Atlas-Campaspe Mineral Sands Mine

Annual Environmental Management Report 2020

Burton's Snake Lizard (*Lialis burtonis*)

Report by Chaka Chirozva

Tronox Mining Australia Ltd

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Table 1 - Annual Review Title block

Name of operation	Atlas-Campaspe Minerals Sands Mine
Name of operator	Tronox Mining Australia Limited
Development consent / project approval	Development Consent SSD_5012
Name of holder of development consent / project approval	Tronox Mining Australia Limited
EPBC approval	2012/6447
Name of holder of EPBC approval	Tronox Mining Australia Limited
Mining lease(s)	ML 1767
Name of holder of mining lease	Tronox Mining Australia Limited
Water licence	WAL27918
Name of holder of water licence	Tronox Mining Australia Limited
MOP/RMP start date	February 2018
MOP/RMP end date	31 January 2022
Annual Review start date	1 January 2020
Annual Review end date	31 December 2020

I, **Chaka Chirozva**, certify that this audit report is a true and accurate record of the compliance status of Atlas-Campaspe Mineral Sand Mine for the period **1st January 2020 to 31st December 2020** and that I am authorised to make this statement on behalf of Tronox Mining Australia Limited.

Note.
a) The Annual Review is an 'environmental audit' for the purposes of section 122B(2) of the Environmental Planning and Assessment Act 1979. Section 122E provides that a person must not include false or misleading information (or provide information for inclusion in) an audit report produced to the Minister in connection with an environmental audit if the person knows that the information is false or misleading in a material respect. The maximum penalty is, in the case of a corporation, $1 million and for an individual, $250,000.
b) The Crimes Act 1900 contains other offences relating to false and misleading information: section 192G (Intention to defraud by false or misleading statement—maximum penalty 5 years imprisonment); sections 307A, 307B and 307C (False or misleading applications/information/documents—maximum penalty 2 years imprisonment or $22,000, or both).

Name of authorised reporting officer	Chaka Chirozva
Title of authorised reporting officer	Environmental Advisor
Signature of authorised reporting officer	
Date	26 March 2020

1 STATEMENT OF COMPLIANCE

1.1 Statement of Compliance

Table 2 – Statement of compliance

Were all conditions of the relevant approval(s) complied with?	
EPBC (2012/6447)	Yes
Development Consent (SSD_5012)	Yes
Mining Lease (ML 1767)	Yes
Environment Protection Licence (21007)	Yes
Mining Operation Plan (2018-2022)	Yes

1.2 Non-compliances

There were no incidences of non-compliance during this reporting period.

2 INTRODUCTION

2.1 Project background

The Atlas-Campaspe Mineral Sands Project is being developed by Tronox Mining Australia Limited (Tronox).

The Project includes the development of a mineral sands mining operation (herein referred to as the Atlas-Campaspe Mine), together with the construction and operation of a rail loadout facility located near the township of Ivanhoe (herein referred to as the Ivanhoe Rail Facility).

The Atlas-Campaspe Mine is located approximately 80 kilometres (km) north of Balranald, New South Wales (NSW) and 270 km south-east of Broken Hill, NSW (Figure 1). The Ivanhoe Rail Facility is located approximately 135 km north-east of the Atlas-Campaspe Mine, and is approximately 4.5 km to the south-west of the township of Ivanhoe (Figure 1).

Product (mineral concentrates) generated as a result of operations at the Atlas-Campaspe Mine will be trucked to the Ivanhoe Rail Facility for transfer to train wagons, which will then be railed to the existing Broken Hill Mineral Separation Plant (the MSP) (Figure 1).

The Project will integrate with currently existing/approved Tronox Mining operations in western NSW, including (Figure 1):

- **the MSP** – located in Broken Hill approximately 270 km north-west of the Atlas-Campaspe Mine;
- **Snapper Mine** – located approximately 105 km to the west of the Atlas-Campaspe Mine;
- **Ginkgo Mine** – located approximately 100 km to the west of the Atlas-Campaspe Mine; and
- **Hatfield Gravel Pit Project** – located approximately 2 km south-east of the Atlas-Campaspe Mine.

The Project general arrangements and activities associated with the two main development components of the Atlas-Campaspe Mine, as well as the Hatfield Gravel Pit Project, are described in the following sub-sections.

Atlas-Campaspe Mine

The main activities associated with the development of the Atlas-Campaspe Mine (Figure 2) will include:

- ongoing exploration activities;
- sequential development and operation of two separate mineral sands ore extraction areas within the Mining Leases;
- use of conventional mobile equipment to mine and place mineral sands ore into dry mining units (DMUs) at a maximum ore production rate of up to 7.2 million tonnes per annum (Mtpa);
- mineral processing infrastructure including the primary gravity concentration unit, salt washing facility and a wet high intensity magnetic separation (WHIMS) circuit;
- mineral concentrate stockpiles and materials handling infrastructure (e.g. towers and stackers);
- progressive backfilling of mine voids with overburden behind the advancing ore extraction areas or in overburden emplacements adjacent to the mine path;
- placement of sand residues and coarse rejects (and MSP process wastes) following mineral processing to either the active mining area (behind the advancing ore extraction area) or in sand residue dams;
- development of a groundwater borefield at the Atlas deposit and localised dewatering systems (bores, spearfields and trenches) at both the Atlas and Campaspe deposits, including associated pump and pipeline systems;
- reverse osmosis (RO) plant to supply the salt washing facility and potable water;
- progressive development of water storage dams, sediment basins, pumps, pipelines and other water management equipment and structures;
- administration/office buildings, car parking facilities, workshop and stores;
- on-site accommodation camp;
- sewage treatment plant;
- diesel powered generators, electricity distribution station and associated internal electricity transmission lines (ETLs);
- site access road, internal access roads and haul roads;
- roadworks along the mineral concentrate transport route to the Ivanhoe Rail Facility;
- transport of mineral concentrates along the mineral concentrate transport route to the Ivanhoe Rail Facility;
- road transport of MSP process waste in sealed storage containers from the Ivanhoe Rail Facility to the Atlas-Campaspe Mine for subsequent unloading, stockpiling and placement behind the advancing ore extraction areas;
- development of soil stockpiles and laydown areas;
- monitoring and rehabilitation; and
- other associated minor infrastructure, plant, equipment and activities.

Ivanhoe Rail Facility

The main activities associated with the construction and operation of the Ivanhoe Rail Facility located approximately 4.5 km south-west of Ivanhoe (Figure 3), will include:

- development of a rail siding for:

- loading of train wagons with mineral concentrate for rail transport to the MSP via the Orange – Broken Hill railway; and
- unloading of MSP process waste in sealed storage containers (transported via the Orange – Broken Hill railway) from train wagons;

- site access road and internal haul roads/pavements;
- hardstand areas for mineral concentrate and MSP process waste unloading, stockpiling/sealed container storage and loading;
- a retention basin, drains, pumps, pipelines and other water management equipment and structures;
- site office and car parking facilities;
- extension to existing 11 kilovolt (kV) powerline;
- monitoring, landscaping and rehabilitation; and
- other associated minor infrastructure, plant, equipment and activities.
- A groundwater production bore

Hatfield Gravel Pit Project

The Hatfield Gravel Pit Project will involve the development, operation and rehabilitation of three gravel pits along the mineral concentrate transport route for the purposes of internal mine and public road upgrades and maintenance.

2.2 Annual Environmental Management Report

This Annual Environmental Management Report (AEMR) refers to the Environment and Community performance of the Tronox Mining Australia Limited Atlas-Campaspe mineral sands mining operations. This Report has been prepared in accordance with the *Annual Review Guideline published by the Department of Planning and Environment NSW, dated October 2015.* This AEMR describes environment and community performance for the 2020 reporting period, and is intended to satisfy the requirements of:

- Atlas-Campaspe Mineral Sands Project Development Consent (SSD_5012) Conditions issued by the Department of Planning under Part IV of the *Environmental Planning & Assessment Act*.
- Atlas-Campaspe Mineral Sands Project Approval EPBC 2012/6447 issued by the Commonwealth Department of Environment and Energy under Section 143 of the *Environment Protection and Biodiversity Conservation Act 1999.*
- Mining Leases (ML1767) conditions set by the Department of Industry NSW under the *Mining Act 1992*.
- Environment Protection Licence (21007) Condition R4 under Section 55 of Protection of the Environment Operations Act 1997.

This report is distributed to:

- NSW Mining, Exploration and Geoscience (MEG);
- NSW Department of Planning, Industry & Environment (DPIE);
- Commonwealth Department of Agriculture, Water and Environment;
- Heritage NSW;
- NSW Environment Protection Authority (EPA);
- NSW Land Registry Services (LRS);
- NSW Department of Planning, Industry and Environment Water (DPIE Water);

- Balranald Shire Council (BSC);
- Central Darling Shire Council (CDSC);
- Local Leaseholders

2.3 Key personnel contact information

Table 3 – Key personnel contacts

Personnel	Position	Contact No.
Thomas Meulemans	Project Manager	0488 901 618
Debra Stokes	SHEQ Manager	0427 111 205
Brendan Isaacs	Environmental Lead	0419 045 911
Chaka Chirozva	Environmental Advisor	0437 146 508

Figure 1 – Project general location

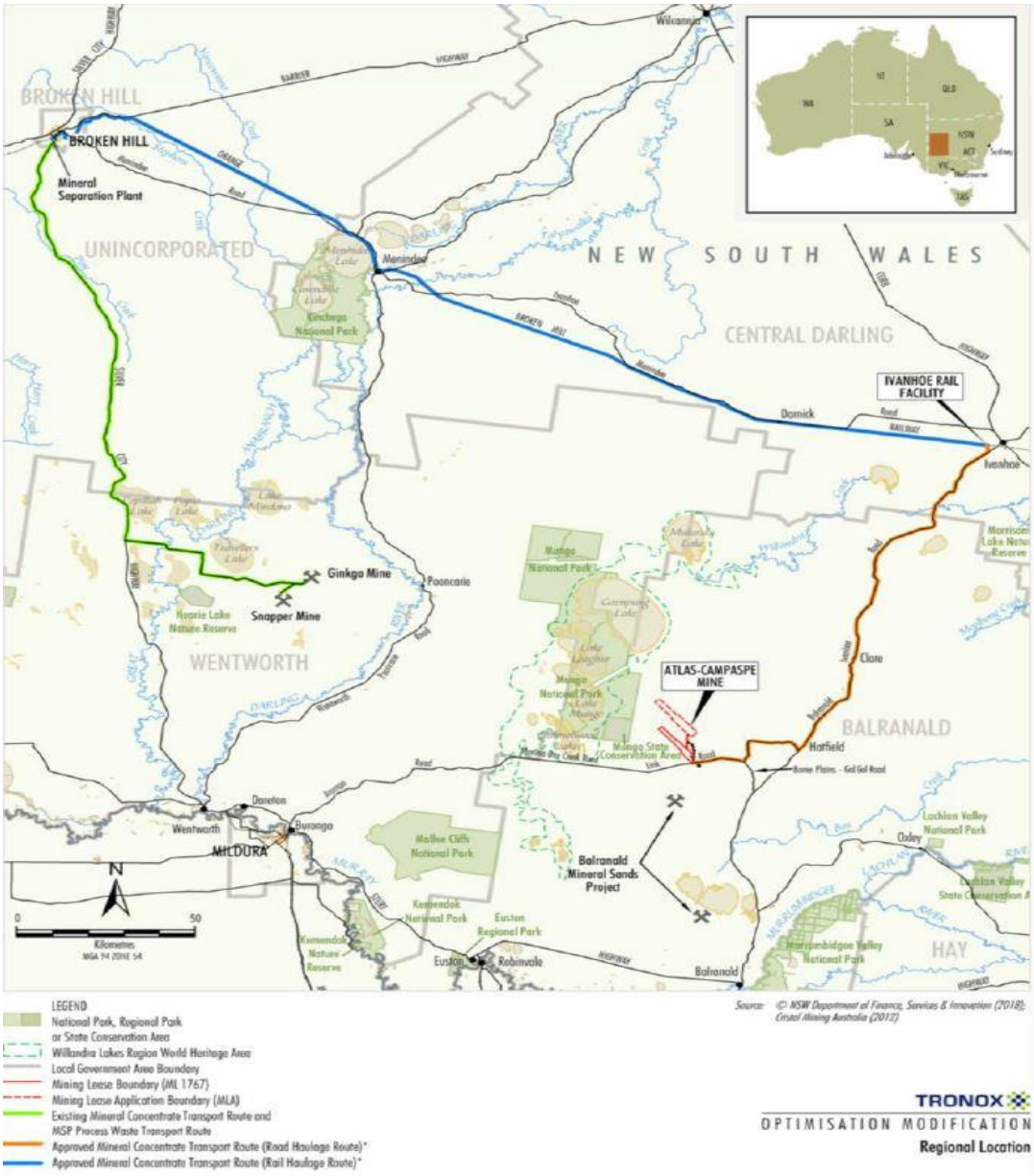


Figure 2 – Atlas-Campaspe general arrangement

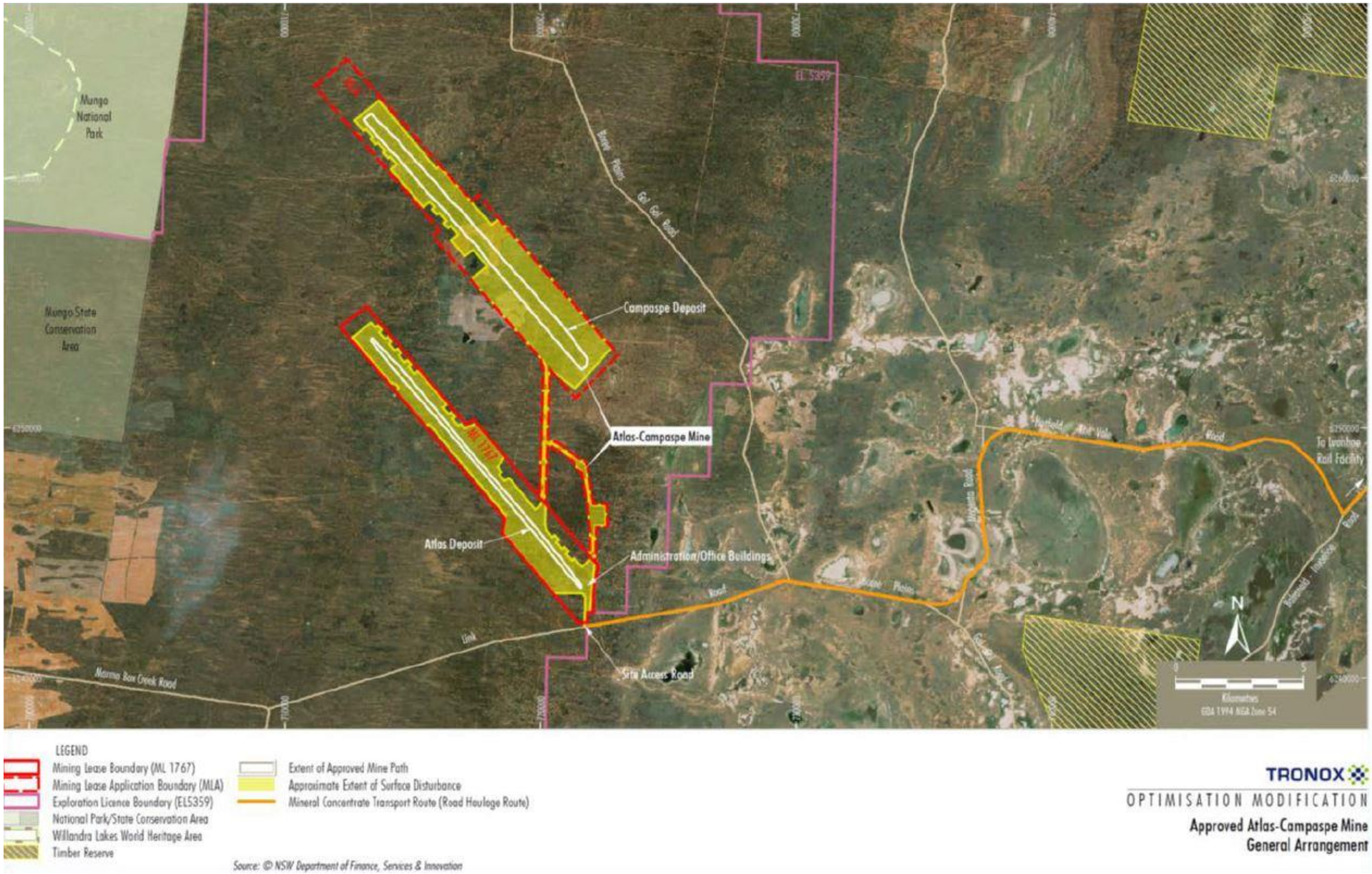
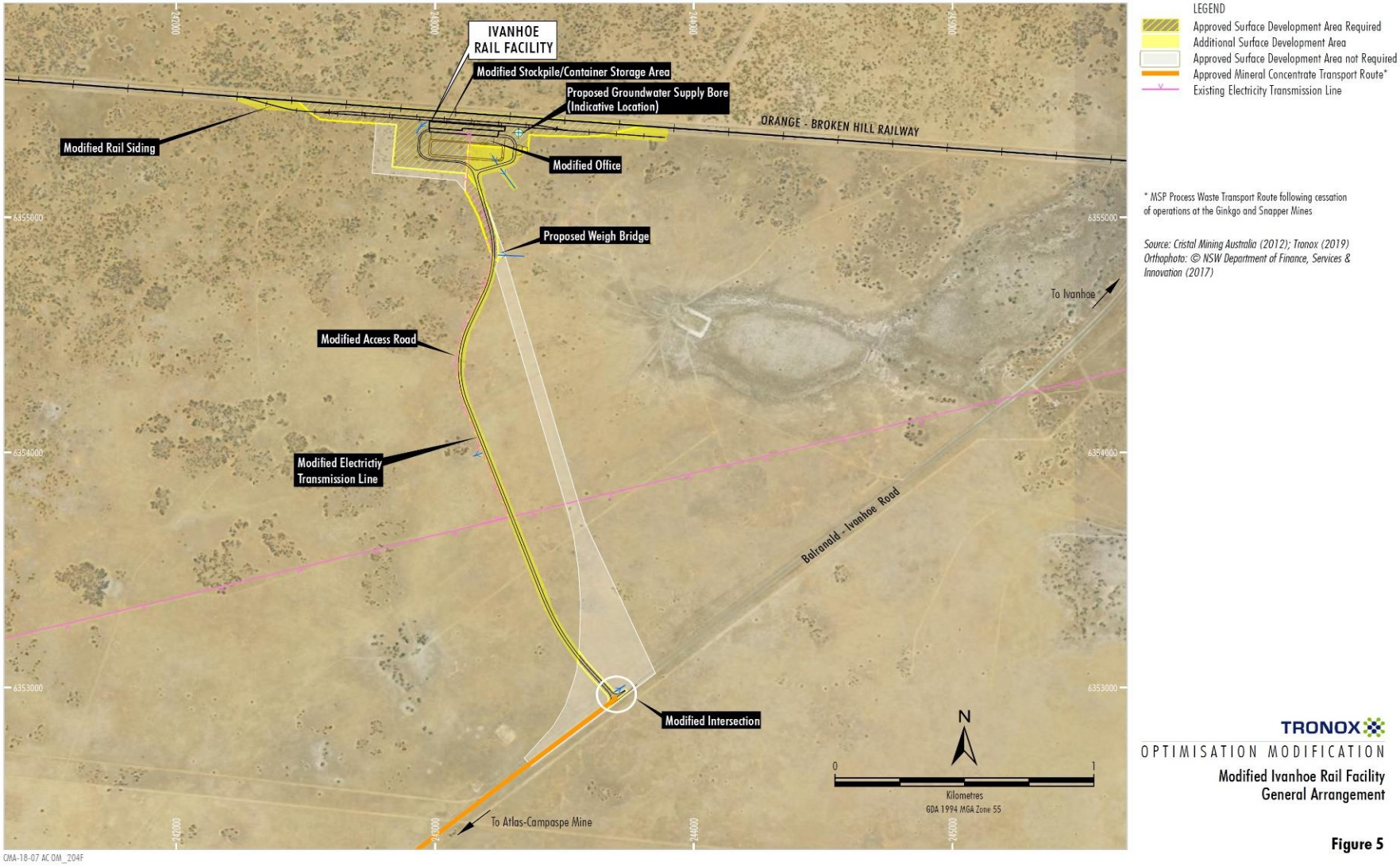


Figure 3 – Ivanhoe rail facility general arrangement



3 APPROVALS

3.1 Key statutory approvals

Table 4 – Key statutory approvals

Statutory Approval	Granted	Expires	Approval Authority
EPBC (2012/6447)	4 September 2014	31 August 2064	Department of Agriculture, Water and Environment
Development Consent (SSD_5012)	6 June 2014	30 June 2034*	NSW Department of Industry, Planning and Environment
Mining Lease (ML 1767)	2 February 2018	30 June 2034	NSW Mining, Exploration and Geoscience
Mining Operation Plan	27 February 2018	31 January 2022	NSW DPIE Resources Regulator
Environment Protection Licence (21007)	4 December 2019	Renewed Annually	NSW Environment Protection Authority

* *Note: Under this consent, the Applicant is required to rehabilitate the site and carry out additional undertakings to the satisfaction of the Secretary and NSW Trade & Investment. Consequently, this consent will continue to apply in all other respects other than the right to conduct mining operations until the rehabilitation of the site and these undertakings have been carried out satisfactorily.*

3.2 Ancillary statutory approvals

Table 5 – Ancillary statutory approvals

Statutory Approval	Granted	Expires	Approval Authority
Development Application (DA 10/2018)	21 November 2017	21 November 2022	Balranald Shire Council
Crown Lands Licence (LI 567639)	23 May 2017	Market Review 5 years	DPIE Crown Lands
Crown Land Management Section 5.3 (LN 597575)	4 September 2018	Market Review 5 years	DPIE Crown Lands
Crown Land Management Section 5.3 (LN 597527)	4 September 2018	Market Review 5 years	DPIE Crown Lands
Crown Land Management Section 5.3 (LN 597529)	4 September 2018	Market Review 5 years	DPIE Crown Lands
Water Access Licence WAL27918	4 February 2013	Continuing	Water NSW
Water Access Licence WAL42986		Continuing	Water NSW

Works Approval 60WA582837	10 January 2018	15 January 2025	NSW Natural Resources Access Regulator
Works Approval 60WA583442	12 October 2018	11 October 2028	NSW Natural Resources Access Regulator
Works Approval 60WA583443	12 October 2018	11 October 2028	NSW Natural Resources Access Regulator
Works Approval 70MW604505	March 2021		NSW Natural Resources Access Regulator

3.3 Changes to statutory approvals

Table 6 – Changes to statutory approvals

Statutory Approval	Date of change	Reason for change
EPBC (2012/6447)	3 May 2016	Changes to Condition 5(d) and 5(e) for Biodiversity Offset exclusion fence and monitoring requirements.
Environment Protection Licence (21007)	23 February 2018	Licence variation to include extraction of gravel from Hatfield gravel pits A, B & C.
EPBC (2012/6447)	1 August 2019	Alignment of reporting period with SSD_5012. Changes to timing for nest box research project.
Development Consent SSD_5012	20 December 2019	Modification 1 for Project optimisation
Environment Protection Licence (21007)	4 December 2019	Suspension of Environmental Monitoring requirements
Department of Planning, Industry and Environment	17 August 2020	Suspension of flora and fauna monitoring (including pest monitoring) until February 2021.
Environment Protection Licence (21007)	10 September 2020	Reinstatement of air quality and ground water monitoring

4 OPERATIONS

4.1 Exploration

Tronox Mining owns and manages Exploration Licence 5359 which is located approximately 90 km north-east of the Euston township in New South Wales. A series of previous exploration activities have identified two significant mineral sand deposits (the Atlas deposit and the Campaspe deposit) located within the tenement.

An analysis of the drilling and the existing mineralogical data has shown that further exploration activities are required to further define mineralogical variance across the Atlas and Campaspe deposits. This will allow for the progression of the project towards mining. The drilling programs will form the basis for resource modelling and geological interpretation moving forward and will assist in

classifying the orebodies under the JORC code. In 2019 70 drill holes for 2,048m were drilled at the Atlas deposit, whilst 691 holes for 35,000 were drilled at the Campaspe deposit. Drilling programs on both deposits continued in 2020. A total of 203 holes for 7,992m was drilled at Atlas. The drilling was designed to close the present 200m spaced drill lines down to 100m for the first 12 months of mining. The drilling was also designed to close the edges of the deposit down to 10m spacings to allow for more accurate mine planning definition for optimising overburden removal at the orebody stages.

A total of 721 holes for 34,854m was drilled at Campaspe. The Campaspe deposit was drilled out to a maximum drill spacing of 400m x 20m centres during 2019. A review of the variography in 2019 indicated that the Campaspe deposit should be infilled to approximately 180m in order to resolve grade variance, although it was noted that the wider spaced drilling over most of the deposit made this hard to determine accurately. The aim of the 2020 drilling was to provide infill drilling along the entire strike length to 200m x 20m spacing.

4.2 Land preparation

Land preparation includes initial works required prior to mining overburden and ore. The works include pre-clearance surveys for fauna and flora as required by the Biodiversity Management Plan and Vegetation Clearance Protocol. Broad scale vegetation clearing was conducted using bulldozers and a clearing chain. Topsoil and subsoil are removed and stockpiled for use in rehabilitation by means of tractor and laser bucket.

4.2.1 Topsoil and subsoil stripping

Topsoil stripping was conducted in 2020 on the internal access road, start-up pit and HMC processing area. Topsoil and subsoil were stockpiled separately adjacent to the access road and other infrastructure areas where it will be used in future rehabilitation of these areas once decommissioned.

Case Steiger 600 tractor and laser bucket

4.3 Construction

In June 2019 Tronox suspended all construction works at the Atlas site to undertake a business review of the project after the acquisition of Cristal Mining in April 2019. All portable buildings at the temporary accommodation camp were removed from the site. All mobile plant equipment and workshops have been demobilised from site. All gravel pit operations have ceased until the recommencement of construction.

Construction works recommenced in last quarter of 2020 following Tronox executive board approval.

Activities undertaken in in the first few months of re-mobilisation at the site the included:

a) Excavation and construction of the Haul Road (site access road) both within and outside of the Mining Lease from the Hatfield Penarie Road to the Atlas mine and supporting infrastructure (i.e., office buildings and camp).
b) Construction of water catchment and/or tailings dams to specification.
c) Establishment of a temporary site camp and construction of the administration and office buildings and accommodation camp (and ancillary infrastructure, i.e., supply of services and sewage treatment plant).

4.4 Mining

No mining activities occurred during the reporting period; the commencement of mining is scheduled for the second quarter of 2022.

4.4.1 Hours of operation

The Atlas-Campaspe Development Consent allows the operation of the site 24 hours a day, 7 days per week.

4.4.2 Production statistics

Production statistics detailing topsoil stripping, overburden stripping, ore mining, tailings rejects, saleable product, gravel pit extraction and estimates for the next AEMR period are provided in Table 7.

Table 7 – Production summary

Material	Approved limit	Previous reporting period (actual) (2019)	This reporting period (actual)	Next reporting period (forecast)
Topsoil/Subsoil (Kt)	No limit	277	745	0
Overburden (Mt)	No limit	0	0	0
Ore (Mt)	7.2Mt (extract) (SSD_5012) 0.5Mt (extract or process) (EPL 21007)	0	0	0
Saleable Product (HMC) (Kt)	665Kt (transport) (SSD_5012)	0	0	0
Sand rejects (Mt)	No limit	0	0	0
Gravel extraction	Pit A-100Kt, Pit C-140Kt per annum	224,665	34, 347	* 96 923

*Actual amount of gravel extracted in 2021; no more gravel will be further extracted.

4.5 Transportation

4.5.1 Management

A Transport Management Plan for the construction phase of the project has been developed and approved by the Department of Planning and Environment (DPIE).

The objective of the Transport Management Plan (TMP) is to address relevant State and Commonwealth approval conditions and facilitate the management of transport at the Project and surrounding road network.

The TMP has been prepared to manage transport for the construction phase of the Project. As per the letter from the DP&E (dated 27 July 2018), management of operational transport (e.g. mineral concentrate transport) will be included in a later revision of this TMP, prior to the commencement of mining operations at the Project.

The TMP also facilitates the management of transport for the Hatfield Gravel Pit Project.

4.5.2 Performance

The Atlas-Campaspe Development Consent allows for the transportation of 665,000 tonnes of mineral concentrate from the site in any calendar year.

No material has been transported from the Atlas mine, it is anticipated that transportation of HMC product will commence in the second quarter 2022.

A revised TMP will be submitted to DPIE for approval prior to the commencement of mining operations at the project.

4.5.3 Incidents

There were no incidents related to transportation during the reporting period.

4.6 Waste Management

4.6.1 General waste and recycling

Waste produced from the temporary accommodation camp was collected in wheelie bins and transported to the Balranald landfill for disposal. Aluminium cans and bottles were collected onsite and recycled. Long term waste management plans will be developed for the site in 2021. Waste minimisation and recycling will be promoted in the workplace and all contractors for mine site.

4.6.2 Effluent waste

Effluent discharge was managed in accordance with local council under Section 68 of Local Government Act 1993.

Effluent water was disposed of utilising large droplet sprinklers in nearby remnant bushland, sprinklers were periodically moved around to prevent surface ponding. Signage was erected at the irrigation site to warn camp personnel that reclaimed water was being used and it is not safe to drink and avoid contact.

5 ACTIONS REQUIRED FROM PREVIOUS ANNUAL REVIEW

There are no actions required from previous reporting period.

6 ENVIRONMENTAL PERFORMANCE

6.1 Air Quality

With respect to ambient air quality, particulate matter (i.e. dust) is managed as per the requirements of the Development Consent.

6.1.1 Management

Prior to the commencement of construction at the Atlas mine Tronox prepared an Air Quality Management Plan in accordance with Development Consent requirements for the construction and operation of the mine, transport and the Hatfield gravel pits. The Air Quality Management Plan prescribes the key sources of emissions, outlines air quality criteria, provides baseline data, dust prevention, monitoring, assessment, control, incident response and reporting procedure for the site.

The air quality monitoring locations are shown in Table 8 and Figure 4. Air quality criteria for particulate matter and dust deposition for short and long term impact assessments are shown in Table 9, Table 10 and Table 11. Data is collected according to AS 3580.10.1-1991 and analysed using a NATA accredited laboratory.

Table 8 – Air quality monitoring locations

Site ID	EPA Identification No.	Location	Parameter	Frequency
DC01	1	Iona	Dust Deposition	Monthly
DC02	2	Boree Plains Swamp		
DC03	3	Boree Plains Homestead		
DC04	4	Campaspe NW		
DC05	5	Atlas NW		
DC06	6	Wampo Windmill		
DC12	-	Iona		
DC13	-	Boree Plains Swamp		
DC14	-	Boree Plains Homestead		
PM01	25	Boree Plains Homestead	PM_{10} / TSP	Every 6 Days

Dust deposition gauge

Figure 4 – Air quality monitoring locations

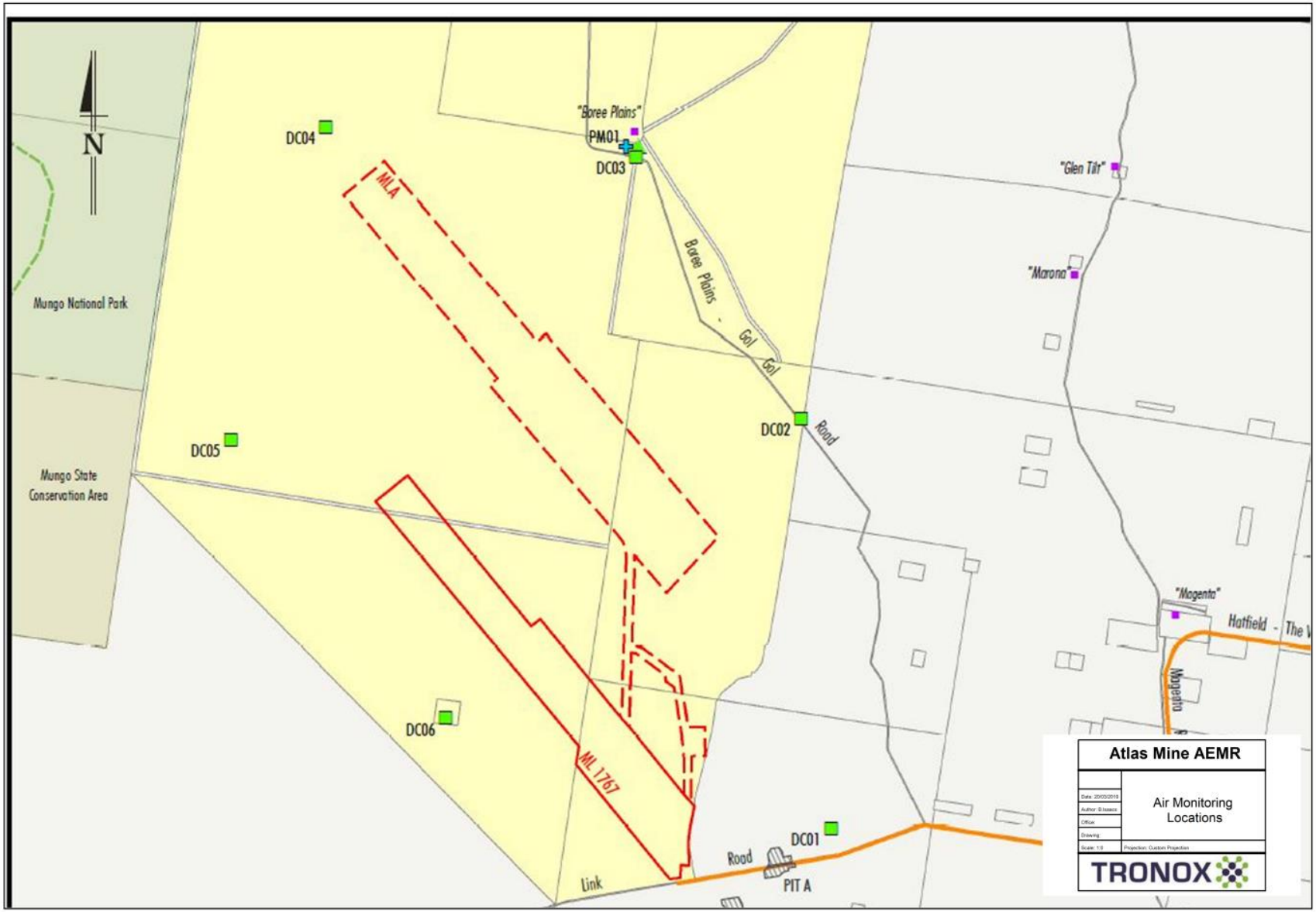


Table 9 – Long term impact assessment criteria for particulate matter

Pollutant	Averaging Period	Criterion
Total suspended particulate (TSP) matter	Annual	90 µg/m^3
Particulate matter < 10 µm (PM_{10})	Annual	30 µg/m^3

Table 10 – Short term impact assessment criteria for particulate matter

Pollutant	Averaging Period	Criterion
Particulate matter < 10 µm (PM_{10})	24-hour	50 µg/m^3

Table 11 – Long term impact assessment criteria for deposited dust

Pollutant	Averaging Period	Maximum increase in deposited dust level	Criterion
Deposited Dust	Annual	2 g/m^2/month	4 g/m^2/month

6.1.2 Performance

6.1.2.1 Dust deposition

The Department of Planning & Environment amenity criteria for dust deposition seeks to limit the maximum increase in the average annual rate of dust deposition from a new development to 2 g/m2/month and a total dust deposition of 4 g/m2/month. The nominal background dust deposition level (as per Atlas EIS 2013) was estimated to be less than 2 g/m^2/month.

There are other activities not associated with mining operations that cause elevated levels periodically; these include stock movement, crop harvesting as well as drought conditions with extremely dry and hot winds.

During the period from 1st January 2020 to 31st of December 2020, nine dust deposition samples were collected, with six NSW EPA required dust deposition sample results published on the Tronox Mining website.

Figure 5 shows monthly dust deposition for each location and monthly rainfall in the area. There were no dust exceedances recorded during this period.

6.1.2.2 PM10 and TSP

Particulate matter (PM_{10} and TSP) is monitored using a High Volume Air Sampler (HVAS) at air quality monitoring site PM01 (Figure 4). Samples are retrieved from PM01 on a six-day cycle as per AM-19 sampling method.

HVAS results are used to determine compliance with the 24-hour PM_{10} concentration criteria. The results are also averaged over each calendar year for compliance with annual PM_{10} criteria.

TSP concentrations are determined based on the correlation between TSP and PM_{10}. A conversion factor of 50% (i.e. PM_{10} accounts for 50% of the TSP concentration) is applied, as specified in Atlas-Campaspe Air Quality Management Plan.

The HVAS was commissioned in August 2018 at the Boree Plains homestead. Tronox requested a temporary change to environmental monitoring at the Atlas-Campaspe Mine due to border and quarantine restrictions associated with the COVID-19 public health orders. There was no PM10/TSP monitoring in 2020.

6.1.3 Incidents

There were no incidents related to air quality during the reporting period.

6.1.4 Improvements

Tronox requested temporary changes to air quality monitoring requirements at Atlas Campaspe Mine in July 2020, the suspension was approved by the Department of Planning, Industry and Environment in August 2020. The Air Quality Management Plan was updated to include the suspension of monitoring activities. The Management plan will be updated once environmental monitoring recommences. Tronox must notify DPIE once construction recommences or recommence monitoring if requested by the Department.

The NSW EPA approved an Environment Protection Licence variation on 10 September 2020, the variation reinstated all air quality monitoring requirements to the licence.

High Volume Air Sampler at Boree Plains

Figure 5 – Dust deposition individual sites

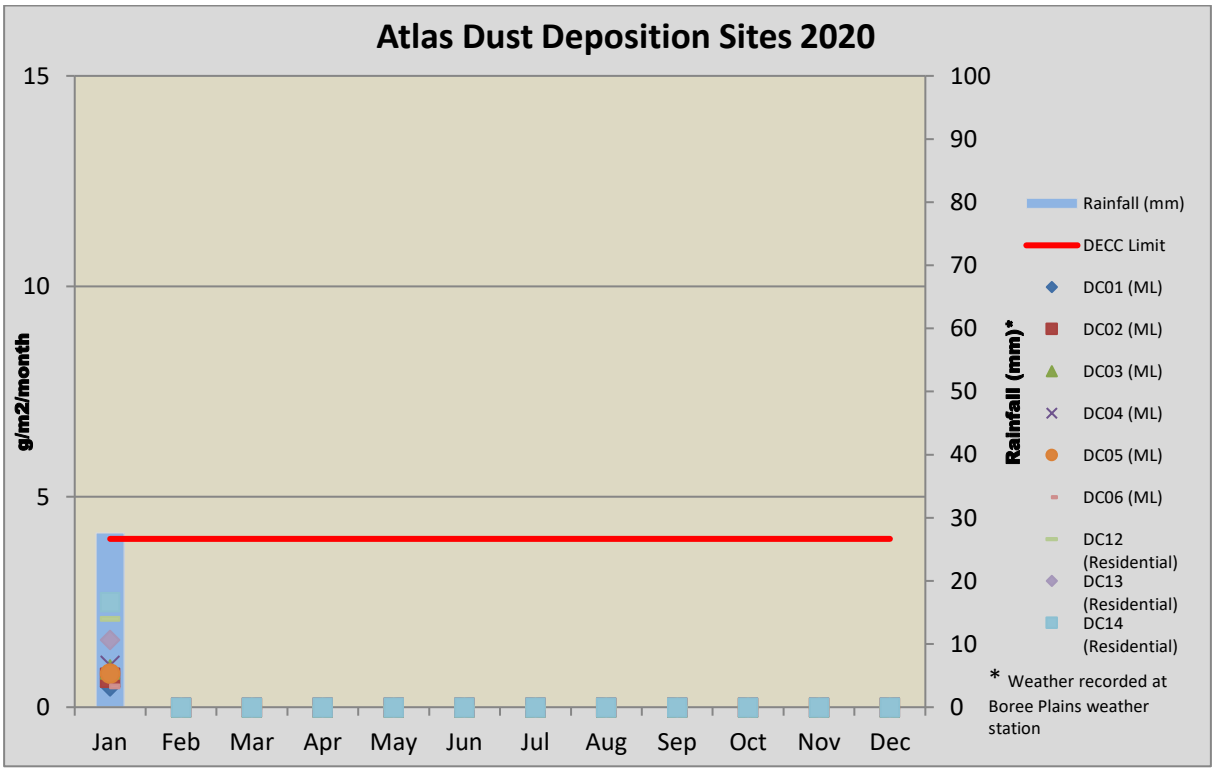


Figure 6 – Dust deposition average all sites

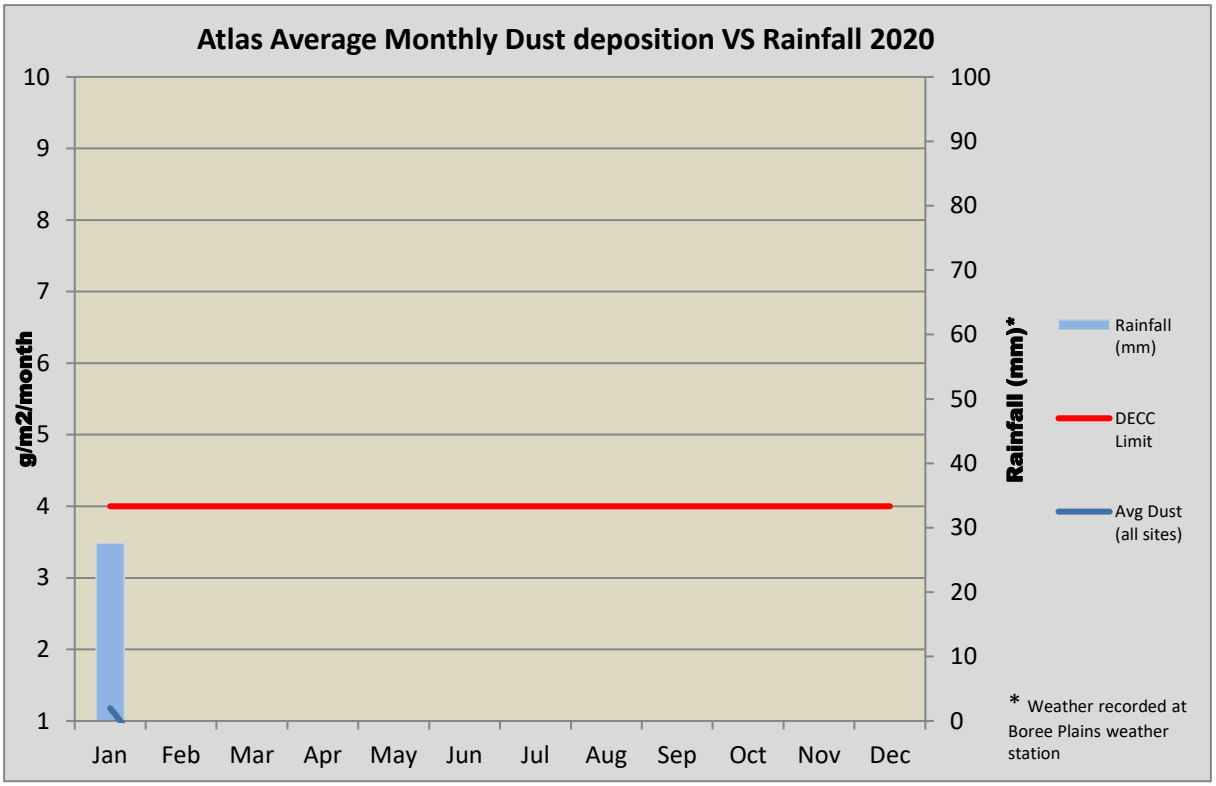
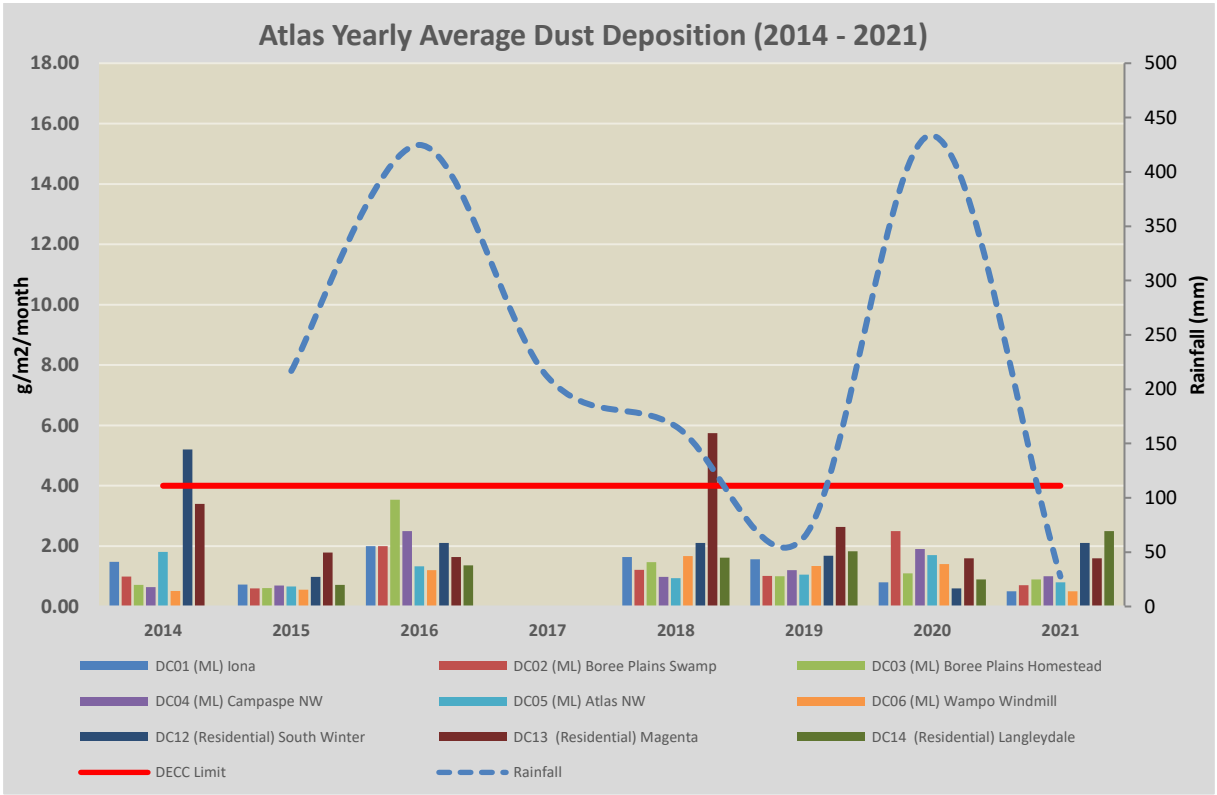


Figure 7 – Annual average dust deposition



6.2 Noise

6.2.1 Management

Prior to the commencement of construction at the Atlas mine Tronox prepared a Noise Management Plan in accordance with Development Consent requirements for the construction and operation of the mine, transport and the Hatfield gravel pits. The objective of the Noise Management Plan (NMP) is to address relevant State approval conditions and facilitate the management of noise at the Project and ensure compliance with noise limits.

The NMP prescribes the key noise generating activities relevant to the project, outlines the relevant noise criteria applicable to the Project, provides baseline data, outlines noise management measures, outlines the noise monitoring program, provides a contingency plan to manage unpredicted impacts and their consequences and outlines the reporting, auditing and reviewing requirements.

The noise monitoring program is shown in Table 12. Noise monitoring sites NAC1 and NAC2 are representative of the privately-owned receivers most likely to be affected by noise generated by the Atlas-Campaspe Mine and mineral concentrate transport route (Figure 8). Noise monitoring site NAC2 would also be used to assess noise generated by the Hatfield Gravel Pit Project against the criteria for the project.

Noise monitoring site MNP is representative of the Mungo National Park and Mungo State Conservation Area. The location of this site is shown on Figure 8. Noise monitoring is conducted to the east of the boundary between Tronox Mining-owned land and the Mungo National Parl and Mungo State Conservation Area. Noise monitoring sites NI1, NI2 and NI3 are representative of privately-owned receivers most likely to be affected by noise generated by the Ivanhoe Rail Facility (Figure 9). Noise criteria requirements in accordance with the Development Consent are provided in Table 13. The general noise limits for the Ivanhoe rail facility as specified in the Australian Rail Track Corporation's (ARTC) EPL 3142 are tabulated in Table 14.

Table 12 – Noise monitoring sites

Site Name		Site Type	Monitoring Time and Frequency
Atlas-Campaspe Mine	NAC1	Compliance Attended Site	Quarterly
	NAC2		
	MNP		
Ivanhoe Rail Facility	NI1		
	NI2		
	NI3		

Table 13 – Noise Criteria dB(A)

Location	Day LAeq(15 min)	Evening LAeq(15 min)	Night	
			LAeq(15 min)	LA1 (1 min)
All privately-owned land	35	35	35	45
Mungo National Park and Mungo State Conservation Area	50	50	50	-

Table 14 – ARTC's EPL Noise limits

Railway	Licence Holder	Descriptor	Rail Traffic Goal (dB[A])
Orange – Broken Hill Railway	ATRC EPL 3142	Daytime/evening $L_{Aeq(15hour)}$	65
		Night-time $L_{Aeq(9hour)}$	60
		Maximum Pass-by L_{Amax}	85

Figure 8 – Atlas-Campaspe noise monitoring locations

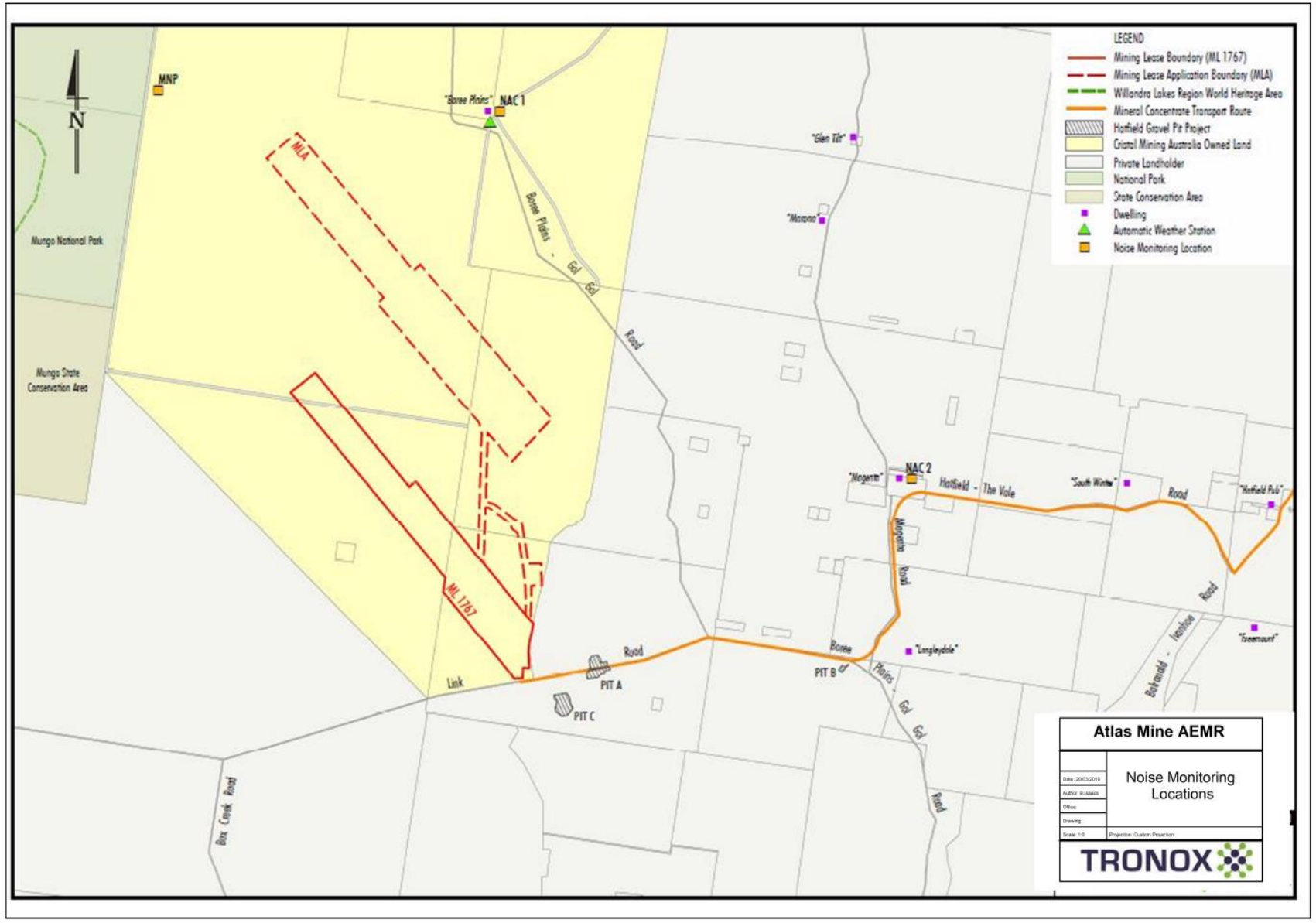
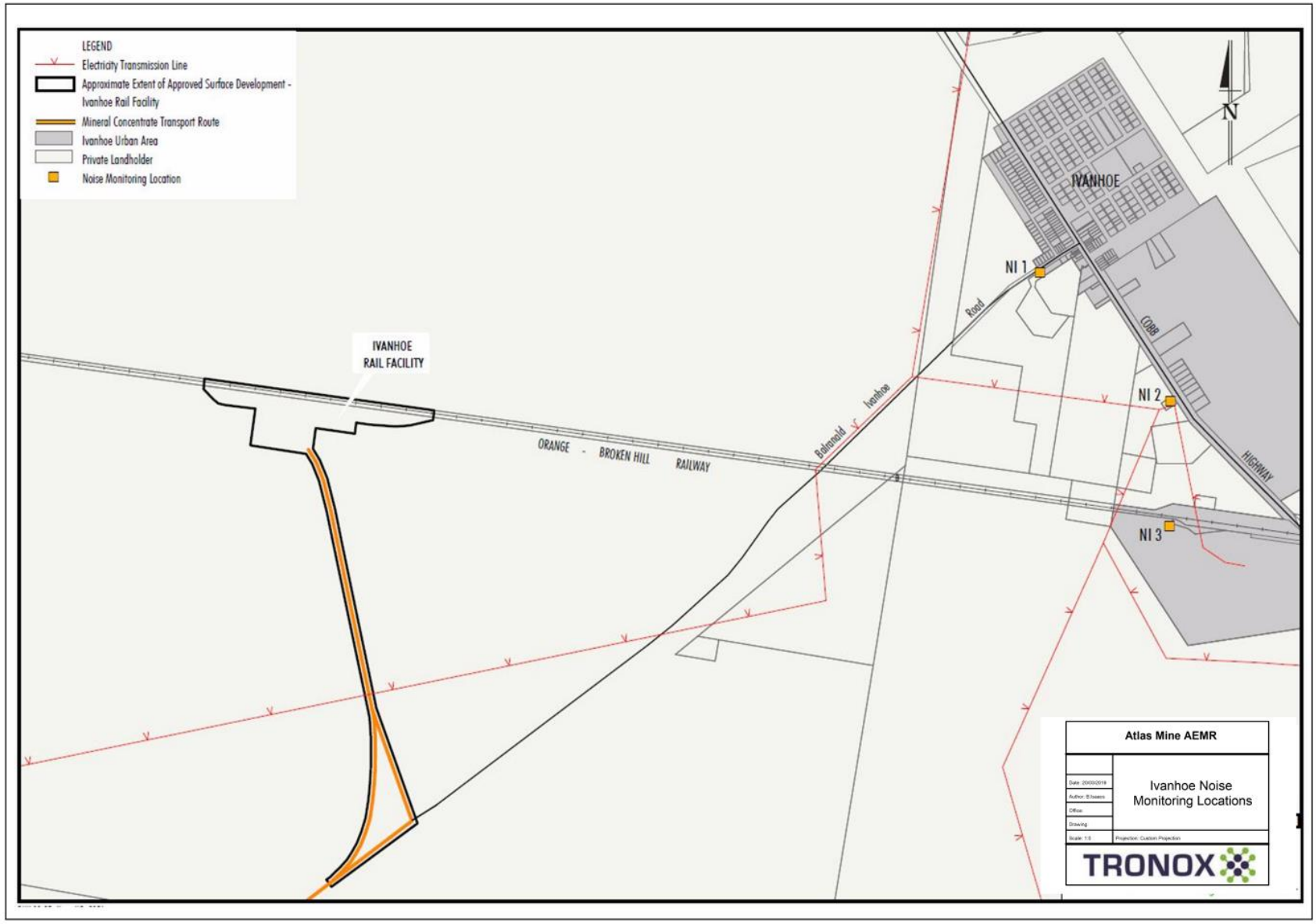


Figure 9 – Ivanhoe Noise monitoring locations



6.2.2 Performance

There was no noise monitoring in the current reporting period because monitoring requirements for this period were suspended,

Attended noise monitoring will resume in 2021 at the Boree Plains (NAC1), Magenta (NAC2) and the Mungo National Park Boundary (MNP) (NAC3) and Ivanhoe Rail Facility (NI1, NI2 and NI3).

6.2.3 Incidents

There were no incidents related to noise during the reporting period.

6.2.4 Improvements

Noise monitoring was suspended in November 2019, the suspension was approved by the Department of Planning Industry and Environment on 22 November 2019. The Noise Management Plan was updated to advise of the suspension of monitoring activities.
In July 2020 Tronox requested temporary changes to environmental monitoring requirements at its mining operations including Atlas-Campaspe due to the border and quarantine restrictions associated with public health orders making in difficult for specialised personnel to conduct monitoring. The Department was aware that construction had been suspended at Atlas-Campaspe since October 2019.

The Department approved request to suspend attended noise monitoring in August 2020. Tronox advised the Department that construction activities for the Atlas-Campaspe Project were scheduled to recommence on 1 September 2020. As a result of recommencing construction at the site all required environmental monitoring resumed as per the applicable Environmental Management Plans for the site. The Noise Management Plan, Air Quality Management Plan and Groundwater Management Plan will be updated accordingly and published on the Tronox Mining Website. Quarterly noise monitoring recommenced when construction recommenced at Atlas-Campaspe. Noise monitoring at the Ivanhoe rail facility will be undertaken at the commencement of construction at the site in 2021.

6.3 Groundwater

6.3.1 Management

Prior to the commencement of construction at the Atlas mine Tronox prepared a Groundwater Management Plan (GWMP) in accordance with Development Consent requirements for the construction and operation of the mine, transport and the Hatfield gravel pits.

The objective of the GWMP is to address relevant State approval conditions and facilitate the management of groundwater at the Project.The GWMP outlines the relevant groundwater criteria applicable to the Project, provides baseline data, outlines groundwater management, outlines the process for determining groundwater impact trigger values, outlines the groundwater monitoring program, provides a contingency plan to manage unpredicted impacts and their consequences and outlines the reporting, auditing and reviewing requirements. The monitoring sites include existing

landholder owned wells, NSW Office of Water monitoring bores, and project related monitoring bores. The trigger levels and locations of the groundwater monitoring sites are listed in Table 15 and Table 16 and locations are identified in Figure 10.

Table 15 – Groundwater trigger levels

Site	Water Level			Total Dissolved Solids (Salinity)		
	Baseline Data	Upper Water Level Trigger	Lower Water Level Trigger	Baseline Data		Water Quality Trigger
	Average Groundwater Level (mbgl)			Total Dissolved Solids Range (mg/L)	Average Total Dissolved Solids (mg/L)	
AM1	36.8	1 m increase to baseline water level	10 m decrease to baseline water level	14,600 – 22,730	19,940	Average Total Dissolved Solids ± 5000 mg/L
AM2	36.4			15,760 – 26,300	20,860	
AM3	38.6			12,280 – 19,000	16,855	
AM4	54.2		2 m decrease to baseline water level	23,400 – 25,710	24,570	
AM5	22.6			14,630 – 26,050	20,307	
AM6	51.07			6530 - 9860	8287	
AM7	53.67			1155 - 4050	2386	
AM8	50.32		10 m decrease to baseline water level	*TBD*	*TBD*	
AM9	*TBD*			*TBD*	*TBD*	
GW036674 (1)	13.1		2 m decrease to baseline water level	*TBD*	*TBD*	
GW036674 (2)	13.1			12,590 – 19,330	15,900	
GW036674 (3)	8.23			*TBD*	*TBD*	
GW036790 (1)	51.18			*TBD*	*TBD*	
GW036790 (2)	51.39			17,890 – 28,890	*23,488*	
GW036790 (3)	43.15			*TBD*	*TBD*	
GW036875 (1)	13.1			*TBD*	*TBD*	
GW036875 (2)	13.95			*TBD*	*TBD*	
GW036875 (3)	14.25			13,360 – 23,520	19,310	
GW063606	34.84			*N/A*	*N/A*	*N/A* (water level monitoring only)

N/A = not applicable.

TBD = to be determined.

mbgl = metres below ground level.

Groundwater monitoring bores AM8 and AM9 will be constructed 1 year prior to the commencement of construction activities at the Campaspe Deposit.

Table 16 shows the groundwater monitoring program and the groundwater monitoring bore locations are shown in Figure 10.

Table 16- Groundwater monitoring program

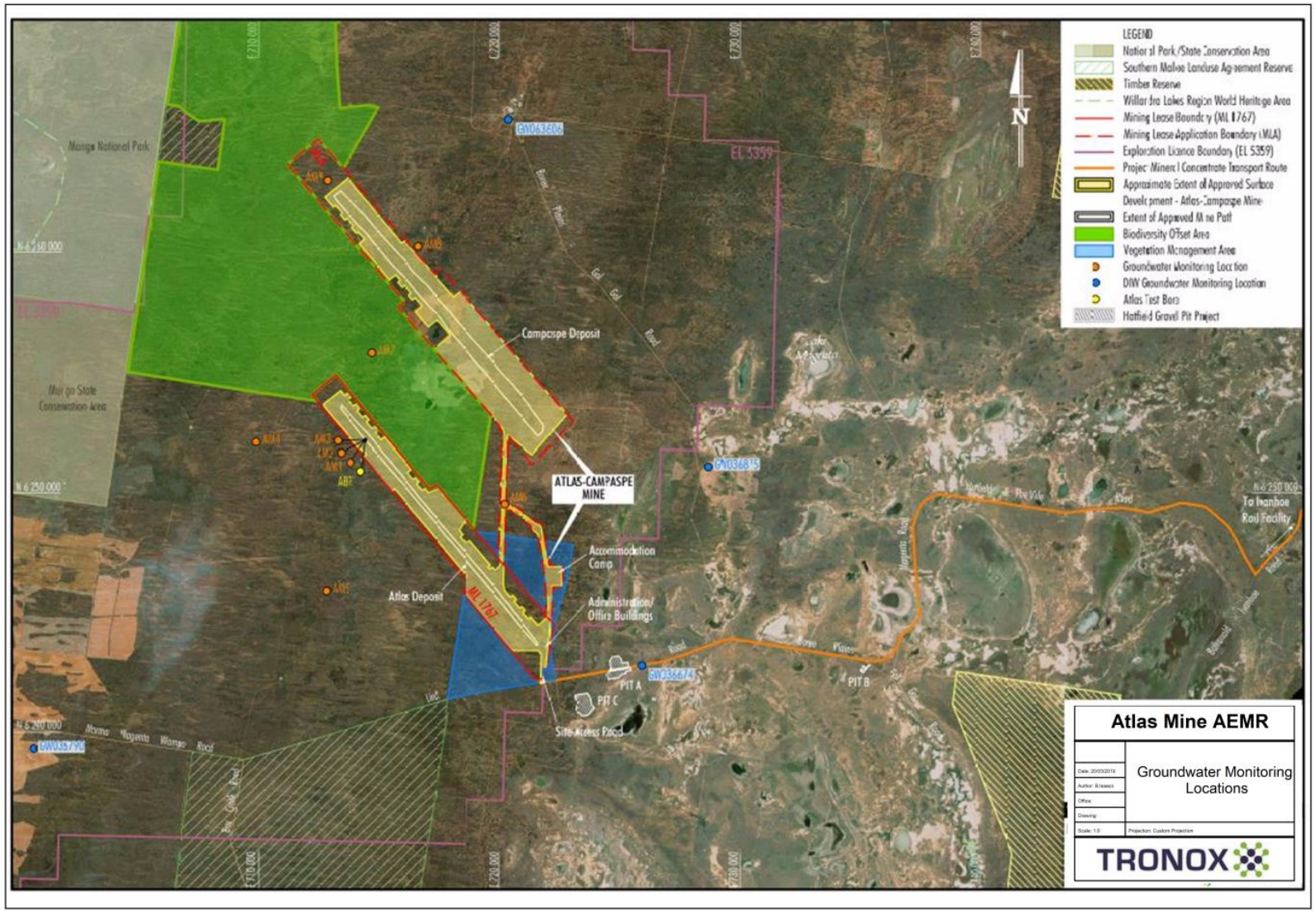
Site	Site Description	Frequency	Parameters
AM1	Tronox Mining groundwater monitoring site	Quarterly	Water level, groundwater quality (pH, EC, cations, anions and metals)
AM2			
AM3			
AM4			
AM5[1]			
AM6[1]			
AM7[1]			
AM8[1]			
AM9[1]			
GW063606	Boree Plains Bore (privately-owned)	Quarterly	Water level
GW036674[2]	DIW groundwater monitoring site	Quarterly	Water level
GW036790[2]		Annually	Groundwater quality (pH, EC, cations, anions and metals)
GW036875[2]			
Supply Bores	Groundwater supply bore field bores	When operating	Flow rate, groundwater quality[3] (pH, EC, cations, anions and metals)

1 Groundwater monitoring bores AM5, AM6 and AM7 will be established prior to the commencement of mining activities at the Atlas Deposit. Groundwater monitoring bores AM8 and AM9 will be constructed 1 year prior to the commencement of construction activities at the Campaspe Deposit.

2 Subject to availability of data from DIW.

3 Groundwater quality samples will only be taken from one of the groundwater supply bore field bores.

Figure 10 – Groundwater monitoring location



6.3.2 Performance

6.3.2.1 Groundwater Levels

Groundwater levels have remained stable since baseline monitoring commenced in 2012. Monitoring was suspended in March 2016 and recommenced in December 2017. In 2019, monitoring commenced at AM5, AM6, AM7 and AM8. Groundwater monitoring (level and quality parameters) and surface water (quality parameters) continued quarterly and half yearly as per conditions of period as per conditions of approval.

Figures 11 and 12 show groundwater bore levels at local and regional locations respectively. Rainfall is sourced from the meteorological weather station situated at Boree Plains homestead approximately 16km north of the Atlas site. Historical groundwater levels in tabulated format are attached as Appendix 2.

It is not expected that groundwater levels will be impacted during the construction phase of the project. Mining of the Atlas deposit will be above the groundwater table therefore it is unlikely groundwater levels will be affected directly by mining operations. The extraction of groundwater via bore pumping for processing when mining commences may lead to temporary lowering of groundwater levels. The Atlas-Campaspe EIS predicts that groundwater drawdown during the project would be approximately 1 metre at year 5 of the project.

Monitoring bores AM5 to AM9 were installed in late 2018 but only AM5 to AM8 were successful at intercepting the groundwater table. Further investigation for AM9 will be carried out to move the bores to a suitable location 12 months prior to the construction commencing at the Campaspe site.

Figure 11 – Atlas monitoring bore levels

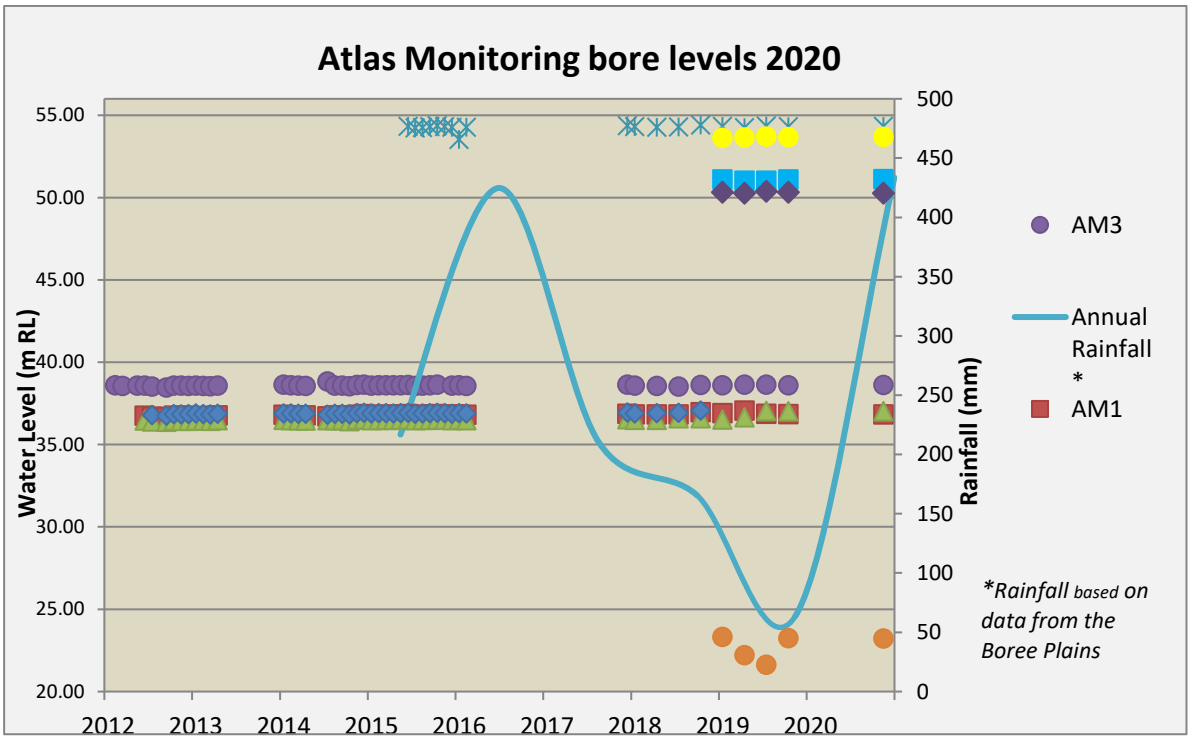
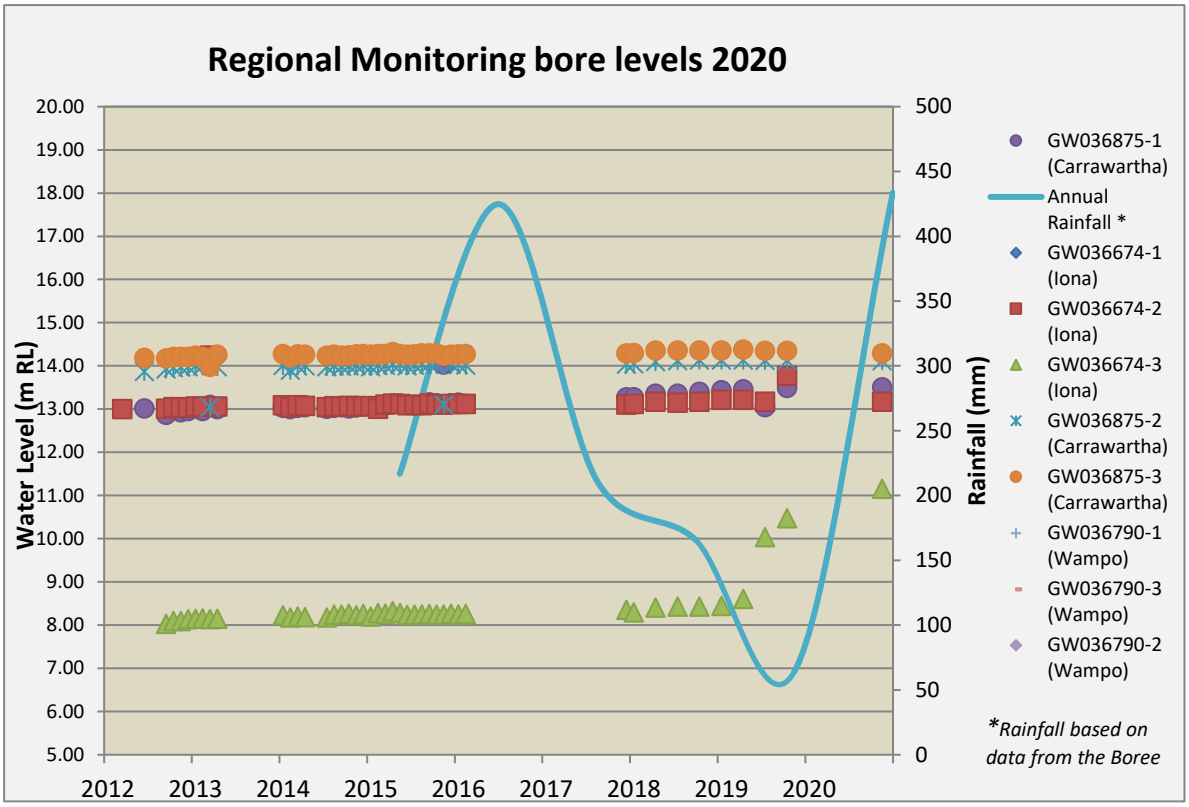


Figure 12 – Regional monitoring bore levels



6.3.2.2 Groundwater Quality

Total Dissolved Solids (TDS) has been recorded for groundwater monitoring bores AM1, AM2, AM4 and regional government bores since monitoring began in 2012. Initially monitoring frequency was monthly but since December 2017 frequency has been reduced to quarterly which is the frequency required by the Environment Protection Licence and the GWMP. Figures 13 and 14 show groundwater Total Dissolved Solids (TDS) for local and regional locations respectively. Historical groundwater TDS in tabulated format are attached as Appendix 3.

6.3.3 Improvements

Groundwater monitoring bore AM9 will be repositioned as so they successfully intercept the groundwater table at related to the Campaspe site, this will occur 12 months prior to the start of construction at the Campapse site.

6.3.4 Incidents

No incidents occurred related to groundwater during the reporting period.

Figure 13 – Atlas Lease Total Dissolved Solids (TDS)

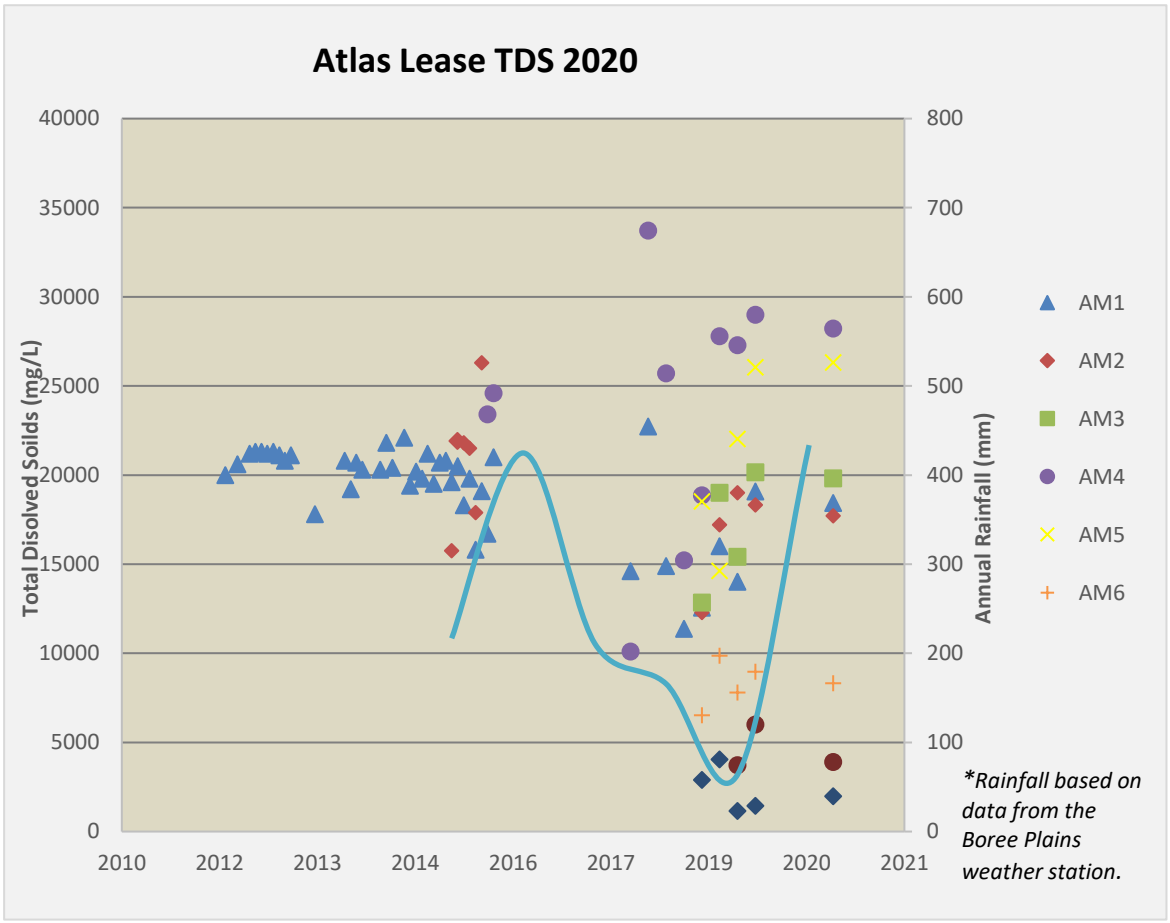
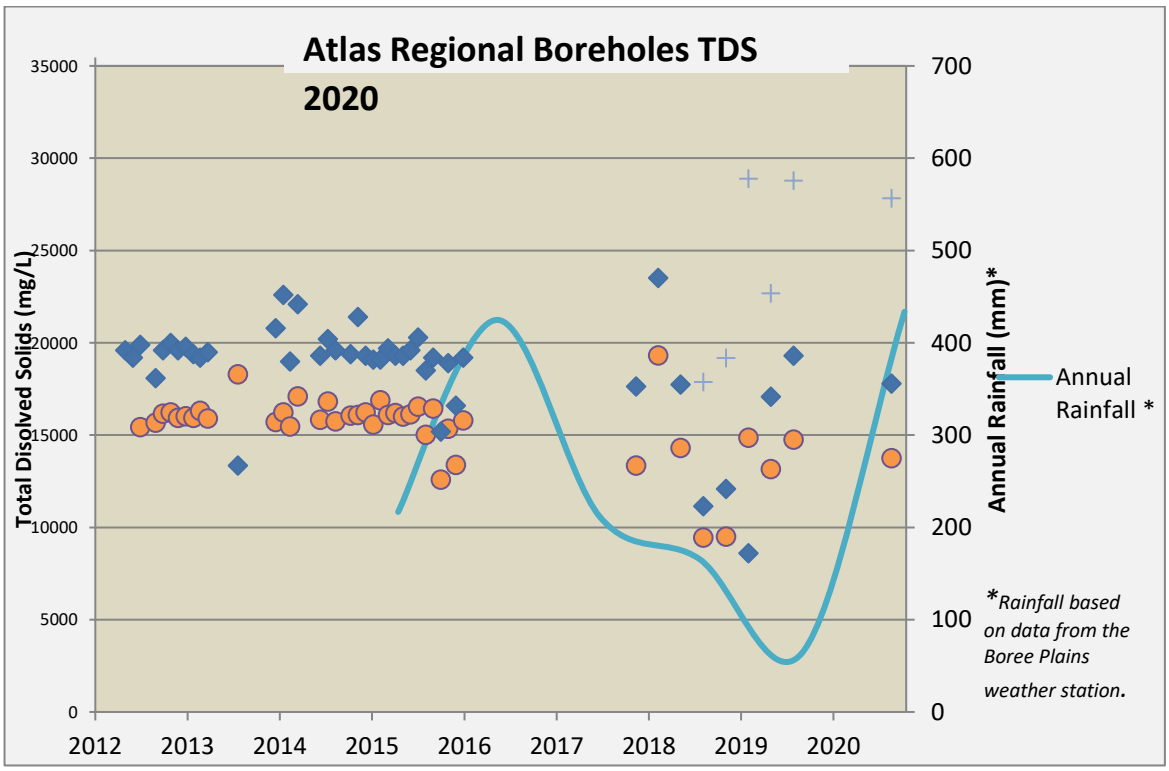


Figure 14 – Atlas Regional Bores Total Dissolved Solids (TDS)



6.4 Surface Water

6.4.1 Management

Prior to the commencement of construction at the Atlas mine Tronox prepared a Surface Water Management Plan (SWMP) in accordance with Development Consent requirements for the construction and operation of the mine, transport and the Hatfield gravel pits.

The objective of the SWMP is to address relevant State approval conditions and facilitate the management of surface water at the Project. The SWMP outlines the surface water and environmental setting of the project, relevant surface water criteria applicable to the Project, provides baseline data, outlines surface water management, outlines the process for determining surface water impact trigger values, outlines the surface water monitoring program, provides a contingency plan to manage unpredicted impacts and their consequences and outlines the reporting, auditing and reviewing requirements. Figure 15 shows the surface water monitoring locations and surface profiles. Tables 17 and 18 show provisional trigger levels and the surface water monitoring program respectively.

No baseline surface water monitoring data has been collected from SW01 and SW03 of the ephemeral or permanent water bodies (with the exception of one sample from the First Mildura Tank in the vicinity of the Atlas-Campaspe Mine site.

In November 2020 Atlas mine received 119mm resulted in SW01 (First Mildura Tank); SW02 (Unknown Tank) and SW04 (Yankee Tank) holding some water. Samples were collected from these and sent to a NATA accredited laboratory for further analyses in accordance the requirements with Development Consent.

As there was very limited surface water available in 2020, the data obtained is not representative to make inferences about water impact trigger values. This is likely to be achieved after collecting 12 months worth of data to observe any patterns. Therefore, provisional water quality trigger values have been applied for the samples collected in this reporting period (Table 17). The trigger levels used are derived from *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC and ARMCANZ, 2000b) as well as 2019 baseline data.

Table 17 – Provisional water quality trigger values

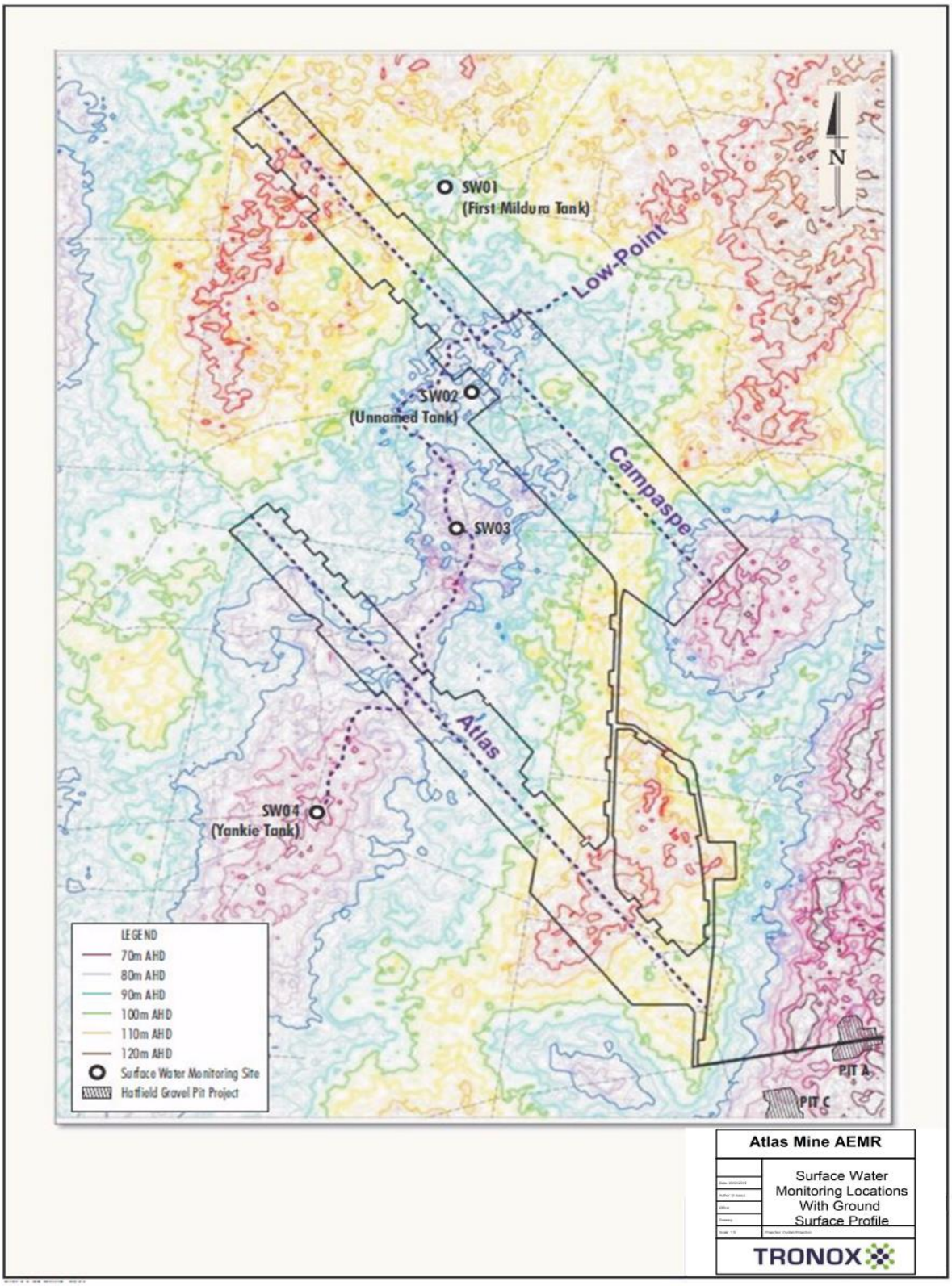
Parameter	Provisional Trigger Value
pH	6.5 - 8
Turbidity	20 NTU
Total Phosphorus	10 µg/L
Total Nitrogen	350 µg/L
Chlorophyll-a	5 µg/L
Salinity	2,200 µS/cm
Total Dissolved Solids	4,000 mg/L

Table 18 – Surface water monitoring program

Site	Site Description	Frequency		Parameters
		Baseline (first 12 months)	**Long-term**	
SW01	"First Mildura Tank" – a reference water body not affected by the project)	Monthly	6-monthly	pH, turbidity, total phosphorus, total nitrogen, chlorophyll-a, salinity and TDS
SW02	Unnamed tank located approximately 500 m of the Campaspe footprint			
SW03	Natural depression located between the Atlas and Campaspe footprints			
SW04	"Yankie Tank" located approximately 3 km south-west of the Atlas footprint			

Sufficient water quality monitoring data is yet to be obtained as the water bodies did not hold any water due to the dry conditions obtaining in the region. Surface water impact trigger values will be adopted once enough quality monitoring becomes available.

Figure 15 – Surface water monitoring sites and ground surface profile



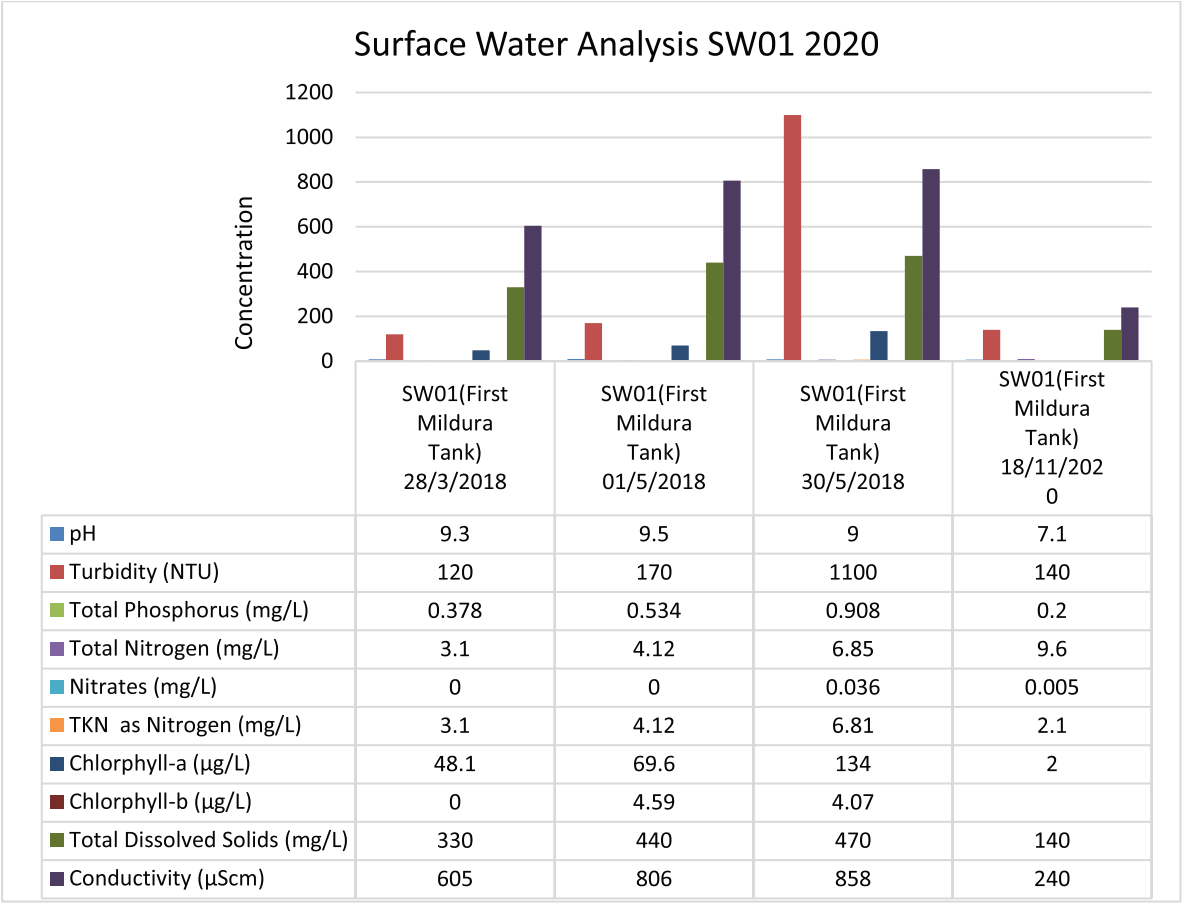
6.4.2 Performance

In 2020, three samples were collected in November at locations SW01 (First Mildura Tank), SW02 (Unknown Tank) and SW04 (Yankee Tank) (Figures 17-22). Analysis of the three samples resulted in some provisional trigger levels being exceeded. More samples will be collected in future as surface water becomes more available and to investigate any incidences of abnormal results that may occur.

Historically there has been limited surface water availability around the site for baseline monitoring. For example, 165.8mm of rainfall was recorded on the Boree Plains weather station during 2018. In 2018, three samples from SW01 (First Mildura Tank) were obtained. At the time, several of the provisional trigger levels were exceeded including pH, Turbidity and Chlorophyll-a. Because there was insufficient baseline data to determine if the obtained results are abnormal no action has been taken.

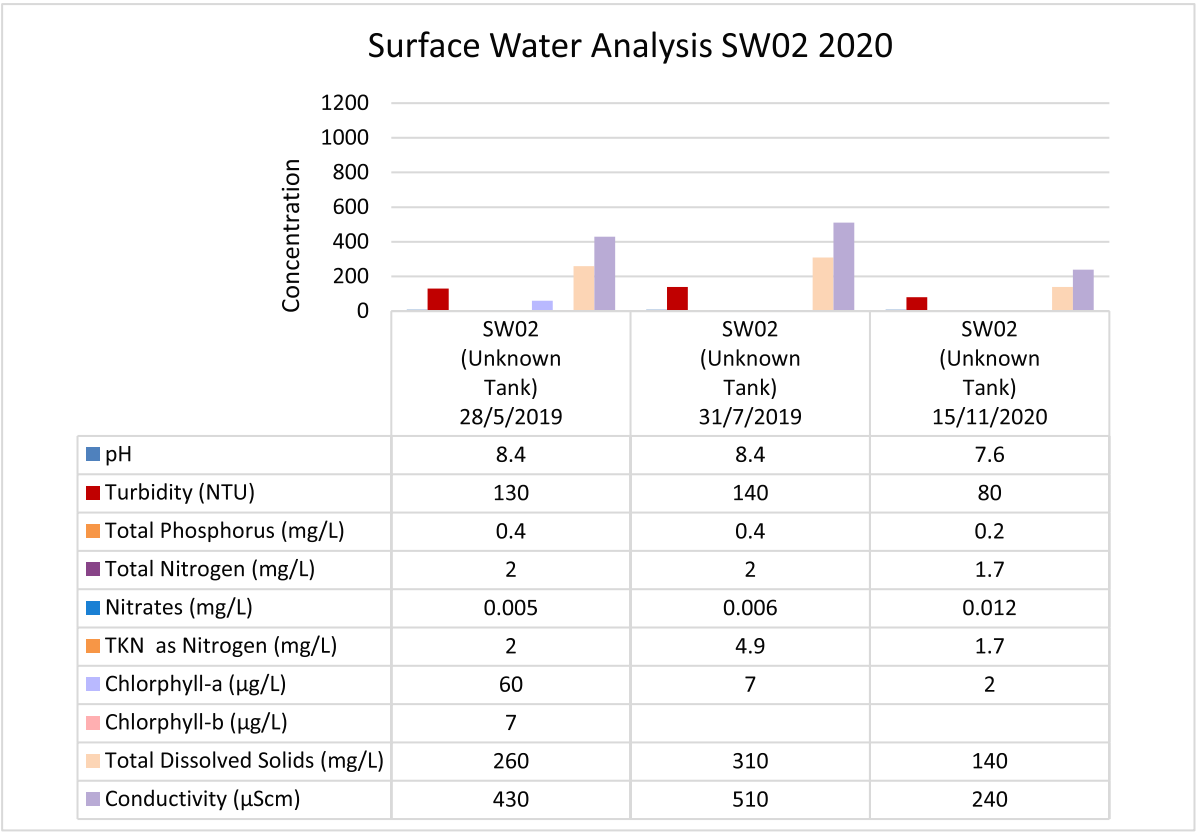
This situation continued in 2019 with 63.8mm rainfall recorded. Boree Plains weather station recorded 433.6mm rainfall in 2020. Surface water paraments will continue to be closely monitored to assess how they respond to rainwater recharge events. Given the location of the ephemeral water bodies and the nature of future mining activities it is highly unlikely that mining will have any impact on surface water quality.

Figure 16 - Surface water results SW01



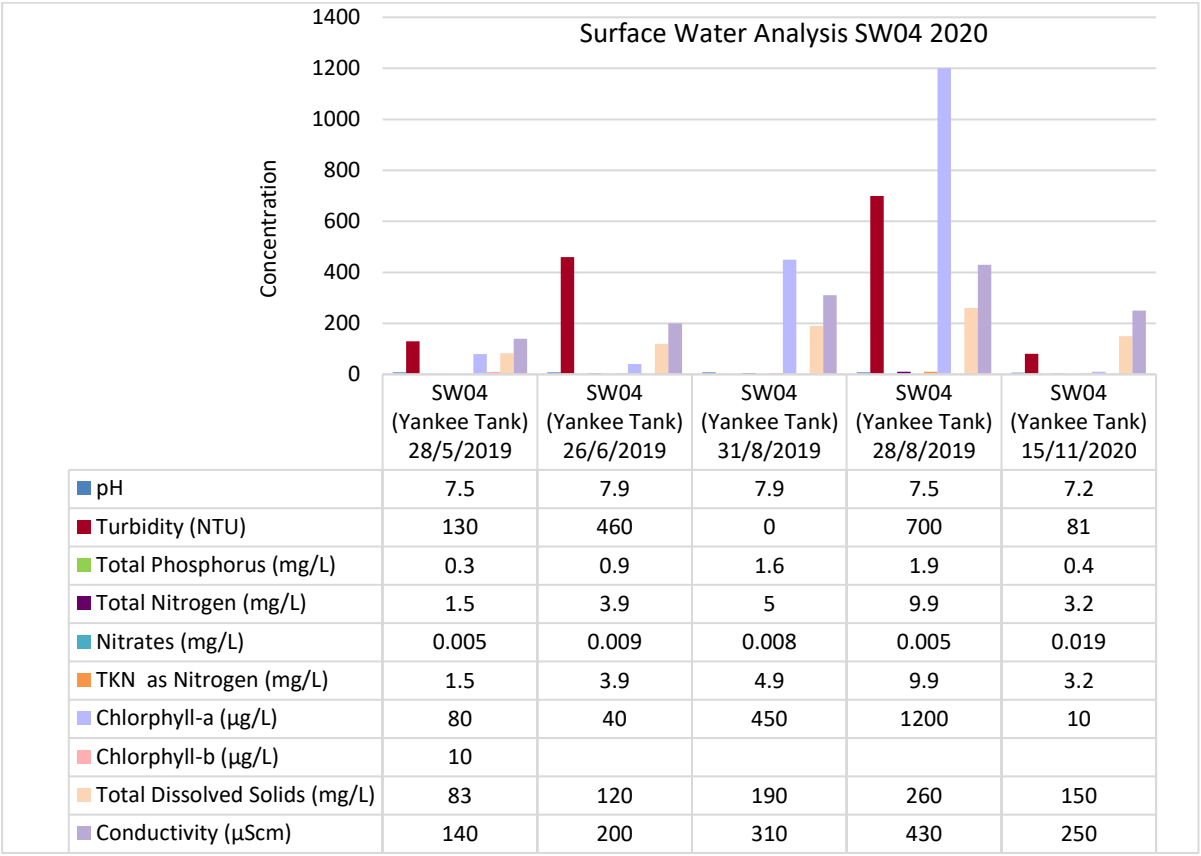
	SW01(First Mildura Tank) 28/3/2018	SW01(First Mildura Tank) 01/5/2018	SW01(First Mildura Tank) 30/5/2018	SW01(First Mildura Tank) 18/11/2020
pH	9.3	9.5	9	7.1
Turbidity (NTU)	120	170	1100	140
Total Phosphorus (mg/L)	0.378	0.534	0.908	0.2
Total Nitrogen (mg/L)	3.1	4.12	6.85	9.6
Nitrates (mg/L)	0	0	0.036	0.005
TKN as Nitrogen (mg/L)	3.1	4.12	6.81	2.1
Chlorphyll-a (µg/L)	48.1	69.6	134	2
Chlorphyll-b (µg/L)	0	4.59	4.07	
Total Dissolved Solids (mg/L)	330	440	470	140
Conductivity (µScm)	605	806	858	240

Figure 17 – Surface water results SW02



	SW02 (Unknown Tank) 28/5/2019	SW02 (Unknown Tank) 31/7/2019	SW02 (Unknown Tank) 15/11/2020
pH	8.4	8.4	7.6
Turbidity (NTU)	130	140	80
Total Phosphorus (mg/L)	0.4	0.4	0.2
Total Nitrogen (mg/L)	2	2	1.7
Nitrates (mg/L)	0.005	0.006	0.012
TKN as Nitrogen (mg/L)	2	4.9	1.7
Chlorphyll-a (µg/L)	60	7	2
Chlorphyll-b (µg/L)	7		
Total Dissolved Solids (mg/L)	260	310	140
Conductivity (µScm)	430	510	240

Figure 18 – Surface water results SW04



	SW04 (Yankee Tank) 28/5/2019	SW04 (Yankee Tank) 26/6/2019	SW04 (Yankee Tank) 31/8/2019	SW04 (Yankee Tank) 28/8/2019	SW04 (Yankee Tank) 15/11/2020
pH	7.5	7.9	7.9	7.5	7.2
Turbidity (NTU)	130	460	0	700	81
Total Phosphorus (mg/L)	0.3	0.9	1.6	1.9	0.4
Total Nitrogen (mg/L)	1.5	3.9	5	9.9	3.2
Nitrates (mg/L)	0.005	0.009	0.008	0.005	0.019
TKN as Nitrogen (mg/L)	1.5	3.9	4.9	9.9	3.2
Chlorphyll-a (µg/L)	80	40	450	1200	10
Chlorphyll-b (µg/L)	10				
Total Dissolved Solids (mg/L)	83	120	190	260	150
Conductivity (µScm)	140	200	310	430	250

6.4.3 Incidents

There were no incidents related to surface water during the reporting period.

6.4.4 Improvements

Surface water monitoring will continue on a monthly basis when surface water is available at the monitoring locations outlined in Table 18. Once sufficient surface water data is obtained a revised SWMP will include new baseline monitoring and trigger values. The monitoring frequency will be reduced to 6 monthly once sufficient baseline data is obtained for all locations.

Drainage structures will continue to be constructed during the Atlas construction phase to capture runoff from disturbed areas post rain events. Water will be re-used for dust suppression and future rehabilitation works.

Surface water monitoring is the only environmental monitoring that is currently required because of a suspension being granted. Surface water will only be sampled after significant rain events where surface water drainage has accumulated at the monitoring locations.

6.5 Biodiversity

Prior to the commencement of construction at the Atlas site, Tronox prepared a Biodiversity Management Plan in accordance with Development Consent requirements, for the construction and operation of the mines and associated infrastructure.

The objective of the Biodiversity Management Plan (BMP) is to address relevant State and Commonwealth approval conditions and facilitate the management of biodiversity at the Atlas-Campaspe Mine, Ivanhoe Rail Facility, Vegetation Management Areas (VMAs) (at the mine site and Ivanhoe Rail Facility) and an offset area.

The BMP provides a description of existing environment related to the Atlas-Campaspe Mine, VMAs and offset area, describes the management of the Atlas-Campaspe mines, VMAs and Biodiversity Offset, and outlines reporting, auditing and reviewing requirements.

6.5.1 Biodiversity Offset and Vegetation Management Areas

The Atlas-Campaspe Offset area is some 16,540 hectares and is situated on Boree Plains station and part of Wampo station which are owned by Tronox Mining. The offset lies between the Atlas and Campaspe sites and adjoins the eastern most boundary of Mungo National Park. The Offset comprises of semi-arid woodlands, arid shrublands, grass/herblands and cleared land and is in excellent condition. The Vegetation Management Area (VMA) comprises of 1,380 hectares adjoining the Atlas mine site and a further 15 hectares at the Ivanhoe rail facility. Figure 19 shows that location of the Biodiversity Offset and Vegetation Management Areas. Management of the Offset and VMAs involves vegetation monitoring, pest fauna and weed monitoring, threatened fauna surveys, pest animal control and habitat monitoring, mapping of stock fences and tracks and closing of artificial water points.

Threatened fauna surveys

GHD were commissioned by Tronox Mining Australia (Tronox) in 2018 to establish a threatened fauna species monitoring program at the Atlas-Campaspe Mine Site and Offset Area. The monitoring program is completed quarterly, for five years commencing October 2018. GHD's fifth round of surveys was completed in February 2020. This survey was completed in February 2020 following data collection in November 2019, August 2019, May 2019 and October 2018. Results to date show similar numbers of pest fauna within the offset sites and the control sites within the uncleared pastoral areas, with overall numbers for all species in both uncleared pastoral areas and Offset areas being generally quite low. The low numbers of all pest and grazing fauna numbers are likely influenced by the very dry conditions in the region.

The monitoring of threatened fauna will continue in the future in the offset area to allow Tronox to assess the effectiveness of its offset management program and ability to enhance biodiversity within the offset. These results when input into an adaptive management process allow for continuous improvement in the approach to reserve management over time. All offsets are gazetted on the property titles and are subject to exclusion of domestic livestock and control of wild goats, with watering points decommissioned and exotic species of plant and animal controlled.

Recommendations for the ongoing monitoring for the Atlas-Campaspe Offset area are:

- Continue monitoring of pest fauna, weeds and Malleefowl mound activity as outlined in the Atlas-Campaspe BMP (Resource Strategies. 2018), as long-term data are required to determine changes and trends in these to inform management intervention and in the future to measure the effectiveness of management intervention.
- Consider integration of automated camera traps to monitor active Malleefowl mounds, and at additional sites to target predators, which are much more likely to be detected using baited camera traps.

The following management actions are required to control pest fauna and improve vegetation and habitat condition at the site:

- Implement an ongoing, targeted predator control program, such as baiting, trapping or shooting, to limit numbers of introduced predators such as Red Fox and Cats, particularly in the vicinity of Malleefowl mounds.
- Consider implementing goat and rabbit controls; and
- Signage of the offset area at key entry points and roads.

The recommended management actions of the Atlas-Campaspe BMP should be reviewed annually, with the results of the ongoing monitoring used to determine the effectiveness of the management actions that have been undertaken over time. The results of the ongoing monitoring may lead to recommendations for additional management actions to be undertaken within the offset area to aid the improvement of the offset and uncleared pastoral areas. Table 19 summarises the biodiversity monitoring performance and progress to date. Details of pest fauna monitoring conducted in 2020 are provided in Appendix 4.

Figure 19 – Biodiversity Offset and Vegetation Management Areas

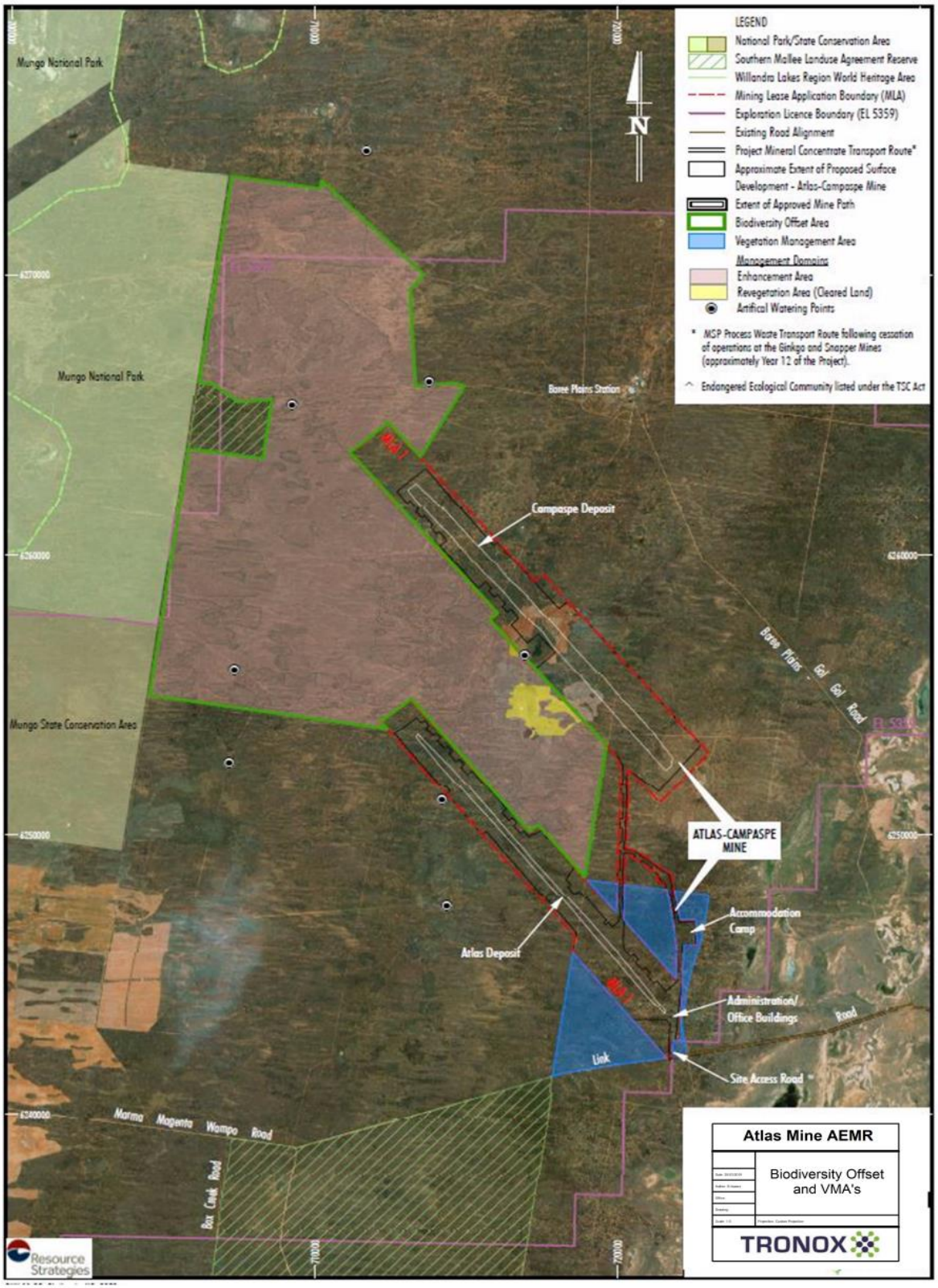


Table 19 – Biodiversity Offset performance criteria and progress

Action	Performance Criteria				Completion Criteria
	Year 1 (January 2018 to end of December 2018)	**Year 2 (January 2019 to end of December 2019)**	**Year 3 (January 2020 to end of December 2020)**	**Year 4 onwards (January 2021 until the end of EPBC Approval or Completion Criteria achieved)**	
Setting up the Offset Area					
Long-term Conservation Security	-	Commenced	Completed	-	The offset area is secured
Offset Implementation Costs and Conservation Bond	Completed	-	-	-	Conservation bond paid and returned in full
Livestock Fences – Mapping	Completed	-	-	-	Livestock fences mapped
Livestock Fences – Installation (also refer to Goat Proof Fencing Installation option below)	-	-	Complete - 12 months from Long-term Conservation Security	Planned	Fences installed^
Livestock Fences – Maintenance	-	Continue as required	Continue as required	Continue as required	N/A
Livestock Fences – Removal of Redundant Fences	-	-	Complete - 2 months from Long-term Conservation Security	Planned	Redundant fences removed
Signage - Installation	-	-	Complete - 6 months from Long-term Conservation Security	Planned	Signage installed
Signage - Maintenance	-	Continue as required	Continue as required	Continue as required	N/A
Access Tracks – Mapping	Completed	-	-	-	Access tracks mapped
Access Tracks – Maintenance	Commenced	Continue - Annually	Continue - Annually	Continue - Annually	N/A
Artificial Watering Points – Mapping	Completed	-	-	-	Artificial watering point mapped
Artificial Watering Points – Closure	-	Completed	-	-	Artificial watering points closed
Habitat Restoration/Revegetation					
Monitoring Natural Regeneration	Baseline vegetation monitoring completed	Completed	Monitoring not completed	Continue - Annually in Spring	270 ha of revegetated land on a trajectory towards a self-sustaining ecosystem
Introduction of Fauna Habitat Features					
Introduction of fauna habitat features in the revegetation area	-	-	-	Complete – one year from securing the offset	Fauna habitat features introduced
Nest box Research Program					
Nest Boxes – Installation	Commence – 3 years after the establishment of the first rehabilitation. EPBC 2012/6447 approval	-	-	-	300 Nest boxes installed in the Offset

Nest Boxes – Maintenance	Continue - Annually	-	-	-	Annual monitoring undertaken
Weed control					
Weed control and monitoring	Completed	Completed	Monitoring not completed	Continue - Biannually	Weed cover remains below 5% for the life of the EPBC Approval
Feral animal control					
Feral animal control and monitoring	Completed	Completed	Monitoring not completed	Continue - Quarterly for first 5 years and then biannually	Feral animals reduced below baseline levels for the life of the EPBC approval*
Goat Management and Monitoring					
Goat Control and Monitoring Measures	Completed	Completed	Monitoring not completed	Continue - Quarterly for first 5 years and then biannually	Feral goat abundance and distribution reduced below baseline levels for the life of the EPBC approval Reduced evidence of goats during habitat/vegetation surveys compared to data collected during the first monitoring event (ongoing for the life of the EPBC Approval#
Controlling Erosion					
Inspection of offset area for substantial erosion and control (if required)	Completed	Completed	Completed	Continue - Monthly	Erosion does not increase in extent beyond baseline levels for the life of the EPBC Approval
Bushfire Management					
Mapping of Fire Breaks and Trails	Completed	-	-	-	Fire breaks and trails mapped
Monitoring of Fuel Loads	-	Completed	Completed	Continue - Annually	N/A
Controlled Burning	-	Not required	Not required	Commence (if required)	Biomass does not exceed suitable levels for threatened species habitat (based on benchmark condition for the respective vegetation communities)
Monitoring					
Visual Monitoring	Completed	Completed	Completed	Continue - Monthly	N/A
Photo Monitoring	Completed	Completed	Monitoring not completed	Continue - Annually	N/A
Vegetation and Habitat Monitoring	Completed	Completed	Monitoring not completed	Continue - Annually	Vegetation communities reach benchmark condition.

Vegetation and Habitat Monitoring - Winged Peppercress densities, distribution and habitat use	Completed	Completed	Monitoring not completed	Continue - Annually	Habitat quality for the Winged Peppercress, achieves a quality score of 9 out of 10. No adverse impacts on densities, distribution and habitat use relative to baseline
Vegetation and Habitat Monitoring - Corben's Long-eared Bat	Completed	Completed	Monitoring not completed	Continue - Annually	Habitat quality for the Corben's long-eared bat achieves a quality score of 9 out of 10.
Vegetation and Habitat Monitoring – Malleefowl Habitat	Completed	Completed	Monitoring not completed	Continue - Annually	Habitat quality for the, Mallee fowl achieves a quality score of 9 out of 10.
Fauna Monitoring	-	-	-	Commence – Every three years.	N/A
Corben's Long-eared Bat Monitoring - densities, distribution, movement patterns and habitat use	Completed	Completed	Monitoring not completed	Continue in Year 4 and then every three years. If a trigger is exceeded, then monitoring will return to being undertaken annually	No adverse impacts on densities, distribution, movement patterns and habitat use relative to baseline
Malleefowl Monitoring - densities, distribution, movement patterns and habitat use	Completed	Completed	Monitoring not completed	Continue - Annually	No adverse impacts on densities, distribution, movement patterns and habitat use relative to baseline

Suspension of Flora and Fauna Monitoring

On 30 July 2020, Tronox Mining requested a suspension of annual flora and fauna monitoring in rehabilitation and biodiversity offset sites. The suspension was required due to the difficulty undertaking monitoring and sourcing consultants because of border and quarantine restrictions associated with COVID-19 public health orders.

On 17 August, the Department of Planning, Industry and Environment approved the request to suspend flora and fauna monitoring until 1 February 2021 or earlier:

- at the request of the Department.
- if relevant border restrictions are lifted (e.g. the NSW COVID-19 Border Control Order 2020 and South Australia Emergency Management (Cross Border Travel No 10) (COVID-19) Direction 2020).
- if construction recommences at the Atlas Campaspe Mine (monitoring related to Atlas Campaspe Mine only).

Construction works commenced in September 2020 and monitoring of flora and fauna and rehabilitation sites will be conducted in the next reporting period.

6.6 Cultural Heritage

6.6.1 Management

Prior to the commencement of construction at the Atlas site Tronox Mining prepared a Heritage Management Plan (HMP). The HMP has been prepared on behalf of Tronox Mining by Dr Matthew Cupper of Landskape (whose appointment has been approved by the NSW Department of Industry, Planning and Environment [DPIE] as a "*suitably qualified and experienced person*"), to satisfy the requirements of NSW Development Consent (SSD_5012) and the requirements of Commonwealth Approval (EPBC 2012/6447).

The HMP describes the management of Aboriginal and historic heritage at the project. Figures 20, 21 and 22 show locations of Aboriginal and historical heritage sites for the Atlas-Campaspe site, haulage route and Ivanhoe rail facility respectively. A Standard Operating Procedure (SOP) has been developed for sight personnel for awareness and instruction in relation to preserving cultural relics. The SOP outlines the protocol for the management of previously unrecorded Aboriginal cultural heritage sites and the protocol for the discovery of human remains.

Figure 20 – Atlas-Campaspe heritage sites

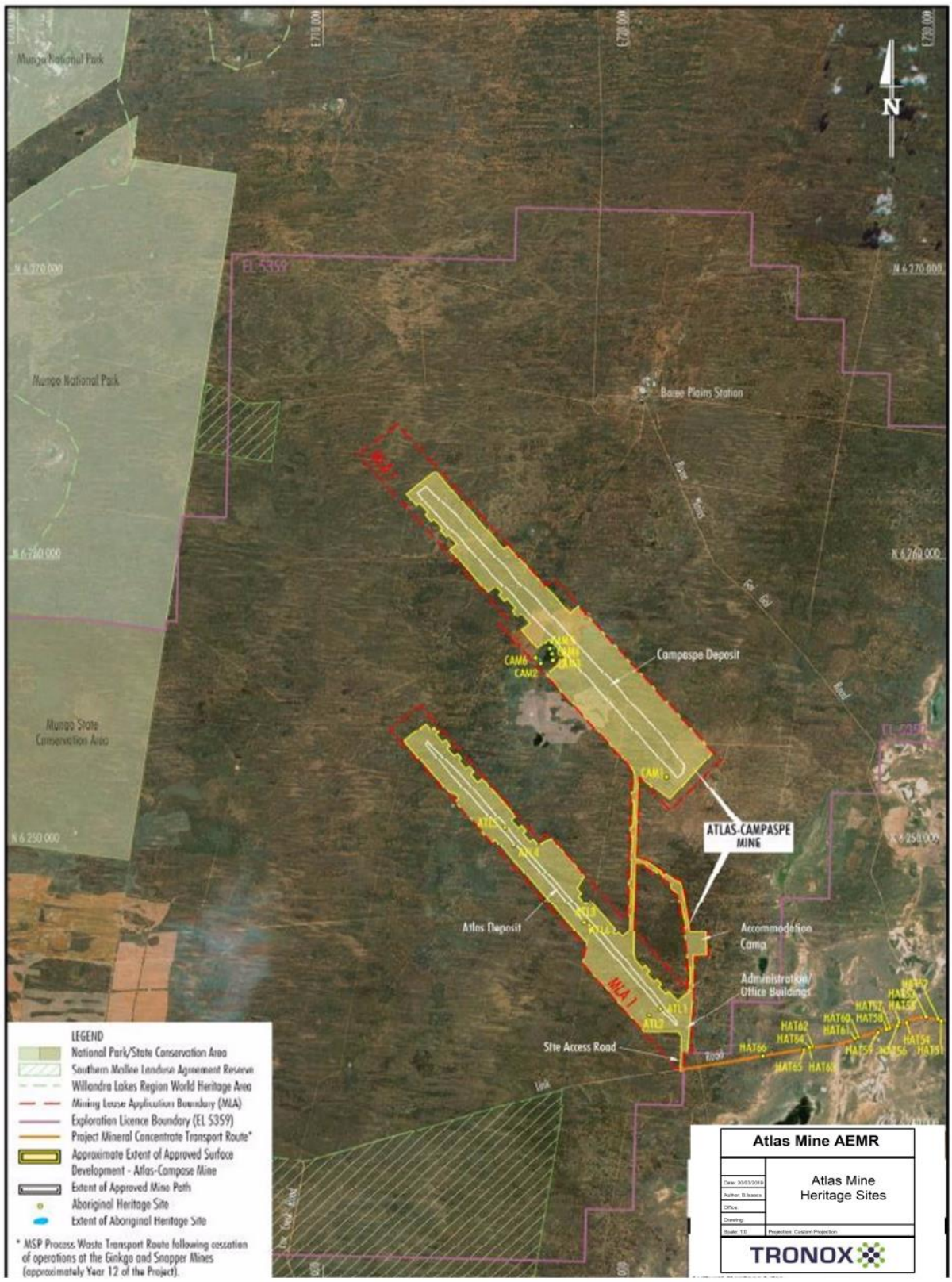


Figure 21 – Haulage route heritage sites

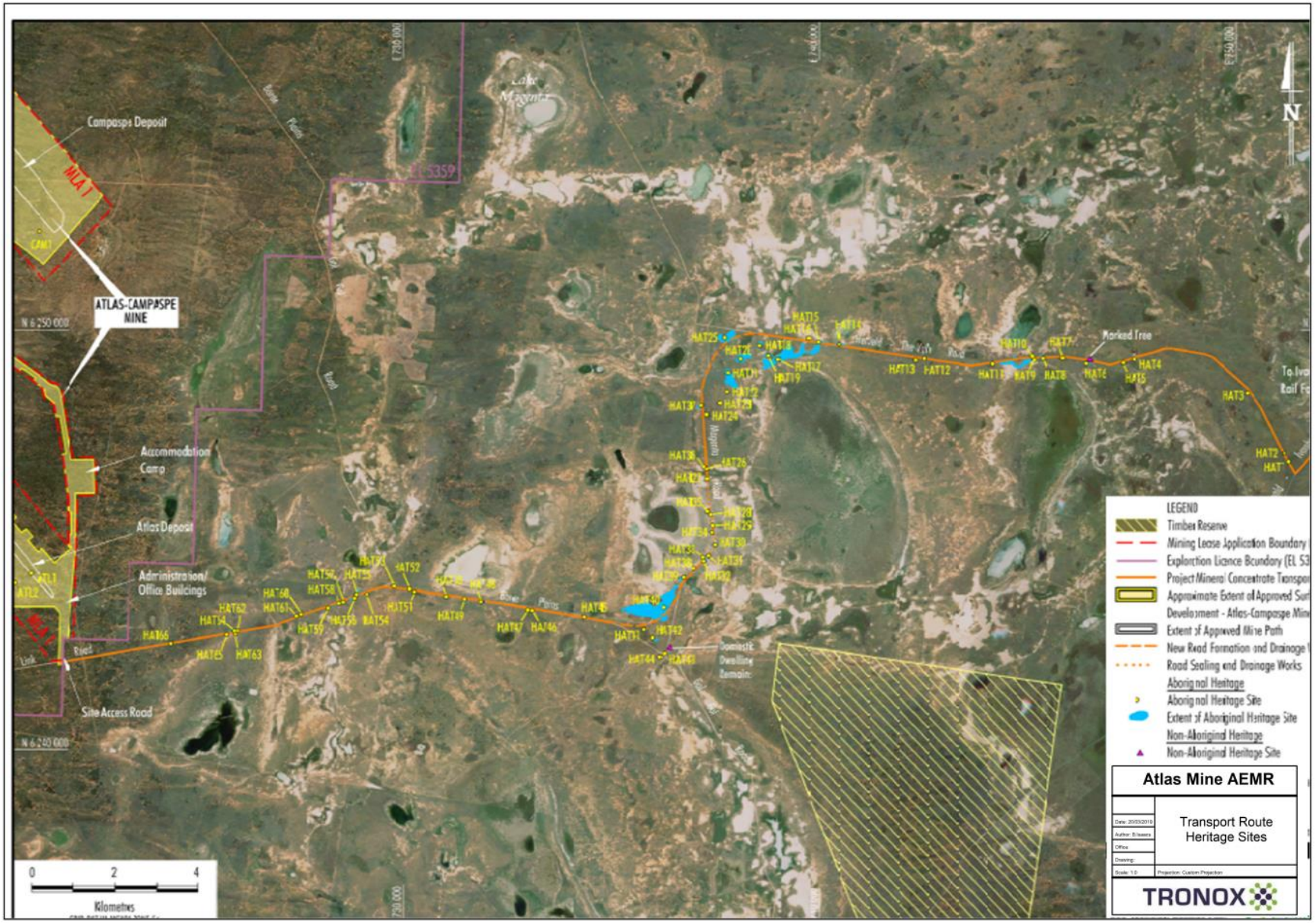
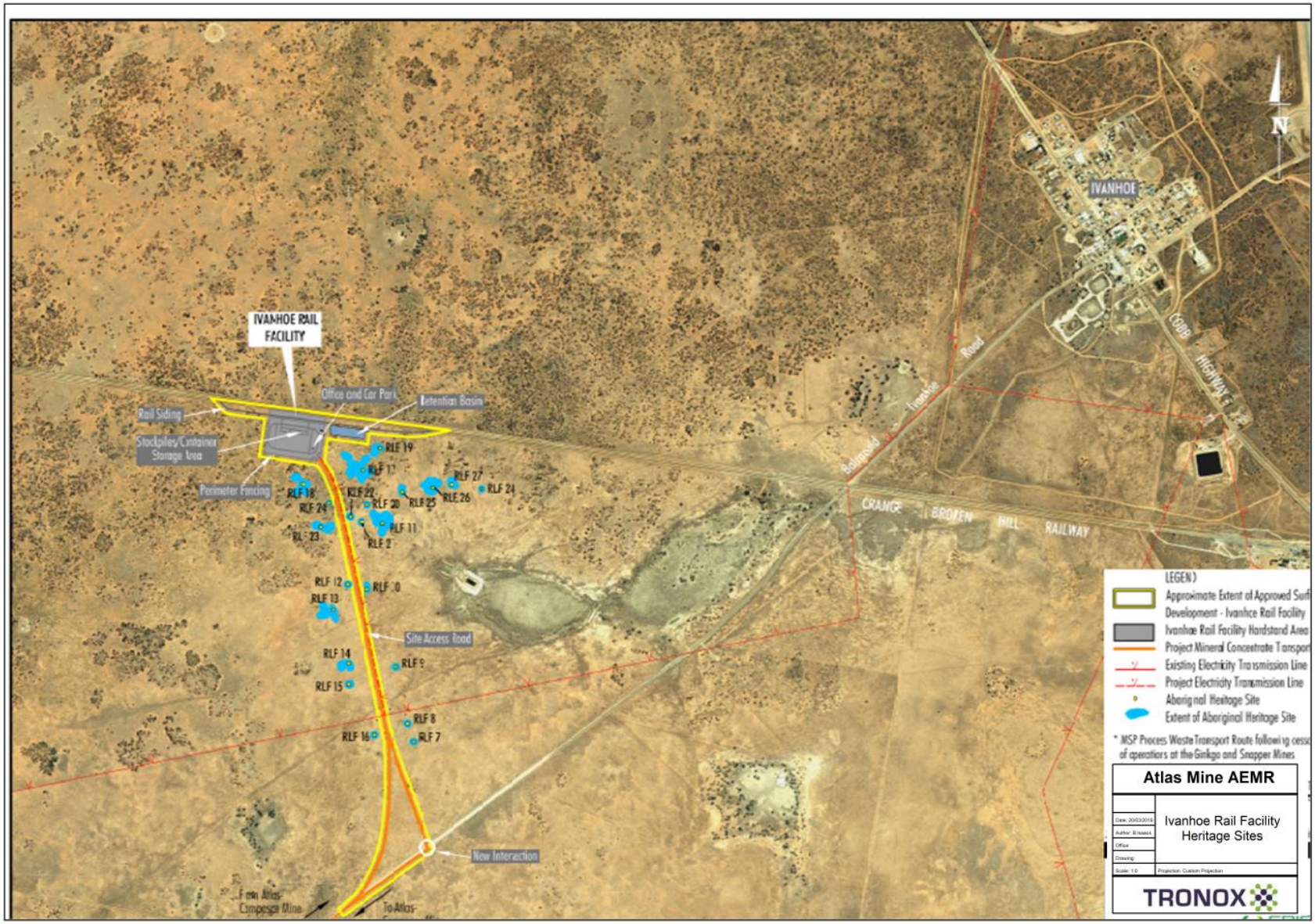


Figure 22 – Ivanhoe Rail Facility heritage site



6.6.2 Performance

6.6.2.1 Aboriginal Heritage

In December 2020, an archaeologist from Landskape and two representatives of the registered Aboriginal stakeholder group Mutthi Nation Aboriginal Corporation supervised the placement and erection of protective barrier fences at Aboriginal cultural heritage sites along the proposed Atlas-Campaspe Project Haul Road. In some instances, barriers were only erected on the road-facing perimeters of the sites.

Fencing was not completed at some sites (Hatfield 17-25 and Hatfield 40) where the final placement of the proposed haul road was not determined. These sites should be fenced under supervision by representatives of the registered Aboriginal stakeholders and/or an archaeologist after the route is pegged and prior to the commencement of construction. Approximately 60 sites were fenced using star pickets and nylon rope. The fencing will remain in place until the construction of the haulage route has been completed as to avoid any unnecessary disturbance to the sites during civil works.

Tronox facilitated a meeting with representatives with five representatives from two Registered Aboriginal Parties (Ngiyampaa and Mutthi Mutthi). The meeting was to introduce Tronox, following the acquisition of Cristal and explore opportunities for collaboration in the protection of cultural heritage. This engagement meeting also covered opportunities for community funding and employment opportunities for locals.

6.6.2.2 European Heritage

Two historical heritage sites were identified near the mineral concentrate transport route during the Aboriginal and Non-Aboriginal Cultural Heritage Assessment prepared for the Project EIS (Niche, 2012) These comprise:

- a blazed survey tree marked "↑RD" on the north side of Hatfield-The Vale Road, 6.5 km from the intersection with the Balranald-Ivanhoe Road; and
- ruins of a residential dwelling (possibly of the region's former postman) with associated domestic refuse east of the Magenta Road, about 250 metres (m) north of the intersection with the Boree Plains-Gol Gol Road (referred to as "domestic dwelling remains").

The two historical heritage sites (i.e. the blazed survey tree and the domestic dwelling remains) near the mineral concentrate transport route will not be directly impacted by the Project. Tronox Mining erected temporary protective fencing in 2019 and maintained in 2020 around the two sites. Contractors will be required to undertake inductions prior to any surface disturbance activities occurring in their vicinity of these two sites to avoid any inadvertent disturbance. Tronox will conduct ongoing monitoring and inspections during construction of the haul road to ensure compliance.

6.6.3 Incidents

No incidents related to Aboriginal or historical heritage occurred during the reporting period.

6.6.4 Improvements

Tronox will commence annual meetings with RAPs to collaborate in the protection of Aboriginal heritage. In 2021 Tronox will continue monitoring any fencing erected to protect cultural heritage along the Haul road as well as raise awareness about and erect fences for protection of sites located at the Ivanhoe Rail Facility prior to the start of construction.

6.7 Bushfire

6.7.1 Management

Tronox has prepared a Bushfire Response Procedure (BRP) for the Atlas and Campaspe sites. The BRP prescribes the emergency procedure in the event of a bushfire, emergency contacts, firefighting equipment available and its location, location of access tracks, fences and firebreaks.

Tronox maintains a vehicle and mobile equipment standard where all heavy earthmoving machinery must be fitted with a fire suppression system. This reduces the risk of a bushfire if machinery were to catch fire on the mine site.

6.7.2 Performance

During 2020 Atlas recorded moderate spring rains which have seen an increase in grass cover (i.e. higher fuel loads). The management strategies implemented by Tronox during 2020 aim to manage fuel to reduce the spread and intensity of bushfires and control for any environmental/ecological impacts that could occur. This was mostly achieved by monitoring fire trails and mine lease boundaries, construction and maintenance of dams on the mine site to catch run off and maintaining the access roads and drains to farm dams under the control of Tronox.

The firebreaks are designed to act as control lines for low-intensity fires and assist with safer access and egress for high-intensity fires, as well as providing for a defence line for back burning.

6.7.3 Incidents

No incidents occurred during the reporting period.

6.7.4 Improvements

As the project ramps up further controls for bushfire management will be introduced including more firefighting equipment, an airstrip, additional fire breaks and track maintenance.

6.8 Radiation

6.8.1 Management

Tronox is required to develop a Radiation Management Plan (RMP) as per the Development Consent requirements and it is to be submitted for approval 6 months prior to the commencement of the transport of MSP process waste to the site for disposal. Tronox has begun to develop the RMP with a qualified expert approved by DPIE and in consultation with the NSW EPA.

6.8.2 Performance

Radiation dose readings were taken along the Atlas deposit and surrounding areas to gain a baseline from the natural surface prior to the commencement of mining. The baseline data will provide criteria for future rehabilitation sites and ensure no residual radiation is detected post mining. The baseline data collected from the Atlas site is shown in Table 20.

Table 20 – Atlas baseline radiation survey results

Atlas Mine Site Baseline Radiation Survey	
Sample Size	45
Average Radiation (µSv/h)	0.205
Standard Deviation (µSv/h)	0.05
95% Confidence Limit (µSv/h)	0.01

6.8.3 Incidents

No incidents occurred related to radiation during the reporting period.

6.8.4 Improvements

A Murray Basin Radiation Management Plan was developed and approved by DPIE on 25 September 2020 for all Tronox sites in the Murray Basin region (Broken Hill MSP, Ginkgo-Crayfish mine sites, Snapper mine site and Atlas-Campaspe mine sites)

6.9 Hydrocarbons

6.9.1 Management

Prior to the commencement of construction at the project a Standard Operating Procedure (SOP) was developed for site personnel that outlines the action in response to a hydrocarbon spill in the field. The SOP provides instruction on containment, clean-up, disposal, reporting requirements and follow up actions.

Spill kits are in go bays and at fuelling stations. Currently, any contaminated material from the Atlas site is to be collected and transported to the Ginkgo mine site where it can be treated in lined hydrocarbon treatment dams.

6.9.2 Performance

Civil works at the Atlas site during 2020 involved the use of heavy earthmoving equipment where potential for hydrocarbon spills was possible.

6.9.3 Incidents

No incidents were recorded in 2020.

6.9.4 Improvements

As construction ramps up hydrocarbon treatment dams will be constructed onsite for remediation of contaminated soil in the event of a spill onto the grounds surface. The dams will be lined with an impervious material such as high-density polyethylene (HDPIE) to prevent leaching of contaminates into the surrounding soil or groundwater. The hydrocarbon dams will be ready for mining operations in 2022.

Concrete wash bay areas will be constructed with oil separators and collection sumps for the washing of vehicles, plant and equipment.

Waste oil collection tanks and bunds will be installed for the storage, containment and collection of used oil by a licenced contractor.

7 WATER MANAGEMENT

Groundwater extraction for the project for the period 1st January 2020 to 30th December 2020 is shown in Table 21.

Table 21 – Groundwater extraction volumes

Water Licence #	Source/Water sharing plan//Management Zone	Entitlement (ML)	Amount extracted (ML)
WAL 27918	Western Murray Porous Rock Groundwater/NSW Murray Darling Basin	14,000	8.68

Groundwater management is detailed in Section 6.3 of this report.

8 REHABILITATION

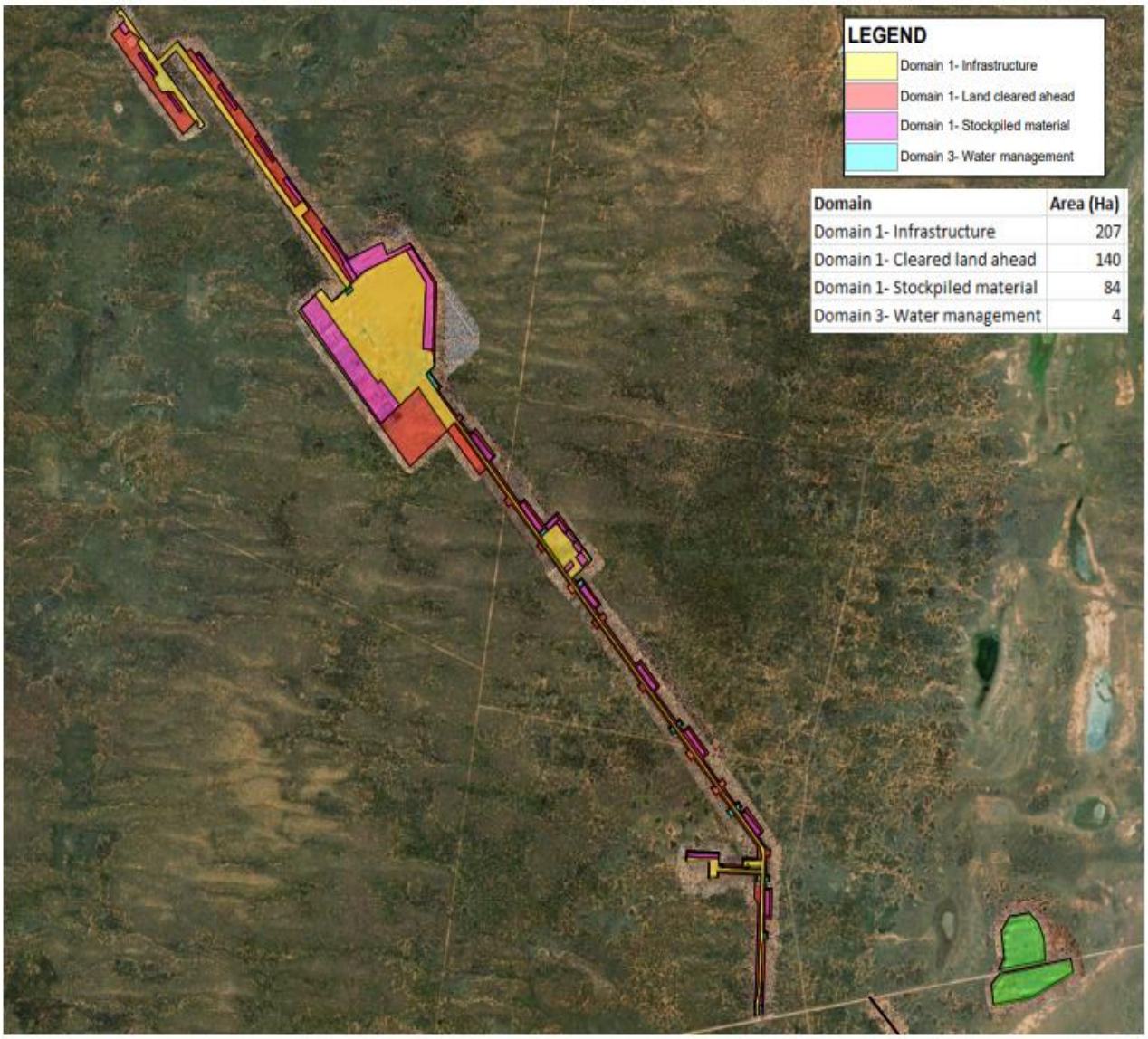
No rehabilitation activities were completed during the reporting period and no rehabilitation is planned in the next reporting period as the project is still in construction phase. Mining is due to commence in the first quarter of 2022. A rehabilitation plan is required by the Development Consent prior to the commencement of mining operations at the Atlas site in consultation with the relevant authorities.

Table 22 summarises the site disturbance and rehabilitation progress for the current reporting period, previous reporting period and forecasts for the next reportioning period. Figure 23 shows the disturbance and rehabilitation areas at Atlas site.

Table 22 – Disturbance and rehabilitation summary

		Area Affected / Rehabilitated (Ha)		
		To date: 31/12/2020	Last report	Next Period (est.)
A:	MINE LEASE AREA			
A1	Mine Lease(s) Area (Ha)	2333.2		
B:	DISTURBED AREAS			
B1	Infrastructure area (other disturbed areas to be rehabilitated at closure including facilities, roads)	211	77	211
B2	Active Mining Area	0	0	-
B3	Waste emplacements	0	0	-
B4	Tailings emplacements	0	0	-
B5	Shaped waste emplacements	0	0	-
B6	Topsoil Stockpiles	84	51	84
B7	Cleared Ahead	140	307	140
Total Disturbed		**435**	**435**	**435**
C:	REHABILITATION PROGRESS			
C1	Decommissioning	-	-	-
C2	Landform Estabishment			
C3	Growth Medium Development	-	-	-
C4	Ecosystem and Land Use Establishment	-	-	-
C5	Ecosystem and Land Use Sustainability			
C6	Land Relinquishment	-	-	-
Total Under Rehabilitation Phase		-	-	-

Figure 23 – Disturbance and rehabilitation areas



9 COMMUNITY

9.1 Complaints

No complaints were received related to the Atlas-Campaspe project during the reporting period.

9.2 Community engagement

Community engagement during the construction phase in 2020 at the Atlas-Campaspe project included:

- Regular meeting with Balranald Shire Council and Central Darling Shire Council
- Meetings with local Aboriginal communities to discuss future employment opportunities
- Contact with local landholders for progress on project
- Procurement of local businesses for on the ground works
- Financial support to local community groups and scholarships for school children

10 INDEPENDENT AUDITS

Tronox is required within 18 months of the commencement of construction at the Atlas-Campaspe project, and every 3 years thereafter, to commission an Independent Environmental Audit of the development.

The audit must:

(a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Secretary;
(b) include consultation with the relevant agencies;

(c) assess the environmental performance of the development and assess whether it is complying with the requirements in this approval, and any other relevant approvals, relevant EPL/s and/or Mining Lease (including any assessment, plan or program required under these approvals);

(d) review the adequacy of any approved strategy, plan or program required under the approvals; and

(e) recommend measures or actions to improve the environmental performance of the development, and/or any strategy, plan or program required under these approvals.

Within 3 months of commissioning the audit a copy of the audit report will be submitted to the Secretary, together with its response to any recommendations contained in the audit report.

The first Independent Audit of the Atlas-Campaspe project was conducted in October 2019 by Telford Environmental Consulting who appointment was approved by the Department of Planning, Industry and Environment. The audit along with Tronox's responses to auditor recommendations were submitted to the DPIE on 20 November 2019. The next Independent Environmental Audit will be undertaken in October 2022.

11 ACTIVITIES PROPOSED IN NEXT REPORTING PERIOD

11.1 Approval triggers

11.1.1 Development Consent (SSD_5012)

Schedule 3, Condition 1

Within 12 months of commencing construction on the site and prior to the haulage of mineral concentrate, unless otherwise agreed with the Secretary, the Applicant shall implement the road upgrade, realignment and intersections works detailed in Table 1 to an acceptable standard for Type 1 Road Trains, to the satisfaction of the applicable roads authority.

Gravel was crushed in preparation of road construction in 2019/20 and vegetation was cleared in the road corridor in preparation of upgrade works. As advised previously in 2019. road upgrade works will be completed prior to the haulage of mineral concentrate and not within 12 months of commencing construction as originally envisaged.

Schedule 3, Condition 9

The Applicant shall prepare and implement a Transport Management Plan for the development to the satisfaction of the Secretary.

A construction only Transport Management Plan was approved in 2018, a revision of the plan is required prior to mining operations. The revision will take place during the 2021 reporting period.

Schedule 3, Condition 12

Within 12 months of commencing construction on the site, unless the Secretary agrees otherwise, the Applicant shall make suitable arrangements for the long-term protection of the biodiversity offsets listed in Table 2 in consultation with OEH and to the satisfaction of the Secretary.

An application for a change of lease purpose to conservation was lodged with DPI Lands Department. The change of lease was approved by Crown Lands on 27 April 2020.

Schedule 3, Condition 34

The Applicant shall prepare and implement a Rehabilitation Management Plan for the development to the satisfaction of NSW Trade & Investment.

A Rehabilitation Management Plan has been developed during the 2020 reporting period. RMP is yet to be approved by DPIE.

11.1.2 Mining Operation Plan

A revision of the Mining Operation Plan (MOP) is required prior to mining activities and approval by DPI Resource Regulator is required prior to the commencement of mining. The current MOP expired 31 January 2020. Due to the suspension of construction the Atlas mine an extension of the Mining Operation Plan was granted until 31 January 2022.

11.1.3 Management Plan Revisions

Transport Management Plan

A revision is required prior to commencement of mining operations at Atlas, the plan is to be revised to include the management of the mineral haulage route and other road users.

Rehabilitation Management Plan

A Rehabilitation Management Plan was developed in 2020 based on principals adopted at the Ginkgo and Snapper mines owned by Tronox prior to the commencement of mining at Atlas. The was developed in consultation with all required agencies as specified in the Development Consent, Condition 34 of Schedule 3. The Plan has not yet been approved.

Water Management Plan

A revised Water Management Plan is required in 2021 prior to the commencement of mining operations. The plan must provide details of water infrastructure installed during construction, operating water management principals and a full site water balance.

Radiation Management Plan

A Radiation Management Plan is required prior to the transport of process waste from Tronox's Broken Hill Mineral Separation Plant to the Atlas site. The plan was developed by an appointed expert approved by DPIE. The Plan was submitted to DPIE for review and comment, a revised plan was approved by DPIE on 25 September 2020.

11.1.4 Environment Protection Licence

A variation is required prior to the commencement of mining operations to allow the fee-based activity "Mining for minerals" at a scale of >5,000,000 T produced per annum.

11.2 Biodiversity Offset

Controlling of feral animals

Feral goats and other pest animals will be controlled and monitored in 2021 each quarter.

Fencing

Fence the Offset to exclude livestock will occur in 2021.

Signage

Install signage at the access points around the Offset will occur in 2021.

Closure of artificial water points

Artificial watering points in the offset area will be closed (ripped or backfilled so the dams no longer hold water) to prevent access from feral animals. Two artificial water points were closed in 2019.

Vegetation and habitat monitoring

Quarterly monitoring of vegetation and habitat will continue in 2021.

Threatened fauna monitoring

The third round of monitoring for the Corban's Long-eared Bat and Malleefowl was delayed due to COVID-19 restrictions but will be completed in 2021.

11.3 Cultural Heritage

Monitoring

Monitor the identified cultural heritage sites and ensure fencing is adequate to prevent accidental disturbance to any sites. Cultural heritage inspection and salvage works will be conducted in 2021 at the Ivanhoe Rail Facility prior to any works.

11.4 Land preparation

Vegetation clearing will occur at the Ivanhoe Rail Facility site in 2021.

11.5 Operations during next reporting period

During the next reporting period the following developments are scheduled.

(a) Haul road construction
(b) Development of bore field
(c) Construction of the mining civils (Start-up pit, water dam and tailings storage facility)
(d) Construction of the non process infrastructure (water, power, buildings, boom gates etc)
(e) Construction of the accommodation village near the temporary mine camp
(f) Construction of the mining and processing plants
(g) Construction of the Telstra tower and ancillary facilities
(h) Bulk earthworks and construction of a rail siding at the Ivanhoe Rail Facility (a secondary site approximately 240 km north of the Atlas mine near Hay, NSW). Construction of the rail loop and infrastructure at Ivanhoe
(i) Concrete works as required.
(j) Associated supporting infrastructure (i.e., lay down areas, stockpile areas for construction, fuel storages, etc.).