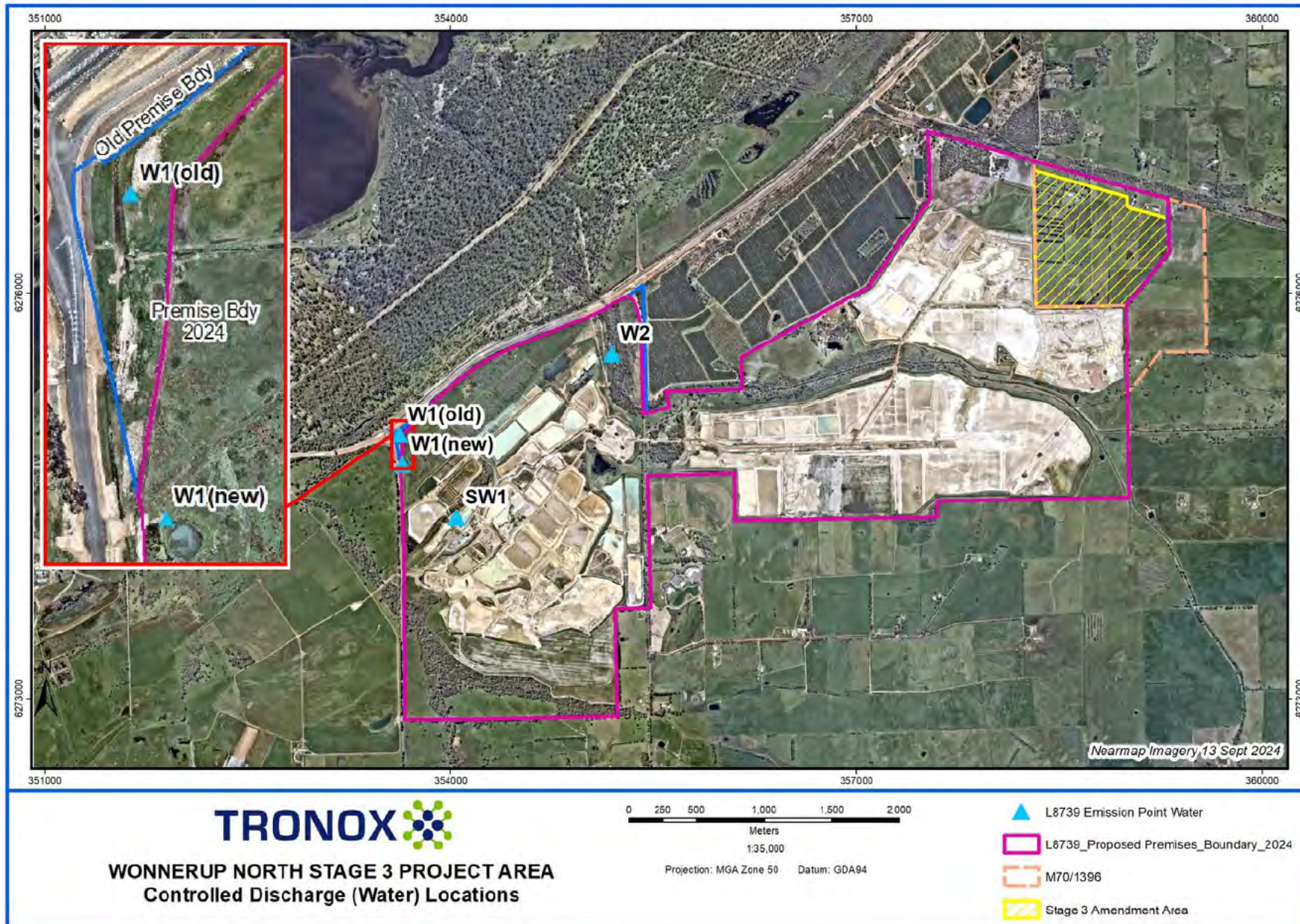


Figure 11 Controlled discharge locations including detail on W1 relocation

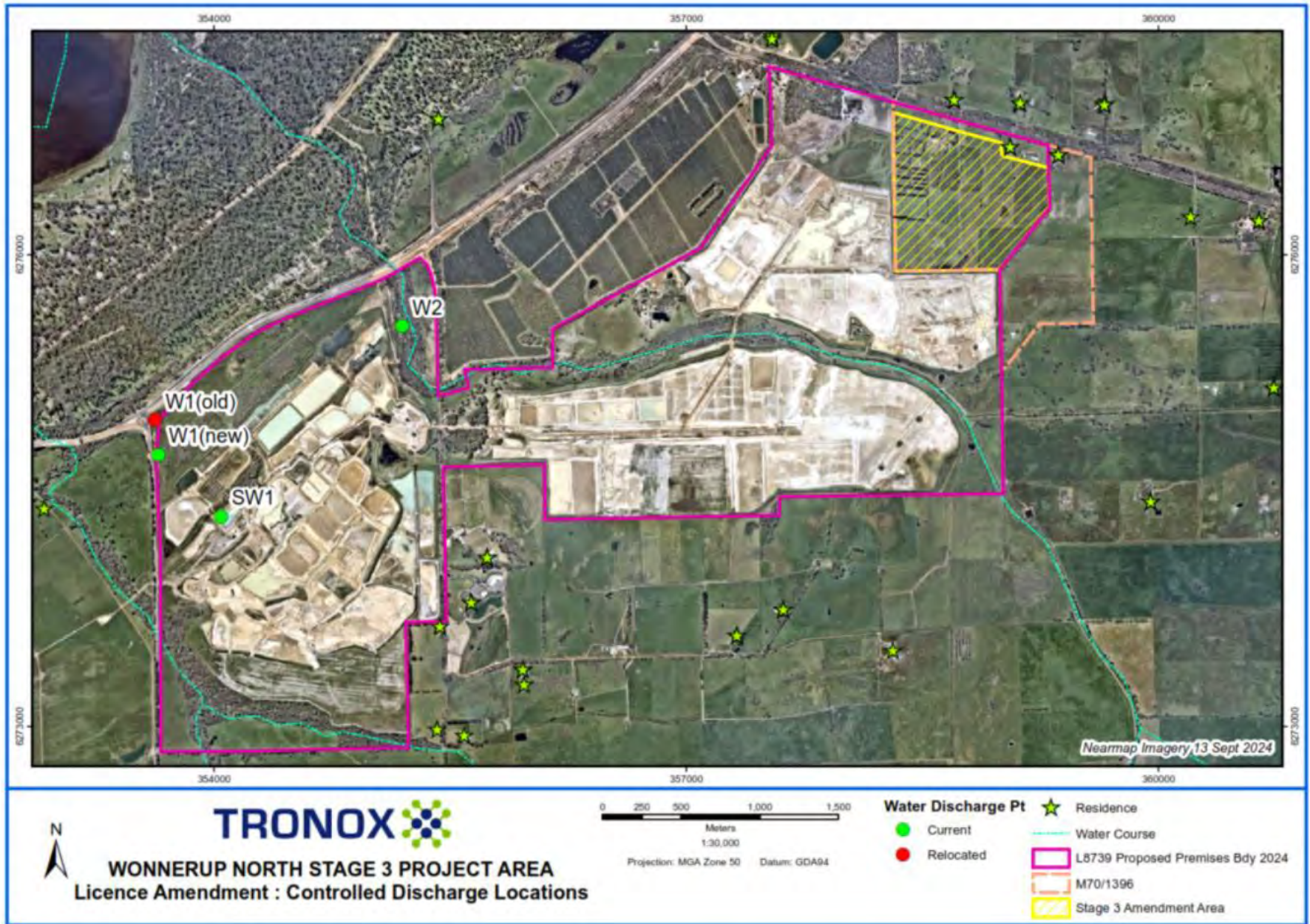


Figure 12 Controlled Discharge Locations Wonnerup Mine

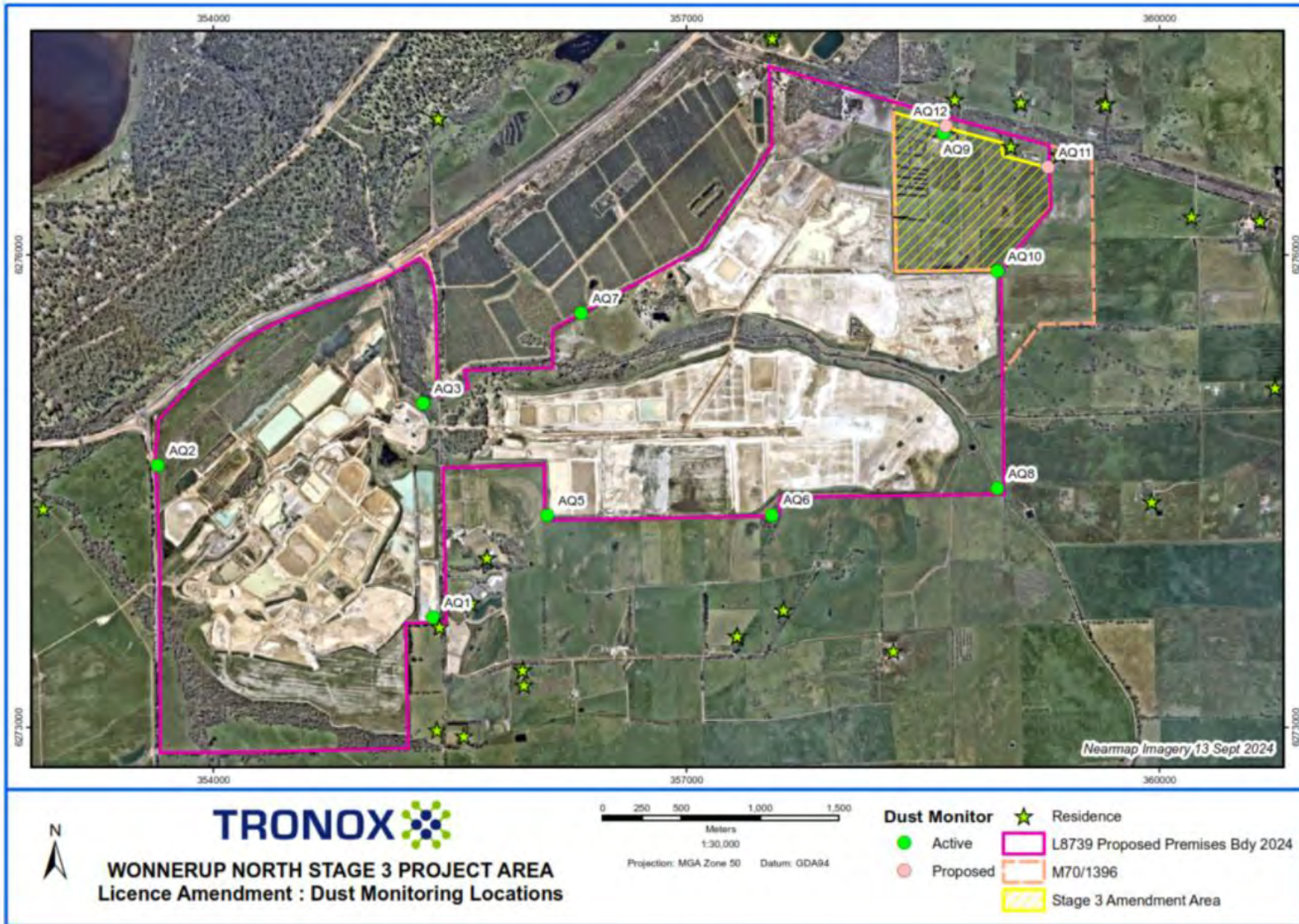


Figure 13 Dust Monitoring Wonnerup Mine

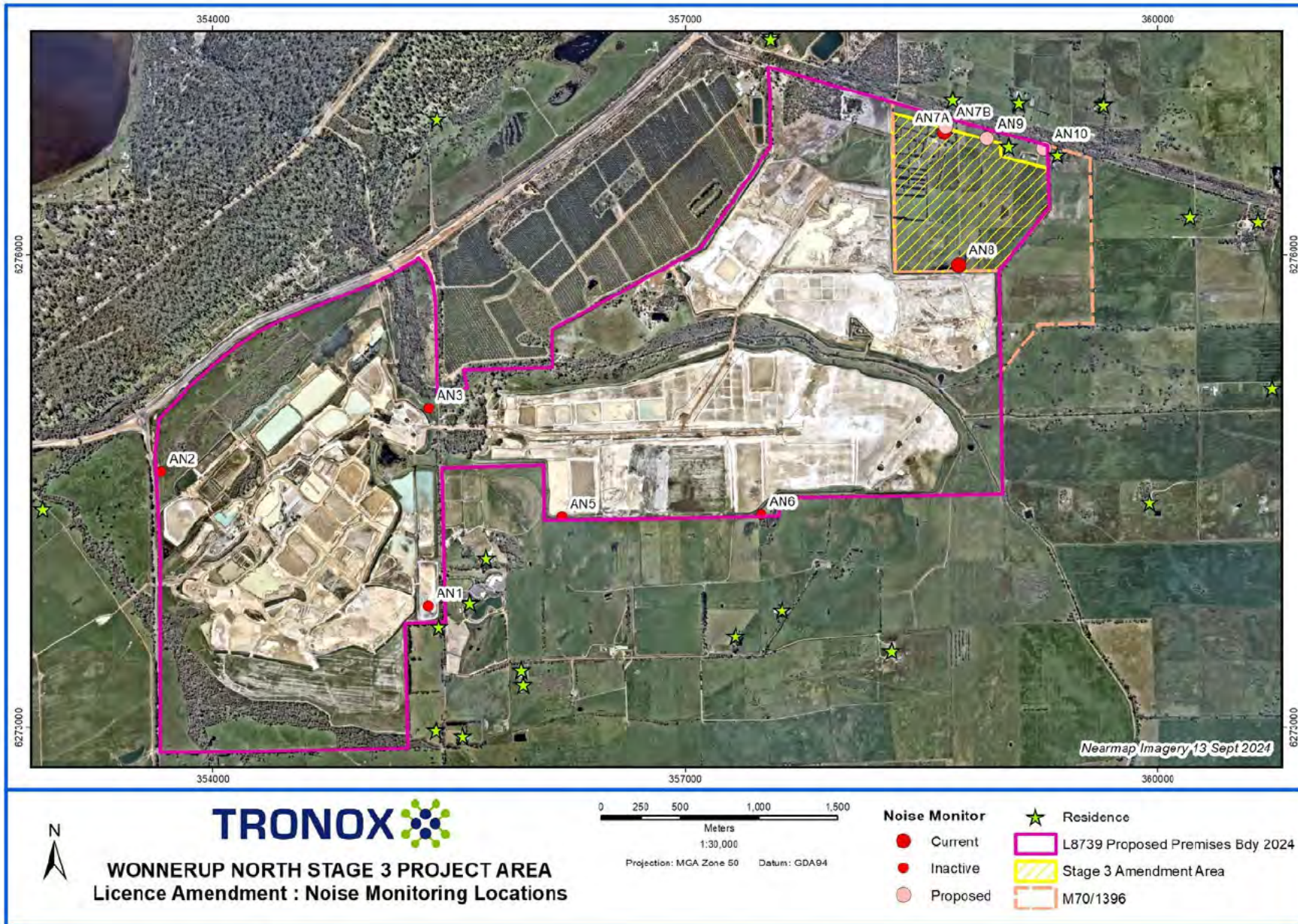


Figure 14 Noise Monitoring Wonnerup Mine

8. Siting and location

8.1 Environmental site context details

The environmental setting of the Wonnerup mine is described in Table 20. Tronox propose to disturb up to 74 ha to progress the mine pits associated with Stage 3.

The expansion will not increase throughput or production, instead it is a move from mining at the Stage 1 and Stage 2 areas to mining at the Stage 3. The Stage 1 area has been backfilled and is scheduled for landform contouring and rehabilitation to pasture. Stage 2, Phase A backfill is almost complete and Stage 2, Phase B backfill is partially complete. As there is no increase in throughput, no increase or changes to the characteristics of emissions and discharges are anticipated.

The primary emissions and discharges of noise, dust and surface water will continue to be effectively managed under existing provision and management strategies which will be applied to the Stage 3 operations. There will be minimal environmental impacts associated with the proposed extension of the operations, and the existing environmental setting for the Wonnerup Mine remains largely unchanged.

Table 20 Environmental site context

Environmental Aspect	Description
Climate	The climate can be described as Mediterranean, characterised by mild, wet winters and warm, dry summers. The nearest Bureau of Meteorology (BoM) weather station, the Busselton Aero Station (009603) is located at the Busselton/Margaret River Airport which is approximately 8 km to the southwest of the Project and has records from 1997 to 2023. Records from this station show the average annual rainfall for Busselton is 684 mm. The wettest months are generally May to August when approximately 70% of rainfall occurs. Mean summer maximum temperatures range from 28.2°C to 30.3°C with mean summer minimums ranging from 12.4°C to 12.7°C. The hottest month on average is February. Mean winter maximum temperatures range from 16.9°C to 17.9°C with mean winter minimums ranging from 6.9°C to 7.8°C. The coolest month on average is July (BoM, 2024) (2024).
Topography	The Project is located within the southern Perth Basin. The Perth Basin is a rift trough containing up to 15 km of sedimentary rocks overlain by a thinner veneer of post rift sediments and which extends for a length of >1000 km along the south western margin of the Australian continent (Freeman & Donaldson, 2006). The basin is bounded to the east by the Archean Yilgarn Craton, to the north by the Southern Carnarvon Basin and to the west and south by the offshore oceanic crust of the Indian and Southern Oceans, respectively (Thomas, 2014). Topographically, the Perth Basin is characterised by three main features being the Swan Coastal Plain, the more elevated Blackwood Plateau and the Scott Coastal Plain. Former marine erosion scarps (e.g. the Whicher Scarp) separate the coastal plains from the plateau (Hassan, 1998). The Project is located towards the southern end of the Swan Coastal Plain and is between 5 – 7 km from the current shoreline. The Department of Primary Industries and Regional Development (DPIRD) 2 m contour dataset (DPIRD-072) revealed that topography across the site is generally flat with an average elevation of ~18 m Australian Height Datum (AHD). Topographic contours indicate that the Project slopes gently in a north-westerly direction towards the coastline (DPIRD, 2019).
Geology	The regional geology of the Busselton area is typically dominated by a Phanerozoic sedimentary sequence that was deposited within a deep graben (trough) structure in the southern Perth Basin (Playford, Cockbain, & Low, 1976). The graben structure is situated between the Archaean Yilgarn Craton in the east and the Proterozoic Leeuwin Complex to the west. The major north-south trending Busselton Fault subdivides the graben structure into two major structural units: the deep Bunbury Trough to the east and a relatively shallow fault block, known as the Vasse Shelf, to the west (Thorpe & Baddock, 1994). The Project is situated on the Bunbury Trough.
Acid Sulphate Soils	The Acid Sulphate Soils (ASS) mapping dataset published by DWER (DWER-055), indicates that within 3 m of the ground surface, the Project is mapped as being at a 'moderate to low risk' of ASS occurrence (DWER, 2017). RPS (2023) note however that below 3 m of the ground surface, the ASS risk is mapped by DWER as being at a 'high to moderate risk'. A two-phase (field and laboratory) targeted soil investigation was conducted for the adjoining Wonnerup North tenements M70/360 and M70/569 in 2013. The soil samples were screened for the

Environmental Aspect	Description
	<p>presence of ASS material in accordance with the Department of Environment and Conservation (DEC) (2012) guidelines. The results showed:</p> <ul style="list-style-type: none"> – No sample from any borehole recorded a field pH (pHF) < 4 (0%); and – Seven samples recorded a field peroxide pH (pHFOX) < 3 (1.6%). <p>Comparison of the screening results to the DEC (2012) assessment criteria found no exceedance of the assessment criteria. The mapping concluded no significant risk of sulphide hazard in tenements adjacent to the Proposal, and although some sulphide oxidation hazard has been identified (1.6%), there is a low risk that a significant issue would occur with potential to impact receptors (Cristal Mining Australia Ltd, 2015).</p>
Groundwater	<p>The Proposal impacts directly on a highly localized areas of the locally occurring superficial aquifer. A conceptual hydrogeological model proposed by RPS (2014) for the now approved Wonnerup North project area (located on adjacent tenements M70/360 and M70/569), inferred that mining in this vicinity would involve excavation into a thin, low permeability aquifer system, underlain by clays and mudstones which separate the upper superficial aquifer (Bassendean Sands) from the deeper and more permeable aquifer systems (Leederville Sands and Yarragadee Formations). Tronox expects that the conceptual model adequately describes the area covered by Stage 3.</p>
Conservation areas	<p>The nearest conservation reserves are the Ruabon Townsite Nature Reserve (Reserve 32205), located approximately 2 kms to the east of the Project and the Tuart Forest National Park (Reserve 40250), located approximately 2 kms to the west (DLPH, 2014).</p>
Watercourses	<p>There are no surface water features within the Project. Drainage is very subdued and there are no identifiable surface water features, drainage lines, dams or watercourses within the Project boundary. The nearest significant surface water feature is the Abba River which is located approximately 700 m to the south.</p> <p>The Project is situated within the Abba River sub-catchment of the Vasse-Wonnerup Estuary system. This sub-catchment occupies an area of approximately 128 km² at the Abba River gauging station (610016) which is located near the Bussell Highway. The sub-catchment boundary is somewhat difficult to determine given the flatness of the terrain. The Abba River is approximately 35 km long in total. The Abba River is approximately 700 m south of the Project. It discharges into the Vasse-Wonnerup Estuary System located approximately 2 km downstream. The Vasse-Wonnerup Estuary System is listed under the Ramsar convention as a wetland of international importance (RPS, 2014).</p>
Wetlands	<p>The Project occurs over sandy soils without any identifiable drainage lines or watercourses and is mapped as a palusplain wetland with an assigned management category of Multiple Use (DBCA, 2023). A palusplain is defined as wetland comprising a seasonally waterlogged flat. The Multiple Use category is assigned to wetlands with few remaining important attributes and functions (DBCA, 2024).</p> <p>The nearest wetland to the Project, as presented in the WA Government's mapping dataset (DBCA, 2018), is the Vasse – Wonnerup Wetland System which is listed under the Ramsar Convention and which is, at its nearest point, located approximately 3.5 kms to the west.</p>

8.2 Sensitive receptors

The Wonnerup projects premises is proximal to three different groups of sensitive receptors:

- Owners and occupiers of surrounding residential dwellings and out-buildings (within 1 km), situated in rural settings;
- A commercial horticultural operation in the form of an avocado farm situated immediately to the north of the premises; and
- Public roads close to or within the boundaries of the premises, particularly the Bussell Highway, Sues Road, Wonnerup South Road and Ruabon Road that are used by drivers of motor vehicles.

The locations of identified sensitive receptors including the neighbours are shown in Figure 15.

The existing land use of the Stage 3 expansion is grazed farmland. There are two cadastral lots, one is owned by Tronox, the second is owned by a third party.

The closest resident to the proposed Wonnerup North Stage 3 Expansion is located approximately 100 m to the north. Tronox Mining is currently negotiating a formal Amenity and Compensation Agreement with the occupants of this property. The Stage 3 mining area is located on this property.

One additional property has been identified by the noise model as potentially impacted by noise emissions from the Wonnerup North Stage 3 Expansion. Tronox is currently negotiating an Amenity Agreement with this landowner.

8.3 Nearby environmentally sensitive receptors and aspects

A search of the DWER Clearing Permit System map viewer website shows that the Proposal is not located within a declared ESA (Figure 17). The nearest declared ESA is a conservation category wetland located approximately 1.5 km to the west. There are no surface water assets on the Stage 3 expansion area. There are no natural wetlands, creeks, streams or soaks and no agricultural drains or dams. The Abba River is an ephemeral watercourse that is located 700 m south of the proposed Stage 3.

A flora and vegetation survey was undertaken in September 2021 by Onshore Environmental (2021) which noted there was no native vegetation (as defined for the purposes of the EP Act) recognised from within the Project boundary and that the entire site was classed as cleared/disturbed.

The road reserve of Ruabon Road is locally recognised for supporting important remnant vegetation, PEC, TEC and rare flora. The mine footprint has been designed with a setback from the road reserve of between 100 m and 150 m. The setback and revegetation program are designed to protect remnant vegetation in the road reserve. Table 21 outlines environmental receptors and their distance from the proposed boundary.

Table 21 Environmental receptors and distance from boundary

Environmental receptors	Distance (km) from Premises	Environmental value
Watercourse, drain (surface or subsurface), river		
Abba river	0.5 km south	Habitat for waterbirds and aquatic species
Vasse – Wonnerup Wetland System	3.5 km west	Significant habitat for migratory birds
Managed Lands and Threatened Flora and Fauna		
Ruabon Townsite Nature Reserve (Reserve 32205)	2 km east	Groundwater Dependent Ecosystem. Supports important remnant vegetation, PECs, TECs and rare flora.
Tuart Forest National Park (Reserve 40250)	2 km west	Significant habitat for conservation fauna. Supports important PECs, TECs and rare flora.
Conservation significant flora: – 25 Threatened flora species – 27 Priority flora species	Within 10 km buffer	Several Threatened flora species and Priority flora species are present within 10 km of the site. None of these species were identified within the site Onshore Environmental (2021).
Conservation significant fauna: – 19 Threatened terrestrial vertebrate fauna	Recorded or likely to occur within 5 km of the Proposal area	Several threatened fauna species known to occur within 5 km of the site. None of which are reliant on the site for habitat. There is very limited to no habitat value for any other fauna species of conservation significance.

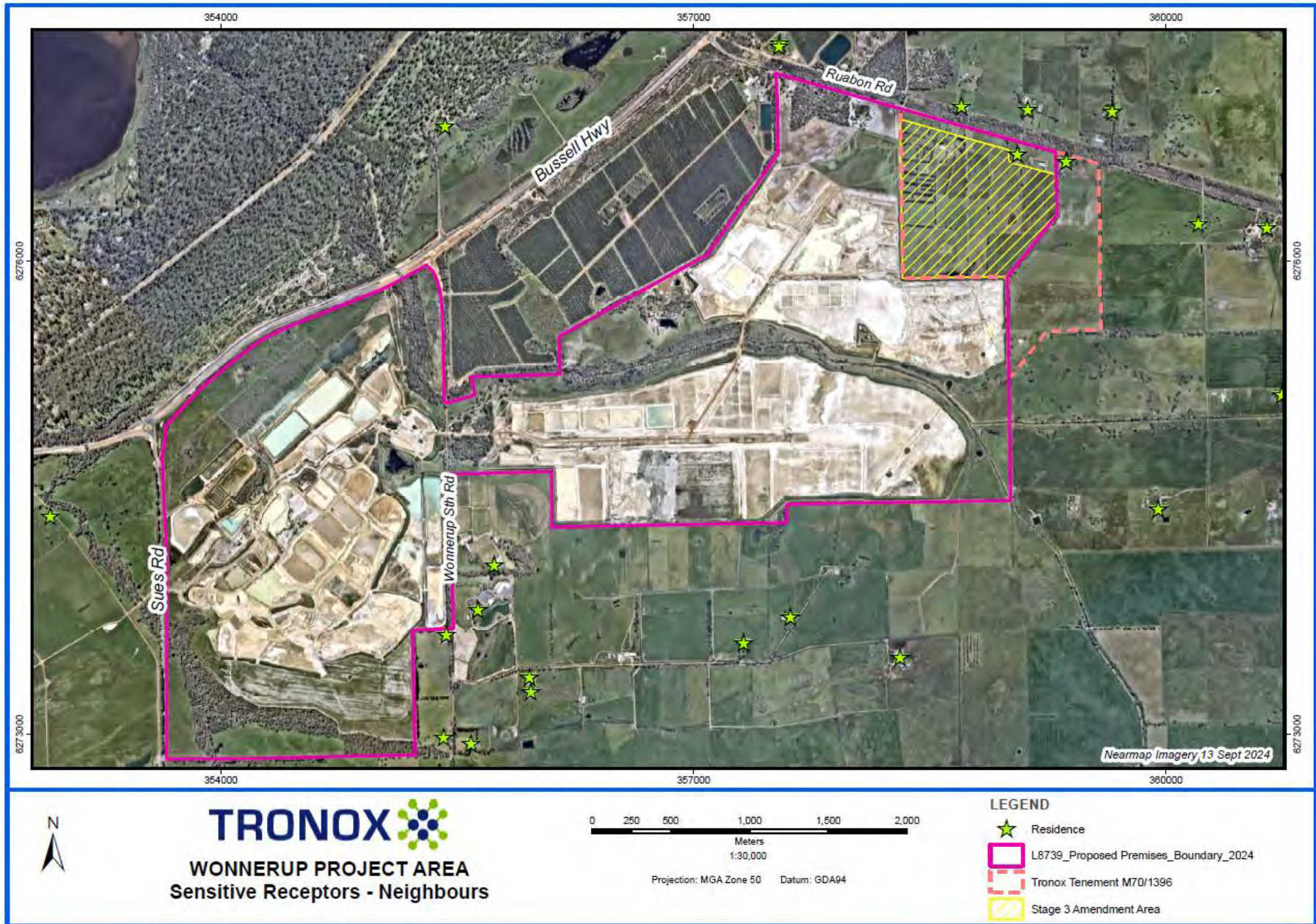


Figure 15 Sensitive Receptors – Nearby Residents

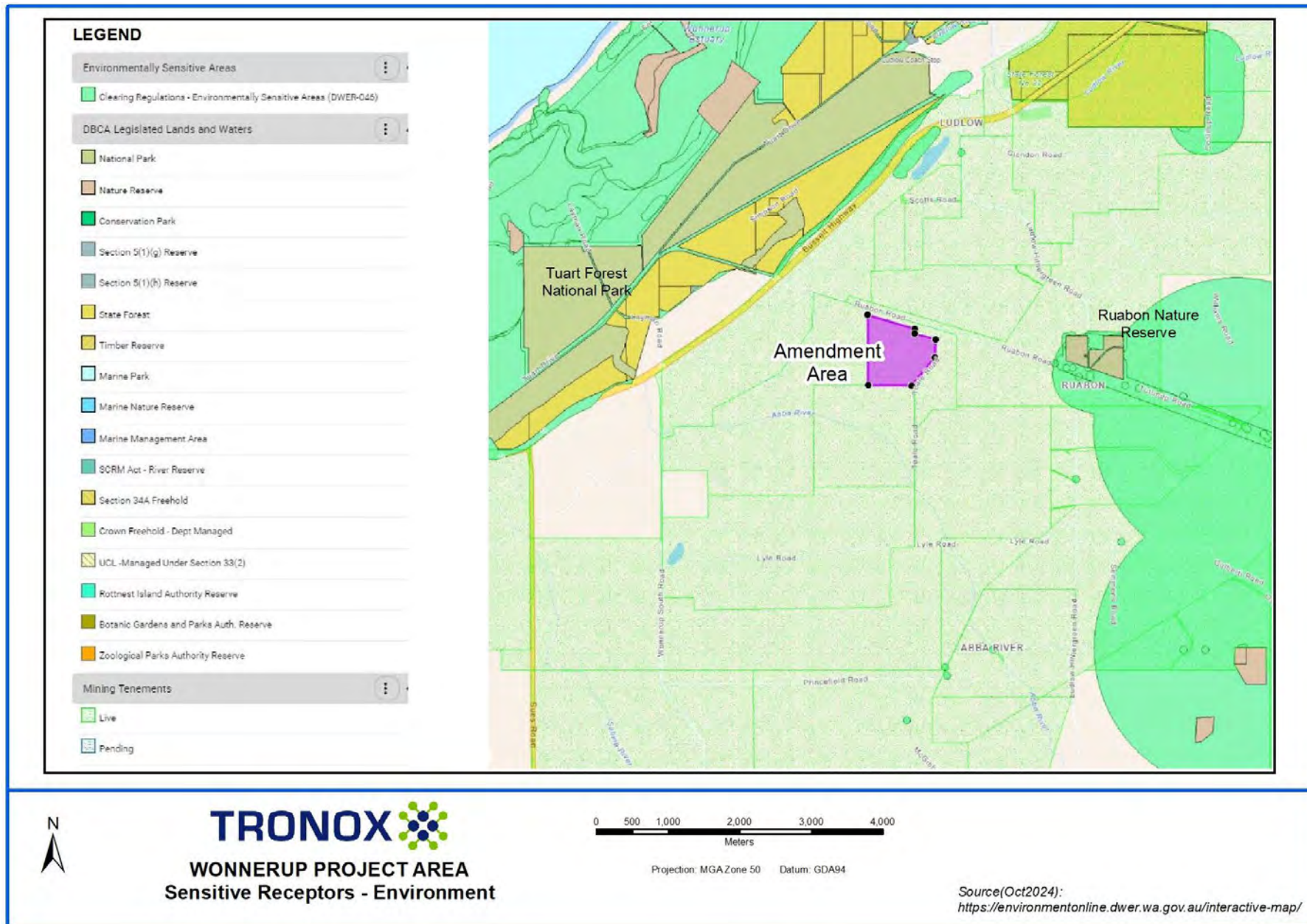
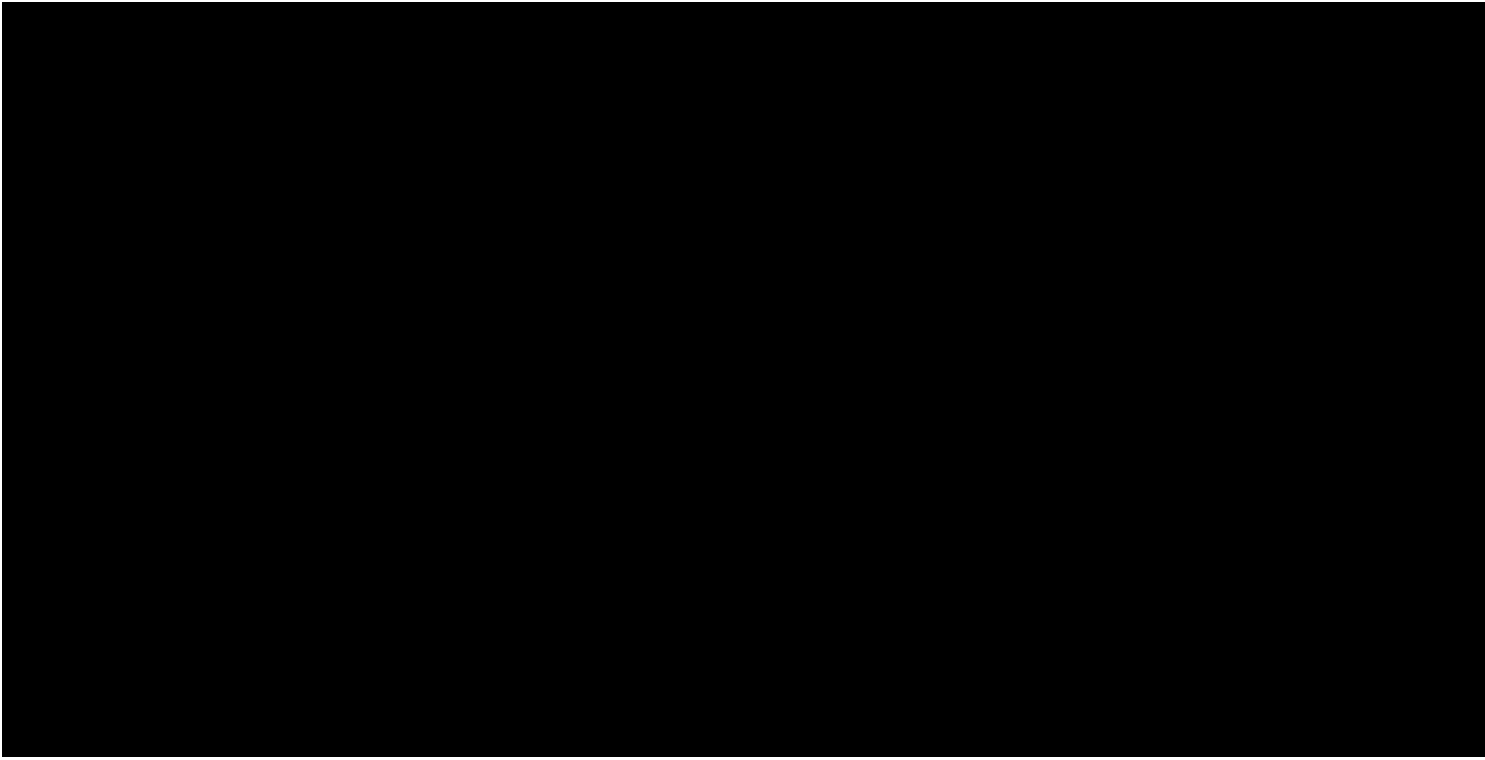


Figure 16 Sensitive Receptors – Environment



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Appendices

Appendix A Proof of occupier status, ASIC company extract, Authorisation to act as a representative of the occupier

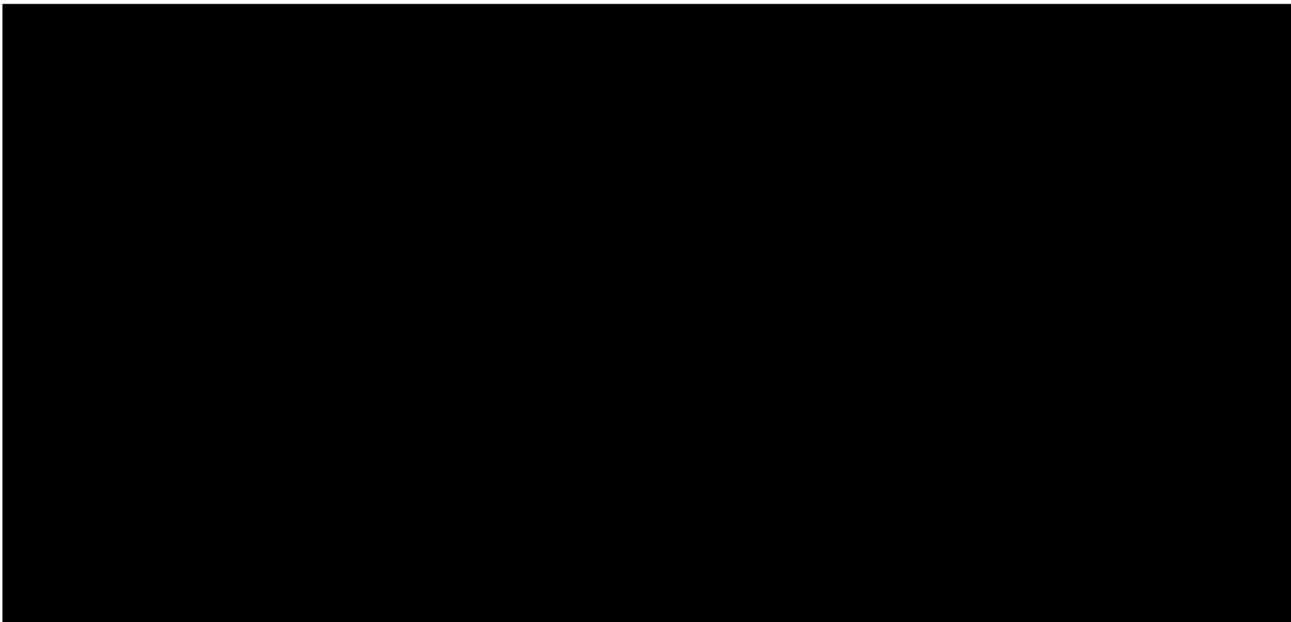
Department of Water and Environmental Regulation
Industry Regulation Division
Locked Bag 10
Joondalup DC WA 6919

To Whom it May Concern

Letter of Authority in regard to Works Approval and Licence Applications and Applications for Clearing Permit

On behalf of **Tronox Mining Australia Ltd** I authorise the following Tronox staff to sign the listed applications pursuant to Part V, *Environmental Protection Act 1986* and the *Environmental Protection Regulations 1987*.

- *Application form: Works Approval/Licence/Renewal/Amendment/Registration*
- *Application for new permit or referral to clear native vegetation*



Date: 22 / 11 / 2022

Title	Letter to Delegate Signing Authority for Part V Applications...
File name	Part V Tronox SOPs signing authority.pdf
Document ID	87a1ce136a3da45c7560cf2d1e776b96ff2d3f59
Audit trail date format	DD / MM / YYYY
Status	● Signed

Document History



Appendix B

Noise

**EMP, Noise Assessment, Waste
Management Plan**

Appendix C *Air*

Quality EMP

Appendix D

**Application Form Works Approval /
Licence Renewal / Amendment
Registration)**



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