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1. INTRODUCTION

This report reviews the performance outcomes for environmental management conducted in accordance with Ministerial Statement 790 (MS790) and associated Proponent Management Commitments for the 2009 to 2012 period. This specifically relates to the Tronox Cooljarloo Mine – Falcon Extension, a minor extension of the dry-mining operations on the Cooljarloo Mining Lease (ML268/SA). In doing so it seeks to fulfil Ministerial Conditions 5.1 and 5.2 as stated below:

790:M5.1 The proponent shall submit to the CEO of the Department of Environment and Conservation Performance Review Reports at the conclusion of the second and fourth years after the start of productive mining and then, at such intervals as the CEO of the Department of Environment and Conservation may regard as reasonable, which addresses:

- 1. the major environmental risks and impacts; the performance objectives, standards and criteria related to these; the success of risk reduction/impact mitigation measures and results of monitoring related to the management of the major risks and impacts;*
- 2. the level of progress in the achievement of sound environmental performance, including industry benchmarking, and the use of best available technology where practicable; and*
- 3. significant improvements gained in environmental management which could be applied to this and other similar projects.*

790:M5.2 The proponent shall make the performance review reports required by condition 5-1 publicly available in a manner approved by the CEO of the Department of Environment and Conservation.

1.1. PROJECT DESCRIPTION

1.1.1. COMPANY NUMBER AND SITE ADDRESS

Tronox Management Pty Ltd

ACN: 59 009 343 364

Tronox Cooljarloo Mine Site

Tenement ML268/SA

Brand Highway

CATABY WA 6507

1.1.2. SITE OPERATIONS AND LEASE DESCRIPTION

The Cooljarloo Mining Lease (ML268/SA) is located some 170km north of Perth and about 12km north of Cataby in Western Australia and covers three freehold lots (1,092ha) and an area of Unallocated Crown Land (UCL) (8,651ha), as granted in accordance with the Mineral Sands (Cooljarloo) Mining and Mineral Processing State Agreement Act, 1988. See **Figure 1**.

The Falcon extension lies within the north-western-most extremity of ML268/SA and encompasses the 25,000 and Lone ore-bodies, as well as minor portions of the 13,000 ore-body as presented **Figure 2**. At Cooljarloo the deeper low-grade ore-bodies tend to be dredge-mined while the mid- to upper level ore-bodies are dry-mined. The Falcon extension was exclusively dry-mined.

1.1.3. ENVIRONMENTAL MANAGEMENT SYSTEM

The Cooljarloo mining operation is *ISO 14001:2004 (Environmental Management Systems Standard)* certified. This system helps to ensure that continual improvement in environmental performance is driven by the sequential setting and achievement of ever-increasing performance targets. Performance targets are set annually by the Senior Management of the operation in order to:

- Strive for improvement against previous performance;
- Help ensure that the environmental and community relations commitments made for the operation are achieved (Refer to **Appendix 1**);
- Help ensure that legal requirements will be met; and

- In order to mitigate significant environmental and community relations risks for the operation.

1.2. KEY FACTORS AND ASSOCIATED RISKS

EPA Report 1299 sets out the EPA's findings regarding the environmental effects of the Falcon Mining proposal. It determined that, in the EPA's opinion, the following key environmental factors were relevant to the proposal and required evaluation:

- (a) Flora and Vegetation;
- (b) Groundwater; and
- (c) Rehabilitation and Closure.

2. PROJECT STATUS

The Falcon extension received environmental approval during March 2009 and mining (ore removal) commenced during May 2009. Mining ceased during October, 2011 and rehabilitation activities for the remainder of the disturbed areas commenced and were concluded in April, 2012. A total of 141.5ha were disturbed and rehabilitated over the life of mine for the Falcon extension. Completed activities are presented in **Figure 2** (ore-mining and backfilling), **Figure 4** (disturbance progress) and **Figure 3** (rehabilitated area).

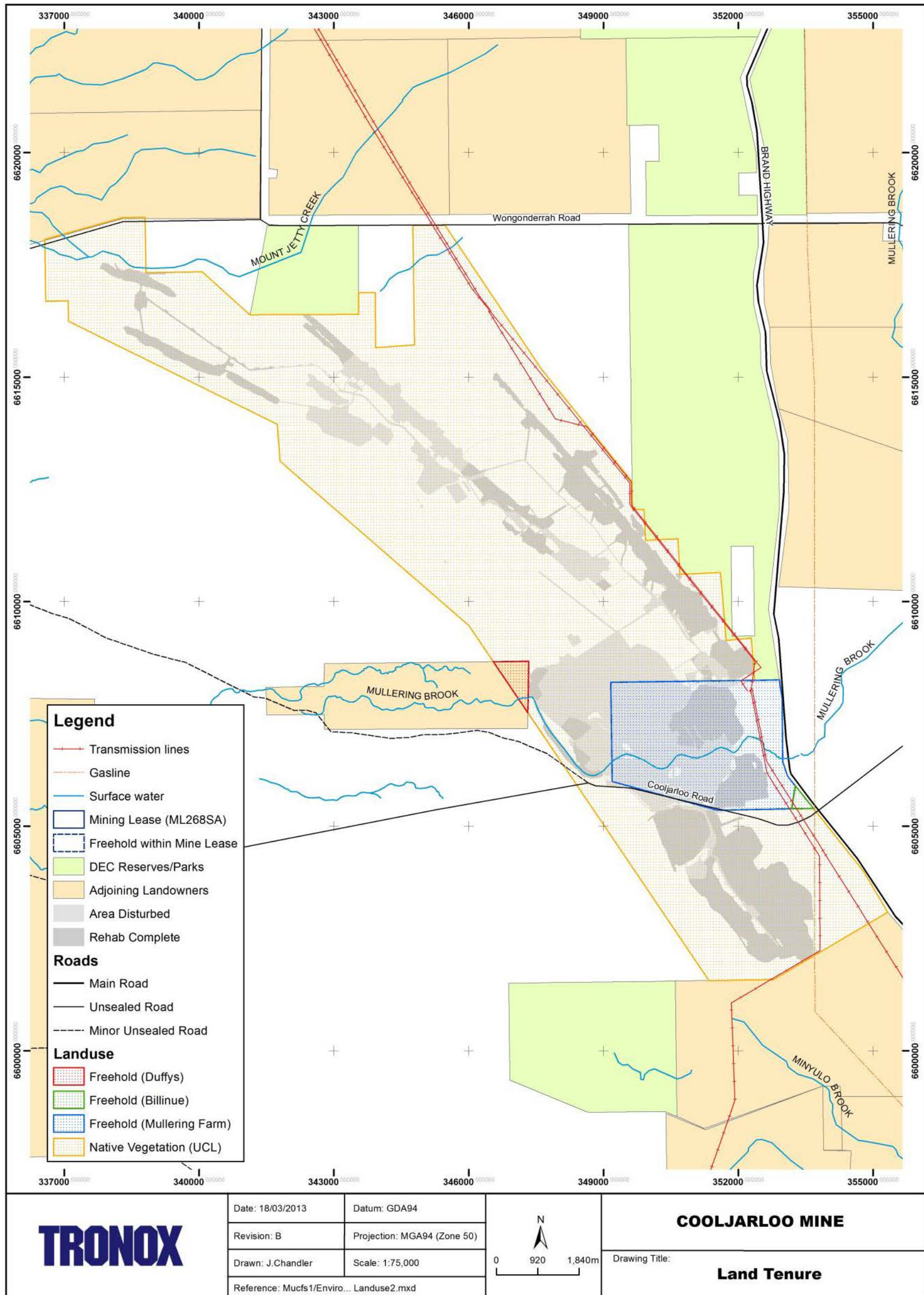


FIGURE 1: LAND TENURE

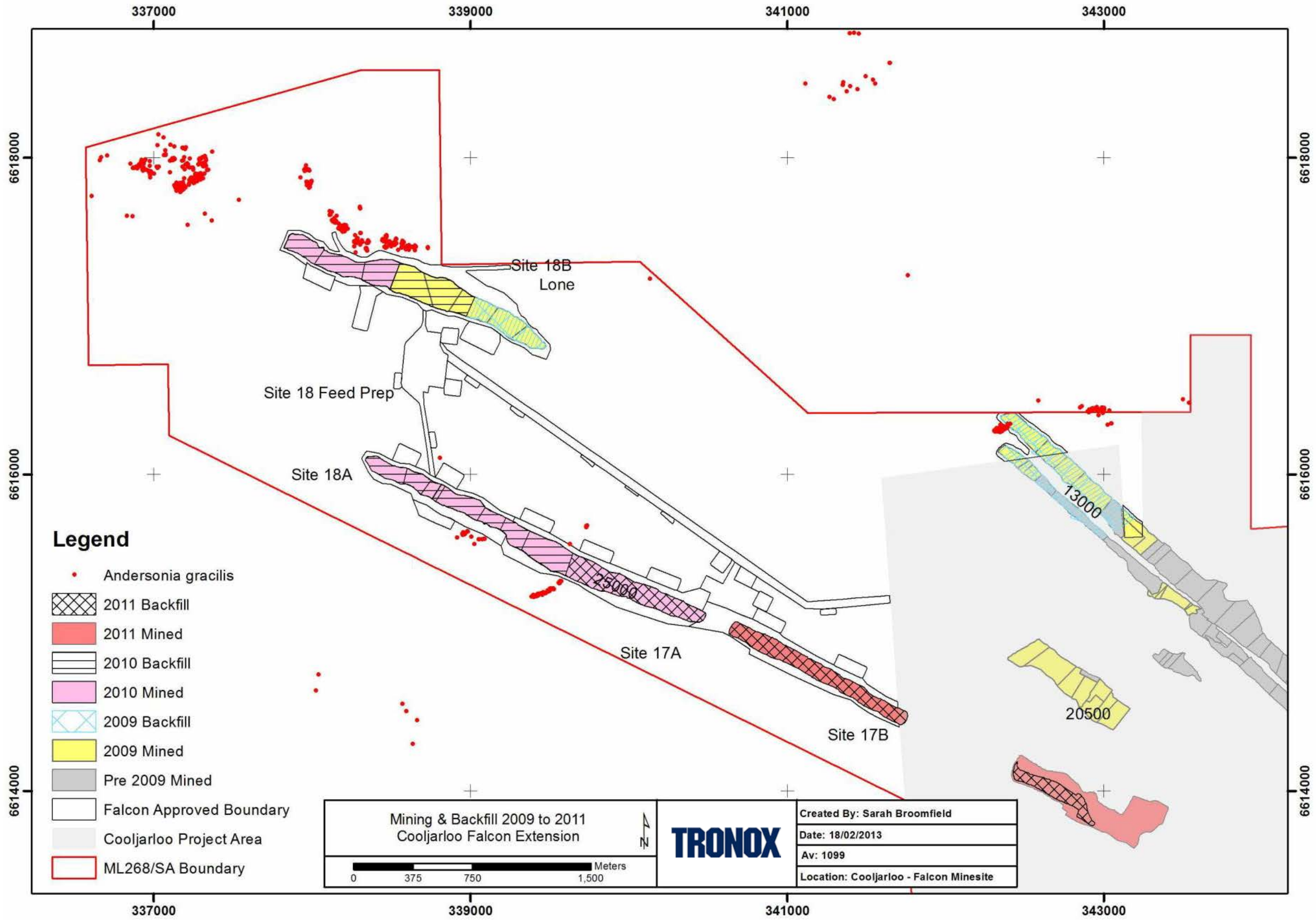


FIGURE 2: MINING AND BACKFILL – FALCON EXTENSION

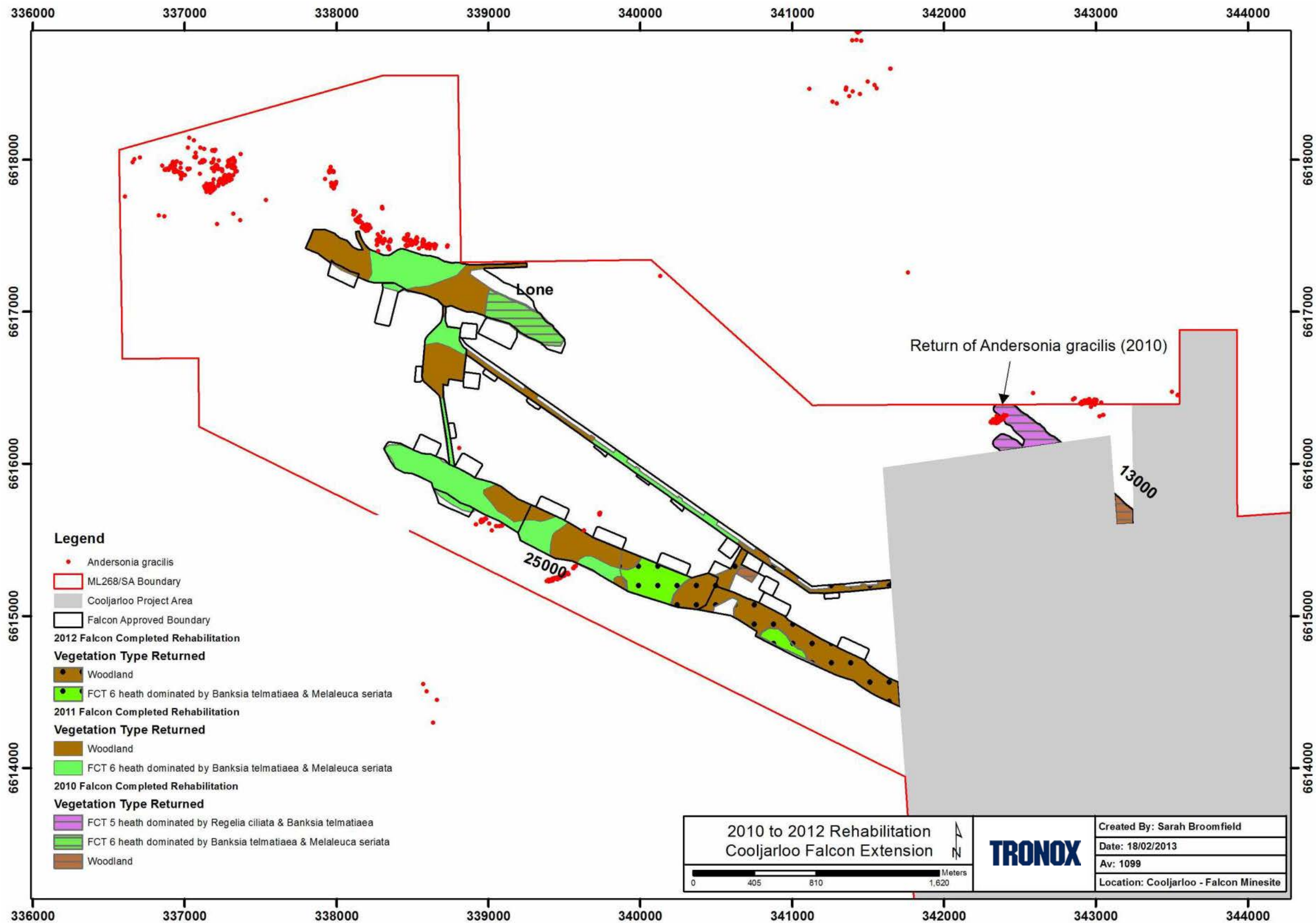


FIGURE 3: REHABILITATION – FALCON EXTENSION

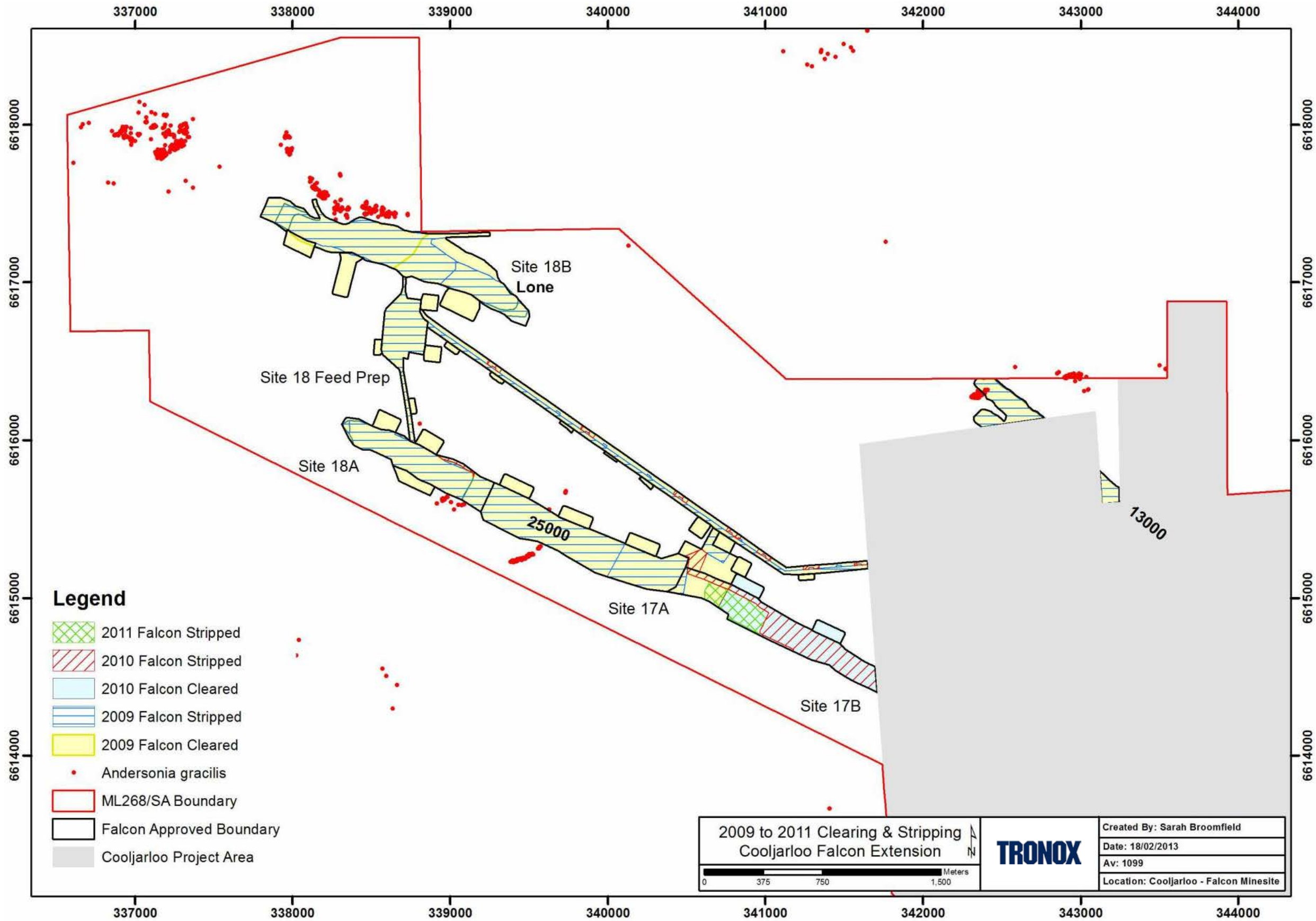


FIGURE 4: VEGETATION CLEARING AND TOPSOIL STRIPPING – FALCON EXTENSION

3. PERFORMANCE REVIEW

This section provides commentary on environmental management performance as required under M790:5-1. Detailed commentary regarding the management of the key risks as identified in EPA Report 1299 is provided in **Table 1**, **Table 2** and **Table 3** within **Sections 3.1**, **3.2** and **3.3** of this report.

It addresses:

- Major environmental risk management;
- Progress levels for sound environmental performance achieved; and
- Significant environmental management improvements gained.

This report compliments information provided in the annual Falcon Environmental Compliance and Monitoring Reports (Tiwest 2012, 2012a; and Tronox 2013 and 2013a) and site wide Annual and Triennial Environmental Reports (Tiwest 2012b and Tronox 2013b).

In general, environmental management measures have been implemented in accordance with the proposal documentation. Key areas of success include:

- Tronox has maintained an ISO14001 certified Environmental Management System throughout implementation of this proposal. External audits are conducted annually and no major non-conformances have been raised for the full period;
- Groundwater drawdown and vegetation impacts associated with the Falcon Proposal have been less than estimated in the EPS and associated technical studies. This is primarily attributed to the significant ongoing efforts in implementing mitigation measures by Tronox. In addition it is recognised that the drawdown modelling and ecological risk assessment overestimated the risk of vegetation impact;
- Ongoing investigation into the response of vegetation to groundwater drawdown including post-impact recovery and fire response;
- The ongoing application of a management hierarchy during mine plan refinement allowed the majority of *Andersonia gracilis* populations to be avoided; and
- Continued significant contributions into the development of measures for the detection, containment and treatments of *Phytophthora Dieback*.

3.1. FLORA AND VEGETATION

EPA Objectives:

- Protect DRF, Priority flora and other species of conservation significance, consistent with the provisions of the Wildlife Conservation Act 1950; and
- Maintain the species abundance, diversity, geographic distribution and productivity of floristic communities.

TABLE 1: FLORA AND VEGETATION RISKS SUMMARY

Risks:	Management Methods:	Key Outcomes:	Initiatives and Improvements:
<p>Mine Clearing:</p> <ul style="list-style-type: none"> DRF and other conservation significant flora populations located within and adjacent to the mine footprint. 	<ul style="list-style-type: none"> Limit Clearing to 185ha. Avoid whole <i>A. gracilis</i> populations removal. Restore <i>A. gracilis</i> population portions by means of topsoil translocation. Rehabilitate all areas disturbed. Return conservation significant flora in rehabilitation. 	<p>Actual mine clearing impacts to this <i>A. gracilis</i> were lower than predicted in the EPS as a result of changes to the mine plan – only one of two <i>A. gracilis</i> populations were disturbed during mining. Topsoil removed from the population disturbed was stockpiled separately and returned to the same area post-backfill within 12 months of stripping. Seed was also collected from <i>A. gracilis</i> for investigative and rehabilitation purposes.</p> <p>Other conservation species management followed the <i>A. gracilis</i> approach. In the first instance, where avoidable, individuals were avoided during the mine planning phase. Where unavoidable, their return in rehabilitation will be tracked. Return in rehabilitation is being attempted by means of targeted topsoil handling and placement.</p> <p>Refer to Appendix 2 for DRF and significant flora locations found in rehabilitation to date.</p>	<p>Tronox, in association with the WA Herbarium and University of Western Australia, has supported detailed study into:</p> <ul style="list-style-type: none"> <i>Isopogon sp. Badgingarra</i> (complete); <i>Acacia saligna subsp. O'sullivaniana</i> (complete); and <i>Grevillea thelemanniana subsp. Cooljarloo</i> (in progress) <p>This work appears to have been an efficient and effective method of improving knowledge regarding these conservation-significant species.</p> <p>A research and plant development project was developed in conjunction with the Botanic Gardens and Parks Authority, Kings Park, to produce <i>A. gracilis</i> plants from seed collected from plants prior to clearing. Once developed, plants will be used within the translocation area and in other suitable rehabilitated areas at Falcon. It is expected that by mid-2013 tube-stock will be available for planting within the translocation area and in suitable rehabilitation at Falcon.</p>

Risks:	Management Methods:	Key Outcomes:	Initiatives and Improvements:
<p>Groundwater Drawdown:</p> <ul style="list-style-type: none"> • Potential phreatophytic vegetation impacts within mine dewatering related drawdown zones. • DRF within close proximity. • Thirteen priority species within close proximity. • No impacts on Wongonderrah NR expected. 	<ul style="list-style-type: none"> • Quarterly vegetation health assessment. • Time dewatering within the impact risk zone during winter in order to reduce vegetation stress risk. • Cease activities if monitoring indicates excessive drawdown. • Artificial aquifer recharge if drawdown causes stress on vegetation. • Monitor vegetation in order to ensure a return to pre-impact composition. 	<p>Drawdown in the superficial aquifer resulting from mine dewatering caused by in-pit sumps is managed to minimise impact on groundwater dependant ecology, most notably vegetation.</p> <p>In implementing the Falcon Proposal, thresholds for drawdown set out within the ministerial conditions were exceeded. However, drawdown was not excessive with levels returning to above thresholds in 2012 with little impact to vegetation and no impact to conservation significant species has been observed. This is mainly the result of: the thresholds being incorrect (as described in Tiwest 2010 and 2011); active drawdown management by Tronox; and the framework for setting the thresholds being ecologically conservative (overestimating the likelihood of a moderate or greater impact occurring).</p> <p>Furthermore, actual drawdown has remained less than that predicted by the groundwater modelling that was undertaken as part of the impact assessment. This is considered to be due to the model over-estimating drawdown and the positive impact of efforts made to reduce drawdown. Tronox's approach to apply adaptive management for addressing drawdown appears effective. This approach was described in the management plan presented with the EPS (Tiwest 2008).</p> <p>In practice, Tronox has mainly relied on modifying water handling practices and to a lesser extent, the mining or backfill sequence. Water handling offers significantly greater flexibility and response times than modification of mining location or sequence. The linear nature of the deposits, render mining activity relocations a more expensive and less effective outcome option.</p>	<p>Vegetation monitoring plots were established in areas displaying water stress that are outside the Falcon extension area. This will ensure that information, contributing to post-stress event vegetation response understanding, is collected. Furthermore, in consultation with the regional DEC office, some of these areas were subjected to controlled burns in order to determine whether fire has a significant bearing on the recovery timing and extent. Results from these investigations indicate that previous stressed vegetation is now in its recovery phase.</p> <p>Monitoring has indicated that there had been no groundwater drawdown effects on the DRF and Priority Flora at Falcon (WEC 2012).</p> <p>Tronox continue to consult with relevant experts (e.g. Dr Ray Froend) regarding refining the management of drawdown related risks.</p>

Risks:	Management Methods:	Key Outcomes:	Initiatives and Improvements:
<p>Weeds and <i>Phytophthora cinnamomi</i>:</p> <ul style="list-style-type: none"> Mining activities could increase weeds and introduce <i>Phytophthora cinnamomi</i>. 	<ul style="list-style-type: none"> Restrict vehicles to established roads. Vehicle washdown facilities. 	<p>Equipment hygiene and site access has been controlled in accordance with Tronox Dieback Management Plan. This was revised during 2008/9 in response to the identification of a <i>P. cinnamomi</i> infestation in the wider tenement area (some kilometres southeast of the Falcon extension). Some minor hygiene practices breaches have occurred and been reported in the internal incident reporting systems. These generally relate to failure to stop in the automatic wash-station or unauthorised access to the tenement.</p> <p>The site-wide <i>P.c.</i> monitoring status, using risk based sampling and interpretation, has not presented any additional infestations within the Falcon extension area.</p> <p>A baseline weed densities assessment within the Falcon Area was completed during 2008/9 to provide reference information for rehabilitation. This will be considered in setting rehabilitation criteria in accordance with M790: 8-3.1(3).</p>	<p>Tronox support consultation, development and research into <i>P.c.</i> dieback management. Within the tenement area, the main activities are centred on managing the identified infestation and include collaboration with CPSM on containment and eradication activities.</p> <p>Support of other <i>Phytophthora</i> activities provided by Tronox includes:</p> <ul style="list-style-type: none"> MERIWA Project M399: Susceptibility to <i>Phytophthora cinnamomi</i> and Sensitivity to Phosphate in Native Australian Plants: Why are they Linked? Currently in Year 4 of a 5 year programme. Other minor projects with CPSM, Curtin (Elaine Davidson). Collaboration though the Dieback Consultation Council/Northern Sandplains Dieback Working Party networks. Research into containment and eradication measures in association with CPSM within the mine lease. Sponsorship and attendance of the Dieback Information Group's annual conference. Investigations into using remote sensing and aerial photography to aid in field interpretation, sampling and diagnosis over large areas in collaboration with Glevan Consulting.

Risks:	Management Methods:	Key Outcomes:	Initiatives and Improvements:
<p>Dust:</p> <ul style="list-style-type: none"> Proposed mining activities have the potential to generate excessive dust which could have detrimental flora and vegetation impacts. 	<ul style="list-style-type: none"> Implement dust management measures as per the Part V licence. 	<p>Dust has been managed in accordance with the management plan (See Attachment 3 of the Cooljarloo Site Environmental Licence L5319/1988/12) and monitoring results suggest that this is effective. All Falcon sites remain below the <math>10\text{g}/\text{m}^2/\text{month}</math> internal target (for the lease boundary) as measured at depositional gauges. Topsoil stripping and placement have been occasionally halted due to high wind conditions.</p>	<p>Investigation into alternative methods and materials to be used in site stabilisation (especially rehabilitation) is ongoing. To date, mulch, oats cover crop and slimes (clay tailings) have proven effective for different applications. Other polymer based chemical stabilisers have generally demonstrated limited success for general site stabilisation.</p>

3.2. GROUNDWATER

EPA Objectives:

- Maintain the quality and quantity of groundwater so that existing and potential uses,
- including ecosystem maintenance are protected.

TABLE 2: GROUNDWATER RISKS SUMMARY

Risks:	Management Methods:	Key Outcomes:	Initiatives and Improvements:
<p>Acid Sulfate Soils:</p> <ul style="list-style-type: none"> Proposed dewatering and mining activities could expose acid sulfate soils (ASS) to oxidising conditions, bringing about acidic material leaching and so causing groundwater contamination. 	<ul style="list-style-type: none"> Plan pit limits to avoid basement lithological units characterised by its black colour and increasing clay content. Return such materials that are within the saturated zone to a similar depth during landform reconstruction. Monthly groundwater quality monitoring in piezometers adjacent to active mining areas and in-pit water. Monitoring would continue for at least 3 months post-backfilling. Management actions such as capping, blending, ASS relocation or neutralisation in order to mitigate impacts if unearthed. 	<p>To date no materials considered potentially acid-forming have been encountered. Similarly, groundwater drawdown has remained above levels known to contain potentially acid-forming materials.</p> <p>Discussions of management outcomes for drawdown management in general are provided in Flora and Vegetation (Section 3.1).</p> <p>From groundwater quality monitoring some minor changes in key parameters were observed but all are considered within general expected ranges.</p> <p>No ASS ameliorative management actions have been required to date.</p>	<p>Nil to report.</p>

3.3. CLOSURE AND REHABILITATION

EPA Objectives:

- Ensure that closure and rehabilitation achieves stable, non-polluting and functioning landforms which are consistent with the surrounding landscapes and other environmental values; and
- Ensure that self-sustaining native vegetation communities are returned after mining which, in species composition and ecological function, are as close as possible to naturally occurring analogue sites.

TABLE 3: CLOSURE AND REHABILITATION RISKS SUMMARY

Risks:	Management Methods:	Key Outcomes:	Initiatives and Improvements:
<p>Rehabilitation failure to meet expected outcomes (i.e. rehabilitation objectives).</p>	<ul style="list-style-type: none"> • Progressive mine void backfill and mine disturbance rehabilitation. • Topsoil management practices. • Seeding, mulching and stabilisation practices. • Selective stripping, handling and placing landforming resources to ensure appropriate soil profiles and landforms return. • Targeted DRF and other conservation significant species return. • Selectively stripping, handling and storing rehabilitation resources including topsoil, seed and mulch. • Monitoring rehabilitation outcomes. • Ongoing rehabilitation criteria, methods and practices development by means of continuous improvement processes. 	<p>Progressive rehabilitation has been completed within the Falcon area. Landform reconstruction is undertaken in accordance with the plan and recorded by means of rehabilitation signoff records.</p> <p>Rehabilitation resources handling is in accordance with the plan and recorded by means of rehabilitation signoff records.</p> <p>Tronox revisited baseline rehabilitation data (reference plots) during 2008/9. This includes expanding the dataset to encompass the Falcon extension.</p> <p>From 2008 to date Tronox has been consulting with the Minerals Sands Agreement Rehabilitation Coordinating Committee (MSARCC) regarding completion criteria revision or finalisation. See further detail as presented under the Initiatives and Improvement column to the right.</p> <p>All rehabilitation for the Falcon tenement is completed. Formal rehabilitation monitoring was completed in mid-2012. Data is currently being analysed with a report expected in April, 2013. Early establishment monitoring indicates that rehabilitation is developing well. See Appendix 3.</p>	<p>During 2008 Tronox sought to redraft completion criteria for the Cooljarloo Minesite. This process involved an initial review of rehabilitation processes and proposed a framework for the development of the criteria (the Woodman Nichols Review referred to in M790: 8-6). Tronox then held a workshop with key regulators (MSARCC members) and other stakeholders to consult on the rehabilitation criteria. From the outcomes of this consultation, criteria were then drafted and circulated for discussion. Shortly thereafter Tronox also completed and circulated a detailed review of existing rehabilitation performance. During 2011 Tronox circulated a draft Improvement Plan setting out all improvement activities planning in the area of rehabilitation for the coming 5 years.</p> <p>Throughout this process Tronox consulted with key technical experts on soils, flora and fauna and hydrology as well as rehabilitation techniques. Tronox also maintains an active information exchange with Iluka Pty Ltd regarding rehabilitation and environmental management practices in general.</p> <p>The Rehabilitation Completion criteria and Improvement Plan have been incorporated into the Cooljarloo Mine Closure Plan for regulatory endorsement. This Plan will be submitted during March, 2013.</p>

4. REFERENCES

Tiwest 2008, Cooljarloo Mine (M268SA) Falcon Extension Environmental Protection Statement, (EPS). Unpublished report by Tiwest Pty Ltd.

Froend 2009, Cooljarloo Vegetation Mortality Risk Assessment Review of Groundwater Management Trigger Levels: Falcon Extension. Unpublished report by Froend Bowen & Associates for Tiwest Pty Ltd

Tiwest 2012, Falcon Compliance Report. Unpublished report by Tiwest Pty Ltd.

Tiwest 2012a, Falcon Monitoring Report. Unpublished report by Tiwest Pty Ltd.

Tiwest 2012b, Annual Environmental Report. Unpublished report by Tiwest Pty Ltd.

Tronox 2013, Falcon Compliance Report. Unpublished report by Tronox Pty Ltd.

Tronox 2013a, Falcon Monitoring Report. Unpublished report by Tronox Pty Ltd.

Tronox 2013b, Triennial Environmental Report 2010 – 2012. Unpublished report by Tronox Pty Ltd.

Woodman Environmental Consulting (WEC) 2011: Falcon Mineral Sands Project Monitoring of Potential Groundwater Drawdown Impacts on Vegetation at Falcon. Unpublished report by Woodman Environmental Consulting Pty Ltd for Tiwest Pty Ltd.

Woodman Environmental Consulting (WEC) 2012: Declared Rare Flora and Priority Flora Health Monitoring for the Falcon Project Area. Unpublished report by Woodman Environmental Consulting Pty Ltd for Tiwest Pty Ltd.

APPENDIX 1: STATEMENT OF COMMITMENT

COOLJARLOO

Environment and Community Relations Statement of Commitment

We will abide by the principles of the Tronox Environmental Policy and add value to the Cooljarloo environment and the local community through a shared commitment to continual improvement in every facet of our business. We will specifically:

- Comply with all legal and other requirements as a minimum by ensuring current and anticipated legal requirements are reflected in set annual targets.
- Maintain a robust environmental management system that drives continual improvement and ensures risks are mitigated, legal requirements are fulfilled and the expectations of the community are met.
- Seek to prevent the pollution of land and water through the provision of facilities that contain emissions and the management of activities to prevent spillage of fuels and process wastes and, the generation of dust.
- Protect sites of cultural heritage by ensuring that all areas are thoroughly checked prior to disturbance and that no disturbance occurs without approval.
- Protect our flora and fauna by:
 - minimising areas of disturbance
 - progressively rehabilitating disturbed areas to a high standard
 - preventing the introduction of the die-back pathogen *Phytophthora cinnamomi* to the active mining leases
 - contributing to the Western Shield regional fox baiting programme
 - undertaking targeted environmental research
- Conserve resources and minimise greenhouse emissions by operating efficiently and minimising waste.
- Manage our abstraction of ground-water to avoid adverse impacts on vegetation.
- Respond quickly and effectively to stakeholder concerns.
- Communicate openly with employees, the community and regulatory authorities and capitalise on opportunities that benefit the environment and the community.

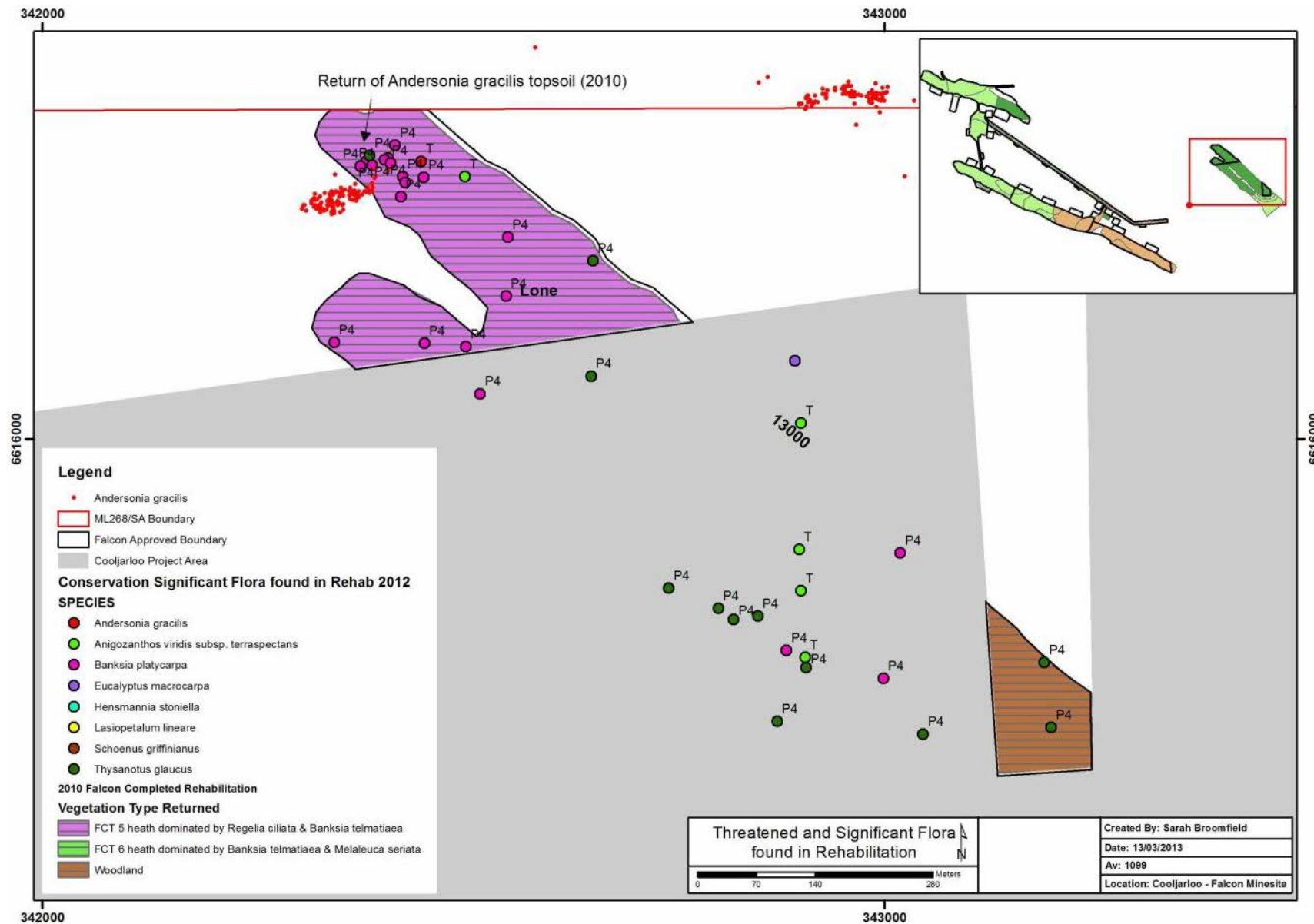


RUSSELL AUSTIN
General Manager
Northern Operations



PAUL GILMAN
Operations Manager
Cooljarloo

APPENDIX 2: DRF AND SIGNIFICANT FLORA IN REHABILITATION



APPENDIX 3: REHABILITATION MONITORING DATA

2012 Rehabilitation Walk-throughs:									
Monitoring Type:	Rehabilitation Year:	Site:	Vegetation Type:	Trees/ha:	Stem/m ² :	Species/m ² :	Weeds/m ² :	Mulch % Cover / m ² :	Comments: (landform/appearance/site development)
Early-establishment monitoring	2012	Falcon 17A	Woodland (FCT 7)	600	<5	<5	0	14	Site developing well.
Early-establishment monitoring	2012	Falcon 17B	Woodland (FCT 7)	1081	<5	<5	0	13	Site developing well. Evidence of kangaroo grazing.
Early-establishment monitoring	2012	Falcon Road	Woodland (FCT 7)	579	<5	<5	0	20	Site developing well.
Early-establishment monitoring	2012	Falcon 17A	Wet Heath (FCT 6)	333	<5	<5	0	17	Site developing well. Evidence of kangaroo grazing.
Early-establishment monitoring	2012	Falcon 17B	Wet Heath (FCT 6)	175	<5	<5	0	12	Site developing well.