



Exploration Operations Mining Management Plan and Public Report

**NORTHERN STAR (TANAMI) PTY LTD
TANAMI REGIONAL EXPLORATION PROJECT
MARCH 2017**

Document Distribution List: NT Department of Primary Industry and Resources
 Central Land Council
 Tanami Gold NL
 Northern Star Resources Ltd

I, MICHAEL MULRONEY – CHIEF GEOLOGICAL OFFICER declare that to the best of my knowledge the information contained in this Mining Management Plan is true and correct and commit to undertake the works detailed in this plan in accordance with all the relevant Local, Northern Territory and Commonwealth Government legislation.

SIGNATURE:

A handwritten signature in blue ink, appearing to read "Michael Mulroney", written over a dotted line.

DATE: 08 / 03 / 2017

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1. AMENDMENTS

A Mining Management Plan (**MMP**) for the Tanami Regional Exploration Project (**TRE**) was submitted by Northern Star (Tanami) Pty Ltd (**NST**), a wholly owned subsidiary of Northern Star Resources Ltd (**NSR**), on 10 January 2017. The Department of Primary Industry and Resources (**DPIR**) responded to that submission on 16 February 2017 with a request for additional information.

The tables below describe the amendments made to the MMP in response to the additional information requested by DPIR.

Department Reference: **MR2017/0009**

Section / Reference	Comments	Amendment Reference
General	Please ensure that only information/sections relevant to the Tanami Regional Exploration Project (TRX) are included in your Mining Management Plan (MMP). Some of the references, information and complete sections of the MMP may only be relevant to the Central Tanami Project (CTP). Please ensure that when referring to infrastructure and activities contained within the CTP MMP, that correct references are used. It is understood that some of the information in the MMP will be common to the CTP and TRX projects, however this should be clearly articulated. Please amend or clarify relevant sections where necessary.	Ensured references are made to Tanami Regional Exploration (TRE). Executive summary has been provided at the start of the document to clearly establish the link between the CTP and TRE.
	Your MMP was submitted in 2017. Please amend the front cover of the MMP to reflect the year in which the work will be undertaken (i.e. 2017).	Date changed. Pg. 1
3.0 Project Details	On the maps provided (Figures 1-4) please show the main access roads you intend to use to access your proposed drill locations.	Updated Figures 2-4 with existing access tracks.
3.2 Proposed activities	<i>"NST is applying for conditional approval of the works in this MMP..."</i> Please note that the Department is unable to provide conditional approvals under the <i>Mining Management Act</i> (MMA). The reference to <i>"conditional approval"</i> should be removed from the MMP.	Removed reference to <i>"conditional approval"</i> .
	Please provide digital files of the main access roads you intend to use to access your proposed drill locations. Acceptable files include MapInfo MIF, Google Earth KML, or OziExplorer Track Files PLT.	Added shapefiles of Main Roads and Existing Access Tracks.
4.7 Vegetation Types	The MMP lists vegetation types 348 and 1032. It appears that these correspond with vegetation types 38 and 76 respectively from the Vegetation Survey of the Northern Territory (Wilson, et. al. 1990). If this is the case please advise why the types have different numbers, to that of the published report? Please amend your MMP to use the correct vegetation types. In future, this information must also be referenced correctly in the MMP and the Flora and Fauna Assessment.	Vegetation unit codes correspond to the National Vegetation Information System Version 3.1 (NVIS 2007) as utilised by the NT Department of Environment and Natural Resources. Codes remain unchanged but have added the equivalent Wilson et al. 1990 survey codes. Detailed references added.
4.7 Vegetation Types (Cont.)	Various tenements within the Cave Hill prospect are located on vegetation types:	Maps of TRE tenure added utilising NVIS (2007) code system.

	<p>Mapping Unit 77: Hummock grassland (Soft & Curly Spinifex) with Acacia tall sparse-shrubland overstorey between dunes. This vegetation type covers over 38,858sq km (2.9%) of the NT.</p> <p>Mapping Unit 100: Open grassland (Never Fail) with scattered Acacia and Cassia trees and shrubs. This vegetation type covers over 1,248sq km (0.1%) of the NT.</p> <p>Please amend your MMP to note these different vegetation types.</p>	
4.7.1 Sites of Botanical Significance	<p>This section of the MMP is relevant only to the Central Tanami Project. Please amend this section and provide a map of the relevant tenements, with their underlying vegetation types.</p> <p>All tenements at the Cave Hill prospect (EL9763, EL10355, EL10411, EL22229, EL22378 and EL23342) are located within the South-West Tanami Desert Site of Conservation Significance (SOCS). One of the tenements at the Farrands Hill prospect (EL22061) is located within the South-west Tanami Desert SOCS.</p> <p>Additionally, EL 10355 is also located within the Bluebush Hills Site of Botanical Significance (SOBS) and EL10411 is located within the Western Tanami Palaeodrainage SOBS.</p> <p>Please reassess your proximity to Sites of Conservation Significance (SOCS) and Sites of Botanical Significance (SOBS), and amend your MMP to include references to these areas and their significance to flora and fauna.</p>	Section revised, new map showing Cave Hill and Farrands Hill SOBS and SOCS included with more thorough descriptions.
5.1 Environmental Policy and Responsibilities	You have referred to a number of documents that support your environmental management system. Please provide these to the Department for assessment.	Appendix 18 - Environmental Management Systems and associated documents Appendix 19 - Site Disturbance Permit
5.5.1 Groundwater Monitoring	None of the information in this section is relevant to the Tanami Regional Exploration Project. Please remove this from the MMP.	Details removed.
5.5.2 Workplace inspection & Audits	The schedule provided (i.e. Table 10) details inspection details for the Central Tanami Project. Please provide your proposed schedule for the Tanami Regional Exploration Project.	Original table edited and further TRE specific inspections added.
5.6.1 Objectives and Targets	The schedule provided (i.e. Table 11) details environmental objectives and targets for the Central Tanami Project. Please provide your proposed performance targets for the Tanami Regional Exploration Project.	The same objectives and targets apply to Tanami Regional Exploration as they do the Central Tanami Project. Introductory information to this section has been revised to explicitly state this.
5.7 Emergency Procedures and Incident Reporting	This section does not outline your environmental emergency response procedures. An Emergency Response Plan is referenced in the MMP but is not provided for assessment. Please provide an outline of your emergency response procedures and your Emergency response plan for assessment.	Environmental EMP has been attached as Appendix 20. Note, this EMP is relevant to the CTP and TRE work activities and this is stated explicitly in Section 5.7. Appendix 21 - Hydrocarbon and Chemical Spill Clean Up Procedures
6.0 Exploration Rehabilitation	The rehabilitation methods outlined in Table 12 are applicable to RC & DD drilling on the Central Tanami Project. Please provide your proposed rehabilitation methods for the Tanami Regional	Manual and mechanised remediation methods included in Table 12.

	Exploration Project (i.e. geochemical sampling).	
Appendix 4 Weed Management Plan	This weed management plan was prepared for the Central Tanami Project (CTP). Has a desktop survey been undertaken for the tenements included in the Tanami Regional Exploration Project (TRX)? Please provide details and amend your weed management plan if necessary. The plan should also state that the plan applies to the TRX, not just the CTP.	This weed management plan covers work on all NSR's operations in the NT as explicitly stated in Section 4.7.3. A desktop study has been carried out, wording revised to be more explicit in relation to TRE work activities in Section 4.7.3.
Appendix 10 Security Calculation	<p>In your security calculation, please provide information on the following items:</p> <ul style="list-style-type: none"> • The methodology for calculating the total area of expected disturbance, including the length of off road traverses expected. • Expected mobilisation costs, which includes distances to each prospect from the Central Tanami site. • The Pre-NST Summary indicates that 29.8km of track @ 3m wide (i.e. 8.94ha), was cleared by the previous operator. It also indicates that only 7.4ha has been rehabilitated. This implies that 1.54ha of tracks require rehabilitation at the Cave Hill prospect. Please provide details and, if necessary, amend your security calculation to reflect this outstanding rehabilitation liability. <p>Please ensure your security calculation includes the mobilisation costs (both ways) and, if necessary, is amended to reflect the total level of disturbance for monitoring and weed management. Please refer to the Department's original security calculation spreadsheet for information relating to what is required (i.e. total disturbed area for a minimum of 2 years).</p>	<p>Additional details of previous operator's security calculations have been provided in Section 6.2.</p> <p>Revised security calculation figures are provided in the attached security calculation spreadsheet. See Section 6.2 for further details.</p>

1.0 Operator Details

Operator name: Northern Star (Tanami) Pty Ltd
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1.1 Executive Summary

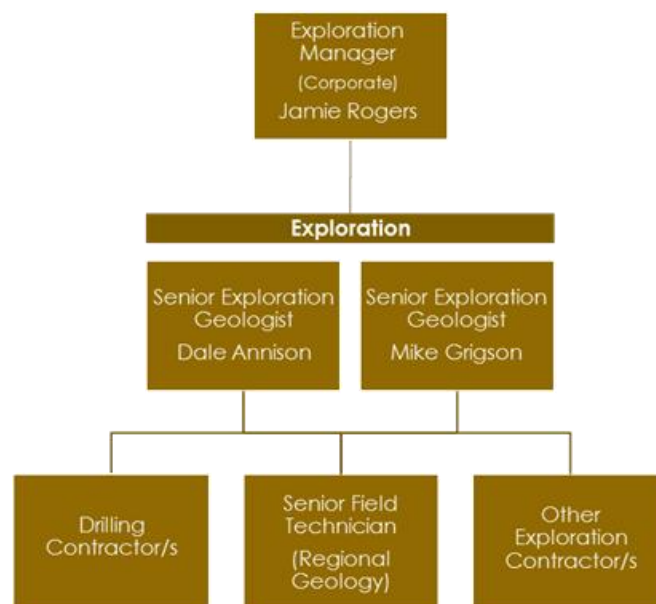
This Mine Management Plan (**MMP**) outlines the proposed work activities over the Tanami Regional Exploration Project (**TRE**). Within this MMP, several sources or associations may be observed between the Central Tanami Project (**CTP**) and TRE. The CTP is a Northern Star (Tanami) Pty Ltd mine site and is a permanent facility. Some documents referenced in this MMP also relate to the CTP, these documents may be generic procedures, management plans or otherwise which NSR utilises for all work activities across the Northern Territory.

1.2 Organisational Structure

The chart below shows the organisational structure of Northern Star (Tanami) Pty Ltd for the proposed exploration activities associated with this phase of TRE, as per Section 40(2)(d) of the Mining Management Act. Where possible, the chart includes the name of the person filling the assigned roles.

1.3 Workforce

NSR's Exploration team for Tanami Regional Exploration (TRE) comprises two exploration teams consisting of two Senior Exploration Geologists and one field assistant, each reporting to the Exploration Manager as a direct supervisor and the CTP Site Manager as an indirect supervisor. Absolute numbers of exploration geologists and field crew may vary (up or down) from time to time depending on work intensity on site.



Whilst on site, the exploration team is aided through site support. This is provided by the Site Administrator, two contract medics and care and maintenance personnel. Environmental and Community Relations functions are coordinated by the NSR's Principal – Environment, Social Responsibility & Government Relations. Specialist environmental consultants are also engaged by NST to assist with the management of various environmental issues.

All employees, other than the Principal – Environment, Social Responsibility & Government Relations, work a rotational fly-in fly-out nominal 16 days on 12 days off roster from Perth, working 12 hour shifts whilst on site. Fly-in fly-out services operate via Broome and/or Alice Springs. Accommodation is provided in the existing mine camp facilities located on MLS153.

All exploration programs will be supervised by competent experienced geologists. All site and contract personnel are required to complete a full site induction covering environmental, health and safety and cultural/heritage practices before commencing work at CTP.

2.0 Identified Stakeholders and Consultation

In line with DPIR's guidelines for identifying and consulting with stakeholders, since acquiring a formal 25% interest in the CTP in July 2015, NSR has undertaken a fit for purpose stakeholder identification/mapping and engagement process. This process ensures all key stakeholders are both aware of NSR as a company and its intentions for near and future term activities.

NSR has conducted a high-level stakeholder mapping process to identify those individuals and organisations that have an interest/intersect in the initial phase of the project. These stakeholders are presented in Table 1 below. These stakeholders are also directly relevant to Regional Exploration works.

Principal stakeholders include DPIR, CLC, Traditional Owners and the owner/manager of Suplejack Downs Station.

Table 1 CTP Stakeholder Register

Stakeholder Name	Key Contact(s)	Title	Key Interest Areas
Department of Primary Industry and Resources <i>DPIR - Alice Springs</i> <i>DPIR - Darwin</i>	Kirsten Johnston Dave Waterson Phil Hausler Peter Waggitt	Mining Team Manager Senior Mining Officer Executive Director Director Compliance	Legal compliance Legal compliance Legal compliance Legal compliance
Central Land Council	Gary Scott Sarah Wilkie Julie-Ann Stoll <i>Traditional Owners</i>	Mining Officer Lawyer Mining Manager	Agreement Implementation Agreement Implementation Agreement Implementation
Central Desert Regional Council	Cathryn Hutton Adrian Dixon	Chief Executive Officer PRESIDENT - Anmatjere Ward	Legal compliance Legal compliance
Suplejack Station	Rob Cook	Station Owner	Natural resource Impacts
Northern Territory Government	Michael Gunner Nicole Manison Kenneth Vowles Lauren Moss	Chief Minister, Minister Aboriginal Affairs Treasurer, Deputy Chief Minister Primary Industry and Resources Minister for Environment and Natural Resources	Project Developments Royalties Environmental Impacts
Department of Treasury and Finance	Eddie The	A/Director Royalty and Advisory Services	Royalties
NT Environmental Protection Authority	Bill Freeland	Chair	Environmental Impacts
NT Geological Survey	Dorothy Close	Director Regional Geoscience	Project Developments
Newmont Mining	Ken Ramsey	Group Executive: Sustainability and External Relations	Project Developments
ABM Resources	Jutta Zimmermann	Chief Financial Officer	Local interactions and information sharing

Table 2 shows a record of face to face engagements with key stakeholders, both leading up to and post-acquisition, as identified in the initial mapping process. This table does not capture the considerable volume of phone and email dialogue that has occurred around these face to face meetings.

Table 2 CTP Stakeholder Consultation Register

Date	Name	Organisation	Location	NSR Attendees	Topic(s)
28/05/15	Kristen Johnston, David Waterson	DPIR Alice Springs	Arid Zone Research Centre, Alice Springs	Guy Singleton, Liza Carpene, Stuart Tonkin, Darren Stralow	Company introduction and project overview prior to entering JV agreement with Tanami Gold.
29/05/15	Julie-Ann Stoll, Sarah Wilkie, Gary Scott	Central Land Council	CLC Office, Alice Springs	Guy Singleton, Liza Carpene, Stuart Tonkin, Darren Stralow	Company introduction and project overview prior to entering JV agreement with Tanami Gold.
2/06/15	NT Chief Minister, Treasurer, Minister for Environment	NT Government	NT Parliament House, Darwin	Bill Beament, Stuart Tonkin, Guy Singleton	Company introduction and project overview prior to entering JV agreement with Tanami Gold.
6/04/15	Dr Bill Freeland	NT EPA	EPA Office, Darwin	Bill Beament, Stuart Tonkin, Guy Singleton, Brad Valiukas	Company introduction and project overview prior to entering JV agreement with Tanami Gold.
22/06/15	Numerous individuals	CLC and Traditional Owners	Central Tanami Mine, NT	Bill Beament, Liza Carpene, Guy Singleton, Darren Stralow	Provide a company overview to Traditional Owners and explain intentions of the project, prior to the CLC consent meeting the following week.
9/07/15	Julie-Ann Stoll, Danielle Campbell, Gary Scott	Central Land Council	CLC Office, Alice Springs	Guy Singleton	Discuss cultural awareness training requirements, access permit protocol, and Tanami biodiversity survey
15/09/15	Kristen Johnston, David Waterson	DPIR Alice Springs	Central Tanami Mine, NT	Guy Singleton, Matt Holmes	Hosted a DPIR site inspection at Central Tanami Mine
28/10/15	Cathryn Hutton, Adrian Dixon	Central Desert Regional Council	ABM Coyote Mine, WA	Guy Singleton, Stuart Tonkin	Provide a high-level summary of project activities to date, and update on intentions moving forward
13/11/15	Kristen Johnston, David Waterson	DPIR Alice Springs	Arid Zone Research Centre, Alice Springs	Guy Singleton, Abe van Niekerk	Discuss letter from DPIR - Peter Waggitt with post inspection tasks
13/11/15	Gary Scott	Central Land Council	CLC Office, Alice Springs	Guy Singleton, Abe van Niekerk	Discuss Aboriginal employment opportunities, and possible expansion of mining project
31/05/16	NT Treasurer, Minister for Environment, Tony Musumeci, Alf Leonoardi	NT Government	NT Parliament House, Darwin	Bill Beament, Guy Singleton	Provide a high-level summary of project activities to date, and update on intentions moving forward
5/01/16	Phil Hausler	DPIR Darwin	DPIR Darwin Office	Bill Beament, Guy Singleton	Provide a high-level summary of project activities to date, and update on intentions moving forward
5/01/16	Eddie The	Department of Treasury and Finance	Treasury Office, Darwin	Bill Beament, Guy Singleton	Provide a high-level summary of project activities to date, and update on intentions moving forward, project royalty clarification

Date	Name	Organisation	Location	NSR Attendees	Topic(s)
24/08/16	Numerous individuals	CLC and Traditional Owners	Central Tanami Mine, NT	Bill Beament, Liza Carpene, John Fitzgerald, Michael Mulroney, Guy Singleton, Simon Smith, Jamie Rogers, Dale Annison	Provide a company overview and operations update to Traditional Owners and explain intentions of the project.
25/08/16	Phil Hausler, Peter Waggett	Department of Primary Industry and Resources	DPIR Office, Darwin	Michael Mulroney, Jamie Rogers	Provide high level Company update and Project activities
25/08/16	Dorothy Close	NT Geological Survey	DPIR Office, Darwin	Michael Mulroney, Jamie Rogers	Company introduction and project overview, joint research initiatives
19/09/16	Minister Ken Vowels and Chief of Staff,	NT Government - Minister for Primary Industry and Resources	NT Parliament House	Guy Singleton, Brad Valiukas, Michael Mulroney	Company introduction and project overview to new Government representatives
20/09/16	Phil Hausler, Dave Waterson	Department of Primary Industry and Resources	DPIR Office, Darwin	Guy Singleton, Brad Valiukas, Michael Mulroney	Discuss the DPIR's letter requesting amendments to the CTP MMP submission to clarify NST's responses.

Key stakeholder groups such as Traditional Owners and the Central Land Council have been informed of the Company's Complaints and Grievance Standard (*Appendix 12*), and that a mechanism is in place to capture and resolve stakeholder concerns. This important communiqué was made at the 2015 CLC Liaison Committee Meeting.

3.0 Project Details

Authorisation No:	New Authorisation requested.
Project Name:	Tanami Regional Exploration
Location:	The Project is located approximately 650km northwest of Alice Springs and 850km southwest of Darwin.
Site Access:	The Project is accessible from the public Tanami Road that passes through MLS153 within 2km of the CTP camp and treatment plant. Access to the Groundrush pit is via a sealed haul road from the Central Tanami mine site. All site supplies and plant are transported to site via the Tanami Road. Access to other parts of the project area, is via well formed, and in part sealed, private mine haul roads, pastoral station roads and exploration tracks.

NST Mining Interests:

<u>Suplejack</u>	<u>Cave Hill</u>	<u>Farrands Hill</u>
EL28282	EL9763	EL9843
	EL10355	EL22061
	EL10411	
	EL22229	
	EL22378	
	EL23342	

Title Holders: All titles are held by Tanami (NT) Pty Ltd 75% (ACN 141 658 933), a wholly owned subsidiary of Tanami Gold NL ("**TGNL**") and Northern Star (Tanami) Pty Ltd 25% (ACN 603 860 831) ("**NST**"), a wholly owned subsidiary of Northern Star Resources Ltd ("**NSR**").

Further tenement details are included in *Appendix 2*.

Nomination of Operator Form:

Nomination of Operator form has been submitted, and held by the Department, nominating Northern Star (Tanami) Pty Ltd as the operator.

Application for Authorisation Form:

An Application for an Authorisation Form accompanies this MMP.

Location Maps and Site Plans:

Regional Tenure (Figure 1), **Cave Hill Tenure** (Figure 2), **Farrands Hill Tenure** (Figure 3) **Suplejack Tenure** (Figure 4)

Figure 1 Regional Tenure

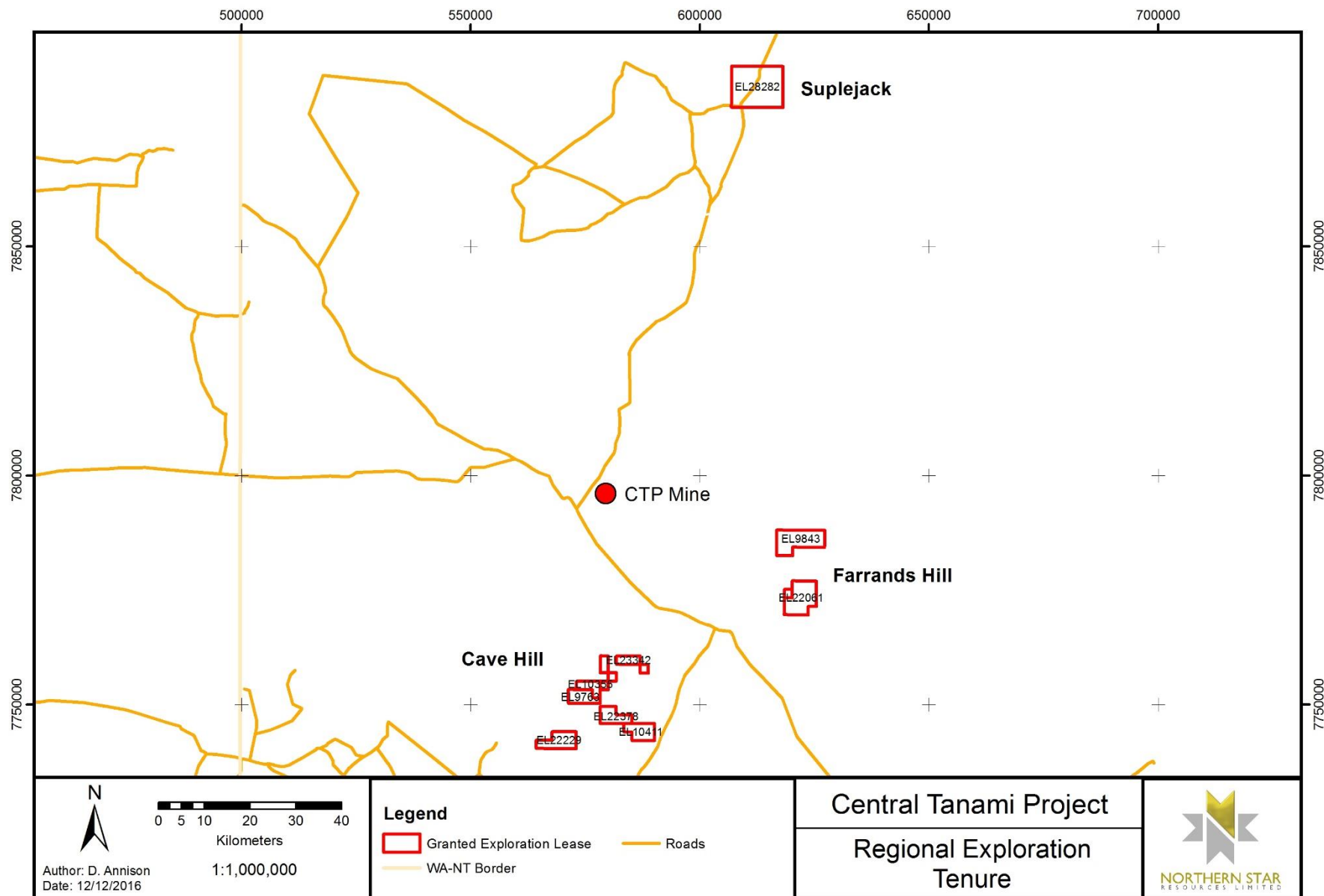


Figure 2 Cave Hill

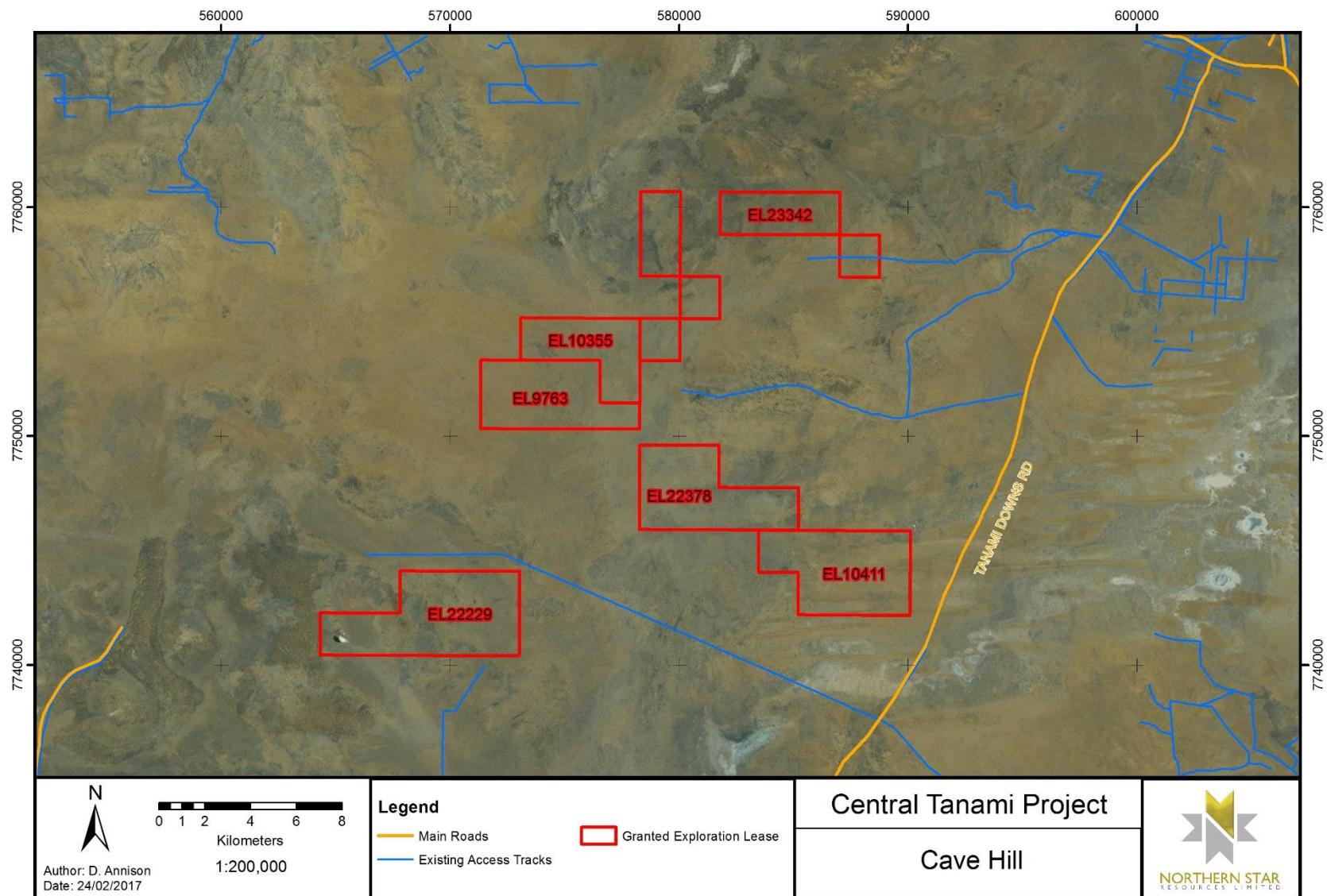


Figure 3 Farrands Hill

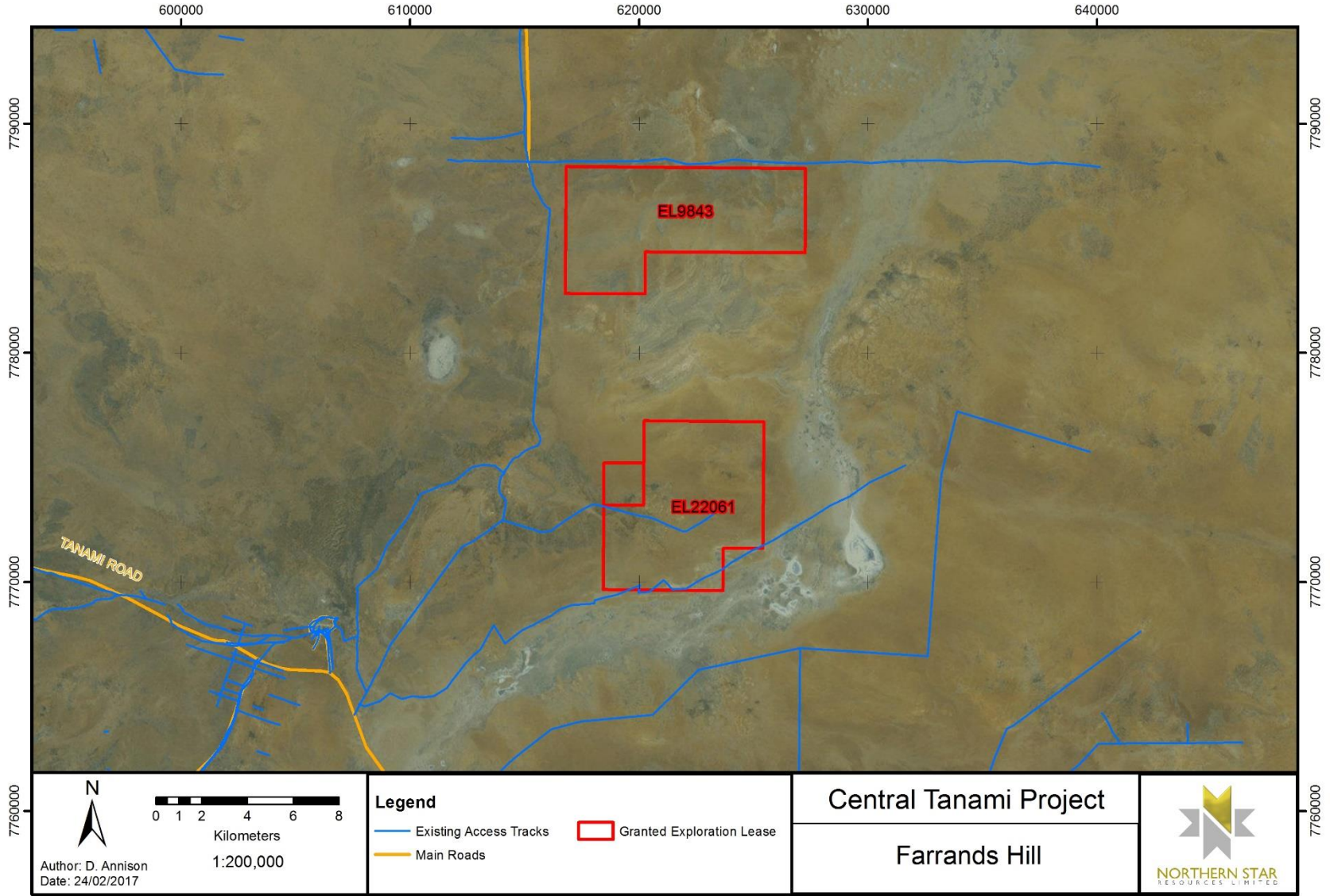
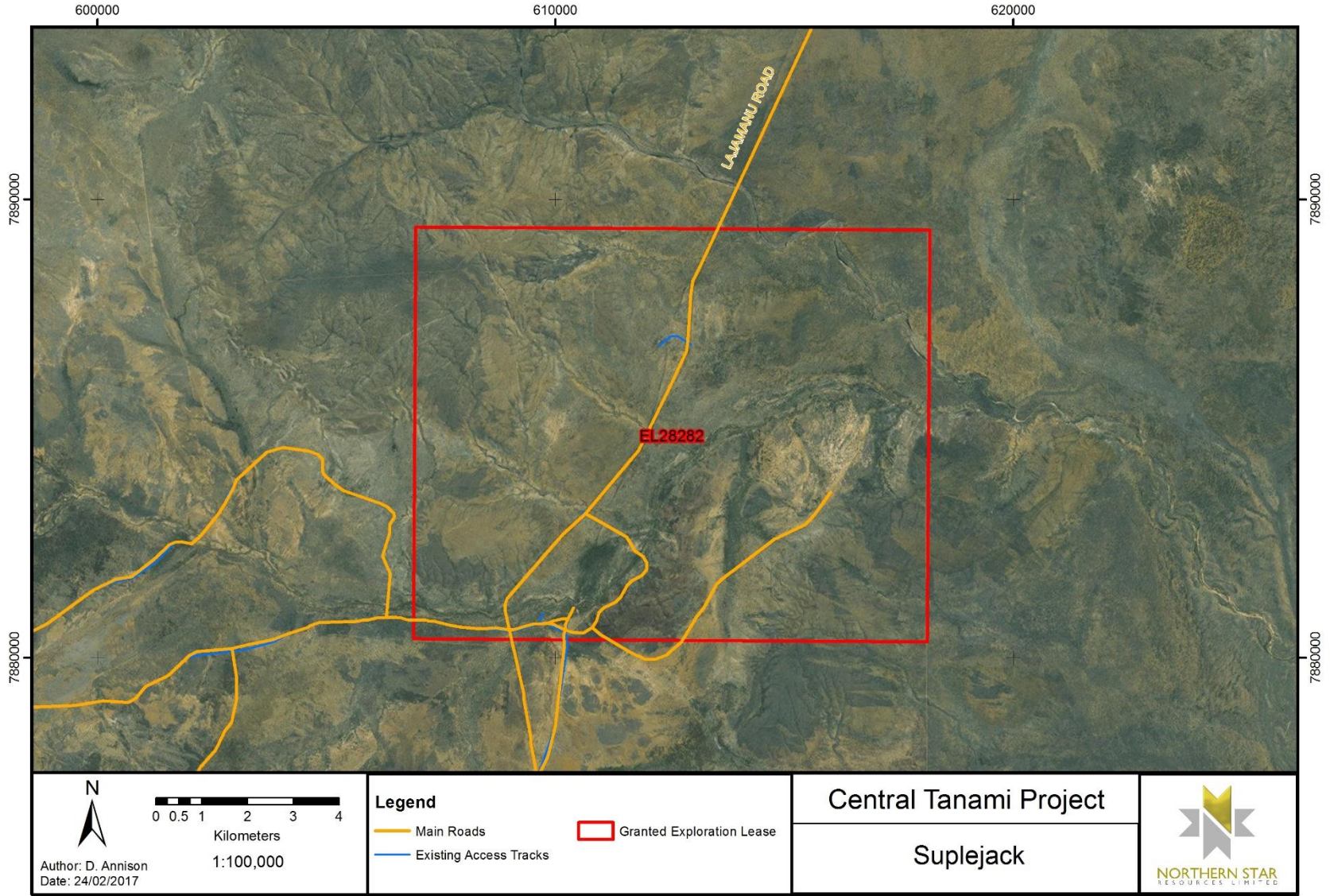


Figure 4 Suplejack



3.1 Previous Activities and Current Position

Historical Mining/Exploration

There is a long mining history at the Central Tanami site. Small scale mining commenced in the early 1900s and operations were sporadic until the late 1980s.

The Tanami Joint Venture commenced operations in late 1987 and Zapopan NL purchased a 50% interest in 1988 (ownership was then 50% Zapopan, 30% Kintaro Resources and 20% Kumagi-Gumi). Mining operations were discontinued in April 1994.

In 1989, Otter Exploration commenced exploration and in 1990 the Central Desert Joint Venture (CDJV) was formed between Otter and Shell Minerals. In 1995, the CDJV purchased the Tanami plant from Zapopan and the Tanami Mine Joint Venture (TMJV) was formed.

The TMJV commenced mining operations in November 1995 and established a multi-pit operation processing 7.5 million tonnes of ore producing 694,658 ounces of recovered gold. Mining ceased in July 2001 and processing operations ceased in October 2001.

Normandy NFM Pty Ltd (now Newmont Tanami Pty Ltd) discovered the Groundrush deposit in 1999 and the deposit was mined from late 2001 to September 2005 with the ore being processed at the newly acquired Central Tanami Processing Plant. Rehabilitation was completed at Groundrush and the site was placed into a post closure monitoring phase.

The Central Tanami Processing Plant was placed on care and maintenance in late 2005 while rehabilitation of the mine and plant site was completed. On completion of the rehabilitation program, Newmont determined that the Central Tanami Project was a non-core asset and, following a tender process, TGNL acquired the Central Tanami Project in March 2010 with settlement occurring at the end of April 2010 on the understanding that all rehabilitation in respect of Newmont's exploration and mining program was completed prior to the sale of the tenements.

TGNL conducted significant resource drilling programs between May 2010 and December 2012 to support the feasibility study into recommissioning of the Central Tanami Processing Plant and re-establishment of the Central Tanami Mining Operation. The feasibility study did not provide an economic outcome and the TGNL MMP in respect to proposed mining operations was withdrawn in 2013.

In 2014, TGNL commenced regional exploration drilling programs on several of its regional exploration tenements. This work was placed on hold in 2015 due to the imminent JV with Northern Star Resources Limited.

In August 2015, an MMP was submitted by TGNL that proposed a continuation of exploration drilling activities in conjunction with NST during 2015/16. This drilling program was completed and rehabilitation works are in progress.

An audit was conducted in October 2016 to assess the rehabilitation status of exploration disturbance conducted under previous Authorisations. Rehabilitation currently pending relates to the drilling of 108 RAB/AC holes on EL 22229 and EL 23342 in 2014 under authorisation 0266-05. Auditing has shown rehabilitation to be successful however there are numerous drill holes noted as having grid pegs present. NST has factored in the removal cost of these grid pegs as part of the security calculation attached to this MMP. To ensure the removal and inspection of each individual drill site, NST has factored in removal of all 108 grid pegs, even though not all exist. Details on the rehabilitation status are recorded in the Rehabilitation Register, provided in Appendix 1.

All previous drilling disturbance has been recorded as successfully rehabilitated within the security calculation spreadsheet. NST used a combination of documentation provided by TGNL, and its own rehabilitation auditing process, to ensure this rehabilitation was completed and adequate.

3.2 Proposed Activities

As part of NSR's 2017 exploration strategy for the Tanami regional tenure, several geochemical sampling programs are proposed to test the region's prospectivity for gold mineralisation and assist in constraining lithological and stratigraphic interpretations.

Year-to-date activities have involved the compilation, validation and review of extensive historical drilling and surface data. Resultant target areas will be ranked based on key geological criteria to identify priority exploration areas and determine the most suitable exploration methods for follow-up.

NST propose a significant work program consisting of field reconnaissance, rock chip sampling and soil sampling. The latter will be a combined program of manual and mechanised sampling.

The key objectives of this program are to:

- Validate and test stratigraphic and lithological interpretations in regional areas to assist in developing an in-house tectono-stratigraphic map. This map will aid in understanding the mineralising system and the areas that are to be considered most prospective.
- Test the gold mineralisation potential of identified target areas.

It should be noted as per discussions with the DPIR, the Suplejack tenement (EL 28282) has been included within this MMP but does not have any proposed work planned at this stage. Any future works planned on EL 28282 will only be carried out once a Land Access Agreement is agreed between NST and the Suplejack Pastoral Lease Holder and approval has been obtained from DPIR.

In communications with DPIR Mining Compliance on 22 December 2016, the DPIR advised that auger, vacuum and mantis sampling were considered substantial disturbance as defined under S35(3)(h) of the *Mining Management Act*. DPIR also expressed a reasonable degree of uncertainty about the proposed methods of sampling and for this reason, NST will provide DPIR representatives the ability to inspect the approved works at their earliest convenience. NST believe the sampling techniques in the works program proposed in this MMP are insufficient to warrant security bonds more than \$5.00 per sample site and would welcome the opportunity to provide the DPIR with guidance on this form of sampling and the nature of its disturbance.

Thus, NST have factored into the security calculation a cost for post-sample monitoring for weed monitoring plus standard post-sampling rehabilitation checks. NST is committed to preventing the spread of invasive weed species and in conjunction with its standard Weed Management Plan (Appendix 4) NST will ensure all works are monitored effectively.

3.2.1 Field Reconnaissance

Consisting solely of geological mapping and rock chip sampling, this work is to be carried out by geologists and field assistants over an extensive area. Specific prospects will be targeted together with regional traverses to assist in developing a greater understanding of the project area.

Field reconnaissance is defined as low impact work, typically conducted by two personnel with the use of a light vehicle. Disturbance is minimised using existing road and track networks and, given the manoeuvrability and size of the vehicles used, off-road navigation will cause negligible disturbance to native vegetation.

The areas requiring clearance for field reconnaissance include all current Exploration Leases listed in this MMP.

3.2.2 Soil Sampling

Soil sampling is proposed using several methods, initially as part of an orientation survey to test the most efficient and accurate means of sampling. The selected survey method will be used to identify new target areas, particularly in areas of significant transported cover, on exploration tenure currently held.

3.2.3 Manual Soil Sampling

This technique is performed by two personnel, travelling by light vehicle. A 100g soil sample is excavated from a hand-dug hole approximately 30cm by 30cm in dimension. The hole is subsequently backfilled and covered with the spoil and adjacent soil material.

3.2.4 Auger Soil Sampling

Auger sampling is carried out using a Landcruiser tray back mounted auger. This sampling technique is designed for areas where transported cover exceeds 1m depth, rendering manual sampling ineffective. This type of sampling is also categorised as low impact as the vehicle is limited to areas with amenable topography and vegetation cover and will make use of existing roads and tracks where possible.

Sample collection is achieved by a continuous flight auger rod that penetrates to a maximum depth of 15m or to the base of transported cover. Soil is lifted to the surface where a 250g sample is taken with the excess spoil is used to backfill the hole. Hole depths vary but typically average several metres. The final sample site has the equivalent disturbance area of a manual soil sampling site, approximately 30cm by 30cm in area.

Figure 5 Standard Landcruiser tray back mounted auger



Figure 6 Traditional auger soil sampling site



3.2.5 Vacuum Soil Sampling

Vacuum sampling is similar to auger sampling, being either Landcruiser or tractor mounted with a similar disturbance footprint. Access is limited by topography and vegetation cover with existing roads/tracks utilised where possible.

Figure 7 Tractor mounted vacuum sampling



As for auger sampling, vacuum sampling is carried out in areas where the presence of transported cover material renders manual soil sampling ineffective. As with auger sampling, this technique uses a rod that rotates through the soil profile with the soil itself being pulled up through the rod internally by vacuum force. The extracted soil is captured in a canister where a 250g sample is taken, the remaining spoil is used to backfill the hole.

3.2.6 Mantis Soil Sampling

Mantis soil sampling also uses a Landcruiser tray back mounted unit with a similar disturbance profile to auger and vacuum sampling. Access is again limited by topography and vegetation with no clearing being required. A 15cm by 15cm hole is backfilled upon completion. As with vacuum sampling, a rotating rod penetrates the soil profile but the soil is lifted initially through the rod using compressed air. The soil is collected in a bucket where a 500g sample is taken, the remaining soil is then used to backfill the hole.

Figure 8 Landcruiser tray back mounted Mantis rig



Regional geochemical sampling is proposed on all current Exploration Leases. The sampling will consist of both regional (e.g. 1000m x 1000m spaced grids) and local scale (e.g. 50m x 50m) surveys. Sampling will be focused on areas of interest with respect to gold mineralisation with results also used for lithogeochemical discrimination and alteration mapping.

Table 3 provides a breakdown of the approximate samples per tenement, however this total may vary depending on timing, access, topography and the suitability of the chosen sampling method. The number of samples allows for follow-up investigation of areas that return significant anomalism.

Table 3 Proposed soil sampling

Project Area	Tenement	~Number of Samples	Approximate Sampling Cost	Approximate Assay Cost
Cave Hill	EL9763	1,500	\$51,600	\$38,400
Cave Hill	EL10355	1,500	\$51,600	\$38,400
Cave Hill	EL10411	1,500	\$51,600	\$38,400
Cave Hill	EL22229	1,500	\$51,600	\$38,400
Cave Hill	EL22378	1,500	\$51,600	\$38,400
Cave Hill	EL23342	1,500	\$51,600	\$38,400
Farrands Hill	EL9843	1,500	\$51,600	\$38,400
Farrands Hill	EL22061	1,500	\$51,600	\$38,400

4.0 Current Project Site Conditions

4.1 Regional Geology

The Tanami Regional Exploration tenure overlies a wide range of stratigraphy, the most prevalent of which belongs to the Tanami Group. The Tanami region can be divided into several different domains based on stratigraphy, structural architecture and location.

Figure 9 shows the Tanami and adjacent regions, notably the Birrindudu, Wiso and Canning Basins, which unconformably overlie the Tanami region to the north, east and west respectively. To the south of the Tanami Region lies the Arunta Province; the margin between the two regions is relatively unknown but can be approximated by a series of east trending faults that separate greenschist-facies terrain in the north from upper amphibolite-facies terrain to the south.

Figure 9 Regional Geological Setting for the Tanami Region (Ahmad, Vandenberg and Wygralak, 2011.)

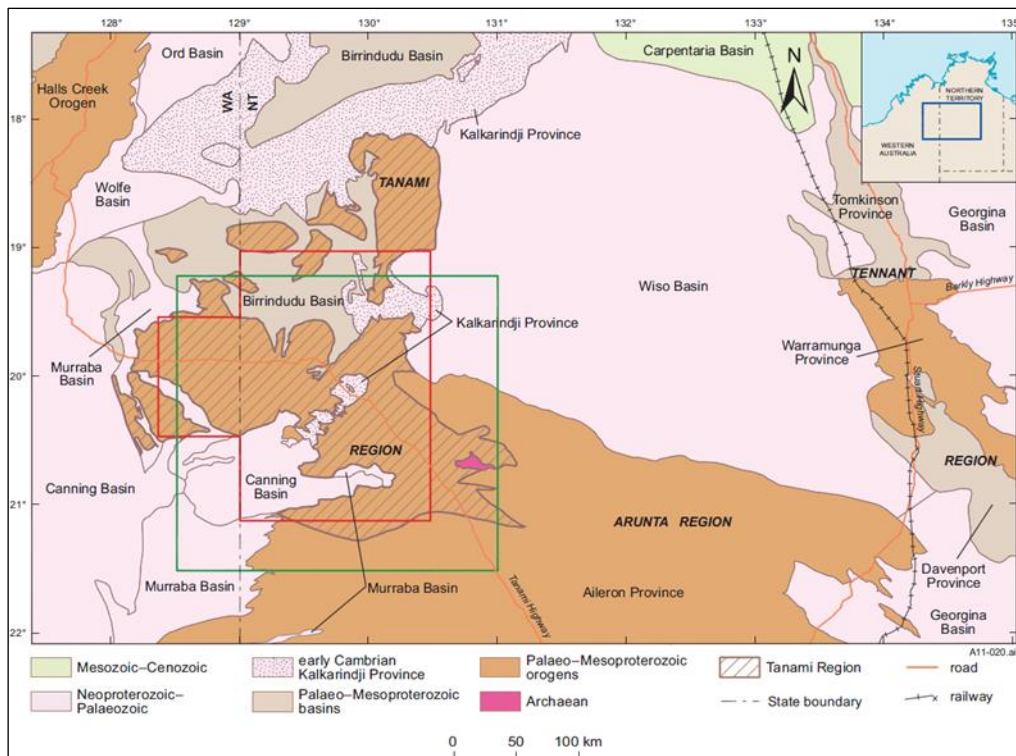


Table 4 summarises the stratigraphy of the Tanami Region. Major gold deposits including Callie, Dead Bullock Soak and The Granites are found in the Dead Bullock Formation while Hurricane-Repulse and Groundrush gold deposits are found in the Mt Charles and Killi Killi Formations respectively.

Granitoid intrusions within the Tanami region form distinct gravity lows with gravity geophysics and research showing that the plutons form large domical structures indicating the intrusions have a significant subsurface extent. Airborne magnetic data shows the granite intrusions to have zoning of magnetic intensity leading to the conclusion that the intrusions contain multiple phases.

The granite intrusion at The Granites deposit cross-cuts, and therefore post-dates, mineralisation however many intrusions show strong foliation and lineation development indicating they may predate or be coincident or with deformation (Ahmad, Vandenberg and Wygralak, 2011).

Table 4 Proterozoic stratigraphic succession of the Tanami Region (Ahmad, Vandenberg and Wygralak, 2011.)

Unit/thickness	Lithology	Depositional environment
UNASSIGNED TO GROUP		
★ Mount Charles Formation <3000 m	Fine-grained turbiditic sedimentary rocks with basal quartzic sandstone; interbedded basalt	Subaqueous, narrow continental rift setting
WARE GROUP		
Wilson Formation ca 1000 m	Greywacke, quartz wacke and siltstone	Deeper marine
Century Formation ca 1200 m	Conglomeratic sandstone, siltstone and fine-grained sandstone	Rapidly submerging shoreface, or fluvial and lacustrine
Nanny Goat Volcanics	Volcanigenic sandstone interbedded mainly with felsic volcanic rocks	Predominantly subaerial
Mount Winnecke Formation	Coarse-grained quartz sandstone and granular conglomerate	Subaerial to subaqueous caldera-type structures
Granite intrusions		
TANAMI GROUP		
Dolerite sills <200 m	Fine- to coarse-grained metadolerite and amphibolite	Intrusive
Killi Killi Formation <4000 m	Turbiditic sandstone and siltstone	Turbiditic, deep-marine proximal to mid-fan setting
★ Dead Bullock Formation <1000 m	Siltstone and sandstone (Ferdies Member) fining into graphitic siltstone and banded ironstone (Callie Member).	Quiet marine conditions below storm-wave base, with increasingly deep-water deposition towards top.
Stubbins Formation 2–3000 m	Sandstone, siltstone, shale in lower part overlain by iron-rich siltstone, carbonaceous shale, chert, pillow basalt, dolerite sills, rare rhyolite	Turbiditic to quiet marine conditions
UNASSIGNED TO GROUP		
Browns Range Metamorphics <3000 m	Quartzofeldspathic gneiss, muscovite schist, fine-grained granite, aplite, pegmatite, and metamorphosed arkosic sandstone	
ARCHAEAN		
Billabong Complex	Granite and gneiss	

4.2 Local Geology

The Cave Hill and Farrands Hill tenure overlie predominantly late stage Cambrian basalts of the Antrim Plateau Volcanics. This formation unconformably overlies older stratigraphy of the Tanami Group with thicknesses ranging from tens of metres to hundreds of metres. The Farrands Hill region also hosts late Tanami Group stratigraphy, namely the Killi Killi Formation, the same unit that is interpreted to host the Groundrush gold deposit.

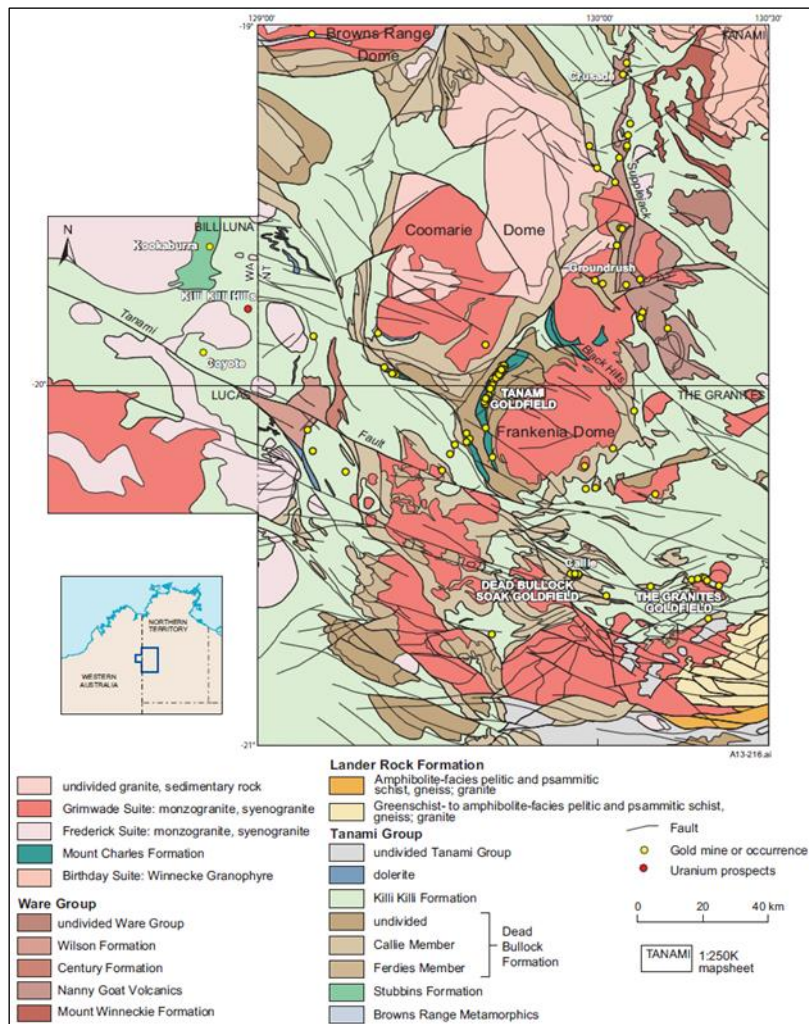
Farrands Hill is located on the eastern margin of the Frankenia Dome (granite) whilst Cave Hill is located on its southern margin. Cave Hill is also wedged between several granite intrusions of unknown emplacement dates.

Gold deposits of the Central Tanami Project are all found within the Mt Charles unit which is currently interpreted to be a late component of the Tanami Group. This unit is comprised of intercalated basalt (flow and pillowed), turbiditic sediments with lesser shallow fluvial sediments.

The Suplejack tenure overlies stratigraphy interpreted to be later than the Tanami Group, but younger than the Cambrian basalts at Cave Hill. This area predominantly hosts the Ware Group which is known to contain significant extrusive volcanic units including the Mt Winnecke Formation, Nanny Goat Volcanics, Century Formation and the Wilson Formation.

Figure 10 illustrates the interpreted geology of the Tanami region underlying all three of NST's regional exploration areas.

Figure 10 Interpreted regional geology and gold deposits of the Tanami Region (Ahmad, Vandenberg and Wygralak, 2011.)

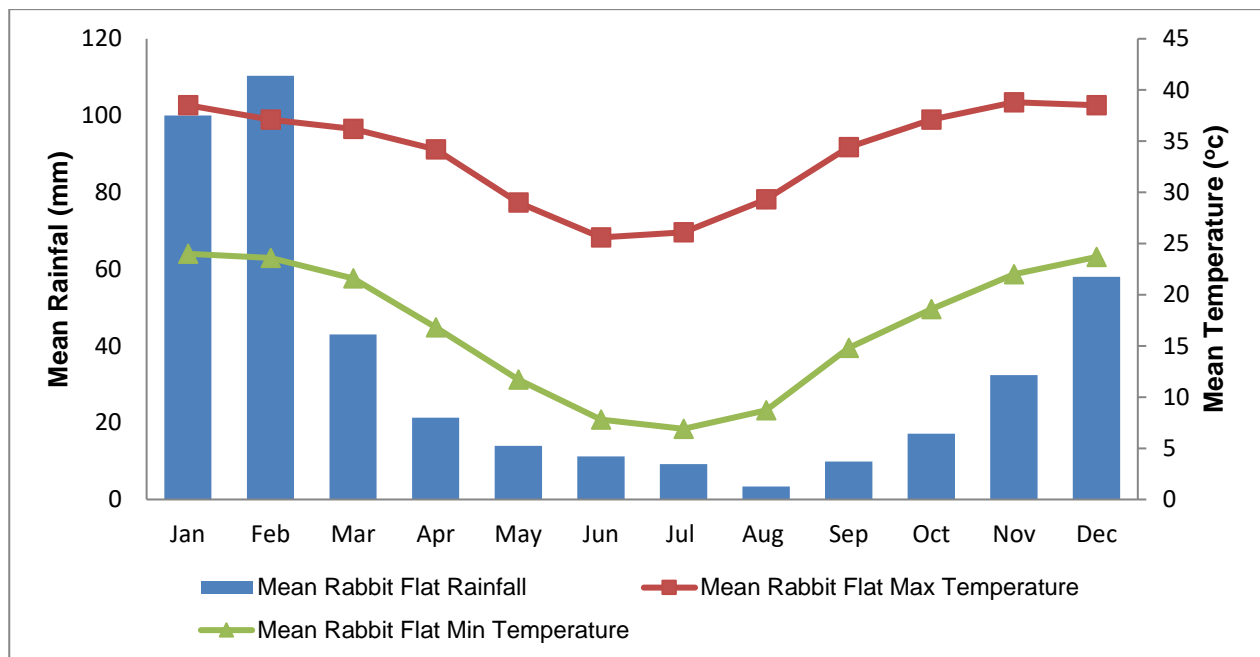


4.3 Climate

The Tanami Desert is a semi-arid, tropical climatic region with approximately 90% of the 370 mm of annual average rainfall received between November and April. Summers are hot with average maximum daily temperatures of 38.8°C, whilst winters are generally mild with the coolest month being June with daily temperatures averaging about 25.6°C. The annual evaporation rate is approximately 3,000 mm.

The Central Tanami Project has an average annual rainfall of 496.5mm determined from 15 years of weather data. The annual records from Rabbit Flat from 1996 to 2011 are presented in Figure 11.

Figure 11 Mean Annual Rainfall and Temperature Rabbit Flat 1996-2011



Source: Bureau of Meteorology www.bom.gov.au

4.4 Surface Hydrology

The project area consists generally of extensive, low relief sandy soil plains with areas of red earth soils found within the catchment. Due to the very uniform topography of the region, the aeolian sands that form many the land systems are usually well-sorted and redistributed.

This flat topographic landscape is comprised of low rises and broad flood ways. As there are no substantial watercourses located within the vicinity of project sites, surface drainage is generally via overland flow through poorly defined and intermittent depressions in the landscape.

Flow paths are poorly defined within the landscape and are likely to consist of intermittent surface ponding and evaporative features.

4.5 Hydrogeology

Most groundwater is found in superficial alluvial sediments, calcrete formations and to a lesser extent, fractured bedrock. The superficial aquifers contain potable to slightly brackish groundwater with the bedrock aquifers tending to be low-yielding and are not used to source either processing or potable water. Alluvial and calcrete aquifers are recharged by rainfall and associated flooding resulting in water levels that naturally fluctuate, not only due to abstraction but also due to varying rainfall recharge. The natural pre-mining groundwater level can be estimated at circa 49m below ground level, as shown by an early water level taken in 1948 at a registered bore (RN470) located near the Tanami Mine site. (Robertson GeoConsultants, 2004).

4.6 Flora

A flora and fauna assessment of the Central Tanami Project area was conducted by Low Ecological Services (LES) in November 2016. The assessment comprised a desktop survey of the area, followed by a three-day field survey, including fauna trapping. The assessment also draws upon previous assessments of the area conducted by LES. The assessment report is provided in Appendix 3. No flora or fauna surveys have been carried out over the regional exploration tenure to date, however preliminary desktop assessment by exploration personnel has identified the recorded distribution of important flora and fauna within the project region.

The Tanami Bioregion covers areas in both the Northern Territory (NT) and Western Australia (WA). The NT portion of the bioregion is characterised primarily by sandplains with small areas of alluvial plains, low ridges and stony rises with ancient paleo-channels variously transecting the plain. Sand plains support mixed shrublands over hummock grasslands. *Chrysopogon* and *Iseilema* grasslands with Gum over storey are present on alluvial plains (Baker et al. 2005).

4.7 Vegetation Types

A preliminary desktop study was carried out to understand the vegetation types at each Regional Exploration area. Figure 12, Figure 14 and Figure 13 show the vegetation units for Suplejack, Cave Hill and Farrands Hill respectively. The coding system used is the National Vegetation Information System (V3.1) as utilised by the Northern Territory Department of Environment and Natural Resources. Corresponding Wilson et al. (1990) codes have been supplied in the individual unit descriptions.

The Suplejack area is dominated by vegetation type 348 whilst the Farrands Hill locality is comprised of mostly vegetation type 1032 but borders type 362. Cave Hill sits predominantly over type 1032 but includes areas of type 410 and type 418. Each of the vegetation types are summarised below.

- *Vegetation unit 348*: Characterised as *Eucalyptus brevifolia* (Snappy Gum) low open-woodland with *Triodia pungens* (soft spinifex) hummock grassland understory and generally a sparse-shrub mid layer dominated by *Acacia* species. This community generally occurs on well drained rises, dissected plateaux and rocky low hills. Soils are chiefly gravelly loams and sandy red earths. (Suplejack) Corresponding Wilson et al. 1990 code = 38.
- *Vegetation unit 1032*: Characterised as *Triodia pungens* and *Plectrachne schinzii* (Curly Spinifex) hummock grassland with *Acacia* tall sparse shrubland overstorey. *Hakea* species including *A.coreacea* and *Hakes macrocarpa* and occasional low tree/mallee eucalypts are also common in the shrub layer. This community is extensive occurring on gently undulating plains with chiefly red earthy sand soils. (Cave Hill and Farrands Hill) Corresponding Wilson et al. 1990 code = 76.
- *Vegetation unit 362*: Characterised as a *Melaleuca* low open woodland to mod open shrubland containing *Triodia* low hummock grassland. Species include *Acacia kempeana*, *Grevillea stenobotrya* and *Grevillea juncifolia*. Commonly seeds depressions

with periodic flood claypans or playas. (Farrands Hill) Corresponding Wilson et al. 1990 code = 52.

- *Vegetation unit 410*: Characterised as low open Acacia tussock grassland. Tree and shrub species such as *Acacia victoriae* and *Carissa lanceolata* may be found. Typically dominated by heavy clay plains. (Cave Hill) Corresponding Wilson et al. 1990 code = 100.
- *Vegetation unit 418*: Characterised as *Triodia* dominated low open hummock grassland. Abundant *Eucalyptus* low open woodlands with mid to sparse *Acacia* shrubland. Species found include *Acacia toulousa*, *Corymbia deserticola* and *Acacia stipuligera*. (Cave Hill) Corresponding Wilson et al. 1990 code = 77.

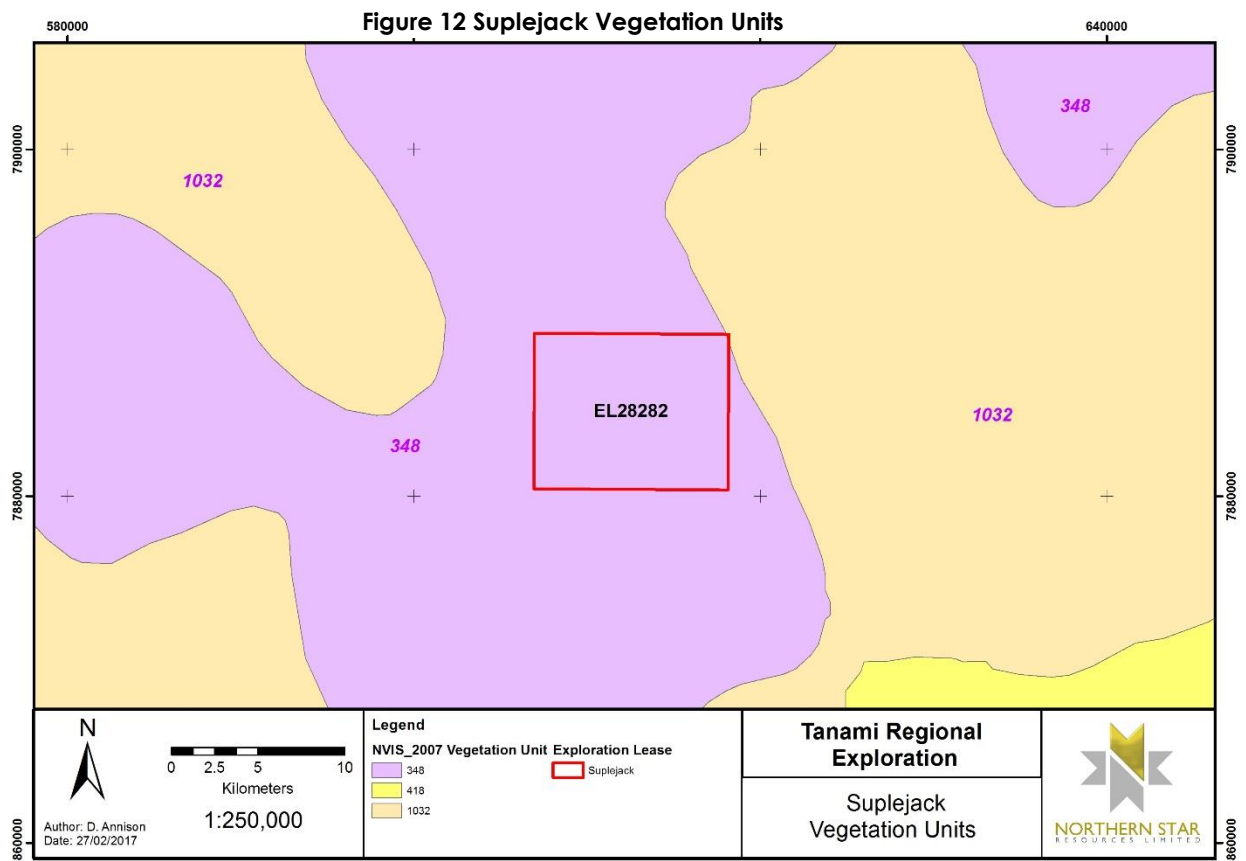


Figure 14 Farrands Hill Vegetation Units

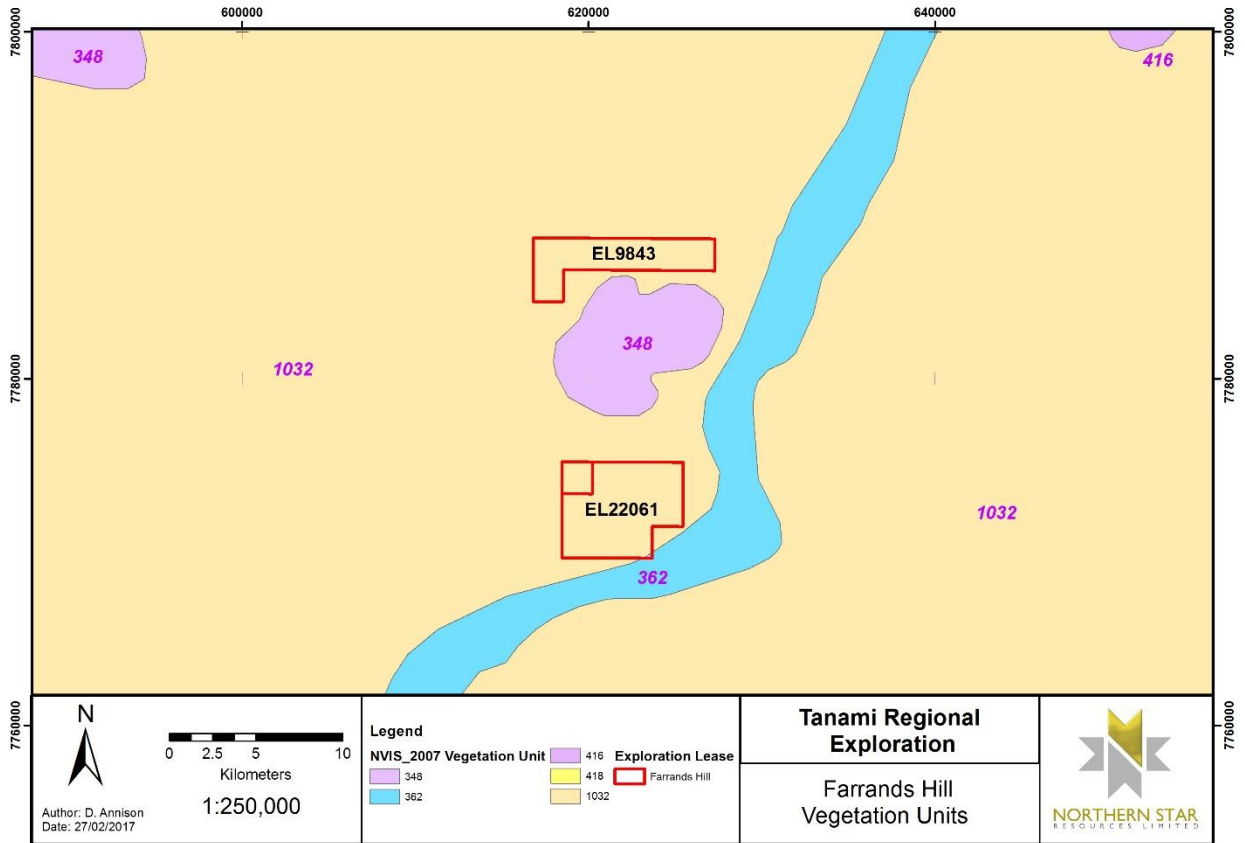
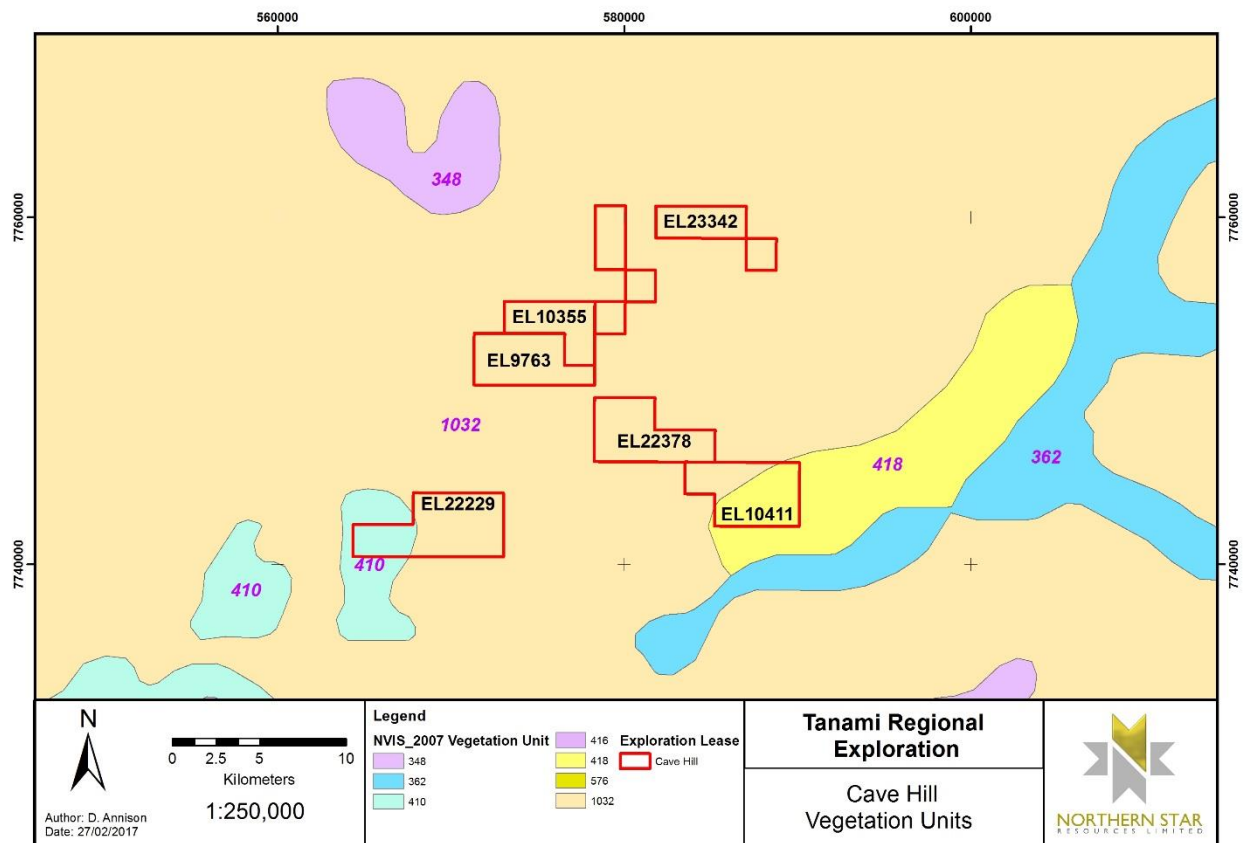


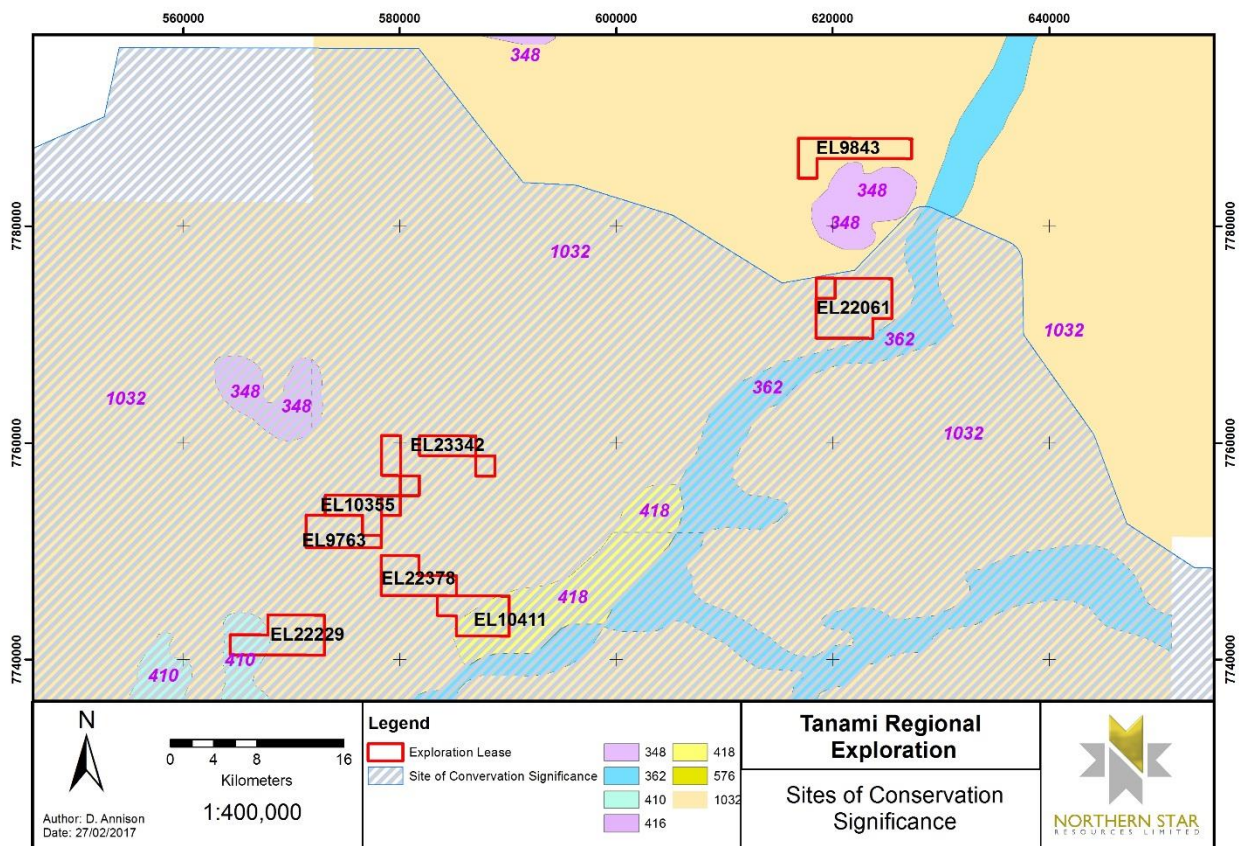
Figure 13 Cave Hill Vegetation Units



4.7.1 Sites of Significance

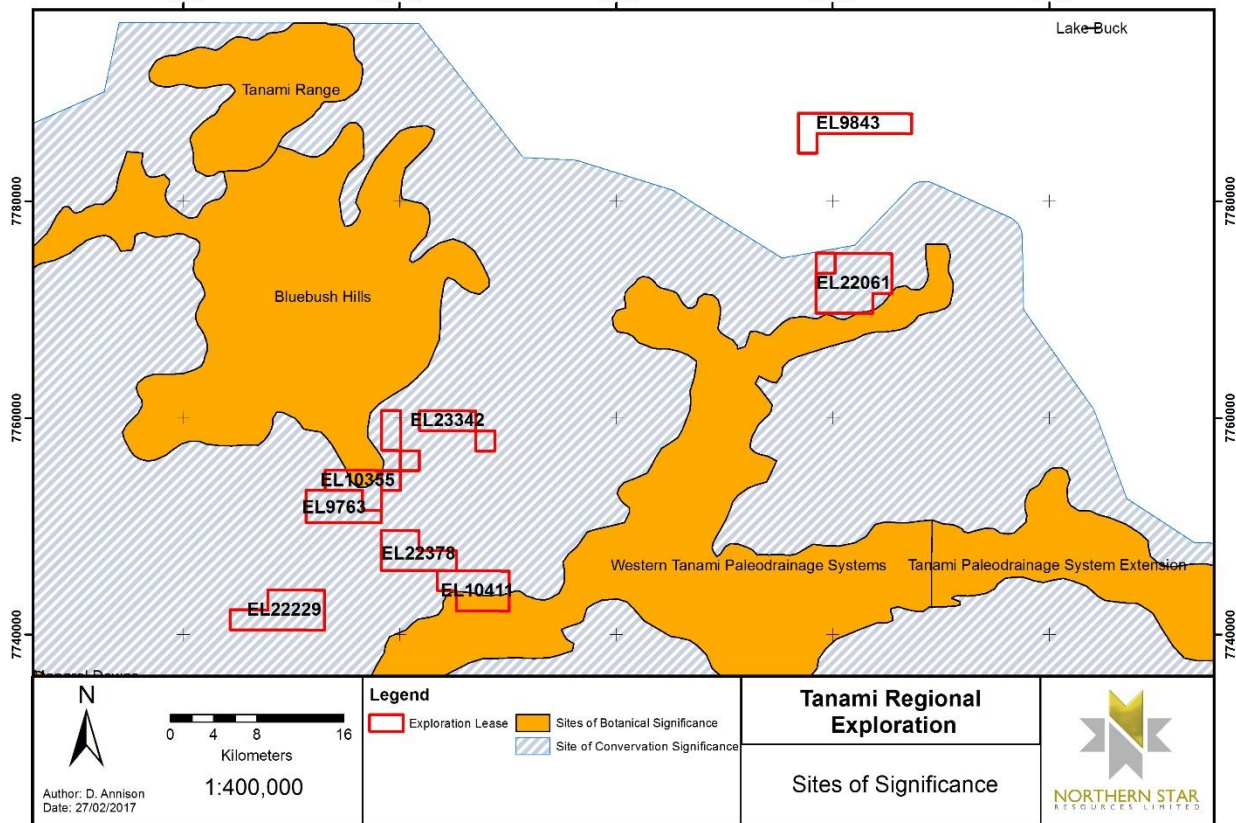
Cave Hill and Farrands Hill lie within or near the South West Tanami Desert Site of Conservation Significance (SWT-SOCS). This area is characterised by a variety of landforms and habitats covering much of the Central Tanami Desert palaeodrainage system. Other habitats include alluvial plains, dune fields, sandplains, rocky hills, freshwater and saline lakes and claypans. NST understands the key role it has in ensuring the integrity and biodiversity of the SWT-SOCS. Figure 15 shows the existing tenure that lies within the SWT-SOCS, underlain by the dominant vegetation unit types.

Figure 15 South West Tanami Site of Conservation Significance



Within the SWT-SOCS lies several Sites of Botanical Significance (SOBS). Figure 16 shows the two main Sites of Botanical Significance under or adjacent to NST tenure. A portion of EL10355 (Cave Hill) is covered by the Bluebush Hills SOBS whilst EL22061 (Farrands Hill) lies immediately adjacent to the Western Tanami Palaeodrainage System. The Bluebush Hills SOBS is of undetermined importance and covers an area approximately 683km². The Western Tanami Palaeodrainage System SOBS covers an area approximately 2,383km² and is recognised as being of national significance. NST recognise the importance of preventing the invasion of weed species, mitigating the impact of feral animals and general management of these significant bioregions.

Figure 16 Sites of Botanical Significance



4.7.2 Threatened Flora

No threatened flora species were identified by the Commonwealth Government's Protected Matters Search Tool (EPBC PMST) as occurring, or potentially occurring, within 80km of the TRE tenure. A search of the NT Flora Atlas found eight near threatened and fourteen data deficient flora species within 80km of the Project area. Flora species deemed near threatened are defined under the Territory Parks and Wildlife Conservation (TPWC) Act as described below in Table 5.

There are no threatened ecological communities recorded within 80km of the Central Tanami Project mining leases and TRE tenure.

116 flora species were recorded during the 2012 and 2016 surveys of 11 sites within the Central Tanami Project. No species listed under the Environmental Protection and Biodiversity Conservation (EPBC) or TPWC Acts were recorded in any survey sites.

Table 5 TPWC Listed Flora Species in 80km Radius of Central Tanami Project Area

Species	TPWC
<i>Acacia maconochieana</i>	Data Deficient
<i>Acacia pachycarpa</i>	Data Deficient
<i>Acacia stellaticeps</i>	Data Deficient
<i>Acrachne racemosa</i>	Data Deficient
<i>Corynotheca asperata</i>	Data Deficient
<i>Ectrosia schultzei</i>	Data Deficient
<i>Euphorbia</i> sp. Beddome Range	Data Deficient
<i>Heliotropium parviantrum</i>	Data Deficient
<i>Heliotropium sphaericum</i>	Data Deficient
<i>Iotasperma sessilifolium</i>	Data Deficient
<i>Jacksonia aculeata</i>	Data Deficient
<i>Peplidium</i> sp. Tanami	Data Deficient
<i>Tephrosia</i> sp. Mistake Creek	Data Deficient
<i>Tribulus</i> sp. long-styled eichlerianus	Data Deficient
<i>Acacia abbreviata</i>	Near Threatened
<i>Acacia grasbyi</i>	Near Threatened
<i>Brachyachne prostrata</i>	Near Threatened
<i>Elatine macrocalyx</i>	Near Threatened
<i>Eriachne flaccida</i>	Near Threatened
<i>Eucalyptus cupularis</i>	Near Threatened
<i>Trianthema glossostigma</i>	Near Threatened
<i>Trianthema oxycalyptra</i>	Near Threatened

4.7.3 Weeds

A desktop survey covering all NSR's Northern Territory tenure indicated eight declared weed species could potentially occur in the TRE area, two of which are Weeds of National Significance (WONS). Declared weed species include Athel pine (*Tamarix aphylla*)-WONS, Bellyache Bush (*Jatropha gossypifolia*)-WONS, Coffee Senna (*Senna occidentalis*), Hyptis (*Hyptis suaveolens*), Mossman River Grass (*Cenchrus echinatus*), Parkinsonia (*Parkinsonia aculeata*), Rubber bush (*Calatropis procera*) and Sida (*Sida* spp.).

Only Hyptis, Mossman River Grass and Rubber Bush have been found on the TRE areas previously.

Environmental weed/invasive species found within the Central Tanami Project area on previous surveys (2006-2012) include Buffel grass (*Cenchrus ciliaris*), Purpletop Rhodes grass (*Chloris inflata*), Feathertop Rhodes grass (*Chloris virgata*) and Ruby dock (*Acetosa vesicaria*).

Environmental weed/invasive species known to or potentially occurring in the project area include:

Kapok	<i>Aerva japonica</i>
Ruby dock	<i>Acetosa vesicaria</i>
Gallons Curse	<i>Cenchrus biflorus</i>
Buffel grass	<i>Cenchrus ciliaris</i>
Purpletop Chloris	<i>Chloris barbata</i>
Purpletop Rhodes Grass	<i>Chloris inflata</i>
Feathertop Rhodes Grass	<i>Chloris virgata</i>
Crab grass - Summer grass	<i>Digitaria ciliaris</i>
Barnyard grass - colona	<i>Echinochloa colona</i>
Goose Grass	<i>Eleusine indica</i>
Lovegrass - amabilis	<i>Eragrostis amabilis</i>
Lovegrass - Pitted	<i>Eragrostis barrelieri</i>
Lovegrass - minor	<i>Eragrostis minor</i>
Asthma Plant	<i>Euphorbia hirta</i>
Red natal grass	<i>Melinis repens</i>
Deenanath grass	<i>Pennisetum pedicellatum</i>
Sicklepod	<i>Senna obtusifolia</i>
Flannel weed	<i>Sida cordifolia</i>
Bindii/Caltrop	<i>Tribulus terrestris</i>
Urochloa/Sabi grass	<i>Urochloa mosambicensis</i>

A site visit was conducted by LES consultants to the CTP between the 14 – 18 November 2016. No Declared weeds under the *Weeds Management Act 2001* were observed although Mossman River Grass has been found in the Central Tanami Project area in previous years (Low et al, various years). The survey also identified Buffel grass, Purpletop Rhodes grass, Feathertop Rhodes grass and Ruby dock as being relatively common on disturbed areas around the central mill area and some waste rock dumps.

NSR has implemented a Weed Management Plan (Appendix 4) which incorporates recommendations from the recent LES survey. This management plan covers all works carried out on NST operations in the Northern Territory, including TRE work activities.

4.8 Fauna

4.8.1 Species of Conservation Significance

A total of 10 EPBC and/or TPWC listed fauna were identified as occurring or potentially occurring in the Central Tanami Project area. Identified species included the EPBC vulnerable listed *Macrotis lagotis* (Greater bilby) and *Liopholis kintorei* (Great Desert Skink), the TPWC vulnerable listed *Dayscercus blythi* (Brush-tailed mulgara) as well as the TPWC near threatened listed *Onychogalea unguifera* (Northern Nailtail Wallaby). *Zyomys pedunculatus* (Central rock-rat) was listed however is now considered locally extinct in the area.

Potentially occurring Threatened bird species in the area included *Calidris ferruginea* (Curlew Sandpiper), *Dromaius novaehollandiae* (Emu), *Falco hypoleucus* (Grey Falcon), *Polytelis alexandrae* (Princess Parrot) and *Rostratula australis* (Australian Painted Snipe).

Of the ten EPBC and TPWC identified species listed as occurring, or potentially occurring, in the Central Tanami Project area, LES considers only four to be vulnerable to development activities given EPBC/PMST assessed fauna records and habitat availability. These included Greater Bilby, Brush-tailed Mulgara, Great Desert Skink and Northern Nailtail Wallaby. Bird species are

generally not considered vulnerable to development activities as they are highly mobile and able to flee slow moving machinery.

These findings are tabulated in Table 6. In addition to the desktop study survey, NSR conducted further research to ensure a complete review of species of conservation significance. Six additional species most relevant to Regional Exploration tenure are detailed in Table 8.

Table 6 Threatened Fauna Species That May Occur

Type	Scientific Name	Common Name	Status		NT Fauna Atlas	PMST	Likelihood	Potential for disturbance
			TPWC ¹	EPBC ²				
Mammal	<i>Macrotis lagotis</i>	Greater bilby	VU	VU	X	X	Moderate	Moderate
	<i>Dasycercus blythi</i>	Brush-tailed mulgara	VU		X		High	Moderate
	<i>Onychogalea unguifera</i>	Northern Nailtail Wallaby	NT		X		High	Low
	<i>Zyomys pedunculatus</i>	Central rock-rat	EN	EN	X	X	Low	Nil
Reptile	<i>Liopholis kintorei</i>	Great desert skink	VU	VU	X	X	Moderate	Low
Bird	<i>Calidris ferrunginea</i>	Curllew Sandpiper	VU	CR	X	X	Moderate	Low
	<i>Dromaius novaehollandiae</i>	Emu	NT		X		High	Low
	<i>Polytelis alexandrae</i>	Princess parrot	VU	VU	X	X	Low	Low
	<i>Rostratula benghalensis (sensu lato)</i>	Painted snipe	VU	EN		X	Moderate	Low
	<i>Falco hypoleucos</i>	Grey falcon	VU		X	X	High	Low

The EBPC Protected Matters Search Tool found 8 migratory species have been known to, or may, occur in the area (Table 7).

Table 7 Migratory Species That May Occur

Type	Scientific Name	Common Name	Status		NT Fauna Atlas	PMST	Likelihood	Potential for disturbance
			TPWC	EPBC				
Bird	<i>Apus pacificus</i>	Fork-tailed swift				X	Moderate	Low
	<i>Hirundo rustica</i>	Barn swallow				X	High	Low
	<i>Calidris ferrunginea</i>	Curllew Sandpiper	VU	CR	X		Low	Low
	<i>Motacilla cinerea</i>	Grey wagtail				X	Moderate	Low
	<i>Motacilla flava</i>	Yellow wagtail				X	Moderate	Low
	<i>Charadrius veredus</i>	Oriental plover, Oriental dotterel				X	Moderate	Low
	<i>Glareola maldivarum</i>	Oriental pratincole				X	Moderate	Low
	<i>Tringa nebularia</i>	Common greenshank				X	Moderate	Low

¹ TPWC Act Status: CR, Critically Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened as listed under the *Territory Parks and Wildlife Conservation Act* (TPWC)

² EPBC Act Status: EN, Endangered; VU, Vulnerable as listed under the *Environmental Protection and Biodiversity Act* (EPBC)

Table 8 Threatened Fauna Species – Regional Exploration tenure

Type	Scientific Name	Common Name	Status		NT Fauna Atlas	PMST	Likelihood
			TPWC[1]	EPBC[2]			
Bird	<i>Erythrotriorchis radiatus</i>	Red Goshawk	VU			X	Moderate
	<i>Erythrura gouldiae</i>	Gouldian Finch	EN		X	X	Moderate
	<i>Falcunculus fontatus whitei</i>	Crested Shrike-tit	VU		X	X	Moderate
	<i>Pezoporus occidentalis</i>	Night Parrot	EN		X	X	Moderate
	<i>Rostratula australis</i>	Australian Painted Snipe	EN		X	X	Moderate
	<i>Polytelis alexandrae</i>	Princess Parrot	VU			X	Moderate

4.8.2 Reptiles

A total of 13 reptile species were recorded from Elliot traps and pit traps as well as active searches and incidental observations during the survey. Geckos (one species), skinks (six species), dragons (three species), snakes (one species) and monitors (two species) were represented across the survey sites. No threatened species of reptile were recorded at any survey sites.

4.8.3 Birds

A total of 52 bird species were recorded during the survey (Appendix 3). In the 2012 survey, birds were abundant and relatively high numbers of species were recorded particularly in low lying drainage depressions and larger trees in flower. Bird numbers were lower but still relatively abundant in the 2016 survey. Several Near Threatened species were observed throughout the surveys including:

- Australian Bustard (*Ardeotis australis*) observed adjacent to the haul road in both 2012 and 2016
- Grey Falcon (*Falco hypoleucos*) recorded incidentally in the 2012 survey; and
- Emu (*Dromaius novaehollandiae*) recorded in the Groundrush tenement in 2016

4.8.4 Mammals

During the LES environmental survey carried out at the CTP a total of 10 mammal species were recorded from Elliot traps, pit traps, tracking and active searches. The three threatened species recorded are detailed below. Due to the broad, early stage works proposed on regional tenure, NST has not conducted any on-ground surveys.

- Greater Bilby in 2012 within the Hurricane Repulse tenement (MLS153);
- Brush-tailed Mulgara in 2012 on MLS 153 and 2016 within the Groundrush tenement (ML22934); and
- Northern Nailtail wallaby within ML22934.

The EPBC PMST has identified six introduced fauna species as occurring, or potentially occurring, within 80km of the Central Tanami Project area:

- *Bos Taurus* (Cattle)
- *Camelus dromedarius* (Camel)
- *Canis lupus familiaris* (Domestic dog)
- *Felis catus* (Cat)
- *Mus musculus* (House Mouse)
- *Vulpes vulpes* (Fox)

4.8.5 Consideration of Significant Impact

Eight fauna species of conservation significance identified by the EPBC, PMST and NT Fauna Atlas were assessed as having a moderate or high likelihood of occurrence within the CTP area based on distribution, habitat availability and distance to previous records. Of these, evidence of five threatened species was recorded in the survey areas including two bird species and three mammal species.

Only the Greater Bilby is listed under the EPBC Act. When assessed against the Matters of National Significance Significant Impact Guidelines 1.1 (2013), LES concluded that if best practice procedures are adhered to, the Project is highly unlikely to have an impact on the population of the Greater Bilby.

4.9 Land Use

The TRE area is located on Aboriginal Freehold Land granted as inalienable freehold title to the Central Desert Land Trust as Traditional Owners, pursuant to the Aboriginal Land Rights Act NT (1976). Much of the land in the region is of high ceremonial and cultural value to the Warlpiri people.

Most Leases are located on Aboriginal Freehold Land with one Lease located on the Suplejack Downs Pastoral Lease (50km north of Groundrush).

Northern Star have contacted the Suplejack Downs Pastoralist regarding the planned low-impact exploration activities and land access needs, a notice of entry will be provided prior to any planned access.

The Tanami region is sparsely inhabited. The nearest settlements are Lajamanu and Balgo, 205km north and 180km west respectively, of the Central Tanami Mine.

4.10 Aboriginal and Heritage Sites

All related Mining Agreements previously held by TGNL have been assigned to NSR under the joint venture agreement. As such, NSR is signatory to the Tanami Consolidated Mining Agreement and the Groundrush Mining Agreement as well as numerous Deeds for Exploration and the Suplejack ILUA.

Prior to any exploration activities on either Aboriginal Freehold land or Pastoral Leases, work programs are submitted to the CLC and heritage surveys are conducted with the relevant Traditional Owners groups where required.

Where necessary, a Sacred Site Clearance is conducted for any proposed area of disturbance. Heritage or sacred site Exclusion Zones are then mapped for the protection of any culturally significant sites. Under the provisions of both the Mining Agreements and Deeds for Exploration, should NST find any areas of possible Aboriginal significance which are not recorded, NSR is required to avoid working within 100m of the feature(s) and advise the CLC of their location as soon as possible.

NSR has obtained Sacred Site Clearance Certificates Numbered C2016-168 (Suplejack), C2016-186 (Cave Hill) and C2016-185 (Farrands Hill) from the CLC providing clearance for exploration activities within the Exploration Licences covered by this MMP. The information in respect of Exclusion Zones advised in the Sacred Site Clearance Certificates is provided on a strictly confidential basis and the CLC have advised that NST do not have approval to include any information, co-ordinates or plans provided by the CLC in our MMP.

It is noted that this does not indemnify the operator from prosecution under the Northern Territory Aboriginal Sacred Sites Act.

An “Abstract of Records Inspection” was conducted through the Aboriginal Areas Protection Authority (AAPA) for the Exploration Licences covered by this MMP. The results of the Inspection were reviewed and matched against the Clearance Certificate provided by the CLC. Appendix 16 is a summary of all AAPA search results as relating to this MMP.

A search has also been conducted using the online NT Heritage Register based on the following Lot numbers that relate to NSR's Tanami tenure, including the tenure the subject of this TRE MMP and no records were noted for any lot:

- Lot 1493: EL28282
- Lot 1740: EL10355, EL22061, EL23342, EL26926, EL28474, EL9763, EL9843, ML22934, MLS119 to ML133, 153, 167, 168, 180
- Lot 3973: EL26925, 8797
- Lot 4147: EL10411, 22229, 22378

NSR consulted the Department of Tourism and Culture Heritage Branch to confirm this status and requested a further search of the NT Heritage Register and the Aboriginal Archaeological Sites Database. Confirmation was received that there are no declared heritage sites within the four NT Portions listed above and there are no previously recorded Aboriginal archaeological sites of note. Email correspondence between NST and the Heritage Branch of the Department of Tourism and Culture is attached as Appendix 17.

All Records of Recorded and Registered Sacred Sites identified through these searches are maintained by NSR to ensure their appropriate protection and management. Systems and processes adopted by NSR for the protection and management of these, and any other sites of historical or cultural significance include:

- Submission of exploration program details to CLC for approval by Traditional owners
- As required Abstract of Records Inspections made via the Aboriginal Areas Protection Authority
- As required searches of the NT Heritage Register and NT Archaeological Resources Database
- Where necessary, commissioning of Sacred Site Clearance prior to any disturbance.
- Application of exclusion zones around any sites of significance.
- Adherence to the CLC site entry permit system
- Communication to NST employees and contractors regarding sites of significance and relevant protection measures via site induction
- All employees, contractors and sub-contractors to be provided with the Rules of Conduct for working on Aboriginal Land

5.0 Environmental Management System

5.1 Environmental Policy and Responsibilities

NSR's Environmental Management System (EMS) is in effect across all its operations. Key aspects of the EMS include the Environmental Policy (*Appendix 5*) and various supporting documents including:

- NSR-ENV-001-SYS Environmental Management System
- NSR-ENV-002-STA Incident Reporting Standard
- NSR-ENV-003-STA Mine Closure Standard
- NSR-ENV-004-STA Energy and Climate Change Standard
- NSR-ENV-005-STA Biodiversity Management Standard
- NSR-ENV-006-STA Environmental Risk Management Standard
- NSR Site Induction
- Site Disturbance Permits
- NST Drill Site Audit Form
- Drilling Site Preparation Procedure
- Drilling Rehabilitation Procedure

Other related policies and commitments are contained in the following external relations documents:

- NSR-ER-001-STA - Management of Cultural and Heritage Sites Standard
- NSR-ER-002-STA - Stakeholder Mapping Standard
- NSR-ER-003-STA - Stakeholder Engagement Standard
- NSR-ER-004-STA - Complaint and Grievance Management Standard
- NSR-ER-005-REP - External Relations and Environment Report (incident reporting)

5.2 Statutory and Non-Statutory Requirements

Statutory Requirements Summary

Legislation	Comment
<i>NT Aboriginal Land Rights Act 1976</i>	Governs access to ALRA land. Deed for Exploration with the Central Land Council (CLC) in respect of tenements on ALRA land.
<i>NT Aboriginal Land Act 1980</i>	Requirement for permits for entry onto Aboriginal Land
<i>NT Aboriginal Sacred Sites Act 1989</i>	Duty to report and protect Aboriginal archaeological and historic sites
<i>NT Heritage Act 2012</i>	Duty to report and protect places and objects of historical and archaeological significance
<i>NT Mineral Titles Act 2010</i>	Exploration Licenses granted under the terms and conditions of the Mining Act
<i>NT Mining Management Act 2011 and Regulations (amended in 2013)</i>	Authorisation issued for ground disturbing activities and as amended
<i>Commonwealth Native Title Act 1993</i>	Indigenous Land Use Agreement with Central Land Council in respect of tenements on Pastoral Land
<i>NT Weeds Management Act 2001</i>	Responsibility to prevent the spread noxious weeds
<i>NT Plant Health Act 2008 and Regulations (2012)</i>	Regulations introduced due to the quarantine risk posed to the NT with the movement of machinery and equipment.
<i>NT Work Health and safety (NUL) Act 2011</i>	An act to promote health and safety in the workplace. Requirement to report employment/injury and safety statistics
<i>Commonwealth Environment Biodiversity Protection Act (1999)</i>	The EPBC Act focuses Australian Government interests on the protection of matters of national environmental significance, with the states and territories having responsibility for matters of state and local significance.
<i>NT Soil Conservation and Land Utilisation Act 1980 (as amended)</i>	An act to make provision for the prevention of soil erosion and for the conservation and reclamation of soil.
<i>Territory Parks and Wildlife Conservation Act 2006</i>	An act that provides for the protection of animals and plants and the preparation of plans of management for parks and reserves.
<i>NT Bushfires Act 1980</i>	Management of fire to prevent damage to persons, land or property.
<i>Dangerous Goods Act 2011 and Regulations</i>	Licensing for storage and handling of explosives, chemicals and fuel.
<i>NT Environmental Assessment Act 1982 and Environmental Assessment Administrative Procedures Act 1984</i>	
<i>NT Environmental Offences and Penalties Act 1996</i>	
<i>NT Public Health Act 1952</i>	
<i>NT Soil Conservation and Land Utilisation Act 1980 (as amended)</i>	
<i>NT Waste Management and Pollution Control Act 1998</i>	
<i>NT Water Act 2011</i>	

Non-Statutory Requirements Summary

Legislation	Comment
Northern Territory Guidelines	Guidelines to Prevent Mosquito Breeding, Department of Health and Community Services (1988).
	Erosion and Sediment Control Plan Content, NRETAS (2006).
	NT Health and Families: Requirements for Mining, Construction and Bush Camps (Environmental Health Information Fact Sheet No. 700), Department of Health.
	Policy - Road Traffic Noise on Northern Territory Government Controlled Roads, DPI (2006).
CLC Mining/Exploration Agreements	Approvals for exploration programs and establishes guidelines for rehabilitation and cultural awareness.
NT Resources Council	Code of Conduct for Mineral Explorers in the NT

5.3 Induction and Training

All staff and visitors entering the Central Tanami Project operation sites are required to complete a site entry induction as an integral part of the Safety Management System. This induction (*Appendix 6*) includes a presentation of safety and environmental information. Currently the induction has been developed based on exploration requirements.

The entry induction includes the following:

- Incident reporting
- Risk management process
- Social responsibility overview
- Stakeholder Policy
- Relationships with Indigenous people commitment
- Cultural heritage management
- Legal penalties for environmental non-compliance
- Fauna protection
- Dingo management
- Flora protection
- Weed management (including identification, legal requirements and weed hygiene practices)
- Hydrocarbon and chemicals storage and management

5.4 Identification of Environmental Aspects and Impacts

NSR's risk management procedure (NSR-COR-020-PRO) has been used for the identification and management of environmental aspects and impacts associated with the proposed activities. This procedure has been designed to align with the International Environmental Management Systems Standard ISO14001:2015. Key elements of the risk assessment process adopted for Tanami Regional Exploration include:

- Identification of potential risks and opportunities within a group/workshop setting.
- Identification of possible contributing factors and causes of such an event.
- Determining the likelihood and consequences of the event occurring. Consequences consider health & safety, environmental, community/stakeholders, legal compliance and financial.
- Rate the likelihood and consequence in the absence of control measures, to determine 'initial risk'.
- Identification of existing control measures in place for reducing the likelihood or consequences of the event.
- Rate the likelihood and consequence with consideration of control measures, to determine 'residual risk'.
- Identification of potential additional control measures that could be implemented to address any knowledge gaps or risks that are considered unacceptable.
- Allocation of timeframes and responsibility/accountability for the effective implementation of proposed control measures.

The information compiled from the process above is collated and documented within the Central Tanami Project risk register. The risk register is reviewed regularly and revised to consider changes to the operating conditions, the implementation of control measures or simply the identification of new risks.

5.4.1 Tanami Regional Exploration Environmental Risk Assessment

The key risk areas currently identified from the project risk assessment are:

- Spread of weeds
- Hydrocarbon spills
- Bushfire
- Inappropriate waste disposal
- Unauthorised clearing
- Unauthorised access to culturally significant areas

These risk events were classified as having a moderate 'initial risk' (i.e. the level of risk in the absence of any control measures). With consideration of the risk control measures currently in place, the likelihood of each of these risks reduces to the extent that the 'residual risk' is low.

A summary of the risk register completed for this assessment is provided in Table 9.

5.4.2 Biodiversity Management

Several operational practices and risk control measures exist at the Central Tanami Project to ensure that significant flora/fauna species and habitats are protected from the proposed activities. As the proposed activities and levels of disturbance increase beyond the scope of this MMP (e.g. drilling), the biodiversity management practices and risk control measures will be reviewed and amended to reflect the levels of risk.

Although not proposed in this MMP, the future drilling activities where biodiversity management will be effected through measures outlined below.

Flora and Fauna Surveys

Prior to land disturbance associated with approved activities, surveys are conducted by suitably trained consultants to identify flora and fauna species of conservation concern, and associated habitats.

A desktop and field survey was conducted for the Central Tanami Project by Low Ecological Services (LES). The results are summarised in *Appendix 3*.

Induction and Training

The education of site personnel on issues relating to biodiversity management is largely achieved through the site induction processes. Staff are provided information (an induction booklet) so that they can identify particular animals, signs of the animals (e.g. burrows) and potential habitat areas. The induction also addresses the identification and management of significant flora species and weed species.

Copies of the site induction process (*Appendix 6*) and the induction material (*Appendix 7-Weeds Field Guide*) are included.

Workplace Inspections

Compliance with site systems and procedures relating to biodiversity management is monitored through regular inspections of work areas. Details of the workplace inspections, including schedules are provided in Section 5.5.1 Workplace Inspections & Audits.

Weed Management

The management of weeds is a significant element of NSR's biodiversity protection program. The existence and management of weed species was included in the scope of the Flora and Fauna assessment conducted by Low Ecological Services in 2016. A Weed Management Plan exists (*Appendix 4*) and weed identification and management is included within site inductions and workplace inspections.

Objectives and Targets

NST has adopted key environmental performance objectives and targets for its Regional Exploration efforts. One of the four key objectives is the protection of flora and fauna. NST has identified specific performance targets and measurement tools that relate to this objective.

Incident Reporting

NSR's incident reporting procedures incorporate aspects of biodiversity management. Sightings of, or damage to threatened flora/fauna species are required to be reported via the site incident reporting process. Incident investigation processes will determine if further reporting is required (e.g. reporting to regulatory authorities).

Waste Management

Responsible management and disposal of wastes is important for the protection of native fauna and the management of pest fauna species. The Central Tanami Project Waste Management Plan (*Appendix 8*) addresses waste management issues that can impact on flora and fauna, such as the collection and disposal of putrescible waste and the management of the landfill facility.

Table 9 Central Tanami Project Environmental Risk Register Summary

Risk/Activity	Risk Description	Initial Risk			Current Controls	Residual Risk		
		Consequence	Likelihood	Rating		Consequence	Likelihood	Rating
Traversing bushland by light vehicle	Unauthorised clearing.	3 - Moderate	C -Possible	Medium	GPS guided field activities - based on approvals and work program outline. No "clearing" as part of this work program proposal.	3 - Moderate	E - Rare	Low
	Spreading of weeds	4 - Minor	B - Likely	Medium	Inspection and wash down procedures. Wash down bay exists - use of air compressor when coming from regional locations. Inductions to provide basic understanding of weed spatial distribution.	4 - Minor	C -Possible	Low
	Driving off designated tracks	4 - Minor	C -Possible	Low	Induction instructs staff to stay on designated tracks. Field staff trained in off-road driving and mitigating damage to environment in doing so.	4 - Minor	D - Unlikely	Low
Soil sampling & field reconnaissance	Hydrocarbon spills	4 - Minor	B - Likely	Medium	Regular maintenance, spill kits, incident reporting requirements. Correct hydrocarbon storage procedures.	4 - Minor	C -Possible	Low
	Inappropriate waste disposal	4 - Minor	B - Likely	Low	Waste Management Plan, induction covers waste management, inspections, landfill facility (including burn pit)	4 - Minor	B - Likely	Low
	Bushfire	3 - Moderate	C -Possible	Medium	Fire extinguishers on all vehicles. Information in induction, emergency response procedures.	3 - Moderate	D - Unlikely	Low
	Unauthorised access to culturally significant areas	3 - Moderate	C -Possible	Medium	GPS guided field activities - based on approvals and work program outline. Inductions teach staff about all types of exclusion areas.	3 - Moderate	D - Unlikely	Low
Storage of hydrocarbons	Spillage/leakage	4 - Minor	B - Likely	Medium	Bulk diesel banded, currently removing un-banded containers, pallet banded provided for small containers. Spill kits, induction, waste management plan.	4 - Minor	C -Possible	Low

5.4.3 Hydrocarbon Management

As part of general work procedures, NST ensures all hydrocarbon management complies with Australian Standard 1940-2004 'The storage and handling of flammable and combustible liquids'. Please find attached the Hydrocarbon and Chemical Spill Clean Up Procedure (Appendix 21) which applies to all works carried out in the Northern Territory.

5.4.4 Landfill and Waste Management

The Central Tanami Project site has a Waste Management Plan (Appendix 8), which addresses issues such as:

- Waste minimisation and recycling.
- Waste segregation and disposal methods.
- Management of the landfill facility, including use of the burn pit and bury pit.
- Inspections, monitoring, waste tracking and reporting.

The landfill facility currently utilised by NST is an existing facility used by previous mine operators. It includes a 'burn pit' for the incineration of combustible, non-hazardous wastes, and a 'bury pit' for burying non-combustible materials and remnants from the burn pit. The management of wastes to minimise wind-blown litter and attracting feral and native animals includes the following measures:

- Waste receptacles at site (e.g. rubbish bins) are secured and emptied regularly to the landfill.
- The burn pit receives waste that is most susceptible to distribution by wind and feral animals and native fauna (paper and food scraps). This pit is burned regularly and immediately any putrescible waste, food scraps or the like is deposited (weekly) to prevent the build-up of waste material. Any remnants from the burning process (e.g. ash, unburned metal) will be periodically transferred by front end loader to the bury pit.
- The bury pit is checked regularly (weekly), formally inspected monthly, and is included on the site inspection schedule (see Table 10 Central Tanami Project Workplace Environmental Inspection Schedule), and will be periodically covered with soil to minimise the distribution of waste material by wind, or feral animals or native fauna.
- The fence around the landfill site is maintained to minimise access by animals, especially dingoes.
- The gate of the landfill is always shut, with prominent signage to keep it shut at all times.

The frequency of covering the bury pit will be determined through monitoring and inspection, and will vary subject to the number of people on site and the quantity of material being placed in the bury pit.

Works will be completed in 2017 to "square off" the bury pit and improve access. The footprint will be largely unchanged and remain within the current fenced area.

All waste collected as part of Regional Exploration works is disposed of accordingly via the Central Tanami Project Waste Management Plan.

5.5 Environmental Audits, Inspections and Monitoring

5.5.1 Workplace Inspections & Audits

A schedule of workplace inspections has been developed and will be implemented at the commencement of the proposed exploration activities. Note this inspection list is relatively exhaustive so it includes inspections relevant to more advanced works not proposed in this MMP. Those inspections relevant to drilling may also be considered relevant to mechanised soil sampling and other Tanami Regional Exploration work activities.

Table 10 Central Tanami Project Workplace Environmental Inspection Schedule

Workplace Environmental Inspection Schedule			
Inspection Type/details	Frequency	Records Management	Responsibility
Pre-drill program inspections: Confirm proximity to Cultural and heritage sites (if applicable) Weeds - check for dirt/mud on equipment (wash down if necessary), check for presence of weeds at proposed drill sites. Site safety – if in proximity to pits, check for any signs of ground instability (e.g. cracks). CONFIRM IN ACCORDANCE WITH DRILLING GEOTECHNICAL MANAGEMENT PLAN.	Once, prior to drilling commencing	Ground disturbance permit Drill rig and drill site audit form (Appendix 15) – one for each general area of drilling.	Site Manager/Supervising Geologist
Operational drill inspections: Land disturbance (tracks, pads, sumps) limited to that necessary for operations and approved under Authorisation. Clearing is not contributing to unacceptable rates of erosion/sedimentation (e.g. along tracks). Sump capacity adequate to prevent overtopping. Hydrocarbon and waste management is occurring as per site procedures (e.g. no litter or hydrocarbon contamination)	Monthly, more frequent opportunistic informal inspections.	Drill rig and drill site audit form – performed at pre-drill and monthly intervals.	Site Manager/Supervising Geologist
Post drill inspections: Conducted as part of the rehabilitation program	Within 6 months of drilling	CTP Rehab database	Site Manager/Supervising Geologist
Temporary Base/Campsite inspections: Conducted prior to and at the cessation of the specific field activities. General cleanliness inspection. Ensure no substantial disturbance is to be made/created. Ensure access is not prohibited by Cultural/Heritage issues.	Before and Immediately after work activities	Work proposal Work program report	Supervising Geologist
Weed hygiene inspections: On all vehicles/machinery moving between site locations. I.e. CTP to Cave Hill. Ensure Weed Hygiene procedure is adhered to (Check certificate). Spot checks of vehicles/machinery pre, post and during work activities for adequate weed hygiene.	Before, during and after work activities. Before mobilisation	Weed hygiene certification	Supervising Geologist/Field Technician
Geochemical Sampling inspections: Carried out prior, during and post sampling. Ensure vehicle access is by non-substantial disturbing means only (i.e. vegetation and landform avoidance). Ensure sample sites are barren areas, void of native habitat. Ensure all waste is removed during the work activity.	Before, during and post-sampling	Work program report	Supervising Geologist
Infrastructure inspections: Includes the processing plant, site offices, accommodation camp, airstrip, haul/access roads, bore field, landfill facility. Checklists include inspection for: <ul style="list-style-type: none"> Housekeeping Emergency equipment Personal health and safety (e.g. PPE, ergonomics) Electrical safety Chemical and hydrocarbon storage 	Monthly	Inspection checklists	Site Manager/Supervising Geologist

<ul style="list-style-type: none"> Waste management (litter, segregation of waste types) Water management (leaks, potential for contamination) Weeds 			
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5.6 Environmental Performance

5.6.1 Objectives and Targets

NSR's environmental performance objectives are outlined in the Environmental Policy (Appendix 5) and Environmental Management System and Environmental Standards, which have been provided as separate files to the DPIR accompanying this MMP.

Project specific environmental performance objectives for both TRE and CTP include:

- Stakeholder engagement** – Liaise with relevant stakeholders to understand issues such as cultural/heritage values, future land users and Regulator expectations. Ensure stakeholder views and expectations are considered throughout NST's activities.
- Protect flora and fauna** – Impacts on flora and fauna are minimised, including those associated with waste disposal, weeds, erosion AND sediment.
- Prevent groundwater and soil contamination** – Ensure the appropriate management and disposal of environmentally hazardous substances to minimise the risks of contamination.
- Progressive rehabilitation** – Ensure that rehabilitation of exploration disturbance is conducted in a timely manner and is conducted to standards that enable long-term success.

Specific performance targets relating to each objective are provided in Table 11.

Table 11 TRE Environmental Objectives and Targets

Objective	Targets	Measurement Tools / KPI's
Stakeholder engagement	Areas of interest are covered by cultural and heritage surveys.	Existence of surveys over areas of interest. Identification of sites of significance.
	Any areas of significance are documented and are considered as part of NST's ground disturbance permitting process.	Ground disturbance permits – evidence of considering the proximity to sites of significance.
	Consultation with relevant stakeholders regarding activities on site.	Stakeholder consultation register
Protect flora and fauna	Cap drill holes immediately after drilling.	CTP Rehab Database
	Prevent the spread of litter by wind or feral animals – inductions, landfill management, drill site inspections.	Operational drill site inspection forms
	Minimise the spread of weed species – by pre-drill inspections. Compliance with Weed Management Plan.	Pre-drill inspection forms
	Minimise impacts from stormwater flows (erosion/sedimentation from sumps or along tracks, drainage shadows or flooding).	Pre-drill inspection forms Operational drill inspections
Prevent water/soil contamination	Minimise hydrocarbon spills and ensure appropriate waste disposal.	Incident reporting forms Operational drill inspections
	Ensure drill sumps are sized adequately to prevent risk of over-topping.	Incident reporting forms Operational drill inspections

Objective	Targets	Measurement Tools / KPI's
Exploration Rehabilitation	Restore exploration drill sites and tracks in so far as is practical to original condition. Focus on removal of rubbish, hydrocarbons, sample bags, and practices to minimise potential slumping or collapse into buried drill holes or sumps and interference with aquifers.	CTP Rehab Database, incl. photo records before, during and after rehab. Audits to be completed 12 months after final rehab.

In October 2016, an audit of all drilling completed on the CTP tenure was completed. Each drill site was visited and inspected for the presence of rubbish, sample bags, sumps and exposed drill collars with photographs taken of each site. This audit forms the basis of a program to progressively address legacy exploration rehabilitation.

5.6.2 Performance Reporting

The implementation of the post-drill inspections as described in section 5.5.2 Workplace Inspections & Audits has been successful in maintaining an accurate record of drill site rehabilitation status. As previously noted, a complete audit of historical drilling was carried out with the status of these works summarised in the Rehabilitation Data Sheet (Appendix 1).

Appendix 9 shows examples of completed rehabilitation from the Cave Hill and Farrands Hill 2012 Air-Core/RAB drilling programs.

5.7 Emergency Procedures and Incident Reporting

The risks associated with environmental emergencies have been considered as part of the risk assessment for the project. Potential emergency situations include hydrocarbon spills and bushfire events. Hydrocarbon spill kits and waste management procedures exist to address the correct disposal of contaminated wastes.

Bushfire response measures include the requirement for fire extinguishers on all vehicles and drill rigs. Water supply and pumps/hoses are also required on all drill rigs. Emergency evacuation plans involve evacuating to the central laydown areas in open clear spaces. Fire risk awareness information is included in the site induction. Operational inspections also consider fire risk e.g. appropriate disposal of cigarette butts.

NSR has developed and implemented an Emergency Response Plan for the Central Tanami Project. The plan is an overarching document containing general emergency procedure information including the delegation of responsibilities, important contact numbers and general procedures to be followed when an emergency is identified.

Environmental emergency situations are addressed in the Central Tanami Project Environmental Emergency Response Plan, attached as Appendix 20. This document applies to both the CTP and TRE work activities.

- Fire – Mobile Plant/Light Vehicles/Buildings.
- Bushfire.
- Tyre fire/explosion.
- Dangerous goods – spill or release.

The reporting and investigation of environmental incidents are conducted in accordance with NSR's Incident Reporting Standard. As the operator at the Central Tanami Project, NST is progressively implementing its own incident reporting system. Incidents and accidents are reported in the internal sever based database and events management system INX. All events are recorded, rated and have the associated impact area identified i.e. Environment, Injury (HSLP), Social Responsibility etc. Actions are raised and managed from the system to ensure appropriate closeout.

Current Incident Reporting Requirements:

- All incidents and accidents must be reported to the Supervisor immediately.
- The Department Head shall be informed by no later than the end of that working shift.
- The Site Manager, as appropriate, shall be informed of any hazard/incident that has a high or significant risk ranking as soon as possible.
- The hazard/incident report shall be completed within two working days.

In addition, NSR is aware of the requirement to notify DPIR on becoming aware of a serious environmental accident or critical incident on the CTP site (Section 29 MMA). NSR will refer to the NT DPIR Guideline 'Environmental Incident Reporting' (Advisory # AT8-006) with regards to classifying the severity of the incident and complying with the subsequent reporting and incident investigation obligations under sections 29 and 31 of the MMA.

Environmental incidents are reported internally using the InControl, incident management system. The site maintains an Environmental and Health and Safety incident register. At the time of preparing this MMP, no environmental incidents have been reported since the commencement of the Joint Venture with NSR.

6.0 Exploration Rehabilitation

Rehabilitation methods adopted for Tanami disturbance are described in Table 12. These methods apply to exploration disturbance resulting from NST's drilling programs as well as historical disturbance remaining from drilling programs conducted by previous operators.

Table 12 Description of Rehabilitation Methods

Disturbance	Rehabilitation Methods	Schedule (Timing)	Closure Objectives / Targets	Monitoring and Remediation
Drill holes - RC/DD	All PVC collars to be capped immediately after drilling.	On completion of drilling the hole (or collar location). <i>(Note. Do not cap if drilling multiple holes off same collar due to risk of plug/cap ejection)</i>	All holes are capped/safe prior to the end of the program. Ensure cap is tightly sealed (use tek screw or Loctite glue)	Site checked before moving on to next drill hole.
	Cut PVC below ground to a minimum depth of 40cm and insert concrete plug, backfill and mound hole.	Within 6 months of completion of drilling (unless hole considered necessary for further drilling)	Holes are plugged and will be safe and stable in the long-term. Prevent fauna access. Prevent pooling of surface water and prevent washouts.	Visual inspection, photograph and complete Rehabilitation Audit Form
Drill holes - RAB or Aircore	All collars plugged at a minimum depth of 40cm Backfill soil into hole, compact and mound over the hole approximately 20cm high and 80cm wide and cover with topsoil	On completion of drilling hole.	Holes are plugged and will be safe and stable in the long-term. Prevent fauna access. Prevent pooling of surface water and prevent washouts.	Visual inspection, photograph and complete Rehabilitation Audit Form
Sample bags	Sample bags to be removed and disposed of at site landfill.	Within 6 months of completion of drilling	Remove all plastic bags and dispose of responsibly.	Check site, photograph and complete Rehabilitation Audit Form
	Drill sample material from bags to be buried in sump.	Within 6 months of completion of drilling (unless hole considered necessary for further drilling)	Reduce visual impact of different coloured drill spoil by burying.	Check site, photograph and complete Rehabilitation Audit Form
Sumps	Check sumps to ensure water has evaporated. Infill sump with drill spoil and excavated material using backhoe and rake flat.	Within 6 months of completion of drilling (unless hole considered necessary for further drilling)	Ensure all sites are safe and rehabilitated.	Check site, photograph and complete Rehabilitation Audit Form
Drill pads	Check ground for any hydrocarbon leaks or spills- excavate and bag any affected soil for disposal. Remove all rubbish	Immediately following drilling	Prevent soil/water contamination Drill site is clean of rubbish	Visual inspection, ensure regrowth is adequate. If signs of issues with compaction ripping to be carried out (re-inspect in 6-12 months)

Disturbance	Rehabilitation Methods	Schedule (Timing)	Closure Objectives / Targets	Monitoring and Remediation
	Rip or rake the collar area to smooth any drill spoil or channels and berms excavated during drilling	12 months after drilling	Ensure disturbed area is returning to pre-disturbed state	
All-weather drill pads	<p>Check ground for any hydrocarbon leaks or spills- excavate and bag any affected soil for disposal.</p> <p>Remove all rubbish. Fresh rock used to construct all weather pads is removed to pit safety bund or pit backfill.</p> <p>Rip or rake the collar area to smooth any drill spoil or channels and berms excavated during drilling</p>	12 months after drilling	<p>Prevent soil/water contamination</p> <p>Drill site is clean of rubbish</p> <p>Ensure disturbed area is returning to pre-disturbed state</p>	Visual inspection, ensure regrowth is adequate. If signs of issues with compaction ripping to be carried out (re-inspect in 6-12 months)
Manual Geochemical Sample Sites	Using hands or a trowel fill the <30cm sample hole with extracted soil, scarify the surface with hands and shovel.	At the point of sampling	<p>Ensure sample site is returned to original state</p> <p>Ensure no rubbish/waste remains</p>	Visual inspection during and at the cessation of the work program.
Mechanised Geochemical Sample Sites	Where sample holes have not backfilled on their own accord, use hands/trowel/feet to fill the hole and compress. Scarify the surface using a trowel.	At the point of sampling	<p>Ensure sample site is returned to original state</p> <p>Ensure no rubbish/waste remains</p>	Visual inspection during and at the cessation of the work program.
Tracks / Gridlines	Where possible, tracks are cleared with 'blade-up' method to minimise impact. Inspect tracks/gridlines for compaction or risk of erosion. Remediate as necessary.	Within 24 months of completion of drilling (unless access considered necessary for further drilling)	Areas regenerate to pre-disturbance state. Prevent erosion along tracks/gridlines.	Check site, photograph and complete Rehabilitation Audit Form

6.1 Exploration Rehabilitation Register

NSR maintains records of all drill holes drilled by NST on the Tanami leases within its Rehabilitation Database. Records for each drill hole include:

- Drill hole I.D.
- Tenement
- Hole type
- Date completed
- Maximum depth
- Project/prospect name
- Geologist supervising
- Drilling contractor
- Coordinates (easting, northing and RL)
- Survey method and date
- Rehabilitation status (e.g. hole capping, plugging, sumps backfilled, bags removed, pre and post rehab photographs taken, post rehab inspection/audit undertaken)

The Rehabilitation Data Sheet provided in *Appendix 1* details the rehabilitation status of all drill sites, the rehabilitation methods used and evidence of rehabilitation (before and after photos). Examples of these photographic records are provided in *Appendix 9*.

6.2 Costing of Closure Activities

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