

**Regional Exploration - Mine Management Plan
Tenement Schedule**

Lease	Lease Name	Registered Holder	Grant Date	Expiry Date	Current Area (Blks)	Project
EL10355	Red Hills North	Tanami (NT) Pty Ltd 75% Northern Star (Tanami) Pty Ltd 25%	4/06/2001	3/06/2017	4	Cave Hill
EL10411	Tanami Downs North	Tanami (NT) Pty Ltd 75% Northern Star (Tanami) Pty Ltd 25%	4/06/2001	3/06/2017	7	Cave Hill
EL22229	Question Mark Bore East	Tanami (NT) Pty Ltd 75% Northern Star (Tanami) Pty Ltd 25%	8/06/2001	7/06/2017	8	Cave Hill
EL22378	Question Mark Bore Far	Tanami (NT) Pty Ltd 75% Northern Star (Tanami) Pty Ltd 25%	8/06/2001	7/06/2017	6	Cave Hill
EL23342	Aperta Far East	Tanami (NT) Pty Ltd 75% Northern Star (Tanami) Pty Ltd 25%	25/05/2006	31/12/2017	8	Cave Hill
EL28282	Suplejack	Tanami (NT) Pty Ltd 75% Northern Star (Tanami) Pty Ltd 25%	20/04/2011	19/04/2017	35	Suplejack
EL9763	Red Hills	Tanami (NT) Pty Ltd 75% Northern Star (Tanami) Pty Ltd 25%	24/07/2000	23/07/2017	7	Cave Hill
EL9843	Chapmans Hill	Tanami (NT) Pty Ltd 75% Northern Star (Tanami) Pty Ltd 25%	27/03/2006	31/12/2017	15	Farrands Hill
EL22061	Farrands Hill South	Tanami (NT) Pty Ltd 75% Northern Star (Tanami) Pty Ltd 25%	27/03/2006	31/12/2017	13	Farrands Hill



FLORA AND FAUNA ASSESSMENT

CENTRAL TANAMI PROJECT

Report Prepared for Northern Star Pty Ltd

November 2016

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Frontispiece:**DISCLAIMER**

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REVISION DETAILS

Date	Revision	Author/Reviewer	Comments
29.11.16	DraftV1	Jess Cuneo	

EXECUTIVE SUMMARY

Northern Star Pty Ltd are the leaseholders for the mining and exploration leases collective referred to as the Central Tanami Project. Northern Star propose to undertake exploration drilling in the Hurricane Repulse (MLS153) and Groundrush (ML22934) tenements in areas thought to have the potential to host economically recoverable resources.

The Department of Mines and Energy (DME) requested that Northern Star Pty Ltd undertake further flora and fauna surveying of the proposed drilling areas prior to undertaking works. Northern Star Pty Ltd contracted Low Ecological Services (LES) to undertake a flora and fauna desktop assessment and on ground survey of the proposed drill areas and leases.

LES undertook a desktop assessment of the leases and surrounding area prior to on ground survey to characterise the environment, identify flora and fauna species of conservation concern and identify habitats present in the area. An EPBC Protected Matters Search (PMST) and interrogation of the NT Flora and Fauna Atlases were undertaken within a 20km area around the leases. These identified threatened species and other species of conservation concern as well as weeds and feral animal species that occurred or had the potential to occur in the survey area.

A total of ten sites were survey during three on ground surveys conducted 2012 and 2016. Survey methods included vegetation and habitat descriptions, fauna observation, trapping and tracking and targeted threatened species surveys. Threatened fauna species identified in the desktop assessment as having a moderate to high likelihood of occurring in the survey area included the greater bilby (*Macrotis lagotis*), great desert skink (*Liopholis kintorei*), brush-tailed mulgara (*Dayscercus blythi*) and northern nailtail wallaby (*Onychogalea unguifera*).

Records of three EPBC and TPWC listed fauna species were noted in the project area during the 2012 and 2016 surveys. Greater bilby (*Macrotis lagotis*) was recorded in the southwest corner of the Hurricane Repulse (MLS153) tenement in the 2012 survey. Brush-tailed mulgara were recorded in the Groundrush (ML22934) tenement in the 2016 survey and northern nailtail wallaby were recorded in both the Hurricane and Groundrush tenements in the 2016 survey.

Of the three near threatened and two data deficient flora species listed under the *Territory Parks and Wildlife Conservation Act* (TPWC Act) as potentially occurring within 20km of the lease area (NT Flora Atlas), none were noted in any of the ten study sties during on ground surveying. One weed of national significance (WoNS), Buffel grass (*Cenchrus ciliaris*), identified by the PMST and NT Flora atlas as occurring in the area, was observed during the on ground survey. Other introduced species identified included Feathertop Rhodes Grass (*Chloris virgata*) , Couch grass (*Cynodon dactylon*) and Ruby dock (*Rumex vesicarius*).

Only one of the observed threatened fauna species, greater bilby (*Macrotis lagotis*), is listed under the EPBC Act. When assessed against the Matters of National Significance Significant Impact Guidelines 1.1 (2013) LES have concluded that the proposed development activities in the Central Tanami Project Area are unlikely to have an impact on the population of any threatened species.

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INTRODUCTION

Low Ecological Services Pty Ltd (LES) were requested by Northern Star Pty Ltd (Tanami) to assess and interpret the flora and fauna data at the Central Tanami Project ('the Project') and to identify measures to reduce any impact on threatened species in targeted project areas. The following report identifies threatened species that may be vulnerable to the Project, assesses the level of risk to the species and provides management techniques to reduce the risk of disturbance. The report is accompanied by an induction booklet, including a threatened species identification kit for construction workers.

The report draws on information from a desktop survey and a three day trapping survey conducted in November 2016 to determine which threatened flora and fauna are in the area and areas of high risk.

1.1. PROJECT DESCRIPTION

Northern Star Pty Ltd (NST) are the current leaseholders of the project area known as the Central Tanami Project (CTP), located 650km northwest of Alice Springs and 850km southwest of Darwin within the Tanami bioregion. The Central Tanami site has a long mining history, dating back to the early 1900's with most recent drilling taking place in 2015/16. The proposed current activities will centre around two primary areas, Groudrush (MLS22934) and Hurricane Repulse (MLS153) tenements and will comprise of 320 drill holes for approximately 50,000m. The Project is accessible from the public Tanami Road that passes through MLS153 within 2km of the camp and treatment plant. Access to Groudrush pit is via a sealed haul road from the CTP mine site. For the purpose of this report "the project area" will therefore refer to both the Groudrush and Hurricane Repulse tenements as well as the adjoining Groudrush haul road.

1.2. SCOPE OF WORK

The objectives for the assessment of flora and fauna in the Central Tanami project area were to:

- Identify and describe relevant existing flora and fauna within the focus areas for development that may be affected by disturbance
- Interpret local data in a regional context through access to current spatial environmental datasets
- Identify potential environmental impacts of the Project on identified environmental values, including habitat areas and assess the associated level of risk
- Describe threatened species that may be impacted by the Project.

1.3. LEGISLATIVE ENVIRONMENT

1.3.1. Environment Protection and Biodiversity Conservation Act, 1999 (EPBC Act) (Amended 2013)

The EPBC Act (revised 2005) came into force in July 2000 and was updated in 2013. Since the inception of the Act, any proposed project that will have a significant impact on a Matter of National Environmental Significance (MNES) must be referred for approval to the federal Minister for the Environment. There are eight matters of national environmental importance protected under the EPBC Act. These include:

- Impact on World Heritage sites;
- Impact on National Heritage Places
- Impact on Ramsar wetlands of international importance;
- Impact on nationally threatened species and communities;
- Impact on migratory species;
- Impact on Commonwealth marine areas;
- Impact on the Great Barrier Reef Marine Park, and;
- Nuclear actions.

1.3.2. Northern Territory Parks and Wildlife Conservation Act 2000 (TPWC Act) (Amended 2005)

The *Northern Territory Parks and Wildlife Conservation Act 2000* (TPWC Act) provides a legislative framework for threatened species in the Northern Territory (NT). Thus meeting the threatened species requirements of the NT is treated in parallel with the Commonwealth Government's requirements.

2. METHODOLOGY

2.1. DESKTOP REVIEW

A desktop survey was conducted to determine:

- Matters of National Environmental Significance (MNES) that may be applicable to the project, determined through a search of the Commonwealth Government's Protected Matters Search Tool (EPBC PMST);
- Threatened flora and fauna listed under the EPBC Act or TPWC Act that have been recorded are may occur within a 20 km buffer of the project; and
- High risk areas for threatened fauna

Databases and literature that were used include:

Table 1. DATASETS UTILISED FOR DESKTOP SURVEY OF CENTRAL TANAMI PROJECT AREA

Number	Information Source	Environmental Aspect
1	Broad Vegetation mapping, Wilson, B.A. et al. (1990)	Vegetation
2	Tanami Bioregional Description – Department of Land resource management http://lrm.nt.gov.au/herbarium/nature/bioregional/tanami#.UOzLuW_qmpo	Bioregion
3	Environment Protection and Biodiversity Conservation (EPBC) Protected Matters Search Tool	Habitats, Fauna, Flora
4	NRETAS Fauna Atlas Database	Fauna
5	NRETAS Flora Atlas database	Flora
6	Atlas of Living Australia	Fauna, Flora
7	Harrison, L, McGuire, L, Ward, S, Fisher, A, Pavey, C Fegan, M and Lynch, B 2009, <i>An inventory of sites of international and national significance for biodiversity values in the Northern Territory</i> . Department of Natural Resources, Environment, The Arts and Sport, Northern Territory, Darwin.	Habitat
8	Numerous reports to mining companies occupying the region of interest including Newmont and Tanami Gold by consultants including Low Ecological Services (1990 to 2012), Ecoz Environmental (1998 – 2000), Desert Wildlife Services (2000)	Habitat, substrate, flora, fauna, mining impact management

2.2. FIELD SURVEYS

Low Ecological Services (LES) undertook flora and fauna assessments in the project area in March 2012, May 2012 and November 2016. The surveys aimed to:

- Survey vegetation, flora, geology, soils and extent of previous disturbances
- Survey terrestrial fauna utilising trapping observations and tracking
- Undertake targeted searches for threatened species identified through the PMST search tool and the NT Fauna Atlas.

2.2.1. Site Selection

Survey sites were selected based on the location of proposed drilling areas around both the Hurricane and Groundrush pits. Additional factors allowing representation of habitats in the area included:

- Site characteristics including vegetation type, land form and elevation
- Land units in the area; and
- Accessibility and distance to the site.

A total of ten sites within the Project Area were surveyed including four sites in March and May 2012 and an additional 6 sites in November 2016. These included five sites in the Groundrush tenement (MLS22934), three sites in the Hurricane Repulse tenement (MLS153) and two sites along the adjoining haul road. These sites are summarised below in Table 2 and mapped in Figure 1.

Table 2: DETAILS AND LOCATIONS OF SITES SURVEYED DURING THE 2012 AND 2016 SURVEYS

Site name	Code	Habitat type	Date	Tenement
Haul road 1	HR1	Low open Eucalypt woodland on Sand plain in shallow drainage depression	27/03/12 – 01/04/12	Black Hills 2 EL26926
Haul road 2	HR2	Sparse <i>Corymbia opaca</i> over storey with Acacia understorey	27/03/12 – 01/04/12	Rushmore EL28474
Groundrush 1	G1a	Open <i>Acacia</i> shrubland in drainage depression	27/03/12 – 01/04/12	Groundrush MLS22934
Groundrush 2	G1b	Low <i>Acacia</i> shrubland with adjacent open woodland of <i>Corymbia</i> and <i>Eucalypt</i> over <i>Acacia</i> shrubland and <i>Spinifex</i> .	15/11/16 – 18/11/16	Groundrush MLS22934
Groundrush 3	G2	Sparse <i>Corymbia</i> overstorey with <i>Eucalypt</i> and <i>Acacia</i> Midstorey over partially burnt <i>Spinifex</i> on sandplain.	15/11/16 – 18/11/16	Groundrush MLS22934

Site name	Code	Habitat type	Date	Tenement
Groundrush 4	G3	Open woodland of <i>Corymbia</i> and <i>Eucalypt</i> over <i>Acacia</i> understory and <i>Spinifex</i> on sandplain	15/11/16 – 18/11/16	Groundrush MLS22934
Groundrush 5	G4	Open woodland of <i>Corymbia</i> and <i>Eucalypt</i> over <i>Acacia</i> understory and partially burnt <i>Spinifex</i> on sandplain.	15/11/16 – 18/11/16	Groundrush MLS22934
Hurricane Repulse	H1a	<i>Corymbia brevifolia</i> , <i>Acacia holosericea</i> , and <i>Acacia colei</i> over <i>Spinifex</i> . Edge of drainage depression	27/03/12 – 01/04/12	Tanami Central MLS153
Hurricane Repulse	H1b	Rehabilitated waste dump of <i>Mallee</i> overstorey over <i>Acacia</i> shrub. Final third of site features 5m high mounds with contour furrows	15/11/16 – 18/11/16	Tanami Central MLS153
Hurricane Repulse	H2	<i>Acacia</i> shrubland over Buffel on SW slope to partially rehabilitated sewerage effluent treatment plant adjacent to <i>Mallee/spinifex</i> sandplain.	15/11/16 – 18/11/16	Tanami Central MLS153

2.2.2. Flora and Vegetation Survey

Site descriptions within a 50m by 50m quadrant were carried out in a representative area at each of the ten sites. Site descriptions provide an overall snapshot of the landscape, geology, soil, dominant flora species, flora structure and density at each site. Other characteristics noted include termite mounds, large logs, impact of fire, impacts from various disturbances, weeds and current condition of vegetation. Full site descriptions are provided in Section 5.2 along with photographs of each site.

A list of flora species was compiled for each site along with sweeps for target species as well as identification of suitable habitat for threatened fauna species.

Flora surveys within the project area will:

- Identify the major vegetation structural types, plant species and vulnerable resources for threatened fauna species that may be affected by the project
- Enable the preparation of a database for floristic composition in the project areas; and
- Record the GPS locations of any threatened flora species observed

2.2.3. Fauna Survey

A three night trapping fauna survey was conducted, complemented by daily tracking within and around target sites and recording of incidental observations throughout the survey duration. Fauna surveying aimed at investigating species diversity in the project area. The layout of traps at each survey quadrat was based on the standard NT EPA Guidelines for Assessment of Impacts on Terrestrial Biodiversity (NT EPA, 2013).

Reptiles and Small Mammals

Traps for reptiles and small mammals were set at each of the ten survey sites. Trapping took place over three nights. Each trap site consisted of:

- 25 Elliot traps
- 2 pit traps
- 4 funnel traps.

Elliot traps were set at approximately 10 metre intervals covering distance at least 250m, estimated by pacing the distance. Pit traps were placed near the start and about half way along each Elliot trap line. Pit traps consisted of a 25L bucket dug in to ground level with a 10m drift fence extending approximately 5m either side. One funnel trap was placed at each end of the drift fence. Silver reflective thermafoil (roof insulation) were set over funnel traps to protect animals from dehydration.

Elliot traps were baited with a standard mixture of peanut butter and rolled oats. Trap lines, pit traps and funnel traps were checked each morning. Animals caught were photographed, measured and identified before immediate release at capture site. Elliot traps were kept closed throughout the day due to high temperatures on site. Traps were reopened in the early evening when pit and funnel traps were checked again. Trapping occurred over a three night period.

Tracking surveys were conducted to complement trapping and observation efforts. Tracking has been proven to be an effective survey method to identify species not likely to be recorded from trapping. Generally this method will identify species to fauna groups only, e.g. macropod or rodent, but can be used to identify species level depending on the distinctiveness of the track, suitability of tracking conditions and the skill of observer. Active searching and tracking was conducted in a sweep around each Elliot trap line within a 300m by 200m quadrant, recording any tracks, scats and burrows encountered. Track beds were created along the Groundrush to Ripcord sandy access road using vehicle tyre tracks. Sections of the track between sites were walked daily and any fresh animal tracks over the top of tyre tracks were recorded.

Camera traps were placed at selected sites to record additional species in the area. Traps were baited with a peanut butter and rolled oats mixture. Track beds were prepared at each camera trap to facilitate species identification.

Targeted searches

Based on the results of the desktop review and local knowledge, additional survey effort was directed towards the location of Greater Bilby (*Macrotis lagotis*), Brush-Tailed Mulgara (*Dasycercus blythi*) and Northern Nailtail Wallaby (*Onychogalea unguifera*). Survey efforts included:

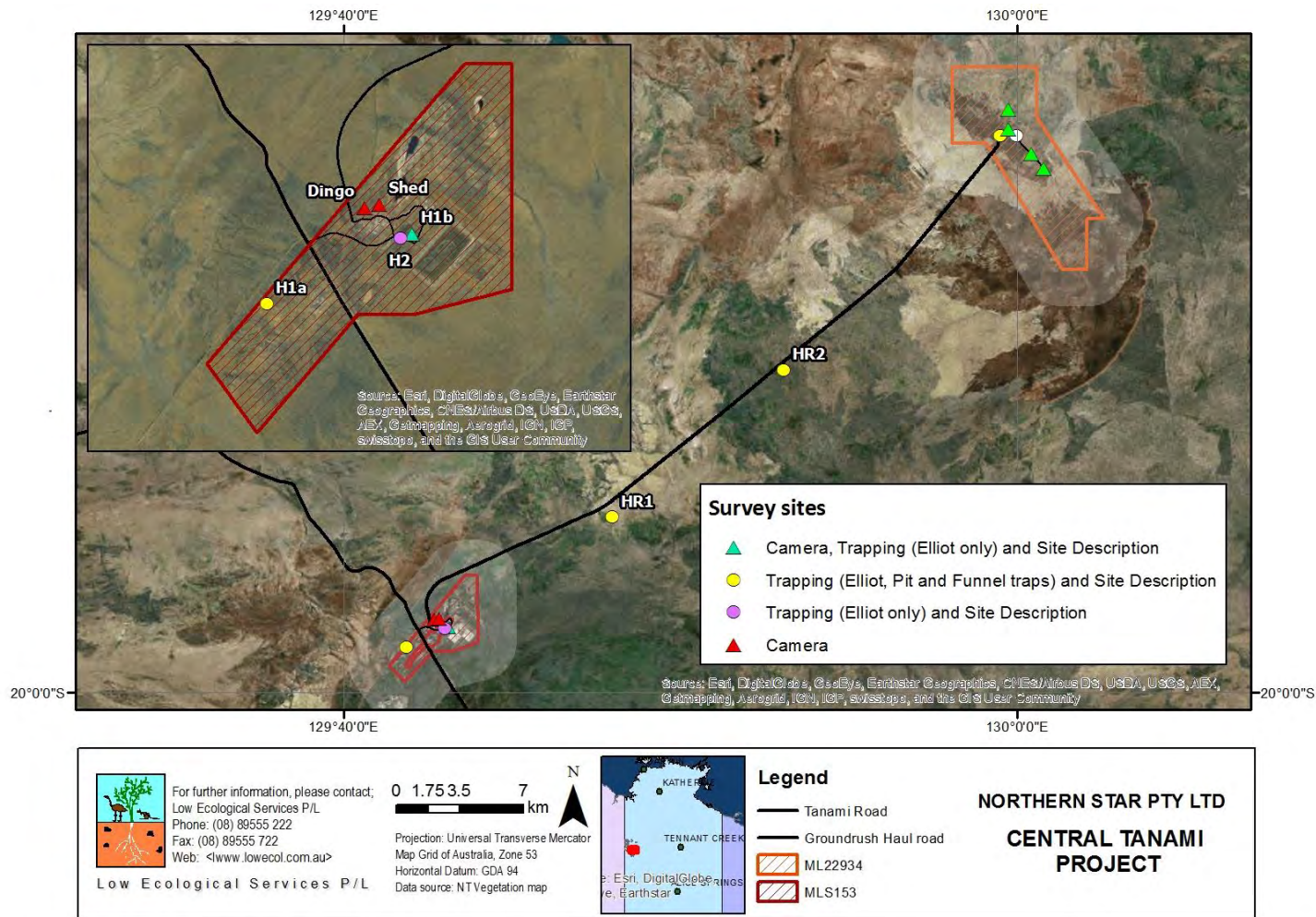
- Conducting targeted active searches along 1km transects at additional sites between established survey sites, looking specifically in areas of known suitable habitat for burrows, tracks and scats e.g. recently burnt patches of vegetation, old mallee clumps etc.
- Laying track beds in suitable habitat and revisiting daily
- Setting camera traps in areas of suitable habitat

Birds

Birds were recorded opportunistically whilst checking trap lines, for 20 to 30 minutes at each site during the early morning (6am-10am) or late afternoon (3pm-7pm) and once in the evening (after 8pm) over three days as well as incidentally whilst traversing the mine leases and sites. Birds were mostly identified by sight and call as well as from photographic records. Call identification was used for species with distinctive vocalisations.

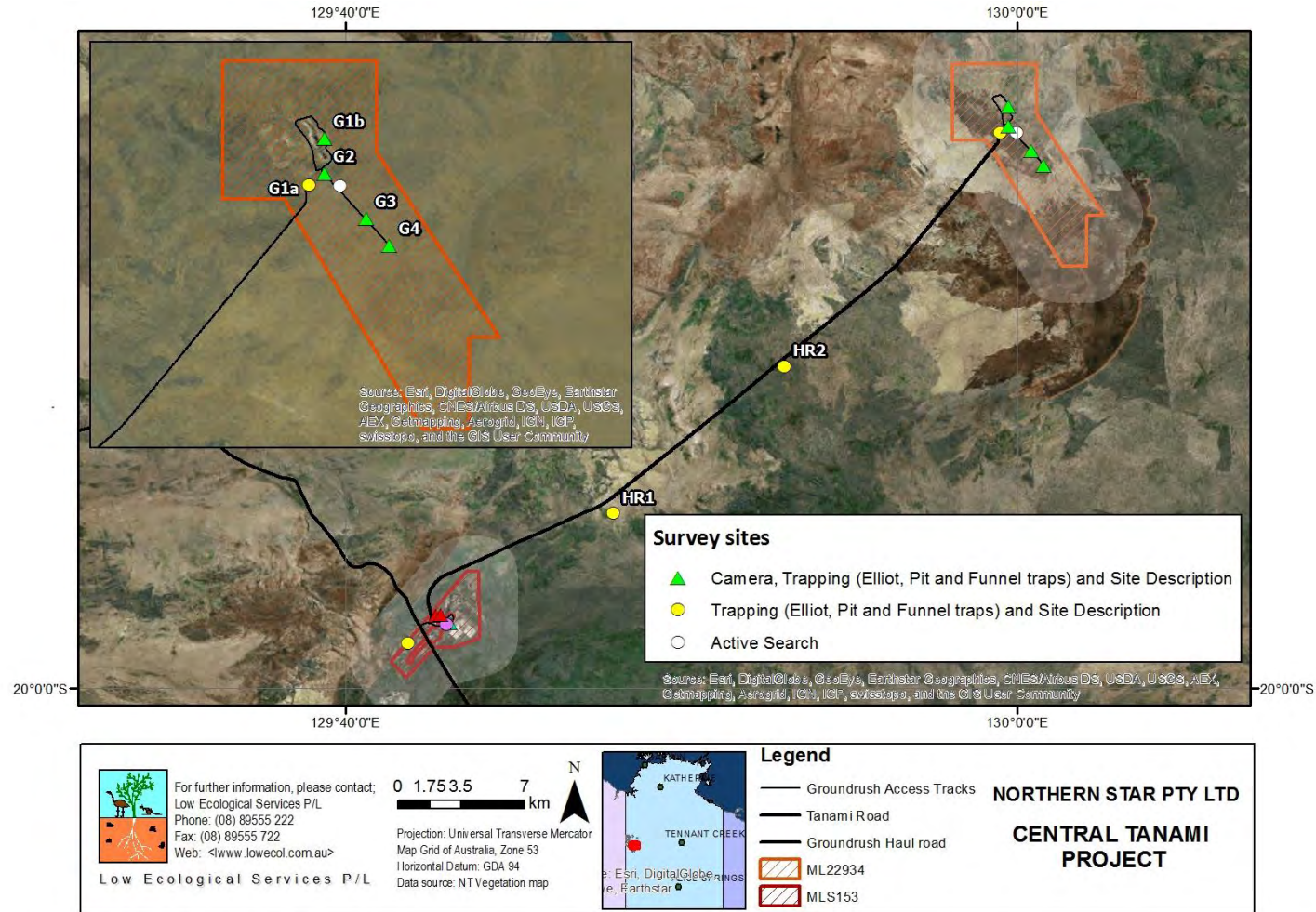
Incidental Observations

Additional sightings, tracks, scats and diggings of animals were recorded opportunistically in project areas outside of target sites throughout the survey.



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Figure 1. FLORA AND FAUNA SURVEY SITES IN TENEMENT MLS153 AND GROUNDROUSH HAUL ROAD



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Figure 2. FLORA AND FAUNA SURVEY SITES IN TENEMENT ML22934 AND GROUNDGRUSH HAULROAD

4. EXISTING ENVIRONMENT

4.1. BIOREGION: LANDSCAPE AND SOILS

The Interim Biogeographic Regionalisation for Australia (IBRA) was developed by the Federal Government's Department of Sustainability, Environment, Water, Population and Communities and represents a landscape based approach to classifying the land surface. According to these divisions of land mass, the project area is situated within the Tanami bioregion.

The Tanami Bioregion is situated 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).

4.2. LAND USE

The Central Tanami project area is located on Aboriginal Freehold Land, land being 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. The Tanami region is sparsely inhabited. The nearest settlements are Lajamanu and Balgo, 230km north and 200km northwest respectively, of the Tanami Mine.

4.3. LAND UNITS

Existing land system mapping of the Northern Territory (e.g. Perry et al. 1962) does not cover in detail the area of interest within the Tanami where the Project is situated. However previous surveys undertaken by Low Ecological Services have created an alternative land unit mapping system based on regolith mapping derived from air photos (Wilford and Butrovski 1999). A total of 49 regolith units covered the full mapping area. These were systematically re-interpreted to inferred land units by grouping regoliths with similar geology, soils and landform to create 10 representative land units over the Project area.

Land form and land units of the project area in the Tanami Desert include:

1. **Rocky Hills and Slopes** including:
 - a) Crests or Domes,
 - b) Rocky Rises (chert, laterite rise, gardner sandstone),
 - c) Drainage Lines,
 - d) Laterite Rise

2. Sand Plains with units:

- a) Lateritic or Chert Lower Slopes,
- b) Lateritic or Chert Plains,
- c) Shallow Sand with Shrubs,
- d) Deep Sands;
- e) Elevated Drainage Depression

3. Drainage Depressions including:

- a) Palaeo-channels,
- b) Broad Valley Bottoms or Drainage Lines, and
- c) Swamps or Basins.

Land Unit types present in survey areas from 2012 and 2016 surveys are detailed below.

Table 3: LAND UNIT TYPES BY PROJECT AREA

Mineral/ Mining Lease	Survey Area	Land Unit types
ML22934	Groundrush	Loamy sand plain, Lateritic rise, Palaeo-channel
MLS153	Hurricane Repulse	Shallow sand plain, Palaeo-channel, Lateritic rise, Loamy sand plain, Chert rise
EL26926, EL28474, ML22934	Groundrush Haulroad (Section included in survey)	Shallow Sand plain, Lateritic rise, loamy sand plain, Chert rise, Palaeo-channel

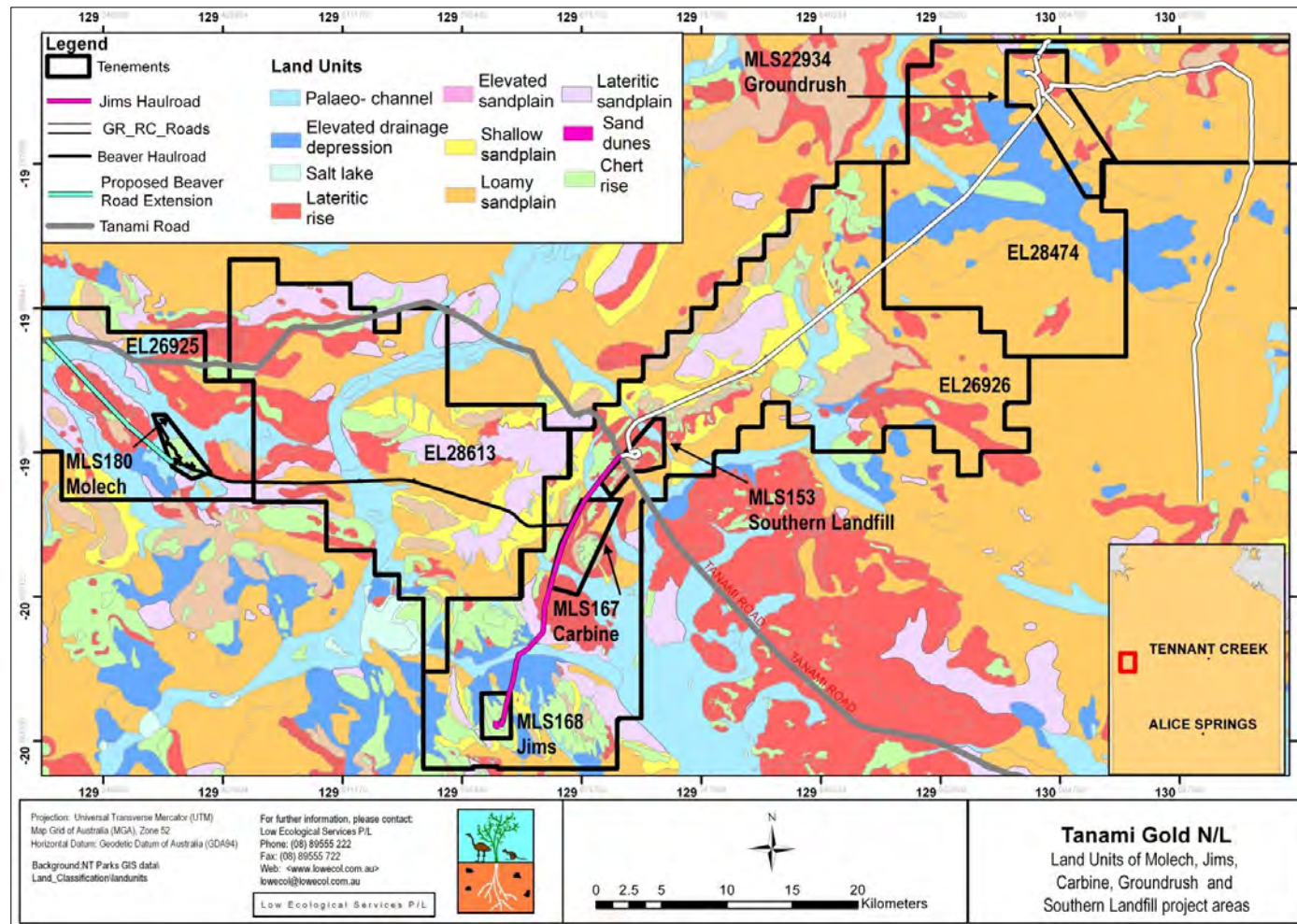


Figure 3. LAND UNITS OF THE CENTRAL TANAMI PROJECT AREA

4.4. VEGETATION TYPES

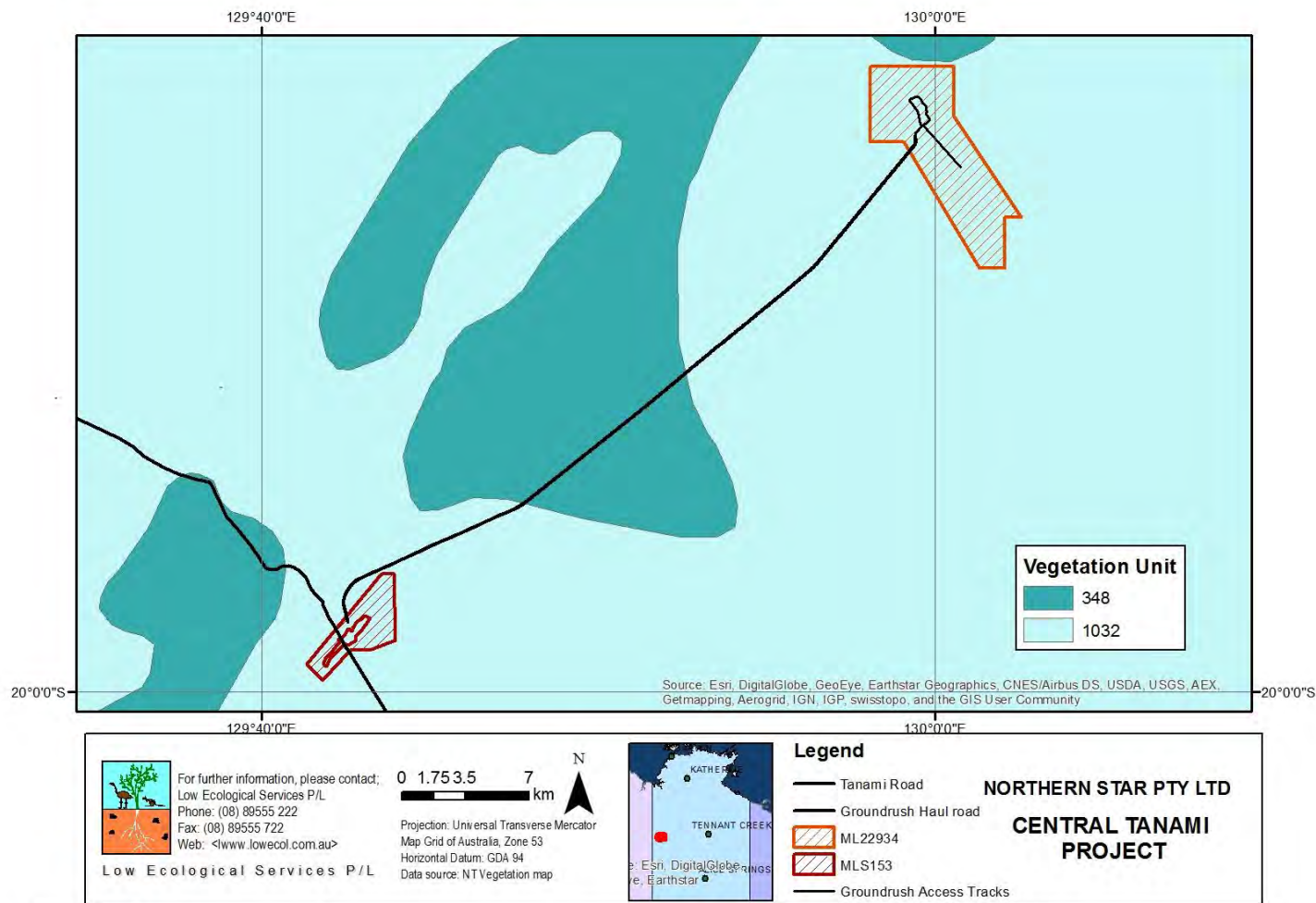
Vegetation in the lease area has been mapped at a scale of 1:100 000 in the Vegetation Survey of the Northern Territory (Wilson et al. 1990). The Project area is located on vegetation type 348 with vegetation type 1032 within the broader area. Previous finer scale vegetation surveying by LES has noted vegetation type 1032 potentially within proposed drilling areas.

Vegetation unit 348 is 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.

Vegetation unit 1032 is 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.

Table 4. VEGETATION UNITS IN THE CENTRAL TANAMI PROJECT AREA

Vegetation unit	Broad vegetation classification	Structural formation	Fine vegetation description
348	Eucalypt with grass understory	Low open woodland	<i>Eucalyptus brevifolia</i> with sparse-shrub mid layer of <i>Acacias</i> and <i>Triodia pungens</i> groundlayer
1032	Hummock grass with Low <i>Acacia</i> overstorey	Hummock grassland with low tall open shrubland	<i>Triodia pungens</i> or <i>Plectrachne schinzii</i> ground layer with <i>Acacia</i> tall sparse shrubland and occasional low <i>Hakea</i> and mallee <i>Eucalypt</i> species



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Figure 4. VEGETATION UNITS IN THE CENTRAL TANAMI PROJECT AREA

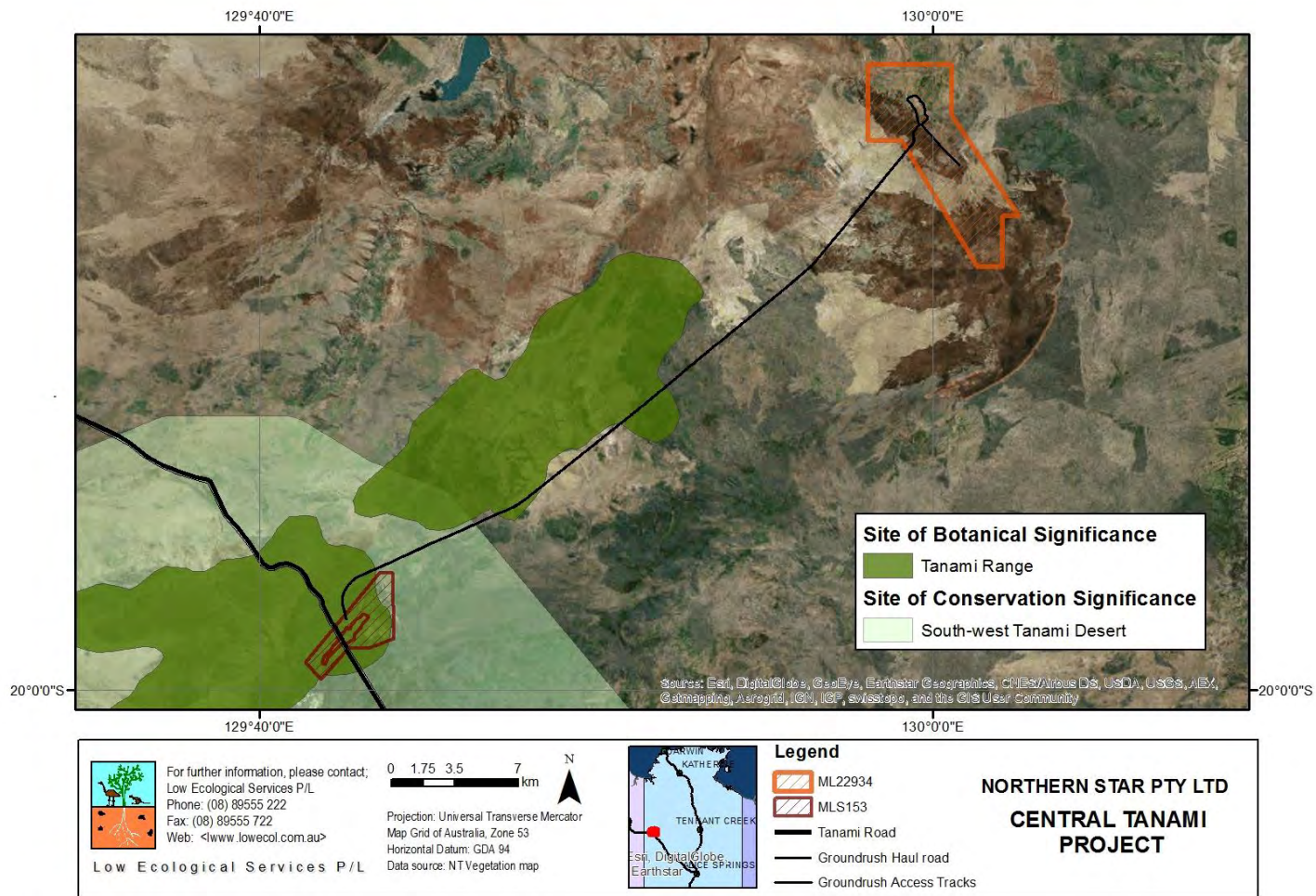
4.5. SITES OF CONSERVATION SIGNIFICANCE

Sites of Conservation Significance (SoCS) have been identified by Northern Territory Government as important sites for biodiversity that require further protecting. Mining lease MLS153 falls within the South-west Tanami SoCS (see Figure 5). The South-west Tanami Desert is characterised by a complex mosaic of landforms and habitats that are distinct from the surrounding country. The site encompasses much of the Central Tanami Desert paleodrainage system; a habitat area supporting rich flora and fauna and contributing to persistence of many threatened species. Other habitats include alluvial plains, dunefields, sandplains, rocky hills and rises, freshwater and saline lakes and claypans (NT Department of Natural Resource, Environment, The Arts and Sport).

The South-west Tanami Desert provides habitat for 11 threatened species; including populations of Bilby, Brush-tailed Mulgara, Australian Bustard and Great Desert Skink. Ephemeral wetlands support the vulnerable dwarf desert spike-rush. Areas like the South-west Tanami, characterised by a variety of substrates or topographies, provide more reliability of resources and protection from some forms of disturbance, and act as significant points of refugia for desert species (Southgate et al. 2006).

4.6. SITES OF BOTANICAL SIGNIFICANCE

Sites of Botanical Significance (SoBS) are defined as areas that have botanical features distinguishing them from the surrounding landscape, and that are important for general plant conservation and for specifically mentioned species (White et al. 2000a). Tanami Range is a site of Botanical significance covering 292km². The mining lease MLS153 and part of the Groundrush haul road fall within this site (see Figure 5). The site satisfies criteria B1, due to the importance of the site “for rare, endangered or uncommon flora, fauna, communities, ecosystems, natural landscapes or phenomena” (White et al. 2000). The area supports a number of important flora species of bioregional, Northern Territory and Australian significance. The area is of particular importance for the conservation of *Acacia abbreviata*, where it grows on laterite rises beneath sandstone range



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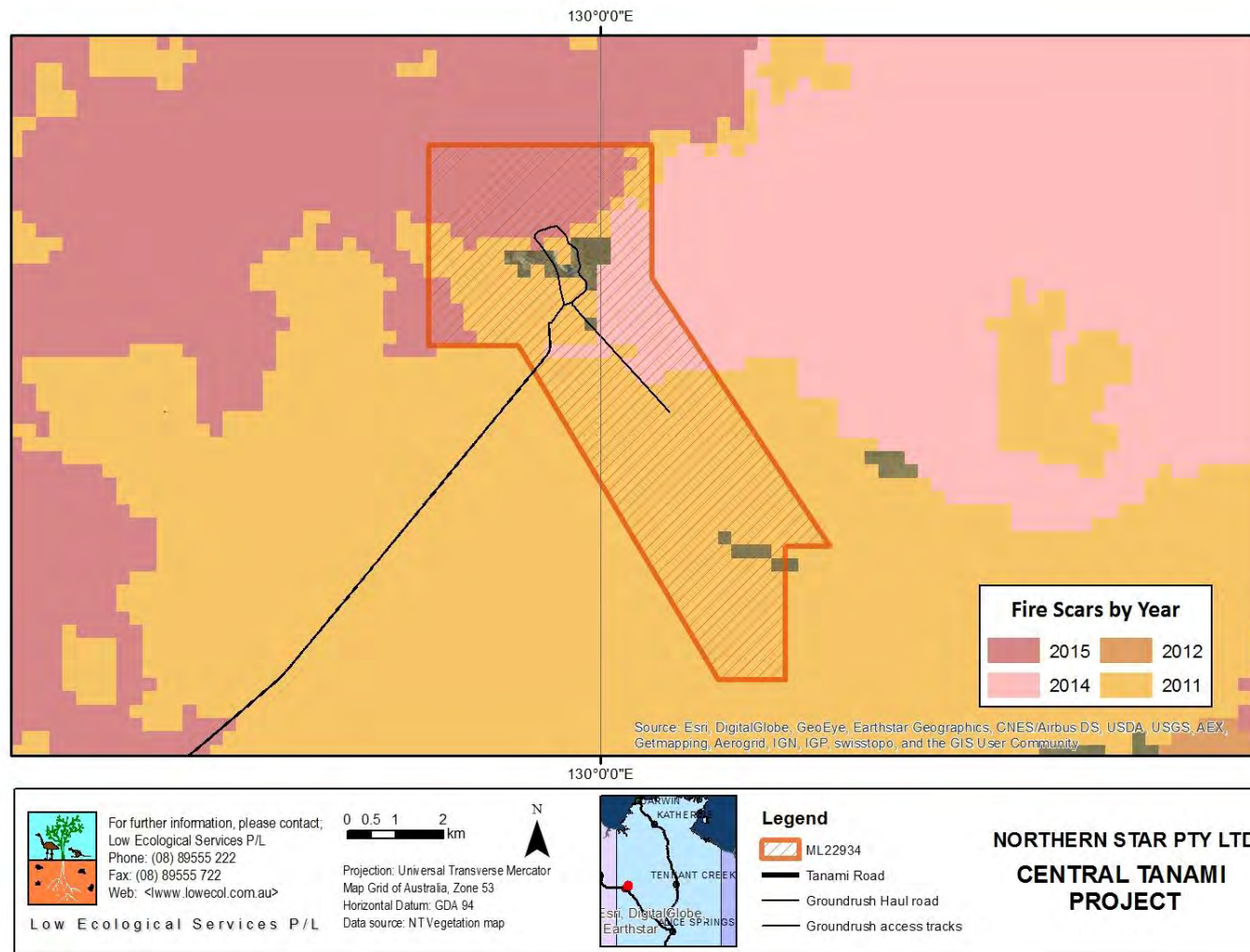
Figure 5. SITES OF BOTANICAL SIGNIFICANCE AND CONSERVATION SIGNIFICANCE

4.7. FIRE HISTORY

Mapping obtained from the North Australia Fire Information website (North Australia and Rangelands fire information (2016) indicates that fire since 2010 occurred within the Groundrush tenement in 2015, 2014 and 2011 and in the Hurricane Repulse tenement in 2015, 2012 and 2011. In 2015 fires 19.56% of Groundrush and 26.3% of Hurricane Repulse was burnt. In 2014 11.5% of Groundrush was burnt. In 2012 8.76% of Hurricane Repulse was burnt. In 2011 88.4% of Groundrush and 60.41% of Hurricane Repulse was burnt. Figures 6 and 7 show the fire history in the two lease areas.

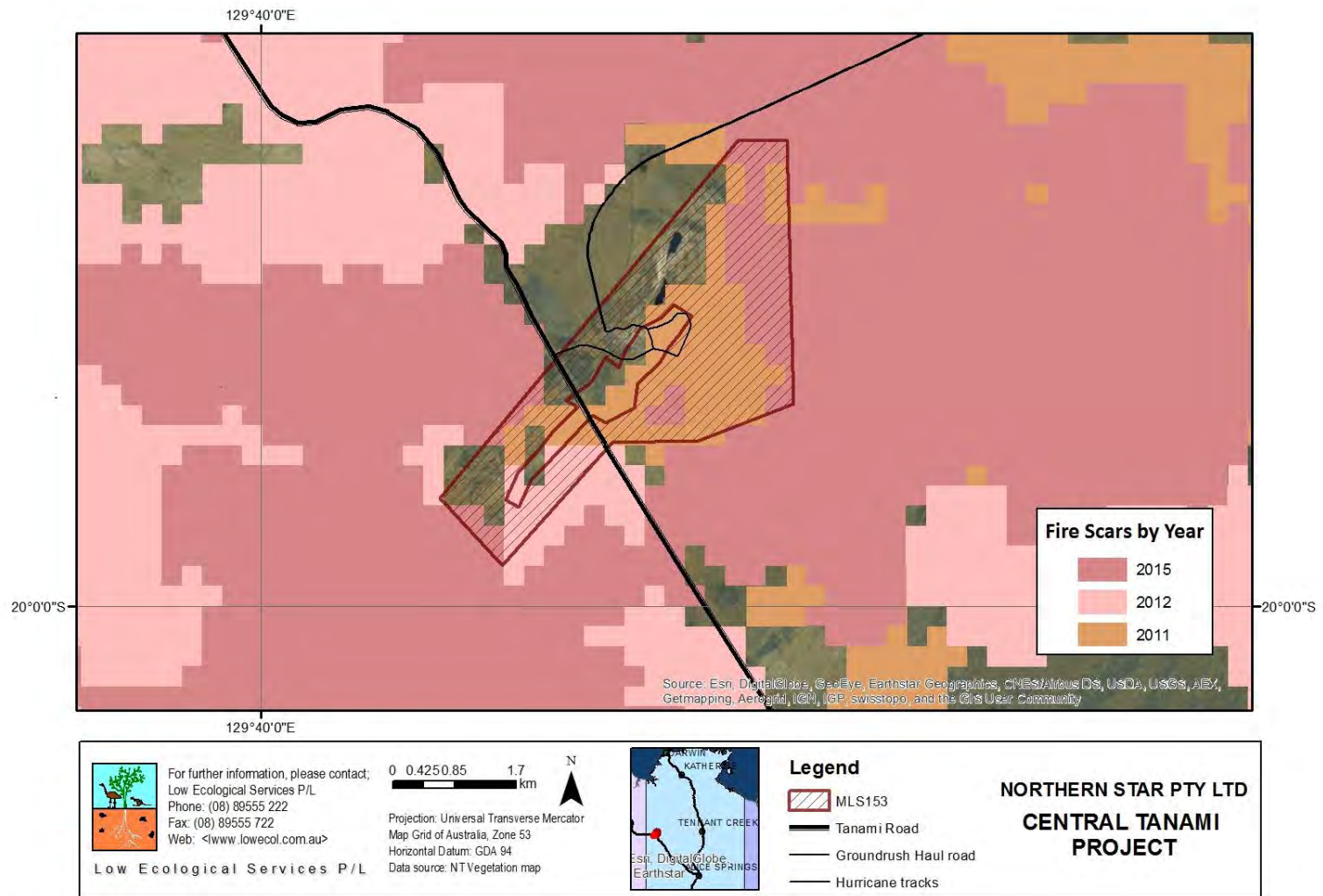
Table 5. FIRES OCCURRING IN GROUNDROUGH AND HURRICANE REPULSE TENEMENTS 2010-2016, WITH THE AREA (HA) AND PERCENTAGE OF LEASE AREA BURNT IN THOSE YEARS

ML	Year	Area (ha)	% Lease
22934	2015	774	19.56
22934	2014	456	11.5
22934	2011	3486	88.4
153	2015	264	26.3
153	2012	88	8.76
153	2011	606	60.41



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Figure 6. FIRE SCARS BY YEAR IN THE GROUNDROUGH TENEMENT 2010-2016



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Figure 7. FIRE SCARS BY YEAR IN THE HURRICANE REPULSE TENEMENT 2010-2016

4.8. FLORA

4.8.1. Existing Flora and Vegetation

The Tanami Bioregion is comprised of seven broad vegetation types, classified as either *Eucalyptus* or *Acacia* woodland; or Hummock or Tussock grassland. Small areas of Chenopod shrublands also occur. The bioregion contained 1029 species, of which 19 are endemic to the region. (Baker, 2005).

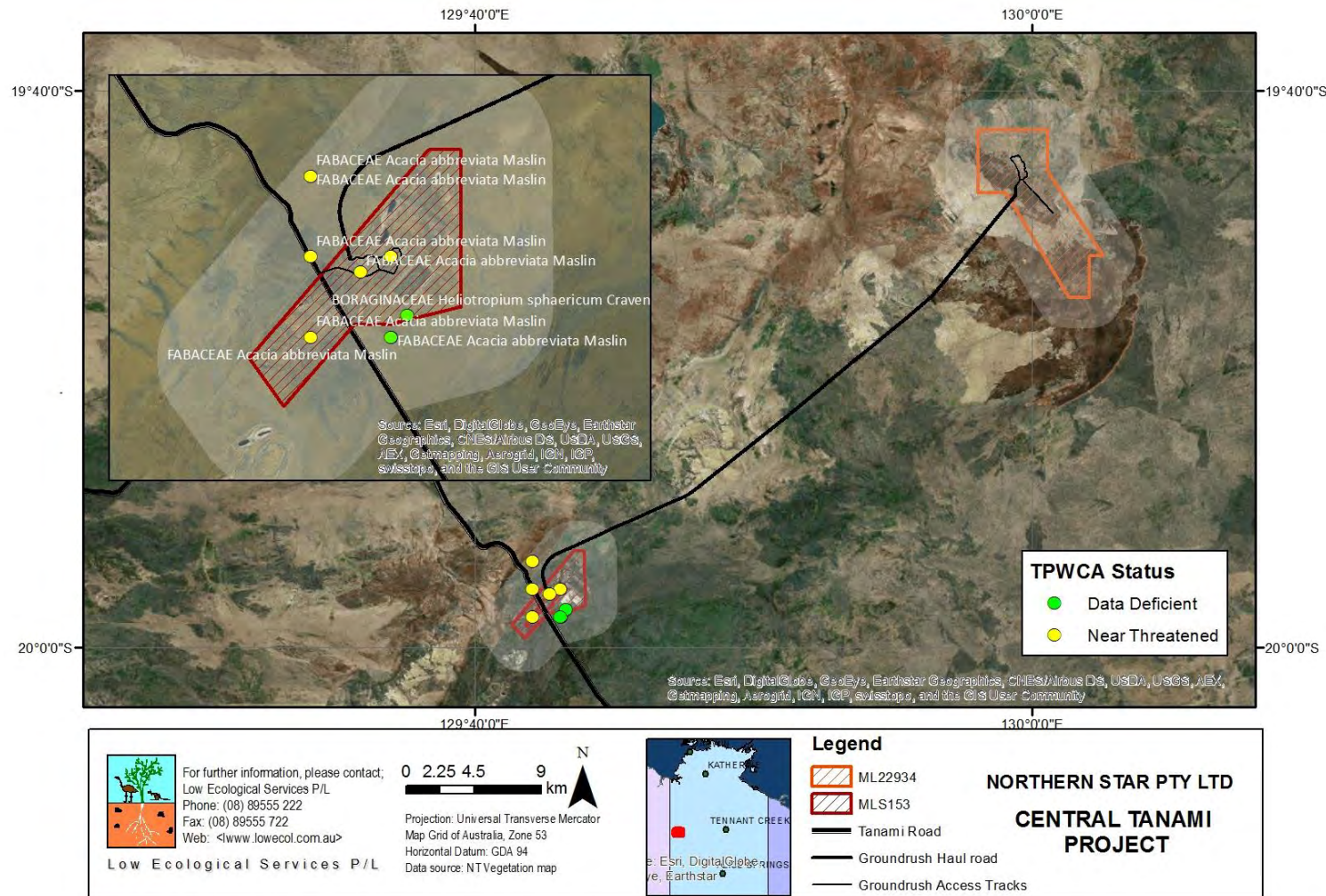
Connors et al. (1996) have listed 1,073 plant species in the NT portion of the Tanami Bioregion, combined with the Murchison-Davenport bioregion. Species diversity increased to the north due to the presence of species with tropical affinities. LES have undertaken numerous surveys in the region of the Groundrush tenement (ML22934) and the northwestern Tanami Desert and document over 500 species in this portion; with various influxes of plant species with summer and winter rainfall across the bioregion.

4.8.2. Threatened Flora

No threatened flora species were identified by the EPBS PMST as occurring or potentially occurring within 20km of the Project area. The full PMST report is available in Appendix 9. A search of the NT Flora Atlas found one near threatened and two data deficient flora species within 2km of Project area. In addition previous LES surveys of the project area and surrounding mining tenements have indicated the presence two other flora species recorded as Near Threatened (NT) under the TPWC Act. These flora species are described below in Table 6 and mapped in Figure 8.

Table 6. TPWCA LISTED FLORA SPECIES IN 20KM RADIUS OF PROJECT AREA

Species	TPWC	Tenements	Comment
<i>Acacia abbreviate</i> Hill Wattle	NT	MLS153, MLS167, EL28613	Grows well in disturbed rocky slopes, including waste rock dumps
<i>Acacia stellaticeps</i>	DD	MLS153	Grows well in red sand, stony sand and clay; on flats, sand ridge, plains and rubbish tip
<i>Eucalyptus cupularis</i> , Hall's Ck Ghost Gum	NT	EL2696 east of Jims and north of Hurricane Repulse and EL28613 north of Beaver Haulroad	Skeletal soils on stony hills or along water courses. Edge of range in NT, common in WA
<i>Heliotropium sphaericum</i>	DD	MLS153	Grows well in red soils
<i>Trianthema glossostigma</i> , Annual prostrate pigface	NT	MLS167 on cleared areas	Sandy or loamy flats, more common in disturbed areas around WRD



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Figure 8. TPWC LISTED FLORA IN THE CENTRAL TANAMI PROJECT AREA

4.8.3. Threatened Ecological Communities

There are no threatened ecological communities recorded within 20km of the Central Tanami Project mining and exploration leases.

4.8.4. Introduced and weed species

Introduced flora and weed species are abundant in some locations across the project area. For a full description of weeds present in the project area including locations of weed species observed during field surveys, refer to the accompanying LES Weed Management Plan.

4.9. FAUNA

The Commonwealth Government's EPBC PMST was used to determine Matters of National Environmental Significance (MNES) that may occur in, or may relate to the project area. Of the eight standard MNES, two were identified as potentially relevant to the project - 'Listed threatened species' and 'Listed migratory species'. The EPBC PMST Report can be found in Appendix 9. Information on listed species from the EPBC PMST was supplemented with records from the NT Fauna Atlas.

4.9.1. Fauna Species of conservation significance

A total of 10 EPBC and/or TPWC listed fauna were identified as occurring or potentially occurring in the 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 project 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 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.

Table 7. THREATENED SPECIES LISTED UNDER THE EPBC AND TPWC ACT THAT HAVE BEEN RECORDED, OR MAY OCCUR, WITHIN A 20KM RADIUS OF THE PROJECT AREA (EPBC PMST AND NT FAUNA ATLAS) AND ASSESSMENT OF DISTURBANCE POSED BY PROJECT

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>Dasyercus 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>	Curlew 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

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)

***Macrotis lagotis* (Greater bilby)**

Macrotis lagotis is a nocturnal medium-size marsupial, originally distributed across 70% of the Australian mainland but now restricted to 20% of its former range in south west QLD and an area extending from the western deserts of the NT and WA north to the Pilbara and Kimberley regions (Pavey, 2006a). *Macrotis lagotis* occurs in a wide variety of habitats that can be classified into three major groups; sparse grassland/forbland on uplands and hills with a low fire frequency, mulga scrub/woodlands on ridges and rises with an infrequent (20-50 year) fire interval and hummock grassland mixed shrub or woodland steppe on plains and alluvial areas with a high (4-10 year) fire frequency (Southgate, 1990b). In the sandy deserts, *M. lagotis* appears to exhibit low site fidelity and high mobility and it is thought that movement of groups is in response to spatial and temporal variability in resource availability (Southgate, et al., 2007). *Macrotis lagotis* is an opportunistic omnivore with a diet consisting of termites, ants, beetles, larvae, grasshoppers, spiders, *Cyperus bulbosus* bulbs, seeds, fruit and fungi (Gibson, 2001; Southgate & Carthew, 2006). It appears that *M. lagotis* can breed at any time of the year in response to resource availability (McCracken, 1990; Southgate, et al., 2000). Threats to *M. lagotis* include predation by introduced predators, habitat degradation by introduced herbivores, altered fire regimes, drought, road mortality and habitat destruction and degradation resulting from mining and other development (Pavey, 2006a).

There are 28 records of the greater bilby within 20 km of the proposed exploration areas, with 6 of these records within 2km of the project area (including the Groundrush haulroad). Previous LES surveys (2012) have documented fresh signs of bilbies in the project area at the time of the survey (including tracks and burrows). However as bilbies are known to exhibit high mobility and low site fidelity over time, LES considers there to be a moderate likelihood of bilby presence in the project area.

***Dasyercus blythi* (Brush-tailed mulgara)**

The brush-tailed mulgara (*Dasyercus blythi*) is a primarily nocturnal, burrowing animal, sheltering in burrows approximately 0.5m deep. They occur in a range of vegetation types, primarily mature hummock grasslands of spinifex; especially *Triodia basedowii* and *T. pungens*. Home range size is highly variable with extremes of 1.0 to 14.4 hectares recorded (Masters, 2003). Brush tailed mulgaras are known to inhabit both the Western and Simpson deserts as well as the Tanami Desert and as far south as Uluru. The species was once widespread and common throughout the Central Deserts region however since the 1930s the species distribution has declined and is now more restricted and fragmented. Whilst threatening processes are unknown, it is likely that processes of environmental degradation, introduced herbivores, changes to fire regimes and increased predation have likely negatively affected the mulgara (Masters et al. 2003).

There are 12 records of the brush-tailed mulgara within 20 km of the proposed exploration areas with 2 records within 2 km of the project area. There is an abundance of potential habitat areas across the project area making the likelihood of presence high. These animals are active as well as inquisitive. They are highly likely to move of the path of slow moving drilling equipment and may be at risk to development activities in the project area.

***Liopholis kintorei* (Great Desert Skink)**

Liopholis kintorei is an endemic arid zone skink, occurring from Uluru-Kata Tjuta National Park north to Rabbit Flat in the Tanami Desert (Pavey, 2006e). *Liopholis kintorei* also occurs in north western SA and in the Gibson Desert and sections of the Great Sandy Desert in WA (Pavey, 2006e). *Liopholis kintorei* is predominantly found in sandplains and adjacent swales containing *Triodia* grassland vegetation and scattered shrubs, but can occupy a range of vegetation types such as lateritic palaeodrainage lines within *Melaleuca* shrubs in the Tanami Desert (McAlpin, 2001). *Liopholis kintorei* is omnivorous, with a diet including plant matter, invertebrates and small vertebrates (McAlpin, 2001). The species' burrows are identifiable by at least one large external latrine (McAlpin, 2001). Breeding occurs between December and February (Pavey, 2006e). Fire, particularly that which takes out all ground cover, has been found to adversely effect *L. kintorei* in spinifex grasslands, and large scale intense fires resulting from a cessation of traditional patch burning may threaten the species (McAlpin, 2001; Moore, et al., 2015). Other potential threatening processes impacting *L. kintorei* include predation by introduced and native predators (McAlpin, 2001; Pavey, 2006e).

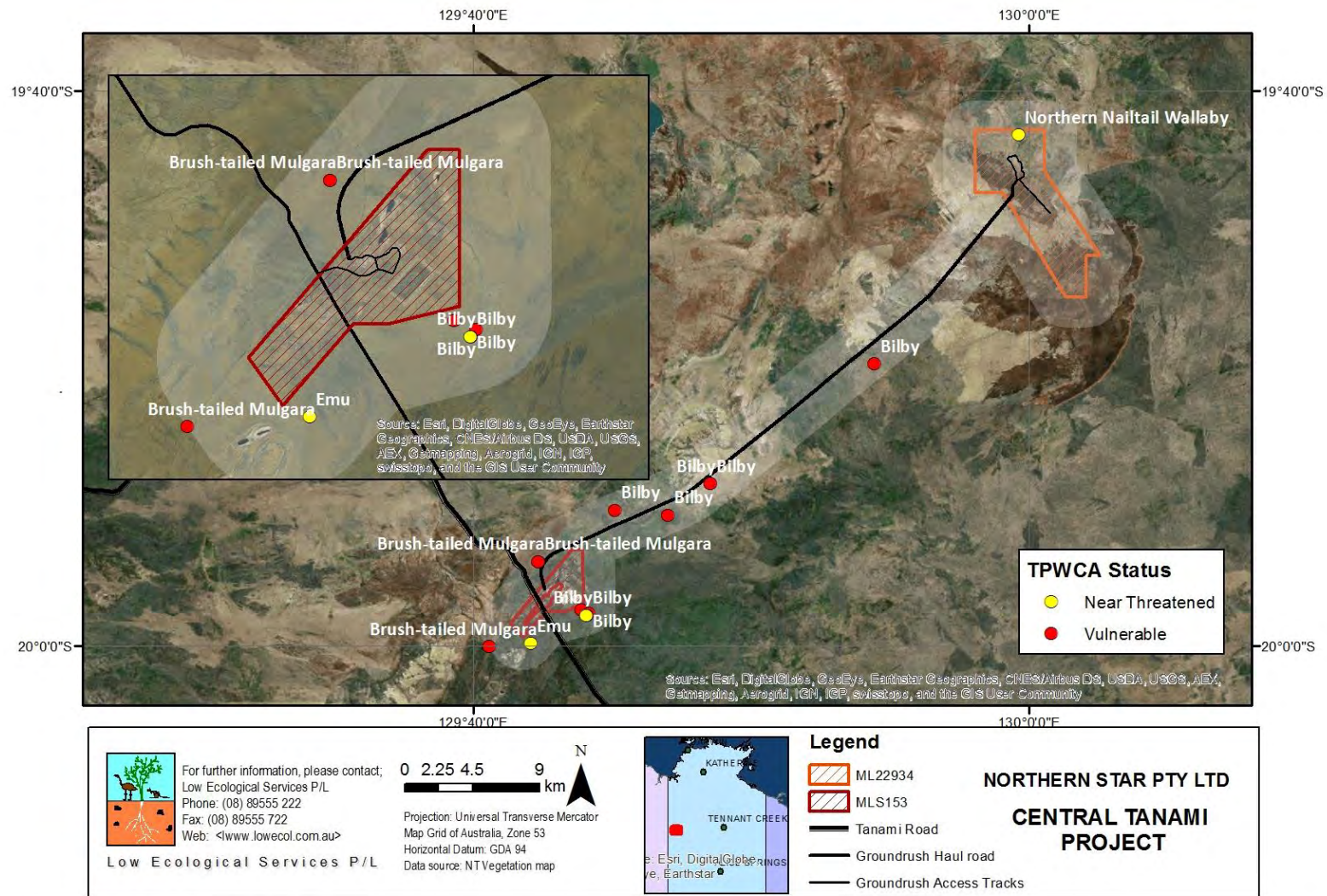
The closest record of *L. kintorei* to the project area is approximately 50 km west of the Hurricane Repulse tenement (MLS153). There is some moderately suitable habitat for *L. kintorei* within the Groundrush tenement (ML22934) with the presence of loamy sandplace across much of the lease area. Therefore there is a low to moderate likelihood of this species occurring.

***Onychogalea unguifera* (Northern Nailtail Wallaby)**

Onychogalea unguifera is widespread throughout northern Australia where it is generally scarce and patchily distributed, but can be locally abundant (Woinarski, et al., 2016). *Onychogalea unguifera* is most commonly found in ecotones between sandy loams and clay in open woodland with tussock grasslands, and shrublands with scattered trees or shrubs (Woinarski, et al., 2016). Potential threats impacting *O. unguifera* include altered fire regimes, pastoralism and fox predation (Woinarski, et al., 2016).

One record of Northern nailtail wallabies was found in the NT Atlas records, in the northern section of the Groundrush tenement (ML22934). Adequate habitat is available in the dominant sandy loam, open woodland areas of the northern Groundrush tenement. There is therefore a high likelihood that this species occurs within lease areas.

Records of vulnerable species within 2km of the project area are mapped below in Figure 9.



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Figure 9. TPWCA LISTED FAUNA VULNERABLE TO DEVELOPMENT ACTIVITIES IN THE CENTRAL TANAMI PROJECT AREA

4.9.2. Listed Migratory Species

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

Table 8. MIGRATORY SPECIES LISTED UNDER THE EPBC AND TPWC ACT THAT HAVE BEEN RECORDED, OR MAY OCCUR, WITHIN A 20KM RADIUS OF THE PROJECT AREA (EPBC PMST AND NT FAUNA ATLAS) AND ASSESSMENT OF DISTURBANCE

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>	Curlew 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

4.9.3. Introduced fauna species

The EPBC PMST identified six introduced fauna species as occurring or potentially occurring within 20km of the Project Area.

Table 9. PMST LISTED INTRODUCED FAUNA

Scientific Name	Common Name	NT Fauna Atlas	PMST	On Ground	Potential impacts
<i>Bos Taurus</i>	Cattle		X		Known to impact native vegetation and waterways
<i>Camelus dromedarius</i>	Camel		X	X	Known to impact native vegetation and waterholes
<i>Canis lupus familiaris</i>	Domestic dog	X			Known to prey on many species of native animal
<i>Felis catus</i>	Cat		X	X	Known to prey on many species of small native animal
<i>Mus musculus</i>	House Mouse		X	X	
<i>Vulpes vulpes</i>	Fox		X		Known to prey upon a range of native species

5. FIELD SURVEY RESULTS




5.1. FLORA




116 species of Flora were recorded during the 2012 and 2016 surveys at 11 sites. No species listed under the EPBC or TPWC Acts were recorded in any survey sites. A population of Desert Walnuts (*Owenia reticulata*) located in the vicinity of Groundrush Haul road has long been known and is protected by an exclusion zone established by the Central Land Council and traditional owners. Mature Bloodwoods (*Corymbia opaca*) were scattered throughout survey sites, along with several other species of large mature *Eucalypts*, mallee type *Eucalypts* and *Hakeas* which offer important habitat areas for a variety of species. For a full list of flora by site see Appendix 6.

5.2. VEGETATION AND HABITAT

A description of vegetation and habitat at each of the ten survey sites is presented below in Table 10. Habitat in the Groundrush tenement consisted primarily of Hummock grassland with low Eucalypt Mallee woodland and *Acacia* shrubland, with some scattered mature Bloodwood and *Hakea* trees in the survey sites along the Groundrush – Ripcord access track. In the Hurricane Repulse tenement, vegetation in the 2016 survey sites consisted of rehabilitated hummock grassland and dense Buffel tussock grassland with low *Acacia* shrubs and low scattered *Eucalypt* mallee species. The 2012 survey site in the Hurricane Repulse tenement was situated on the edge of a drainage ditch and consisted of low open *Eucalyptus brevifolia* woodland over *Acacia* shrubland and spinifex hummock grassland.

Table 10. HABITAT TYPES AND VEGETATION DESCRIPTION AT EACH SURVEY SITE IN THE PROJECT AREA

Survey site	Habitat	Description	Photograph
H1a	Edge of drainage depression. Low woodland with <i>Acacia shrubland</i> over Spinifex	Northern edge of drainage depressed in south-western tip of Hurricane Repulse tenement (MLS153). Lower slope coming off chert ridge onto a clayey loam soils base with 75% vegetation cover, 15% bare ground, 5% vegetation litter and 5% chert and laterite rock. No weed presence and the area appears long unburnt by fire. No termite mounds or fallen logs. Dominant vegetation included low sparse woodland of <i>Eucalyptus brevifolia</i> over <i>Acacia holosericea</i> and <i>Acacia colei</i> shrubs with a groundcover dominated by <i>Triodia pungens</i> and a range of other grasses and forbs (<i>Eulalia aurea</i> , <i>Goodenia armitiana</i> , <i>Bulbostylis barabata</i> , <i>Euphorbia alsiniflora</i> , <i>Cymbopogon obtectus</i> , <i>Frankenia cordata</i>)	
H1b	Low woodland over <i>Acacia shrubland</i> and <i>Triodia pungens</i> groundcover	Rehabilitated waste rock dump in northern part of Hurricane Repulse, south of central administration area and Hurricane pit. Mid slope to East on Rocky dome with some weed presence and no apparent fire impact. Low woodland on sandy loam soil with 60 % vegetation cover, 15% bare soil and 10% chert rock cover. Vegetation consists of a sparse mallee type <i>Eucalyptus</i> overstorey with one mature Bloodwood over an <i>Acacia</i> Midstorey (<i>Acacia holosericea</i> , <i>Acacia lysiphloia</i>) and a diverse lower shrub layer (<i>Acacia hilliana</i> , <i>Senna artemesioides</i> ssp. <i>Gossypium australis</i> , <i>Halgania solanaceae</i> , <i>Dodonea coreaceae</i> etc). Ground cover dominated by <i>Triodia pungens</i> with a range of other grasses, forbs and herbs. Some <i>Ciliaris Cenchrus</i> (Buffel) present.	
H2	<i>Acacia shrubland</i> with Buffel groundcover and adjacent low Mallee woodland over Spinifex	Buffel covered SW sloping low mounds with contour furrows, partially rehabilitated sewerage effluent treatment plant and adjacent sandplain. Initial third of site characterised by 80% vegetation, primarily Buffel (<i>Cenchrus ciliaris</i>) with a mid dense scrub consisting of various <i>Acacia</i> species and scattered lower shrub and native ground cover species amongst the Buffel (e.g. <i>Acacia adoxa</i> , <i>Acacia hilliana</i> etc.). Sewerage effluent plant dominated by various weed and noxious native species including Couch grass, Buffel, Chloris, <i>Achiranthus aspara</i> and Ruby dock. Adjacent sandplain consisted of low sparse woodland of mallee type <i>Eucalypts</i> over a low <i>Acacia shrubland</i> and Spinifex dominated ground cover.	

G1a	Open <i>Acacia</i> shrubland over Spinifex groundcover	Drainage depression near southern edge of Groundrush pit. Sandy loam soil with 55% ground vegetation, 5% vegetation litter and 40% bare soil. Abundance of termite mounds with broad crust coverage (black) indicating presence of sitting water. Vegetation included a sparse <i>Acacia</i> Midstorey (<i>Acacia stipuligera</i> , <i>Acacia adoxa</i>) with some other shrubs sparsely present (<i>Grevillea wickhamii</i> , <i>Melaleuca lasiandra</i>) over a diverse lower shrub layer (<i>Dodonea viscosa</i> , <i>Acacia hilliana</i> , <i>Keraudrenia velutina</i> etc.) and a <i>T.pungens</i> dominated ground cover)	
G1b	Spinifex hummock grassland with open Eucalypt woodland	Sandplains on the East side of Groundrush north, site split by xxx. On the pit side of the xxx vegetation covered 65% with 30% bare soil and 5% vegetation litter. Soils were red-brown sandy loams approx. 40cm deep. Ground cover consisted almost exclusively of <i>Triodia pungens</i> with <i>Acacia lysiphloia</i> dominating the Midstorey and a sparse overstorey of <i>Eucalyptus pachyphyllus</i> and other mallee type <i>Eucalypts</i> . On the other side of the xxx there was obvious fire impact from fire approximately 2+ years prior. Vegetation covered 75% with a higher presence of small rocky coverage (10%) and only 10% bare soil. Scattered mature <i>Corymbia opaca</i> interspersed with a Mallee type <i>Eucalyptus</i> overstorey over an <i>Acacia</i> Midstorey and diverse lower shrub storey (<i>Hibiscus sp.</i> , <i>Sid asp</i> , <i>Keraudrinia integrefolia</i> etc.). Ground cover consisted of <i>Triodia pungens</i> and a range of other native grasses and herbs	
G2		Sandplain on northern part of Groundrush-Ripcord access track, south of Groundrush pit. Obvious fire impact from fire approx. 2 years prior. Red sandy soil with 80% black crust cover suggesting ephemeral presence of sitting water. 55% ground vegetation coverage with 10% vegetation litter and 35% bare sandy loam soil. Vegetation consisted of open woodland of very sparse mature trees including Bloodwoods (<i>Corymbia opaca</i>), Snappy gum (<i>Eucalyptus brevifolia</i>) and mallee type <i>Eucalypts</i> . Midstorey was dominated by mallee type <i>Eucalyptus</i> and <i>Acacia sp.</i> including <i>Acacia lysiphloia</i> and <i>Acacia colei</i> . Diverse lower shrub layer and a ground layer of <i>Triodia pungens</i> with other native grasses and herbs interspersed. No weeds were noted at this site.	

- G3 Sparse open Mallee woodland over *Acacia* shrubland and Spinifex hummock grassland
- 3km down the Groundrush-Ripcord access track on the south side of Groundrush pit. Sandplain with minimal noticeable fire impact from old fire. 90% ground vegetation, 5% vegetation litter and only 5% bare soil. Soil was a sandy loam with 60% black crust cover suggesting presence of sitting water. Abundance of termite mounds. Vegetation consisted of mature, sparsely situated *Corymbia opaca*, *Acacia coreaceae* and *Eucalyptus* species over an *Acacia* Midstorey and Spinifex hummock grassland. A range of other native grasses and forbs were present. No weeds were noted at this site.



- G4 Sparse open woodland of *Eucalyptus* and *Corymbia* over *Acacia* shrubland and Spinifex hummock grassland
- Sandplain located approximately 6km down Groundrush-Ripcord access track where track turns west. Obvious impact of old fire evident from mature trees. 90% ground vegetation with only 5% bare sandy loam soil. 80% black crust cover suggesting presence of standing water. Moderate presence of termite mounds. Overstorey consisted of sparsely situated mature *Corymbia opaca* and *Eucalyptus brevifolia* over *Acacia* shrubland. *Hakea arborescens* noted at this site. Diverse lower shrub layer and a ground cover dominated by *Triodia pungens* interspersed by a range of native grasses and forbs.



- HR1 Sparse open *Eucalyptus* woodland over mallee and *Acacia* Midstorey and spinifex hummock grassland
- Sandplain adjacent to the southern end of the Groundrush Haulroad. Shallow drainage depression with obvious fire impact on vegetation from fire approximately 2+ years prior. 70% ground vegetation with 10% litter and 20% bare soil. Soil type is sandy loam with an abundance of termite mounds present. Vegetation overstorey consists of very sparsely scattered mature *Corymbia opaca*, and *Eucalyptus* sp. over a mallee type *Eucalyptus* and *Acacia* shrublayer with some *Hakea macrocarpas* sparsely present. Diverse lower shrub layer with a *Triodia pungens* (spinifex) ground cover interspersed with a range of other native grasses and forbs. No presence of weeds at this site.



HR2	Very sparse open woodland over Spinifex hummock grassland	Shallow drainage depression on a sandplain, halfway along Groundrush haulroad. Moderate impact of fire noticeable from fire approximately 2+ years prior. 65% ground vegetation with 5% vegetation litter and 30% bare soil. Soil is sandy loam with a moderate presence of termite mounds. Vegetation consists of a sparse overstorey of mature <i>Corymbia opaca</i> and <i>Acacia sericophylla</i> over a sparse upper shrublayer of <i>Acacia sp.</i> , a very sparse diverse lower shrub layer (<i>Maireana georgei</i> , <i>Eremophila laterobei</i> , <i>Gossypium australe</i> etc.) and a mid-dense <i>Triodia pungens</i> dominated groundcover. No presence of weeds at this site.
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5.3. FAUNA

The field surveys of the proposed project areas recorded a total of 75 terrestrial vertebrate species, comprising of 13 reptile (Appendix 3), 52 bird (Appendix 5) and 10 mammal (Appendix 2) species. Three introduced fauna species were recorded all of which were mammal species. Species were identified through trapping, tracking, active searches and incidental observations.

The majority of species recorded were commonly occurring and widespread throughout similar habitats in the region. Three threatened species were recorded:

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

5.3.1. Reptiles

A total of 13 reptile species were recorded during the survey; from Elliot traps and pit traps as well as active searches and incidental observations. Geckoes (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.

Southern Landfill Tenement (MLS153)

A total of five reptile species were trapped within the MLS153 tenement. Species recorded were primarily common skinks and a single common dragon. No signs of reptile tracks or burrows were recorded in the 2016 survey sites.

Groundrush Tenement (ML22934)

A total of ten reptile species were recorded within the ML22934 tenement including skinks, dragons, geckos, monitors and one snake across the 2012 and 2016 surveys. Reptile species trapped though not in high numbers represented a diversity of families and incidental observations of active species, tracks and burrows during searches was high in the Groundrush project area. Military dragons were regularly seen on the Groundrush-Ripcord Access track throughout the 2016 survey whilst other live dragon species and evidence Sand goanna burrows were noted in active searches between sites G2 and G3 adjacent to Groundrush-Ripcord track (see Appendix 8 for track and burrow photos).

Haul Road

Three species of skinks were recorded adjacent to the Haul Road in the 2012 field survey with Sand Goannas incidentally observed at the roadside during the 2016 survey.

5.3.2. Birds

A total of 52 bird species were recorded during the survey (Appendix 5). 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. A number of 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 (see Appendix 8 for track photos)

5.3.3. Mammals

A total of 10 mammal species were recorded during the survey (Appendix 2); from Elliot traps, pit traps, tracking and active searches. Three threatened species were recorded including:

- Greater Bilby
- Brush-tailed Mulgara and;
- Northern Nailtail Wallaby.

Southern Landfill Tenement (MLS153)

8 mammal species were recorded in the Southern Landfill tenement during the 2012 and 2016 surveys. Notable results include:

- Greater Bilby (*Macrotis lagotis*) tracks were recorded at MLS153 survey site H1a during the 2012 survey.
- Brush-tailed Mulgara (*Dascercus blythi*) tracks were recorded during the 2012 survey at site H1a.

The majority of mammal species in this tenement were recorded during the 2012 survey. At the two 2016 survey sites in this tenement only one species of mammal was recorded – Western Chestnut mouse (*Pseudomys nanus*). Variance in capture rates is likely due to difference in survey sites, with the 2012 survey site being situated on the SW side of the Tanami highway on the edge of a drainage depression; whilst the 2016 survey sites fell within waste rock and sewerage treatment plant rehabilitated areas in close proximity to the Central administration area. There were no signs (tracks, scats or burrows) of Greater Bilby or Brush-tailed Mulgara in survey sites H1 and H2 in the Hurricane Repulse tenement in the 2016 survey.

Groundrush Tenement (ML22934)

6 mammal species were recorded in the Groundrush tenement during the 2012 and 2016 surveys. Notable results from the mammal survey include:

- Fresh Brush tailed Mulgara (*Dasycercus blythi*) tracks were recorded in both the 2012 and 2016 surveys in the Groundrush tenement, adjacent to or on the sandy access road connecting the Groundrush and Ripcord tenements (see Appendix 8). Mulgara are known to be found in disturbed landscape in the Tanami region, particularly that affected by fire, vehicle track construction etc. (see Low and various, 1994 – 2012, RBM surveys 2005-2009)
- Nailtail Wallaby (*Onychogalea unguifera*) scats were collected on the Groundrush-Ripcord access track and during an active search adjacent to the track between survey sites G2 and G3 (see Appendix 2)
- An adult lactating female Stripe-faced Dunnart (*Sminthopsis macroura*) was trapped in the Groundrush tenement as well as four juveniles at the same survey site (G4).

Haul Road

4 species of mammal were recorded at study sites adjacent to the haul road in the 2012 surveys. These included the introduced House Mouse (*Mus musculus*) as well as the Delicate mouse (*Pseudomys delicatulus*), Desert Mouse (*Pseudomys desertor*) and the Stripe-faced Dunnart (*Sminthopsis macroura*).

5.4. CONSIDERATION OF SIGNIFICANT IMPACT GUIDELINES 1.1

The Significant Impact Guidelines 1.1 - Matters of National Significance (2013), states that an action will require approval if the action has, will have, or is likely to have a *significant impact on a species* listed in any of the following categories:

- extinct in the wild
- critically endangered
- endangered, or
- vulnerable.

Two of the five threatened fauna that may be affected by the project are listed under the EPBC Act as 'vulnerable' - the greater bilby (*Macrotis lagotis*), and the great desert skink (*Liopholis kintorei*). The relevant section from the National Significance Significant Impact Guidelines 1.1 (2013) states that:

An action is likely to have a significant impact on a vulnerable species if there is a real chance or possibility that it will:

- *lead to a long-term decrease in the size of an important population of a species*
- *reduce the area of occupancy of an important population*
- *fragment an existing important population into two or more populations*
- *adversely affect habitat critical to the survival of a species*
- *disrupt the breeding cycle of an important population*
- *modify, destroy, remove or isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline*
- *result in invasive species that are harmful to a vulnerable species becoming established in the vulnerable species' habitat*
- *introduce disease that may cause the species to decline, or*
- *interfere substantially with the recovery of the species.*

When assessed against this list, the project is highly unlikely to cause any of these events. Potential habitat in the project area that may be affected by development activities spans broadly across the surrounding region with modification or destruction of localised patches unlikely to negatively impact broad population groups. Proposed works in the project area are therefore unlikely to have a significant impact on the vulnerable species and do not trigger the need for approval under the EPBC Act. Additional recommendations to avoid risk to individual members of threatened species whilst working in the project area are summarised in Section 6 of this report.

6. RECOMMENDATIONS

A number of strategies are recommended to reduce risk to individual members of threatened species populations and residual risks to species at a population level. These are presented below in Table 10. Additional general recommendations include:

1. Management strategies to minimize potential impacts on conservation significant fauna species

- All staff operating machinery including standard vehicles in sand plains areas, sand dunes and palaeodrainage channels should be briefed on threatened species present or potentially present in these areas. Staff should be able to identify the animals, signs of the animals (e.g. burrows) and potential habitat areas. Information regarding relevant species will be provided to Northern Star Pty Ltd. in an induction booklet.
- Prior to clearing, sensitive areas should be searched for signs of threatened species and any active burrows found in identified habitat areas should be avoided where possible.
- All incidental mortalities of Listed fauna should be reported through the appropriate avenues.
- Procedures should be in place for the management of any injured fauna, specifically conservation significant fauna. Staff should be trained on reporting protocols relating to target fauna species.
- All large trees should be avoided when clearing drilling areas – *Corymbia opaca* Desert Bloodwood, *Acacia coreaceae* – Dogwood, *Eucalyptus brevifolia* Snappy Gum.
- Endeavour to avoid large clumps of mature mallee type *Eucalypts* as these provide key burrowing habitat for bilbies as well as other species such as Sand goanna.
- Palaeodrainage depressions in sandplain areas should be avoided where possible as these may provide key habitat areas.
- Ensure driving speed limits and restrictions on night, dawn and dusk driving are employed and adhered to, minimizing mortalities of target fauna on roads.

2. Management strategies to enhance long term conservation of threatened fauna species

- Weed spread should be closely managed to prevent degradation of priority fauna habitat, with priority given to those weed free areas in the Groundrush tenement.
- Patch burning in potential habitat areas for target threatened species should be employed where possible. Patch burning has been shown to improve habitat suitability and increase availability of food resources for some species in the Tanami Desert (Southgate & Carthew 2006). Mosaics of interspersed freshly burnt and long unburnt *Spinifex* habitat serve to provide both fire promoted food resources which form a substantial part of bilby diets; with dense patches of *Spinifex* offering shelter to small mammal species from predation. In addition patch burning may increase the resilience of more 'fire sensitive' species dependent on dense spinifex by reducing the extent of wildfires (Letnic & Dickman 2005).

- Feral animal control may assist in improving habitat suitability for small mammals such as the threatened Greater bilby and Brush-tailed Mulgara. Increased predation from introduced species such as cats and foxes are known to have been implicated in the decline of many arid zone mammal fauna species (Moseby et al. 2015). Cats in particular were recorded at multiple sites across both the Hurricane Repulse and Groundrush tenements. Employing a targeted cat reduction program may assist in improving habitat suitability for target species such as bilbies and mulgara. Strategies may include recording feral cat sightings, trapping/tracking/baiting programs, restricting bringing feral animals onto site and restricting feeding or sheltering feral animals on site.
- If Northern Star Pty Ltd is seeking to increase employment of Aboriginal people it could do so by employing skilled Rangers in feral cat reduction programs or to conduct targeted tracking searches of areas to be cleared for active burrows etc.

Table 11. SUGGESTED MANAGEMENT TECHNIQUES TO REDUCE RISK OF DISTURBANCE TO TARGET THREATENED SPECIES

Scientific Name	Common Name	TPWC Status ¹	EPBC Status ²	Habitat	Location on site	Management technique to reduce risk of disturbance
<i>Dasycercus blythi</i>	Brush-tailed mulgara	VU	-	Sandy soils - sandplain and sand dunes, particularly palaeochannels or drainage lines. Mulgara are inquisitive and rapidly mobile. Shelter in burrows, termite mounds or under shrubs.	1. Groundrush-ripcord track and adjacent Sandplains	Search for active burrows and fresh tracks/scats in areas to be cleared. If found endeavour to reroute clearing around active burrows
<i>Liopholis kintorei</i>	Great desert skink	VU	VU	Sandplain and sand dunes, particularly upper shoulders of palaeodrainage channels on lateritic sandy soils supporting <i>Melaleuca</i> shrubs. Shelter in colonial burrows with central latrine.	No evidence of Great Desert Skinks observed in any survey sites within project areas.	Search for active burrows and fresh scats in central latrine areas of burrows. If found endeavour to reroute clearing around active burrows
<i>Macrotis lagotis</i>	Greater bilby	VU	VU	Sandy soils with Spinifex and Mallee type <i>Eucalypts</i> , <i>Acacia</i> shrubs or <i>Melaleuca</i> . Shelter in burrows or under shrubs. Have been known to burrow into the base of old clumps of mallee type <i>Eucalypts</i> , large termite mounds and mounds of previously disturbed soils.	1. Paleodrainage channels in SW corner of Hurricane Repulse tenement. 2. Sandplains adjacent to Groundrush-Ripcord track.	1. Search for active burrows and fresh tracks/scats in areas to be cleared. If found endeavour to reroute clearing around active burrows 2. Avoid clearing mature clumps of mallee type <i>Eucalypts</i> that provide key potential habitat areas for burrows 3. Avoid clearing in palaeodrainage channels as these provide key habitat area
<p>1 TPWC Act Status: CR, Critical Endangered; EN, Endangered; VU, Vulnerable; NT, Near Threatened as listed under the <i>Territory Parks and Wildlife Conservation Act</i> (TPWC)</p> <p>2 EPBC Act Status: EN, Endangered; VU, Vulnerable as listed under the <i>Environmental Protection and Biodiversity Act</i> (EPBC)</p>						

7. CONCLUSIONS

None of the five species of conservation significance identified by the NT Flora Atlas that were assessed as having a high likelihood of occurring within the lease areas, were recorded during on ground surveys.

In the 2016 survey weeds were abundant at site H2 in the Hurricane Repulse tenement (MLS153) and moderately present at site H1. Weeds present included Buffel Grass (*Cenchrus ciliaris*), Feathertop Rhodes Grass (*Chloris virgata*), Couch grass and Ruby dock (*Acetose vesicaria*). For detailed descriptions of weed distribution and recommendations for management see the LES Weed Management Plan (2016).

The majority of habitat areas identified in the Groundrush tenement were Spinifex hummock grassland with *Acacia* shrubland on sandplain and Open *Eucalypt* woodland over spinifex hummock grassland. Both these habitat areas support a diverse array of reptiles, birds and small mammals with mature *Corymbia opaca*, *Eucalypt* species and mallee type *Eucalypts* offering important habitat for burrowing species and roosting habitat for birds whilst dense thickets of spinifex hummock offers habitat and protection from predators for smaller vertebrate species. These habitats are however broadly represented in and around the project area and in the greater bioregion and localised disturbances are unlikely to negatively affect threatened populations as a whole.

Paleodrainage areas surveys in the 2012 surveys were noted as important habitat areas for both Greater Bilbies and Mulgara, particularly in the dry season. Paleodrainage areas were observed amongst sandplain habitats in the Groundrush tenement and south western portion of Hurricane Repulse tenement. Caution when disturbing paleodrainage habitats may reduce risk to individual members of threatened species populations and other fauna inhabitants. See recommendations in section 7 for details.

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 project 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 (Grey Falcon and Australian Bustard) and three mammal species:

- Greater Bilby
- Brush-tailed Mulgara
- Northern Nailtail wallaby

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 have concluded that if best practice procedures are adhered to, the Project is highly unlikely to have an impact on the population of Greater Bilby.

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9. APPENDICES

APPENDIX 1: Location of sites surveying during 2012 and 2016 on ground surveys by LES

Site	Latitude	Longitude
H1a	-19.977575°	129.697114°
H1b	-19.967636°	129.718017°
H2	-19.968197°	129.716336°
G1a	-19.724044°	129.991194°
G1b	-19.711333°	129.995367°
G2	-19.721031°	129.995364°
G3	-19.733153°	130.006661°
G4	-19.740414°	130.013000°
HR1	-19.913231°	129.799258°
HR2	-19.840236°	129.884114°

APPENDIX 2: Mammal species recorded during the March/May 2012 surveys and October 2016 survey

Table 12 COMBINED MAMMAL SPECIES LIST RECORDED DURING SURVEYS

Scientific name	Common Name	TWPC 2012	EPBC 2007	2016							2012			
				SHED	H1b	H2	G1b	G2	G3	G4	H1a	HR1	HR2	G1a
<i>Camelus dromedarius</i>	Camel	Int					X		X					
<i>Canis lupis</i>	Dingo	LC					X	X	X		X			
<i>Dasymercus blythi</i>	Brush-tailed Mulgara	VU								X	X			X
<i>Felis catus</i>	Cat	Int			X		X	X	X	X				
<i>Macrotis lagotis</i>	Bilby	VU	VU								X			
<i>Mus musculus</i>	House Mouse	Int		X							X	X		
<i>Notomys alexis</i>	Spinifex Hopping-mouse	LC					X	X		X				X
<i>Onychogalea unguifera</i>	Northern Nailtail Wallaby	NT				X			X					
<i>Pseudomys delicatulus</i>	Delicate Mouse	LC									X		X	
<i>Pseudomys desertor</i>	Desert Mouse	LC					X			X	X	X	X	X
<i>Pseudomys hermannsburgensis</i>	Sandy Inland Mouse	LC									X			
<i>Pseudomys nanus</i>	Western Chestnut Mouse	LC			X					X	X			
<i>Sminthopsis macroura</i>	Stripe-faced Dunnart	LC								X	X	X		

APPENDIX 3: Reptile species recorded during the March/May 2012 surveys and October 2016 survey

Table 13 COMBINED REPTILE SPECIES LIST RECORDED DURING THE SURVEYS

Scientific name	Common Name	TWPC 2012	EPBC 2007	2016						2012			
				H1b	H2	G1b	G2	G3	G4	H1a	HR1	HR2	G1a
<i>Ctenophorus isolepis</i>	Military Dragon	LC					X	X					
<i>Ctenotus helenae</i>	Clay-soil Ctenotus			X			X						
<i>Ctenotus leonhardii</i>	Leonardi's Ctenotus	LC								X	X		
<i>Ctenotus pantherinus</i>	Leopard Ctenotus	LC	LC		X				X				X
<i>Eremiascincus fasciolatus</i>	Narrow-banded Sand Swimmer	LC										X	
<i>Lophognathus longirostris</i>	Long-nosed Water Dragon	LC						X		X			
<i>Menetia greyii</i>	Grey's Menetia	LC								X			
<i>Moloch horridus</i>	Thorny Devil						X		X				
<i>Strophurus ciliaris</i>	Northern spiny tailed Gecko							X					
<i>Suta suta</i>	Curl Snake	LC								X			
<i>Tiliqua multifasciata</i>	Centralian Blue-Tongue Lizard	LC							X		X		
<i>Varanus gilleni</i>	Pygmy Mulga Monitor	LC											
<i>Varanus gouldii</i>	Sand Goanna	LC							X				

APPENDIX 4: Invertebrate species recorded during the March/May 2012 surveys and October 2016 survey

Table 14 COMBINED INVERTEBRATE SPECIES LIST RECORDED DURING SURVEYS

Insects (w/o Ants)	Insects (w/o Ants)	Insects (w/o Ants)	Ants	Spiders
Beetle	Gumleaf grasshopper	Sow beetle	"Ants"	Barking Spider
Black beetle	Moth	Stick insect	Black ants	"Dot" spider
Black cockroach	Mud wasp	Termite soldier	Blue headed ants	Huntsman spider
Brown beetle	Painted pygomorph	Wasp	Bull ants	Jumping spider
Cardinal beetle	Pie dish Beetle	Weevils	Camponotus ants	Spiny spider
Cicada	Praying Mantis	Wood borer beetle	Honey ants	Wolf spider
Click beetle	Procession caterpillar	Scorpions	Polyrachis ants	Other
Cockroach	Robber fly	"Scorpion"	<i>Iridomyrmex</i> ants	Centipede
Dung Beetle	Silver fish	Yellow Scorpion		Mole Crickets

APPENDIX 5: Bird species recorded during the March/May 2012 surveys and October 2016 survey

Table 15. COMBINED BIRD SPECIES RECORDED IN 2012 AND 2016 SURVEYS

Scientific Name	Common Name	TPWC	EPBC	2016							2012
				H1	H2	G1	G2	G3	G4	Inc	
<i>Acanthagenys rufogularis</i>	Spiny-Cheeked Honeyeater	LC									X
<i>Accipiter fasciatus</i>	Brown Goshawk	LC									X
<i>Ardeotis australis</i>	Australian Bustard	NT		X						X	X
<i>Artamus cinereus</i>	Black-faced Woodswallow	LC					X	X			X
<i>Artamus minor</i>	Little Woodswallow	LC									X
<i>Barnardius zonarius</i>	Australian Ringneck	LC						X	X		X
<i>Cacatua sanguinea</i>	Little Corella	LC			X					X	X
<i>Centropus phasianinus</i>	Pheasant Coucal	LC			X						
<i>Chalcites basal</i>	Horsfield's Bronze-Cuckoo	LC									X
<i>Circus assimilis</i>	Spotted Harrier	LC							X		
<i>Colluricincla harmonica</i>	Grey Shrike-thrush	LC				X					
<i>Coracina novaehollandiae</i>	Black-faced Cuckoo-shrike	LC				X				X	X
<i>Corvus bennetti</i>	Little Crow	LC									X
<i>Corvus orru</i>	Torresian Crow	LC								X	X

Scientific Name	Common Name	TPWC	EPBC	2016							2012
				H1	H2	G1	G2	G3	G4	Inc	
<i>Coturnix ypsilophora</i>	Brown quail	LC			X			X			
<i>Cracticus nigrogularis</i>	Pied Butcherbird	LC			X					X	X
<i>Cuculus pallidus</i>	Pallid Cuckoo	LC									X
<i>Dicaeum hirundinaceum</i>	Mistletoebird	LC									X
<i>Dromaius novaehollandiae</i>	Emu	NT						X	X	X	
<i>Elanus axillaris</i>	Black-shouldered Kite	LC								X	X
<i>Epthianura tricolor</i>	Crimson Chat	LC								X	X
<i>Eurostopodus argus</i>	Spotted Nightjar	LC		X	X						X
<i>Falco berigora</i>	Brown Falcon	LC					X	X	X	X	X
<i>Falco cenchroides</i>	Nankeen Kestrel	LC									X
<i>Falco hypoleucos</i>	Grey Falcon	VU	NT								X
<i>Falco peregrinus</i>	Peregrine Falcon	LC									X
<i>Geopelia cuneata</i>	Diamond Dove	LC				X				X	X
<i>Gerygone fusca</i>	Whiteface Gerygone	LC					X				
<i>Grallina cyanoleuca</i>	Magpie-lark	LC			X						X
<i>Hieraaetus morphnoides</i>	Little Eagle	LC									X

Scientific Name	Common Name	TPWC	EPBC	2016							2012
				H1	H2	G1	G2	G3	G4	Inc	
<i>Lalage sueurii</i>	White-winged Triller	LC									X
<i>Lichenostomus keartlandi</i>	Grey-headed Honeyeater	LC				X	X				X
<i>Lichenostomus penicillatus</i>	White-plumed Honeyeater	LC			X						X
<i>Lichenostomus unicolor</i>	White-gaped Honeyeater	LC									X
<i>Lichenostomus virescens</i>	Singing Honeyeater	LC				X		X			X
<i>Lichmera indistincta</i>	Brown Honeyeater	LC									X
<i>Malurus lamberti</i>	Variegated Fairy-wren	LC						X	X		X
<i>Manorina flavigula</i>	Yellow-throated Miner	LC					X				X
<i>Melithreptus gularis</i>	Black-chinned Honeyeater	LC									X
<i>Melopsittacus undulatus</i>	Budgerigar	LC									X
<i>Merops ornatus</i>	Rainbow Bee-eater	LC									X
<i>Milvus migrans</i>	Black Kite	LC								X	X
<i>Nymphicus hollandicus</i>	Cockatiel	LC									X
<i>Ocyphaps lophotes</i>	Crested Pigeon	LC			X			X			X
<i>Oreoica gutturalis</i>	Crested Bellbird	LC									X
<i>Pardalotus striatus</i>	Striated Pardalote	LC									X

Scientific Name	Common Name	TPWC	EPBC	2016							2012
				H1	H2	G1	G2	G3	G4	Inc	
<i>Phaps chalcoptera</i>	Common Bronzewing	LC								X	X
<i>Rhipidura leucophrys</i>	Willie Wagtail	LC			X	X				X	X
<i>Taeniopygia guttata</i>	Zebra Finch	LC					X	X		X	X
<i>Todiramphus pyrrhopygia</i>	Red-backed Kingfisher	LC									X
<i>Todiramphus sanctus</i>	Sacred Kingfisher	LC									X
<i>Turnix velox</i>	Little Button-quail	LC			X						X

APPENDIX 6: Flora species recorded during the March/May 2012 surveys and October 2016 survey

Table 16: COMBINED FLORA SPECIES LIST RECORDED DURING SURVEYS

Species name	Common name	TPWC 2012	EPBC 2007	2016							2012
				H1	H2	G1	G2	G3	G4	DINGO	
<i>Abutilon otocarpum</i>	Desert Chinese Lantern	LC		X							X
<i>Acacia adoxa</i>	Grey Whorled Wattle	LC		X							X
<i>Acacia adsurgens</i>	Whipstick Wattle	LC									X
<i>Acacia ancistocarpa</i>	Fitzroy wattle	LC				X		X			
<i>Acacia colei</i>	Cole's Wattle	LC		X	X	X	X	X	X	X	X
<i>Acacia coreaceae ssp. Sericophylla</i>	Dogwood	LC		X			X	X	X		X
<i>Acacia cowleana</i>	Hall's Creek Wattle	LC		X	X						X
<i>Acacia elachantha</i>		LC									X
<i>Acacia hilliana</i>	Flying-saucer bush	LC		X	X						X
<i>Acacia holosericea</i>	Candelabra Wattle	LC		X	X						X
<i>Acacia lysiphloia</i>	Turpentine bush	LC		X		X	X	X	X	X	X
<i>Acacia melleodora</i>	Waxy wattle	LC						X	X	X	

Species name	Common name	TPWC 2012	EPBC 2007	2016							2012
				H1	H2	G1	G2	G3	G4	DINGO	
<i>Acacia stipuligera</i>	Scrub Wattle	LC		X						X	X
<i>Acacia tenuissima</i>	Broom Wattle	LC			X		X	X		X	X
<i>Acacia victoriae</i>	Bardi bush	LC			X					X	
<i>Achyranthes aspera</i>	Chaff Flower	LC			X						
<i>Amphipogon caricinus</i>	Grey-beard Grass	LC				X	X		X		
<i>Amyema maidenii</i>	Pale leaf mistletoe	LC									X
<i>Aristida contorra</i>	Bunched Kerosene Grass	LC									X
<i>Aristida holathera</i>	Erect Kerosene Grass	LC				X	X				
<i>Aristida inaequiglumis</i>	Unequal Three-awn	LC		X	X	X	X	X	X	X	X
<i>Boerhavia coccinea</i>	Tar Vine	LC									X
<i>Bulbostylis barbata</i>	Short-leaved Rush	LC									X
<i>Carissa lanceolate</i>	Conkerberry	LC									X
<i>Cassytha sp</i>	Dodder-laurel	LC					X	X	X		
<i>Cenchrus ciliaris</i>	Buffel Grass	LC		X	X					X	

Species name	Common name	TPWC 2012	EPBC 2007	2016							2012
				H1	H2	G1	G2	G3	G4	DINGO	
<i>Chloris virgata</i>	Feathertop Rhodes Grass	LC			X						
<i>Chrysopogon fallax</i>	Golden Beard Grass	LC		X			X				
<i>Cleome viscosa</i>	Mustard Bush	LC									X
<i>Convolvulus clementii</i>	Australian Bindweed	LC									X
<i>Corchorus sericeus</i>		LC				X					
<i>Corchorus sidoides</i>	Flannel Weed	LC					X		X		
<i>Corymbia opaca</i>	Desert Bloodwood	LC				X	X	X	X		X
<i>Cucumis maderaspatanus</i>	Head-ache Vine	LC									X
<i>Cymbopogon oblectus</i>	Lemon scented Grass	LC		X			X				X
<i>Cynanchum viminalis</i>	Milk Vine	LC			X		X				
<i>Cyperus concinnus</i>	Trim Sedge	LC									X
<i>Dampiera candidans</i>		LC									X
<i>Dicrastylis exsuccosa</i>	Rusty Sand-sage	LC									X
<i>Dodonaea coriacea</i>	Hopbush	LC		X							

Species name	Common name	TPWC 2012	EPBC 2007	2016							2012
				H1	H2	G1	G2	G3	G4	DINGO	
<i>Dodonaea viscosa</i>	Sticky hopbush	LC									X
<i>Drosera burmanni</i>	Burman's Sundew	LC									X
<i>Enneapogon avenaceus</i>	Native Oat-grass	LC									X
<i>Enneapogon polyphyllus</i>	Woolly Oat-grass	LC									
<i>Einadia nutans</i>	Climbing Saltbush	LC			X						
<i>Eragrostis cumingii</i>	Fairy Grass	LC									X
<i>Eragrostis pergracilis</i>	Small Lovegrass	LC					X				
<i>Eragrostis speciosa</i>	Handsome Lovegrass	LC									X
<i>Eucalyptus brevifolia</i>	Snappy Gum	LC							X		X
<i>Eucalyptus cupularis</i>	Halls Creek White Gum	NT									X
<i>Eucalyptus gamophylla</i>		LC				X		X			
<i>Eucalyptus leucophloia</i>	Snappy Gum	LC					X				
<i>Eucalyptus odontocarpa</i>		LC		X							
<i>Eucalyptus pachyphylla</i>	Red Bud Mallee	LC		X		X	X				X

Species name	Common name	TPWC 2012	EPBC 2007	2016							2012
				H1	H2	G1	G2	G3	G4	DINGO	
<i>Eucalyptus pruinosa</i>	Silver Box	LC				X	X				
<i>Eucalyptus victrix</i>	Smooth barked coolibah	LC		X			X				
<i>Eulalia aurea</i>	Silky Browntop	LC		X			X	X	X		X
<i>Euphorbia alsiniflora</i>	Namana	LC									X
<i>Euphorbia wheeleri</i>	Wheeler's Spurge	LC									
<i>Evolvulus aslinoides</i> var. <i>villosicalyx</i>		LC		X							
<i>Frankenia cordata</i>	Salty Heath	LC									X
<i>Fimbristylis</i> sp.							X	X			
<i>Goodenia armitiana</i>	Narrow-leaved Goodenia	LC									X
<i>Goodenia azurea</i>	Blue Goodenia	LC									X
<i>Goodenia goodeniacea</i>	Sand plain Goodenia	LC									X
<i>Gossypium australe</i>	Native cotton	LC		X			X	X	X		X
<i>Grevillea wickhamii</i>	Holly-leaf Grevillea	LC			X			X	X	X	X
<i>Hakea arborescens</i>	Tree Corkwood	LC							X		

Species name	Common name	TPWC 2012	EPBC 2007	2016							2012
				H1	H2	G1	G2	G3	G4	DINGO	
<i>Hakea lorea</i>		LC								X	
<i>Hakea macrocarpa</i>	Flat-leaved Hakea	LC					X				X
<i>Halgania sp</i>		LC				X	X				
<i>Halgania cyanea</i>	Rough halgania	LC		X							
<i>Haloragis aspera</i>		LC						X	X		
<i>Hibiscus sp.</i>						X					
<i>Hybanthus aurantiacus</i>	Orange Spade Flower	LC		X							X
<i>Indigofera georgei</i>	Georges Indigo	LC									X
<i>Keraudrenia integrifolia</i>	Common Firebush	LC		X		X					
<i>Keraudrenia velutina</i>		LC									X
<i>Leptosema chamersii</i>	Upside-down Plant	LC						X			
<i>Maireana georgei</i>	Golden Bluebush	LC									X
<i>Marsdenia australis</i>	Bush Banana	LC			X	X					
<i>Melaleuca lasiandra</i>	Sandhill Tea-tree	LC									X

Species name	Common name	TPWC 2012	EPBC 2007	2016							2012
				H1	H2	G1	G2	G3	G4	DINGO	
<i>Mimulus aurantiacus</i>	Orange monkey flower	LC		X							
<i>Mirbelia viminalis</i>	Yellow Spikey Bush (Pea)	LC		X							X
<i>Olearia ferresii</i>	Daisy bush	LC					X	X			
<i>Paraneurachne muelleri</i>	Northern Mulga Grass	LC									X
<i>Petalostylis cassioides</i>	Butterfly bush	LC		X		X	X				X
<i>Pluchea dunlopia</i>	Daisy Bush	LC					X	X			X
<i>Pluchea ferdinandi-muelleri</i>	Daisy Bush	LC							X		X
<i>Pluchea rubelliflora</i>		LC					X				
<i>Pterocaulon serrulatum</i>	Fruit-salad Bush	LC									X
<i>Ptilotus astrolasius</i>	Mulla Mulla	LC									X
<i>Ptilotus calostachyus</i>	Weeping Mulla Mulla	LC				X					
<i>Ptilotus obovatus</i>	Cotton bush	LC		X							
<i>Ptilotus polystachyus</i>	Longtail Mulla Mulla	LC				X					
<i>Ptilotus sessifolius</i>	Climbing Mulla Mulla	LC			X		X				

Species name	Common name	TPWC 2012	EPBC 2007	2016							2012
				H1	H2	G1	G2	G3	G4	DINGO	
<i>Rulingia loxophylla</i>	Pink Fire-bush	LC				X			X		
<i>Scaevola parvifolia</i>	Fanflower	LC		X							
<i>Senna artemisioides ssp.</i>		LC		X							X
<i>Senna artemisioides oligophylla</i>		LC				X					
<i>Senna artemisioides helmsii</i>	Blunt leaf cassia	LC					X				
<i>Senna artemisioides oligophylla</i>	Oval-leaf cassia	LC									X
<i>Senna glutinosa</i>		LC									X
<i>Senna pleurocarpa</i>	Chocolate bush	LC									X
<i>Senna sericea</i>		LC		X							
<i>Setaria surgens</i>	Brown Pigeon Grass	LC									X
<i>Sida ammophila</i>	Sand sida	LC									X
<i>Sida fibulifera</i>	Silver Sida	LC				X		X			X
<i>Solanum cleistogamum</i>	Shy Nightshade	LC									X
<i>Sporobolus australiasicus</i>	Australian Dropseed	LC									X

Species name	Common name	TPWC 2012	EPBC 2007	2016							2012
				H1	H2	G1	G2	G3	G4	DINGO	
<i>Stemodia sp.</i>									X		
<i>Themeda Triandra</i>	Kangaroo Grass	LC				X					
<i>Tinospora smilacina</i>	Snake Vine	LC									X
<i>Triodia pungens</i>		LC		X	X	X	X	X	X	X	X
<i>Triodia schinzii</i>	Feathertop Spinifex	LC									X

APPENDIX 7: 2016 tracking observations for target threatened species

Species observation	Tally	Notes
Greater bilby tracks	1	Bilby tracks were observed in the SW corner of the Hurricane Repulse tenement (survey site H1a) in the 2012 survey. No burrows were sighted during the 2012 or 2016 surveys.
Greater bilby burrows	0	
Brush-tailed mulgara tracks	3	Fresh mulgara tracks were recorded at multiple sites along the Groundrush-Ripcord Access track notably at site 4 and 3 towards the southern end of the track. No mulgara burrows were recorded during active searches of survey sites or surrounding areas.
Brush-tailed mulgara burrows	0	
Northern Nailtail Wallaby tracks	1	Tracks were observed at site H2 in the 2016 survey in the sandplain open mallee type <i>Eucalypt</i> woodland adjacent to the rehabilitated sewerage effluent treatment plant. Scats were collected along the Groundrush-Ripcord access track as well as in an active search between sites G2 and G3 (however
Northern Nailtail Wallaby Scats	1 (possibly 2)	
Great Desert Skink	0	No signs of Great Desert Skink tracks, scats or burrows were noted at any survey sites in the 2012 and 2016 surveys

APPENDIX 8: : Trapping Survey Photos




Figure 2:

Figure 3:

Figure 4:

Figure 5:

APPENDIX 9: Protected Matters Search Report (DoE)



Australian Government
Department of the Environment and Energy

EPBC Act Protected Matters Report


This report provides general guidance on matters of national environmental significance and other matters protected by the EPBC Act in the area you have selected.

Information on the coverage of this report and qualifications on data supporting this report are contained in the caveat at the end of the report.

Information is available about [Environment Assessments](#) and the EPBC Act including significance guidelines, forms and application process details.


Report created: 02/11/16 13:17:23

[Summary](#)
[Details](#)
[Matters of NES](#)
[Other Matters Protected by the EPBC Act](#)
[Extra Information](#)
[Caveat](#)
[Acknowledgements](#)



This map may contain data which are
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[Coordinates](#)
Buffer: 20.0Km



Summary

Matters of National Environmental Significance

This part of the report summarises the matters of national environmental significance that may occur in, or may relate to, the area you nominated. Further information is available in the detail part of the report, which can be accessed by scrolling or following the links below. If you are proposing to undertake an activity that may have a significant impact on one or more matters of national environmental significance then you should consider the [Administrative Guidelines on Significance](#).

World Heritage Properties:	None
National Heritage Places:	None
Wetlands of International Importance:	None
Great Barrier Reef Marine Park:	None
Commonwealth Marine Area:	None
Listed Threatened Ecological Communities:	None
Listed Threatened Species:	6
Listed Migratory Species:	8

Other Matters Protected by the EPBC Act

This part of the report summarises other matters protected under the Act that may relate to the area you nominated. Approval may be required for a proposed activity that significantly affects the environment on Commonwealth land, when the action is outside the Commonwealth land, or the environment anywhere when the action is taken on Commonwealth land. Approval may also be required for the Commonwealth or Commonwealth agencies proposing to take an action that is likely to have a significant impact on the environment anywhere.

The EPBC Act protects the environment on Commonwealth land, the environment from the actions taken on Commonwealth land, and the environment from actions taken by Commonwealth agencies. As heritage values of a place are part of the 'environment', these aspects of the EPBC Act protect the Commonwealth Heritage values of a Commonwealth Heritage place. Information on the new heritage laws can be found at <http://www.environment.gov.au/heritage>

A [permit](#) may be required for activities in or on a Commonwealth area that may affect a member of a listed threatened species or ecological community, a member of a listed migratory species, whales and other cetaceans, or a member of a listed marine species.

Commonwealth Land:	None
Commonwealth Heritage Places:	None
Listed Marine Species:	12
Whales and Other Cetaceans:	None
Critical Habitats:	None
Commonwealth Reserves Terrestrial:	None
Commonwealth Reserves Marine:	None

Extra Information

This part of the report provides information that may also be relevant to the area you have nominated.

State and Territory Reserves:	1
Regional Forest Agreements:	None
Invasive Species:	7
Nationally Important Wetlands:	None
Key Ecological Features (Marine):	None

Details

Matters of National Environmental Significance

Listed Threatened Species		[Resource Information]
Name	Status	Type of Presence
Birds		
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Polytelis alexandrae Princess Parrot, Alexandra's Parrot [758]	Vulnerable	Species or species habitat known to occur within area
Rostratula australis Australian Painted Snipe [77037]	Endangered	Species or species habitat likely to occur within area
Mammals		
Macrotis lagotis Greater Bilby [282]	Vulnerable	Species or species habitat known to occur within area
Zyzomys pedunculatus Central Rock-rat, Antina [68]	Endangered	Species or species habitat may occur within area
Reptiles		
Liopholis kintorei Great Desert Skink, Tjakura, Warrarna, Mulyamiji [83160]	Vulnerable	Species or species habitat may occur within area
Listed Migratory Species		[Resource Information]
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Migratory Marine Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Migratory Terrestrial Species		
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area
Migratory Wetlands Species		

Name	Threatened	Type of Presence
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Tringa nebularia Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Other Matters Protected by the EPBC Act

Listed Marine Species	[Resource Information]	
* Species is listed under a different scientific name on the EPBC Act - Threatened Species list.		
Name	Threatened	Type of Presence
Birds		
Apus pacificus Fork-tailed Swift [678]		Species or species habitat likely to occur within area
Ardea alba Great Egret, White Egret [59541]		Species or species habitat known to occur within area
Ardea ibis Cattle Egret [59542]		Species or species habitat may occur within area
Calidris ferruginea Curlew Sandpiper [856]	Critically Endangered	Species or species habitat may occur within area
Charadrius veredus Oriental Plover, Oriental Dotterel [882]		Species or species habitat may occur within area
Glareola maldivarum Oriental Pratincole [840]		Species or species habitat may occur within area
Hirundo rustica Barn Swallow [662]		Species or species habitat known to occur within area
Merops ornatus Rainbow Bee-eater [670]		Species or species habitat may occur within area
Motacilla cinerea Grey Wagtail [642]		Species or species habitat may occur within area
Motacilla flava Yellow Wagtail [644]		Species or species habitat may occur within area

Name	Threatened	Type of Presence
<u>Rostratula benghalensis (sensu lato)</u> Painted Snipe [889]	Endangered*	Species or species habitat likely to occur within area
<u>Tringa nebularia</u> Common Greenshank, Greenshank [832]		Species or species habitat likely to occur within area

Extra Information

State and Territory Reserves	[Resource Information]
Name	State
Northern Tanami	NT

Invasive Species	[Resource Information]
Weeds reported here are the 20 species of national significance (WoNS), along with other introduced plants that are considered by the States and Territories to pose a particularly significant threat to biodiversity. The following feral animals are reported: Goat, Red Fox, Cat, Rabbit, Pig, Water Buffalo and Cane Toad. Maps from Landscape Health Project, National Land and Water Resources Audit, 2001.	

Name	Status	Type of Presence
Mammals		
Bos taurus Domestic Cattle [16]		Species or species habitat likely to occur within area
Camelus dromedarius Dromedary, Camel [7]		Species or species habitat likely to occur within area
Canis lupus familiaris Domestic Dog [82654]		Species or species habitat likely to occur within area
Felis catus Cat, House Cat, Domestic Cat [19]		Species or species habitat likely to occur within area
Mus musculus House Mouse [120]		Species or species habitat likely to occur within area
Vulpes vulpes Red Fox, Fox [18]		Species or species habitat likely to occur within area
Plants		
Cenchrus ciliaris Buffel-grass, Black Buffel-grass [20213]		Species or species habitat may occur within area

Caveat

The information presented in this report has been provided by a range of data sources as acknowledged at the end of the report.

This report is designed to assist in identifying the locations of places which may be relevant in determining obligations under the Environment Protection and Biodiversity Conservation Act 1999. It holds mapped locations of World and National Heritage properties, Wetlands of International and National Importance, Commonwealth and State/Territory reserves, listed threatened, migratory and marine species and listed threatened ecological communities. Mapping of Commonwealth land is not complete at this stage. Maps have been collated from a range of sources at various resolutions.

Not all species listed under the EPBC Act have been mapped (see below) and therefore a report is a general guide only. Where available data supports mapping, the type of presence that can be determined from the data is indicated in general terms. People using this information in making a referral may need to consider the qualifications below and may need to seek and consider other information sources.

For threatened ecological communities where the distribution is well known, maps are derived from recovery plans, State vegetation maps, remote sensing imagery and other sources. Where threatened ecological community distributions are less well known, existing vegetation maps and point location data are used to produce indicative distribution maps.

For species where the distributions are well known, maps are digitised from sources such as recovery plans and detailed habitat studies. Where appropriate, core breeding, foraging and roosting areas are indicated under 'type of presence'. For species whose distributions are less well known, point locations are collated from government wildlife authorities, museums, and non-government organisations; bioclimatic distribution models are generated and these validated by experts. In some cases, the distribution maps are based solely on expert knowledge.

Only selected species covered by the following provisions of the EPBC Act have been mapped:

- migratory and
- marine

The following species and ecological communities have not been mapped and do not appear in reports produced from this database:

- threatened species listed as extinct or considered as vagrants
- some species and ecological communities that have only recently been listed
- some terrestrial species that overfly the Commonwealth marine area
- migratory species that are very widespread, vagrant, or only occur in small numbers

The following groups have been mapped, but may not cover the complete distribution of the species:

- non-threatened seabirds which have only been mapped for recorded breeding sites
- seals which have only been mapped for breeding sites near the Australian continent

Such breeding sites may be important for the protection of the Commonwealth Marine environment.

Coordinates

-19.721053 130.002126,-19.979391 129.690389

Acknowledgements

This database has been compiled from a range of data sources. The department acknowledges the following custodians who have contributed valuable data and advice:

- [-Office of Environment and Heritage, New South Wales](#)
- [-Department of Environment and Primary Industries, Victoria](#)
- [-Department of Primary Industries, Parks, Water and Environment, Tasmania](#)
- [-Department of Environment, Water and Natural Resources, South Australia](#)
- [-Parks and Wildlife Commission NT, Northern Territory Government](#)
- [-Department of Environmental and Heritage Protection, Queensland](#)
- [-Department of Parks and Wildlife, Western Australia](#)
- [-Environment and Planning Directorate, ACT](#)
- [-Birdlife Australia](#)
- [-Australian Bird and Bat Banding Scheme](#)
- [-Australian National Wildlife Collection](#)
- [-Natural history museums of Australia](#)
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- [-State Herbarium of South Australia](#)
- [-Northern Territory Herbarium](#)
- [-Western Australian Herbarium](#)
- [-Australian National Herbarium, Atherton and Canberra](#)
- [-University of New England](#)
- [-Ocean Biogeographic Information System](#)
- [-Australian Government, Department of Defence](#)
- [Forestry Corporation, NSW](#)
- [-Geoscience Australia](#)
- [-CSIRO](#)
- Other groups and individuals

The Department is extremely grateful to the many organisations and individuals who provided expert advice and information on numerous draft distributions.

Please feel free to provide feedback via the [Contact Us](#) page.

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WEED MANAGEMENT PLAN (NORTHERN TERRITORY)

1. PURPOSE

This document outlines the background and necessary control measures required for all activities to prevent the migration and spread of weeds and/or invasive plant species in or associated with the Central Tanami Project as per the requirements of the Weed Management Act (NT) and Northern Star Resources Limited's Environmental Management System.

2. SCOPE

This Weed Management Plan applies to all activities in any area owned or operated by Northern Star Resources Limited (NSR) in the Northern Territory (NT), specifically the Central Tanami Project (CTP). This includes all activities by contractors, their employees and sub-contractors.

3. RESPONSIBILITY

Position	Key Responsibilities
Site Manager/ Exploration Manager	<ul style="list-style-type: none"> Communicate this procedure to all employees. Ensure regular reviews of this procedure. Ensure all contractors and NST staff are aware of the Environmental Management Plan, Weed Management Plan and associated work standards. Ensure adequate training is provided on, and in line with, this procedure. Ensure all aspects of this procedure are complied with. Ensure investigation details and corrective actions are discussed regularly with site Supervisors. Work collaboratively with Supervisors and Environmental staff, to ensure consistent and reliable communication concerning weed management and control. Ensure investigations and corrective actions are carried out according to NST minimum standards
Environmental Advisor / Representative	<ul style="list-style-type: none"> Work collaboratively with Supervisors to ensure up-to-date information is provided to all concerned parties with respect to weed management and hygiene practices. Monitor legislative requirements. Plan and perform weed management programs. Educate staff and contractors of weed species and the obligations of working in the Northern Territory. Report occurrence of new weeds to regulators and supervisors.
Supervisors	<ul style="list-style-type: none"> Ensure all aspects of this procedure are complied with Ensure all staff/contractors are aware of the Environmental Management Plan and the company's hygiene practices. Track progress of preventative or corrective actions to ensure they are carried out appropriately and effectively. Ensure investigation details and corrective actions are discussed regularly with site personnel. Ensure sufficient training is provided to site personnel regarding their obligations under this procedure and the Environmental Management Plan Ensure all weed hygiene certifications are in place for vehicle/machinery movements.
All Employees	<ul style="list-style-type: none"> Comply with all aspects of this procedure. Report all weeds to their immediate supervisor and appropriate Environmental representative. Ensure fellow staff/contractors are adhering to this procedure, be proactive in changing the situation where this isn't the case.

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WEED MANAGEMENT PLAN (NORTHERN TERRITORY)

4. DEFINITIONS

CTP	means	Central Tanami Project
NSR	means	Northern Star Resources Limited
NST	means	Northern Star (Tanami) Pty Ltd
NT	means	Northern Territory
Propagule	means	Any plant material used for the purpose of plant propagation, most commonly seeds.
Registered weed	means	Those weed species prescribed by the Northern Territory Government that are invasive and may have some form of negative impact on local ecosystems that would otherwise not exist.
WONS	means	Weed of National Significance

5. LEGAL REQUIREMENTS AND OTHER COMMITMENTS

The following legal requirements apply to this plan:

- Environmental Protection and Biodiversity Conservation Act 1999;
- NT Weeds Management Act 2013;
- NT Parks and Wildlife Conservation Act 2006;

6. ASSOCIATED HAZARDS

The following are examples of hazards that may be present whilst performing duties under this plan. Attention must be paid to minimise or eliminate as many as possible.

- Manual Handling
- Chemicals – spills, inhalation, contact
- Lung damage (dust inhalation)
- Eye damage (high pressure air/water or dust)
- Heat exhaustion
- Sun burn
- Environmental damage i.e. destruction of native flora, spread of weeds etc.

7. TOOLS AND EQUIPMENT

Equipment that should be transported with all personnel whilst in the field to cater for weed control includes the following:

- GPS (with spare batteries).
- Shovel/Rake
- Air compressor (with free flowing attachment)
- Weed hygiene certificate (if necessary) – satisfactory knowledge of the proposed travel area in relation to known weed species
- Hand brush
- Note pad and recording stationary (for weed identification/recording)
- Camera

8. BACKGROUND

There are 32 weeds of national significance in Australia (<http://www.environment.gov.au> 06/12/2016) and 19 of those are either present or have been detected in the NT (<https://nt.gov.au> 06/12/2016). A desktop survey indicated eight declared weed species could potentially occur in the project area, three of which are Weeds of National Significance and noted in table 1.

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WEED MANAGEMENT PLAN (NORTHERN TERRITORY)

Table 1

Common Name	Scientific Name	Note
Athel Pine	Tamaris aphylla	Weed of National Significance
Bellyache bush	Jatropha gossypifolia	Weed of National Significance
Parkinsonia	Parkinsonia aculeata	Weed of National Significance

The eight declared weed species identified in the desktop survey as potentially occurring in the project area are noted in table 2. Only Hyptis, Mossman River Grass and Rubber Bush have been found on the lease areas previously (Low Ecological Report 2016).

The declared weeds are either Class A, B or C in the Northern Territory.

Class A: To be eradicated (Also considered Class C)

Class B: Growth and spread to be controlled (Also considered Class C)

Class C: Not to be introduced into the NT

Table 2

Common Name	Scientific Name	Class
Athel Pine	Tamaris aphylla	A/C
Bellyache bush	Jatropha gossypifolia	A/C
Parkinsonia	Parkinsonia aculeata	A/C
Hyptis	Hyptis suaveolens	B/C
Sida	Sida spp.	B/C
Rubber Bush	Calatropis procera	B/C
Coffee Senna	Senna occidentalis	B/C
Mossman River Grass	Cenchrus echinatus	B/C

Non-declared weed/invasive species known to or potentially occurring in the project area include Bindii/Caltrop (*Tribulus terrestris*), Buffel grass (*Cenchrus ciliaris*), Deenanath grass (*Pennisetum pedicellatum*), Flannel weed (*Sida cordifolia*), Gallons curse (*Cenchrus biflorus*), Red natal grass (*Melinis repens*), Purpletop Rhodes grass (*Chloris inflata*), Feathertop Rhodes grass (*Chloris virgata*), Ruby dock (*Acetosa vesicaria*), Kapok (*Aerva japonica*) and Sicklepod (*Senna obtusifolia*). (Low Ecological Report 2016).

Environmental weed/invasive species found within the CTP 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*). (Low & Ghee, 2006) (Outback Ecology Services, 2007) (Outback Ecology, 2008) (Outback Ecology, 2009).

A site visit was conducted by Low Ecological between the 14/11/2016-18/11/2016. No Declared weeds under the Weeds Management Act 2001 were observed although Mossman River Grass has been found in the central area in previous years (Low et al. various years). The survey also identified Buffel grass (*Cenchrus ciliaris*), Purpletop Rhodes grass (*Chloris inflata*), Feathertop Rhodes grass (*Chloris virgata*) and Ruby dock (*Acetosa vesicaria*) as being relatively common on disturbed areas around the central mill area and some waste rock dumps.

There is ongoing debate about the relative value of Buffel grass in providing vegetative cover for bare ground with increased habitat being available for fauna and control of erosion. It is desirable to prevent further spread of Buffel grass however discussions with the DPIR indicate it is no longer being targeted.

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9. WEED CONTROL

9.1 Weed Vectors

Weed control refers to the active participation in mitigating the dispersion or propagation of weed propagule. A weed vector is the means by which these propagules may be transmitted/transported and can be categorised as either Vehicles/Other non-living vectors or living vectors.

Vehicles/Other non-living vectors

- Vehicle tyres, wheel arches, tyre wells and window washer grooves can support the accumulation of mud and seeds on the vehicle
- Machinery such as graders, slashers and trains that have closer interaction with seed material are major weed vectors
- Prevailing wind is the most common weed vector

Living Vectors

- Humans are the most common and effective weed vector, both intentionally and unintentionally
- Animals can also be effective weed vectors
- Propagule attached to footwear, clothing, fur, hooves or digested internally by livestock or feral animals significantly contributes to weed transportation.

The key activities undertaken by NST that have the potential to spread weeds are:

- Vegetation Clearing
- Ground Disturbance
- Vehicle movement
- Construction and establishment of infrastructure
- Rehabilitation

9.2 Control Methods

There are a number of control methods that can be used, where practicable, to create long-term and sustainable weed management approaches. Management, or control, methods that may be used include chemical and mechanical/manual methods.

9.2.1 VEHICLE CONTROL

All vehicles (NST and contractors) must undergo a weed hygiene inspection and certification process when arriving, departing and moving between NST project areas. The following conditions must be met by all personnel:

- All vehicles arriving at CTP, including heavy machinery and drill rigs, must be cleaned upon arrival using high pressure water at the wash bay facilities. Cleaning must include but is not limited to: tyres, wheel arches, tyre wells and window washer grooves.
- Vehicles or machinery moving between Project Areas in the NT must undergo high pressure air hosing before their departure, to ensure the removal of all potential propagule. The same degree of cleaning is required as per high pressure water cleaning.
- Weed Hygiene Certification will be provided to vehicles/machinery following a vehicle inspection to ensure the above conditions have been met. Vehicles moving between areas of known weed infestation are required to be re-certified prior to disembarking. An example of the Weed Hygiene Certificate can be found in Appendix 1.

It is the responsibility of the site contact person, or otherwise as instructed by supervising staff, to ensure that the appropriate weed hygiene certification is in place prior to a vehicle/machine departing or at arrival to site. For field operations including regional exploration work this is the responsibility of the supervising geologist and/or supervising field technician. At the CTP this is the responsibility of the supervisor to ensure the appropriate staff member performs in the certification inspection as part of the general site entry procedure.

If a vehicle/machine is found to be leaving or arriving at a site without sufficient weed hygiene certification the senior person involved in the movement of that asset will be found responsible. This is to

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WEED MANAGEMENT PLAN (NORTHERN TERRITORY)

be treated as a reportable environmental incident and as such further disciplinary action may be taken with the relevant supervisor in the form of a written warning. More severe action may be taken against an individual where there has been a history of breaches.

Vehicles and machinery that are travelling interstate are expected to make use of the government supplied wash down bays, such as those found in Alice Springs in the NT and Halls Creek in WA. This is the first stage in mitigating the transportation of propagule across state and territory borders.

9.2.2 CHEMICAL CONTROL

The use of herbicides can be an effective method for managing wide-spread weed infestations. Weeds must be actively growing to be vulnerable to herbicide treatments, and there are a number of risks involved that must be addressed prior to the use of herbicides. This includes;

- Impact on human health
- Impact on non-target flora and fauna
- Weather conditions impact use of herbicides

NST presently use "Roundup", a herbicide containing the active ingredient glyphosate. It is a non-selective herbicide, meaning it has the potential to harm any plant species it comes in contact with. The following control measures are in place to reduce the risks associated with glyphosate use:

- Chemical control will only be carried out by trained personnel holding a ChemCert qualification
- Correct PPE use; chemical resistant gloves, standard hi vis clothing, face mask, and eye protection
- Portable eye wash station to be accessible at all times during the chemical handling process
- MSDS documents are transported with the chemicals

Herbicides are generally applied using a foliar spraying method, where herbicide is diluted and sprayed over the foliage to the point of run-off. Foliar spraying will occur through spot spraying using a backpack type spray unit. Weather conditions will need to be considered when determining a time for spraying. Typically low wind and very dry conditions are preferable, any rainfall will dilute the herbicide rendering it ineffective. Spraying of perennials must take place during periods where the plants are vigorously growing with healthy young growth visible and before seeds set.

Handling of chemicals must take place in accordance with the manufacturer's SDS including; storage, mixing, and disposal to ensure no harm to personnel or the environment.

9.2.3 MANUAL CONTROL

Where chemical spraying is inefficient or inappropriate, manual removal of plants may be required. Plants are to be removed, inclusive of root material, and placed into plastic garbage bags. The material is to be treated with Round Up and buried to a depth of no less than 600mm in the appropriate waste disposal area at CTP. Manual control methods may include physical or mechanical weed removal using whipper snippers, secateurs, shovels, saws and hoes.

Where manual removal causes the spread of seed, collection using a shovel or vacuum is required. This is particularly common with annual species where the plant itself is in final stages of its lifecycle and is easily able to spread seed when disturbed.

Risk associated with manual control methods include cuts, abrasions and manual handling strains and sprains. These risk can be minimised through:

- Use of correct PPE, including suitable gloves
- Use of correct manual handling techniques, particularly for lifting and bending down

10. WEED MAPPING

As part of the NST Environmental Management Plan, NST recognise the importance of monitoring weed species and their occurrence across the company's area of interest. To do so NST undertake weed mapping, utilising freely available government data in conjunction with internally collected information. When weed species are identified in the field all personnel are required to make a preliminary identification, noting the following information where applicable:

- Date and time

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WEED MANAGEMENT PLAN (NORTHERN TERRITORY)

- Location (MGA GDA94)
- Weed name (Common or scientific)
- Size of infestation (M²)
- Density and growth habit
- Distribution (i.e. single plant, scattered plants, clumps etc.)
- Site description (i.e. slope, drainage, disturbed, waste dump etc.)
- Treatment applied (Including herbicide log)

This data is to be presented to the relevant supervisor whose responsibility it is to ensure the data is imported to the NST acQuire database. These records are stored as point data and are available for export to all personnel.

Where a member of staff or contractor identifies a weed in the field but is ill-equipped to remove or treat the weed, the standard identification procedure must be followed with the environmental advisor or representative initiating the appropriate treatment process for that reporting.

11. EDUCATION AND TRAINING

The site induction includes information on the identification and management of weeds. A field guide to weeds on site is provided to all field personnel as part of their induction. Personnel are required to report sightings of weed infestations, using the weed sighting reports included in the weed field guides.

The field guide is attached as Appendix 3.

12. WEED MANAGEMENT OUTCOMES

Required outcomes under this management plan are:

- The non-introduction, or active removal as appropriate, of any Weeds of National Significance.
- The non-introduction, or active removal as appropriate, of NT declared weed species.
- Containment and/or reduction in non-declared weed species, including:
 - o a short term focus on Ruby Dock at all identified areas.

Northern Star will undertake an annual independent weed assessment to report and confirm the status of weeds on site.

13. ASSOCIATED DOCUMENTS


Document Title	Document Number / Location
Environmental Policy	NSR-COR-003-POL
Environmental Management System Standard	NSR-COR-001-SYS
Environmental Risk Management Standard	NSR-ENV-006-STA
Biodiversity Management Standard	NSR-COR-005-STA
Risk Management Procedure	003 Exploration
Working in remote locations	018 Exploration
CTP Site Specific Induction	Site Specific
Vehicle Use of 4x4	014 Exploration

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WEED MANAGEMENT PLAN (NORTHERN TERRITORY)

Appendix 1

	Weed Hygiene Certificate	Northern Star Resources Ltd. Tanami Operations
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Name	_____	Supervisor	_____
Company	_____	Type of Equipment	_____
Date	_____	Equipment Number	_____
Site Contact	_____	Vehicle Registration	_____

Minimum Requirement	Satisfactory	
	Yes	No
Wheel arches, wheel rims, brake assembly		
Base or undercarriage of object/vehicle		
Interior of object/vehicle		
Above bash plates or engine/gearbox guards		
Between chassis and vehicle body including around suspension and exhaust mounts		
Behind indicators on front of bull bar, along front of vehicle including scrub guard or grill		
Above gearbox, differentials and transfer cases		
Machinery: buckets, ripper blades, tracks		
Tyre treads		
Tray back		
Above fuel tanks		

Vehicle Sighted and certified as clean and free of weeds/contaminants by:

Name	_____	Position	_____
Signature	_____	Date	_____

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Appendix 2.

Low Ecological 2016 Weed Assessment.

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Appendix 3

Field Guide to Weeds on Site

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ENVIRONMENTAL POLICY

Northern Star Resources Limited (Northern Star or the Company) has a duty of care and legal obligation to protect the environment, and is committed to managing its activities in an environmentally responsible manner. Through effective management practices, the Company aims to ensure its activities have a minimum impact on the environment.

The Company's success in environmental management is underpinned by its belief that business can and must be conducted in an environmentally sustainable manner, together with a desire that future generations have the right to enjoy and experience the world as it is today. This overriding commitment to the environment is demonstrated through our Environmental Management System.

Northern Star will drive our approach to environmental care by:

- Implementing and maintaining an Environmental Management System to identify, assess and minimise environmental risk at all stages of its operations as a fundamental part of its long-term strategy.
- Monitoring our environmental footprint, and setting and measuring annual targets for improved environmental performance.
- Complying with all applicable legal and statutory requirements as a minimum standard, and ensuring prompt and transparent reporting of any non-compliances.
- Engaging stakeholders on their concerns, aspirations and values regarding the development, operation and closure aspects of our projects.
- Minimise the environmental impacts of our operations through the efficient use of natural resources, the reduction of input materials and waste, and the minimisation of dust and emissions of gases.
- Pursuing biodiversity understanding through baseline assessments and regular monitoring to enhance the ability for biodiversity protection.
- Providing information, instruction, training and supervision to enable everyone to understand and comply with their environmental obligations and responsibilities.
- Ensuring managers and supervisors are authorised and accountable for taking remedial action in the event of an environmental non-compliance.
- Not compromising first world standards when exploring, building and operating in developing countries or regions.
- Communicating this policy and environmental performance in an open, transparent and accurate manner.

As a minimum, Northern Star will honour its duty of care obligations under all applicable legislation and will work to standards which at least meet or exceed these legal obligations.

Each and every person at Northern Star has a duty of care to ensure they work in a manner which complies with the Company's environmental policies and procedures, and they act in a manner that reflects our Code of Conduct and STARR Core Values.

The Environment Policy applies to all people employed by Northern Star, its subsidiaries, any contractors or visitors interacting in or with our business.

Northern Star encourages the participation and feedback of everyone in all matters relating to the environment, and commits to provide adequate resources to enable effective implementation of this policy.



CHRIS ROWE
Chairman

24 August 2015



NORTHERN STAR
RESOURCES LIMITED

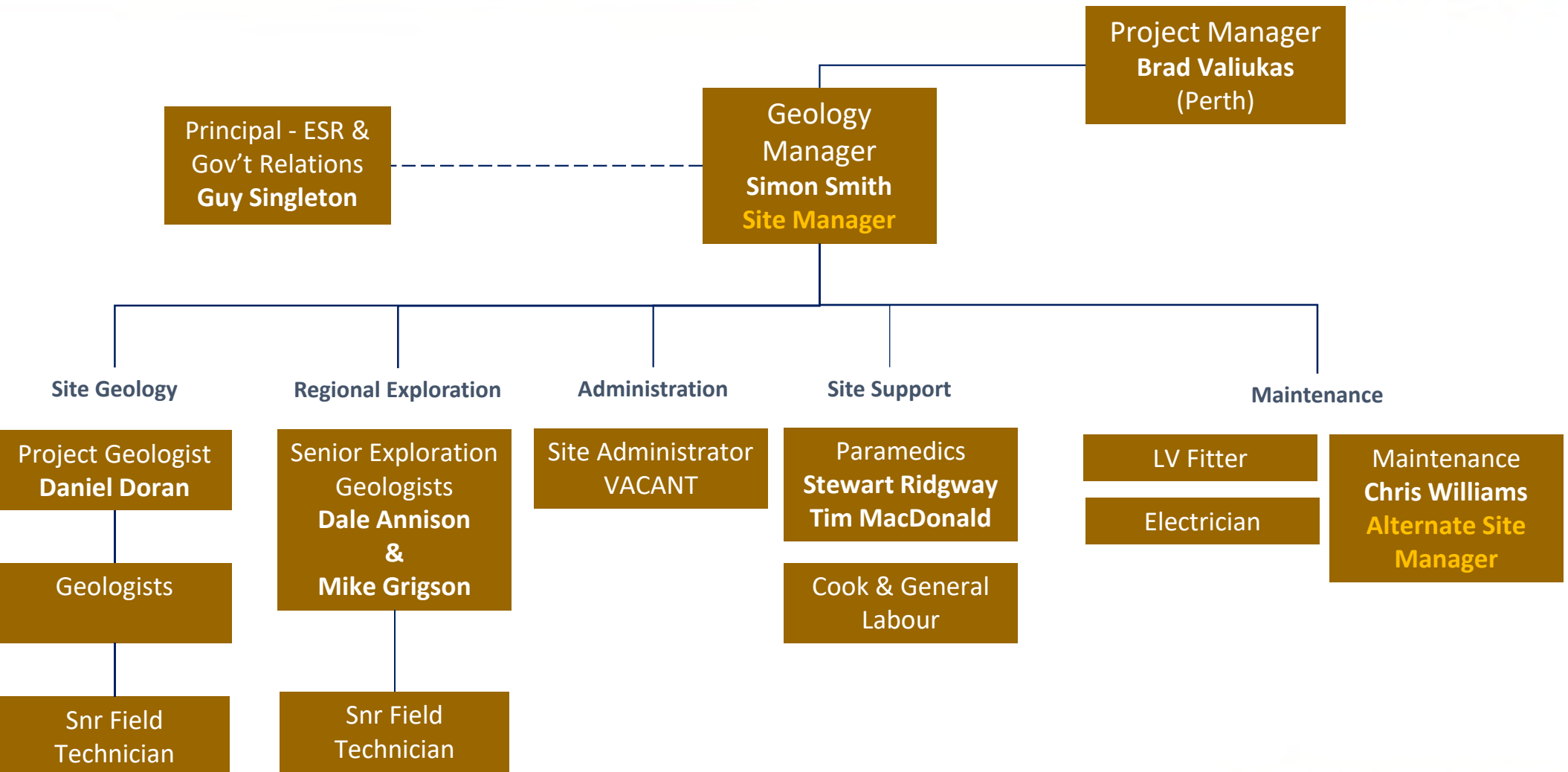
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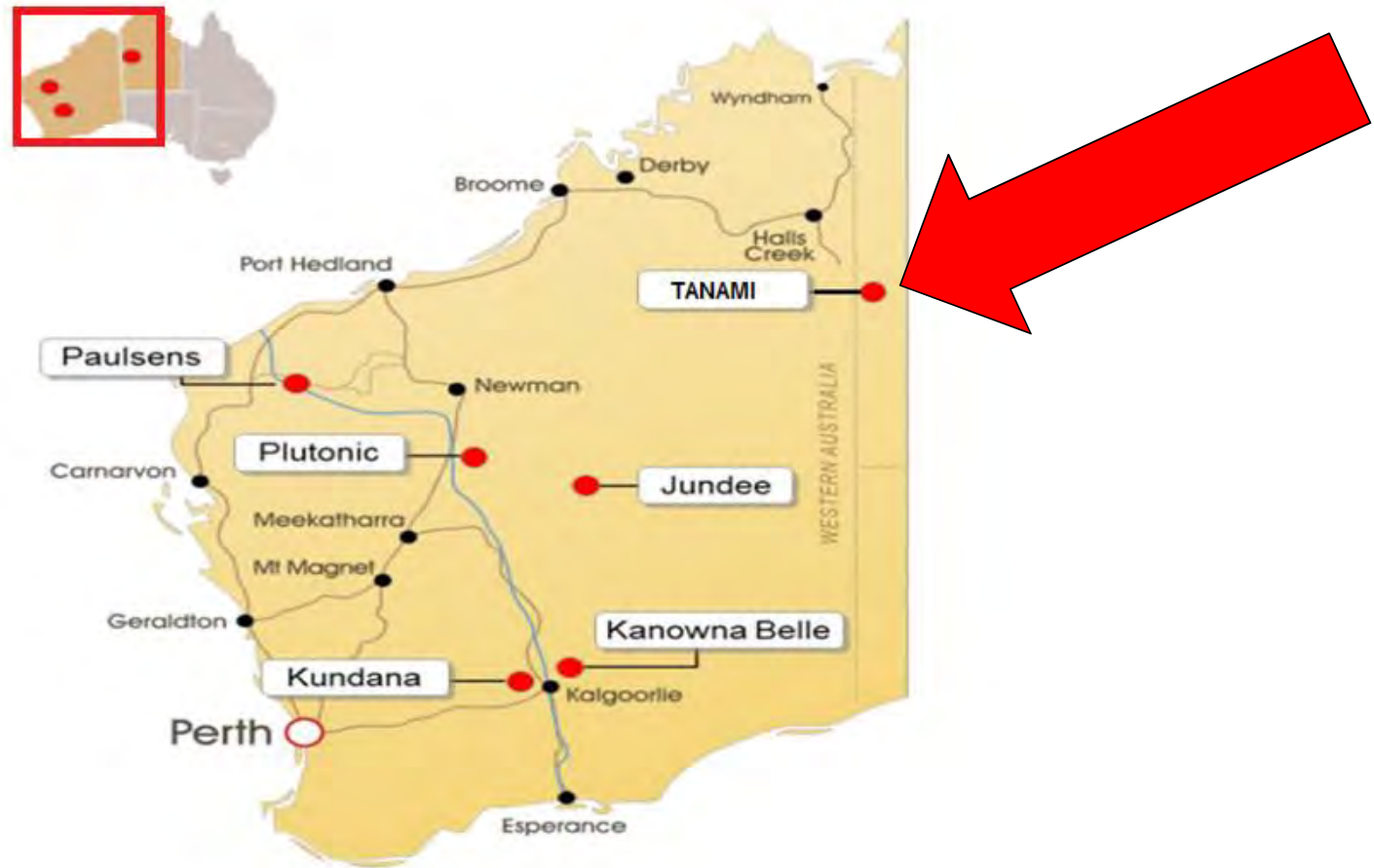
Northern Star Tanami - Site Specific Induction

December 2015

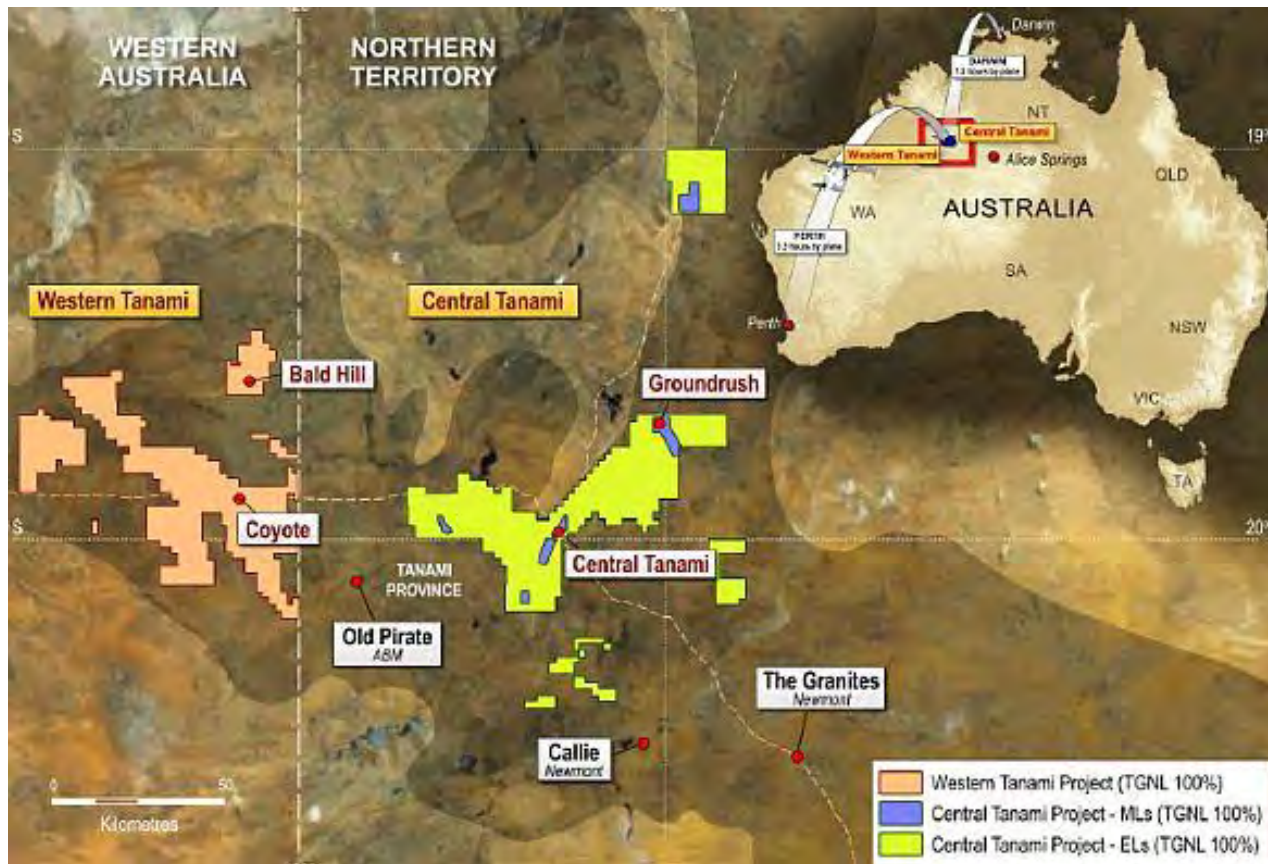
Northern Star Tanami – Organisational Chart



Northern Star Resources Operations



Tanami Gold's location



One of the most remote mine sites in Australia

- ✦ Located 550 km from Alice Springs
- ✦ Yuendumu 260 km to the South East
- ✦ Lajamanu 365 km to the North East

All FIFO personnel fly to site & all freight mobilised along the Tanami Track

Basic Village accommodation and The Processing Plant is in care and maintenance.

Safety is our “Core Value”



Vision

Our vision is to continue to build a safe, quality mining and exploration company focused on creating value for Shareholders.



CORE VALUES

SAFETY

TTEAM WORK

AACCOUNTABILITY

RESPECT

RESULTS

NORTHERN STAR'S MISSION

“Our mission is to generate earning accretive value for our Shareholders through operational effectiveness, growth opportunities and exploration with a prime focus on success to deliver on our targets.”

Cardinal Rules



Every Employee and Contractor working at any Northern Star Operation agrees to **NEVER**:

1. Remove, bypass or modify a safety device without authorisation.
2. Operate equipment unless trained and authorised to do so.
3. Breach the Isolation and Tagging procedure.
4. Breach the Working at Heights procedure.
5. Enter a confined space without following the Confined Space Entry procedure.
6. Report for work under the influence of drugs or alcohol.
7. Enter an open stope or travel under unsupported ground.
8. Handle or fire explosives unless trained and authorised to do so.
9. Remove Company property from site without the proper authorisation.
10. Instruct another person to violate the Cardinal Rules.



Cardinal Rules are established for the protection of People, Assets and the Environment.

Every Employee and Contractor working at Northern Star's Operations is expected to know and adhere to these Cardinal Rules with the understanding that a breach of these rules **will** result in disciplinary action.

Upon discovering a violation, those involved will be immediately stood down from work activities.

Following an investigation, disciplinary action, up to and including termination of employment for employees, or removal from site for contractors, **can and may result from a first time breach** of a Cardinal Rule.

Policies



A copy of the NSR Policies are available on InTuition or from your supervisor.

ENVIRONMENTAL POLICY

Northern Star Resources Limited (Northern Star) has a duty of care and legal obligation to protect the environment, and is committed to managing its activities in an environmentally responsible manner. Through effective management practices, the Company aims to ensure its activities have a minimum impact on the environment.

The Company's success in environmental management is underpinned by its belief that business can and must be conducted without degrading the environment, together with a desire that future generations have the right to enjoy and experience the world as it is today. This overriding commitment to the environment is demonstrated through our environmental management system.

Northern Star will drive our approach to environmental care by:

- Implementing and maintaining an Environmental Management System to identify, assess and minimise environmental risk at all stages of its operations as a fundamental part of its long-term strategy.
- Monitoring our environmental footprint, and setting and measuring annual targets for improved environmental performance.
- Complying with all applicable legal and statutory requirements as a minimum standard, and ensuring prompt and transparent reporting of any non-compliances.
- Engaging stakeholders on their concerns, aspirations and values regarding the development, operation and closure aspects of our projects.
- Minimise the environmental impacts of our operations through the efficient use of natural resources, the reduction of input materials and waste, and the minimisation of dust and emissions of gases.
- Biodiversity understanding through baseline assessments and regular monitoring to enhance the ability for biodiversity protection.
- Providing information, instruction, training and supervision to enable everyone to understand and comply with their environmental obligations and responsibilities.
- Ensuring managers and supervisors are authorised and accountable for taking remedial action in the event of an environmental non-compliance.
- Not compromising first world standards when exploring, building and operating in developing countries or regions.
- Communicating this policy and environmental performance in an open, transparent and accurate manner.

As a minimum, Northern Star will honour its duty of care obligations under all applicable legislation and will work to standards which at least meet or exceed these legal obligations.

Each and every person at Northern Star Resources has a duty of care to ensure they work in a manner which complies with the Company's environmental policies and procedures, and they act in a manner that reflects our STARR Core Values.

The Environment Policy applies to all people employed by Northern Star, its subsidiaries, any contractors or visitors interacting in or with our business.

Northern Star encourages the participation and feedback of everyone in all matters relating to the environment, and commits to provide adequate resources to enable effective implementation of this policy.


CHRIS ROWE
Chairman

17 March 2014

SAFETY AND HEALTH POLICY

Northern Star Resources Limited (Northern Star) will not compromise safety as it is our number one priority. The only acceptable safety outcome is zero harm to anyone working at, living near or visiting our sites or offices, or travelling on company business.

Northern Star is committed to taking all practical steps to providing a safe and healthy working environment thereby safeguarding our people, including contractors and visitors, from injury and work related health problems so that everyone returns home free of injury and in good health.

Northern Star shall drive a safe and healthy working environment by:

- Providing information, instruction, training and supervision to enable everyone to work safely;
- Implementing and maintaining a Safety Management System, which ensures all hazards and risks are identified, evaluated and managed, in order to ensure everyone's safety;
- Ensuring that managers and supervisors understand their responsibilities and are authorised to take remedial action; and
- Working in conjunction with the total workforce to develop and maintain safe systems of work and related procedures which meet Occupational Health and Safety legislative requirements.

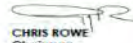
All employees and contractors at Northern Star have a duty of care under occupational health and safety legislation and at common law to ensure the health and safety of themselves and everyone around them by working in a safe manner by complying with all Occupational Health and Safety policies and procedures. All personnel must also act in a manner that reflects our STARR Core Values.

Northern Star has a duty of care to provide a safe workplace so that anyone involved in our business is not subject to reasonably foreseeable hazards.

As a minimum, everyone is required to wear Personal Protective Equipment (PPE) as specified by site management and come to work fit in accordance with the Fitness For Work Policy.

The Safety and Health Policy applies to all people employed by Northern Star, its subsidiaries, any contractors or visitors interacting in or with our business.

Northern Star encourages the participation and feedback of everyone in all matters relating to safety, and commits to providing adequate resources and communication to enable the effective implementation of this policy.


CHRIS ROWE
Chairman

17 March 2014

STAKEHOLDER POLICY

Northern Star Resources Limited (Northern Star) operates its business built on the belief that it must be guided by a purpose beyond profit, and that the support and endorsement of its activities by the communities in which it operates is fundamental to the long-term success of its business. Northern Star thinks of "purpose beyond profit" in terms of how it operates in our work regions, and the contribution it makes to a better future for the communities in which it operates.

Northern Star values its social licence to operate and actively encourages open and reciprocal dialogue with local communities and key stakeholders. The Company regards its reputation amongst the communities in which it operates as a strategic advantage, and seeks to ensure that local communities benefit from its presence.

Northern Star shall drive our relationships with local communities and key stakeholders by:

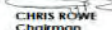
- Developing, implementing and maintaining management systems to identify, assess and manage impacts on the community at all stages of its operations as a fundamental part of its long-term strategy.
- Recognising that communities are comprised of internal and external stakeholders.
- Establishing mutually acceptable methods of communication, consultation and participation processes to create enduring and beneficial relationships built on shared respect and trust.
- Engaging in open and honest dialogue with local communities over their concerns about the impacts of the Company's mining activities in their locality, and incorporating these concerns into studies and business plans.
- Encouraging consultation and provide opportunities for local communities to share in the benefits which flow from mining activities in their regions, including local employment and business opportunities.
- Valuing diversity through the recognition and respect of the different local cultures, values, traditions and customs, and by providing our workforce with location specific cross cultural training, and enforcing the adherence to the Company's core values.
- Incorporating sustainable development initiatives in business plans to ensure that the social and economic benefits obtained by communities are safeguarded in the long-term.
- Holding managers and supervisors accountable for their responsibilities to local communities at all stages of the Company's activities and operations.
- Monitoring, continuously improving and publicly reporting our stakeholder relations performance.

As a minimum, Northern Star will honour its obligations under all applicable legislation and Human Rights Agreements, and provide sound guidelines and processes to respect and actively engage our local communities. The Company will not bypass its commitment to engage local communities and it will proactively seek to enact this policy.

All employees and contractors at Northern Star have a duty to ensure that they act in a manner that reflects our STARR Core Values, and that at all times they honour and respect our commitment to our stakeholders and the communities in which the Company operates.

The Stakeholder Policy applies to all people employed by Northern Star, its subsidiaries, any contractors or visitors interacting in or with our business.

Northern Star encourages the participation and feedback of everyone in all matters relating to stakeholder or community issues, and commits to provide adequate resources to enable effective implementation of this policy.


CHRIS ROWE
Chairman

17 March 2014

STaRR Ratings



- ✿ STaRR stands for “**Safety, Teamwork and Risk Reduction**”
- ✿ Each workgroup will rate its previous shift as a part of the daily pre-shift meeting from 1-5 star days.
- ✿ 1 Star is given when the crew has a poor safety day
- ✿ 5 stars are given if the great day on safety and a significant act of safety occurred, such as a “**significant**” hazard being identified and rectified. Someone is witnessed to be going above and beyond to make our site safe.
- ✿ The aim of the **STaRR Rating System** is to:
 - ✿ *Encourage discussions about safety*
 - ✿ *Focus on safe acts*
 - ✿ *Identify positive behaviour – (Jobs Well Done)*

Village Accommodation

General Village Information



Rooms:

- No smoking in rooms or breezeways
- Are to be kept neat and tidy.
- Janitorial supplies (Brooms, dustpans, mops and cleaning supplies) are available in all laundries – please replace after using them
- All rubbish shall be put in bins, food or drinks not to be left out in rooms.
- Food scraps should only be placed in bins in the kitchens and not the general rubbish bins around site. This will help prevent attracting dingos.
- Your room will be provided with 2 sets of linen and towels only upon arrival.
- It is your responsibility to wash these and change your own linen.
- If you require fresh linen or towels for some reason other than needing to do your laundry please enquire with administration.
- If checking out of the Village please leave your room clean, including the toilet and bathroom.

Noise in village:

There is a noise curfew between the hours of:

(Only exception is maintenance doing emergency works but are required to keep noise to a minimum were possible).

- **09:00 – 15:00 (9am to 3pm)**
- **21:00 - 04:00 (9pm – 4am)**

Breakfast: 5am (6:30NT)

Self Serve: Cereal, toast etc. provided in dry mess.

Lunch:

Self Serve: Lunch provisions are available in Admin building

Dinner: 6pm (7:30 NT)

Meal provided by staff member rostered to cook.

Coffee/Tea making facilities located in Dry Mess and Admin Building

Village Information – Dry Mess



- **Clean clothes at all times**

- Clean work clothes allowed
- No dirty work boots
- No singlets, no gym clothes to be worn

- **Food preparation/service area**

- Wash your hands and use the hand sanitizer provided before serving yourself.
- Only use the serving implements provided for each item and only for that item as there may be people with allergies on site.
- If you spill something on floor, tables, benches it is your responsibility to clean it up.
- Replace sauces and condiments in the fridge when you have finished.
- Be considerate of others and clean up after yourself.

Northern Star Tanami is a dry site.

- ✱ Central Tanami Project is located on Aboriginal freehold land that has been declared dry by the NT Liquor Commission and traditional owners.
- ✱ Alcohol must not be consumed on or brought onto this land.
- ✱ There are very severe penalties under the Liquor Act for breach of these provisions.
- ✱ Breach of these rules will result in immediate disciplinary action up to and including termination of employment and/or withdrawal of accommodation.

Village Accommodation cont.



Pool:

- No food or glass allowed in pool area
- No running, bombing /skylarking
- Open between 05:00 – 21.00
- Wear sunscreen and be wary of being out in sun too long
- There is no lifeguard on duty

Gym

- Take your own towel
- Please be considerate and ensure that all equipment is put away and wiped down after use
- Turn off the lights at night when you have finished
- If working out without a spotter don't take silly risks lifting too much weight

Wi-Fi

- Wi-Fi will be available to all camp
- Please be aware that the bandwidth is limited so please restrict usage to a bare minimum.
- **Please turn off all automatic application and phone updates**
- Internet usage is monitored as per the NSR IT Policy (In Dry Mess)

Maintenance



If there is a problem or maintenance requirement in the village please request to have it amended by noting the problem in the “village maintenance book”, located outside the village office.

- ✴ *Air-conditioner not working*
- ✴ *Tap dripping – Water is precious so let us know.*
- ✴ *Battery needs replacing in the smoke alarm*
- ✴ *Lock on door not working*
- ✴ *Trees scraping on outside walls of room etc....*

Drinking Water



Drinking water across site is marked - “**POTABLE WATER**”

Water is available at various locations around site and in the village including:

✴ *All rooms*

Potable ice is available at the:

✴ *Wet Mess only*

Water testing is conducted monthly

The water at the Core Shed is “**RAW WATER**” and not to be drunk at any time.

Note:

Water is precious at Central Tanami, the RO plant is only small so make sure you do the following:

- Report leaks of any kind
- Limit washing i.e. don't wash every day as this uses lots of water.
- Don't take too long in the shower – minimise your usage please

POTABLE
DRINKING
WATER



General Safety



Emergency Muster Locations



- In Event of an fire alarm or evacuation alarm please proceed to the Emergency Muster Locations Indicated
- Report to your work group and stay in attendance until your name has been checked off and the all clear given.

Note: Testing of Camp Evacuation Siren is every Sunday's between 05:30 – 06:00

Emergency Numbers



At work or in Camp : 08 6211 2662 or extension 2662

This is an all hours number



Two Way Radio – Digital Chn “Central Admin” for Site and Digital Chn “Groundrush” at Groundrush— call “*Medic*”

Satellite Phone - 0420 912 244 (Ambo)

A/H Emergency - Rooms C-22 & C-24

*(Door of Paramedic on swing is marked “**IN**”)*

If unable to contact Site Medic:

- 1. Contact Simon Smith – C Block Room 18 – Ext 2666, alternatively**
- 2. Contact Chris Williams – G Block Room 30 – Office Ext 2656**

Evacuation procedures



In an emergency, say “**Emergency Emergency Emergency**”

State: your name, nature of call, how many people involved – stay with the incident (if say) and render assistance

- **Upon hearing the Emergency notification messages you are to follow instructions given**

Emergency Assembly Area's: (EAA)

Village:

Tennis Court – go to box if first person their - grab the evacuation list and start ticking off names and advise the Emergency Response Coordinator (ERC) if anyone is missing on Digital Channel “Central Admin or UHF 40”

Groundrush:

Attend the Drill Pad EAA and contact the Medic if anyone is missing on emergency channel in Emergency Hut – **Chn “Groundrush” only**

Site Admin & Core Shed:

Attend EAA at Eastern end of core shed and have names marked off through supervisor.

First aid



First Aid facilities are located;

- ✱ *Medical Centre*
- ✱ *Site Administration building*

First Aid kits are located;

- ✱ *Behind the seat of every light vehicle*
- ✱ *Dry Mess*
- ✱ *Kitchen*
- ✱ *Workshop*
- ✱ *Administration Office*

Trauma Kits are located;

- ✱ *In the drill rig support vehicle*
- ✱ *Drill Rig Humpies and Caravans*

Defibrillators are located;

- ✱ *Dry Mess*
- ✱ *Administration Office*



Duty of Care - Duties of a PCBU (Person conducting a business undertaking)



Primary Duty of Care (section 19)

The WHS (NUL) Act requires all PCBUs to ensure, so far as is reasonably practicable, the health and safety of:

- workers engaged, or caused to be engaged by the person, and*
- workers whose activities in carrying out the work are influenced or directed by the person, while workers are at work in the business or undertaking.*

This primary duty of care requires duty holders to ensure health and safety, so far as is reasonably practicable, by eliminating risks to health and safety. If this is not reasonably practicable, risks must be minimised so far as is reasonably practicable.

Duty of Care - Duty of Workers (section 28) WHS ACT



Duty of Workers (section 28)

While at work, workers must take reasonable care for their own health and safety and that of others who may be affected by their actions or omissions. They must also:

- ✦ *Comply, so far as they are reasonably able, with any reasonable instruction given by the PCBU to allow the PCBU to comply with WHS laws; and*
- ✦ *Cooperate with any reasonable policy or procedure of the PCBU relating to health or safety at the workplace that has been notified to workers.*

Duties of Other Persons at the Workplace (section 29)

Similar duties apply to other persons at a workplace. Any person at a workplace, including customers and visitors, must take reasonable care of their own health and safety and that of others who may be affected by their actions or omissions. They must also comply, so far as they are reasonably able, with any reasonable instruction that is given by the PCBU to comply with WHS laws.

WORK HEALTH AND SAFETY (NATIONAL UNIFORM LEGISLATION) ACT

No Go Zones



Areas that personnel who are not authorized should not enter:

- ✱ Process Plant (Plant in Care & Maintenance at present)
- ✱ Workshop – **permission gained from maintenance personnel only**
- ✱ Power Station, Generators and Distribution Boards
- ✱ Airstrip & Aerodrome Buildings
- ✱ Kitchen – permission gained from kitchen staff
- ✱ Pits – unless authorised

If you are found in these areas without authorisation, disciplinary action may be taken

Before Commencing the Job



What is needed to complete your job safely?

- ✿ **Understand the scope of work** - Attend your pre-shift meeting
- ✿ **Field Level Risk Assessment** - Is there a potential for harm during a task or activity ?
- ✿ **PPE** – Have you got the correct protection for the job
- ✿ **'Authority to Work'** Has the task been planned or will it stop a key process?
- ✿ **Permits** is a 'Confined Space' or a 'Hot Work' or any other permit required?
- ✿ **Inspection** what's happening in the area you are working in?
- ✿ **Hazards** - Always check above & below for before you begin the job.
- ✿ **Danger tag & lock** are they on the designated isolation point and has it been tested?
- ✿ **Speak up** - if you are unsure

Remember; This is an isolated location with limited medical support.

Always pause and think about the job you are about to do and how you are going to do it. Don't cut corners and don't take risks.

Personal Protective Equipment (PPE)



Mandatory minimum requirements for
the Surface Active Mining Areas

Hard Helmet

(AS/NZS 1801)

Safety Glasses

(AS/NZS1337)

High visibility long sleeve shirt

(With reflective tape).

Full length pants

Steel-capped Safety Boots

Gloves fit for purpose

(Carried at all times)



**These signs inform you of the additional
mandatory PPE requirements for that area**

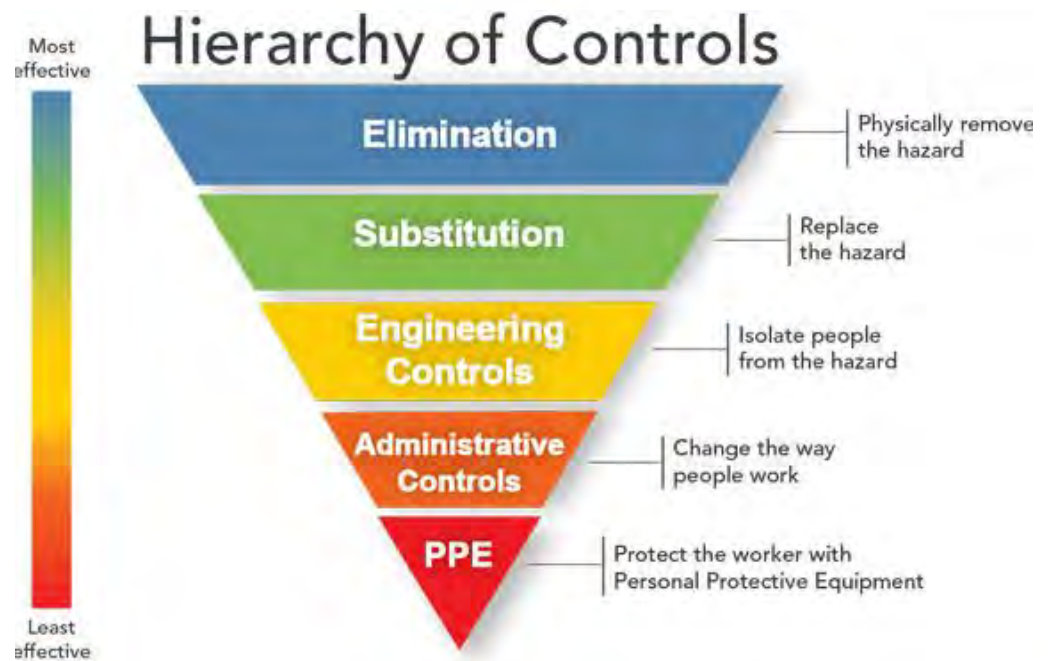


The risk management process



Identify hazards

find out what could cause harm to you and others



Our Own Safety



We don't compromise **our own** safety by ensuring that we do the following:

- ✦ *Adhere to procedures, SOP's and JHAs.*
- ✦ *Use FLRA/SLAM and JHAs to assess our tasks.*
- ✦ *Observe our work environment.*
 - ✦ *Being aware of the hazards and controls for every task that you undertake.*
 - ✦ *Fixing the hazards that you identify.*
 - ✦ *Report the hazards that you can not fix.*
- ✦ *Use the correct PPE for the job.*
- ✦ *Perform Task Observations – i.e. seeing what others do well and applying it to yourself.*

We don't compromise **our work mates** safety by ensuring that we do the following :

- ✦ *Work safely – lead by example*
- ✦ *By caring enough to challenge another person when they are doing something that you consider to be unsafe.*
- ✦ *Fix hazards that you find in the work place.*
- ✦ *Communicate hazards that remain in the work place.*

Workplace Communication



Communication between management and the frontline workforce is an important part of our safety system.

We want to hear your thoughts on how we can improve safety, if you have an idea, speak up.

There are many opportunities for you to raise concerns or improvement ideas, these include;

- ✦ *Daily pre-start meetings*
- ✦ *Weekly Safety meetings*
- ✦ *On the job with your workmates*
- ✦ *During task observations with management*



Your “Duty of Care” is to report to work in a fit state.

This means not under the effects or influence of:

ALCOHOL
DEHYDRATION

DISTRESS
DRUGS
FATIGUE

ILLNESS
SOCIAL PROBLEMS

- Report Pre-existing Medical Conditions or medications to your manager.
- NSR requires medical clearance from your doctor prior to coming or returning to site.
- Alcohol Breath Tests may be conducted daily to monitor your Fit for Work state.
- All Operational Areas Breath Alcohol Limit is 0.000%
- Random drug screening tests may be conducted, a confirmed Non-negative Drug Screen will result in disciplinary action.
- Alcohol and/or Drug tests will be conducted after any accident or incident.

Unacceptable Behaviours



Unacceptable Behaviors may be;

- ✳ intended or unintended;
- ✳ physical, verbal, written or indirect, and
- ✳ behaviour that a reasonable person, having regard to all circumstances would feel personally threatened, intimidated, offended, uneasy, embarrassed or humiliated by.

Unacceptable behaviors include;

Discrimination:

It is illegal to discriminate on the grounds of sex, marital status, pregnancy, race, religion, political convictions or disabilities.

Sexual Harassment:

Sexual harassment involves an “unwelcome sexual advance or an unwelcome request for sexual favours or other unwelcome conduct of a sexual nature”

Bullying:

Bullying is a breach of your duty of care



Details of what to do if you feel you have been subjected to or have witnessed unacceptable behaviours are available in The NSR Equal Opportunity Employment Policy (NSR-HR-005-POL) available on the intranet. Alternatively you may speak to your supervisor, manager or NSR HR representatives.

Our Responsibilities



Everyone

- ✦ We are all responsible and accountable for our own actions.
- ✦ We are responsible for knowing and complying with the laws and the Procedures that relate to our duties in our work and while living in the Village.
- ✦ We each have a responsibility to report our concerns and all perceived breaches of our Procedures.
- ✦ All concerns are taken seriously and investigated.
- ✦ Action will be taken where the Procedures have been breached. This can include disciplinary action up to and including termination for a first time breach for employees, or removal from site for contract employees (See Cardinal Rules). Serious breaches of a criminal nature may also be reported to the police.

Managers/Supervisors

- ✦ In addition, managers/Supervisors are expected to lead by example. Managers/Supervisors must communicate the Policies and Procedures to their direct reports and help them understand the requirements both on site and in the village.

Our Responsibilities



Northern Star Resources Ltd will not tolerate illegal activity on any of our operations, this includes the lease, site and accommodation village. This applies to all persons (employees and contractors equally).

The following are examples of activities against Company policy and the law which will not be tolerated:

- ✦ *Consumption and storage of alcohol at an operations or technical site*
- ✦ *Unlawful manufacture, distribution, dispensation, possession, transfer, sale, purchase, or usage of a controlled/illegal substance*
- ✦ *Driving vehicles or operating Company equipment while under the influence of alcohol or controlled/illegal substances.*
- ✦ *Illegal gambling or betting*
- ✦ *Possession of weapons*

Chemical Management



An SDS is a document which describes

- ✦ *Whether the chemical is classified as hazardous – red, amber or green*
- ✦ *Ingredients*
- ✦ *First aid advice*
- ✦ *Risk controls*
- ✦ *Emergency Information*



SDS's are available for each chemical used, mixed or produced onsite.
The SDS is readily accessible to all employees



High risk Chemicals are stored onsite these include:

Sodium Cyanide, Hydrochloric Acid, Sodium Hydroxide, Diesel, Lime, Silver Nitrate, Degreasing Agents.

Always refer to the Safety Data Sheet prior to working with chemicals or solvents

Dehydration



When you're dehydrated, your body doesn't have enough fluid to work properly. An **average** person on an **average** day needs about 2.5L of water. But if you're out in the hot sun, you'll need to raise that level of water/electrolytes intake in relation to the physical activity or heat humidity. Most healthy bodies are very good at regulating water, don't forget everyone's absorption rate is different.

Common Symptoms of Dehydration:

- ☑ Being thirsty
- ☑ Dark-coloured urine
- ☑ High body temperature
- ☑ Headache
- ☑ Muscle spasms or cramps
- ☑ Urinating less often than usual
- ☑ Dry skin
- ☑ Dizziness and fainting
- ☑ Irritability
- ☑ Rapid heartbeat

Treatment:

Move the individual/s into the shade and cool the body with cool water, have the individual/s drink cool water (not ice water), remove any equipment and excess clothing and lie down, raising his or her legs about 20 – 30cms of the ground (supported), if available wrap ice/icepacks in a wet rag/towel and put under armpits and/or in groin area. Seek medical help

Prevention:

If you think you're dehydrated, drink small amounts of water over a period of time. Taking too much all at once can overload your stomach and make you throw up. For people exercising in the heat and losing a lot of minerals in sweat, sports drinks can be helpful. Avoid any drinks that have caffeine.

“Water Intoxication” (Hyponatremia)

Hyponatremia is a condition in which the amount of sodium (salt) in the blood is lower than normal

Common Symptoms of Water Intoxication: (Hyponatremia)

- | | | |
|---|---|--|
| <input checked="" type="checkbox"/> Confusion | <input checked="" type="checkbox"/> Convulsions | <input checked="" type="checkbox"/> Fatigue |
| <input checked="" type="checkbox"/> Headache | <input checked="" type="checkbox"/> Irritability | <input checked="" type="checkbox"/> Loss of appetite |
| <input checked="" type="checkbox"/> Muscle spasms or cramps | <input checked="" type="checkbox"/> Muscle weakness | <input checked="" type="checkbox"/> Nausea |
| <input checked="" type="checkbox"/> Restlessness | <input checked="" type="checkbox"/> Vomiting | |

Treatment:

- Water restriction (**controlled by the Site Medic – not the individual**)
- Medication to relieve symptoms










Medication to relieve symptoms

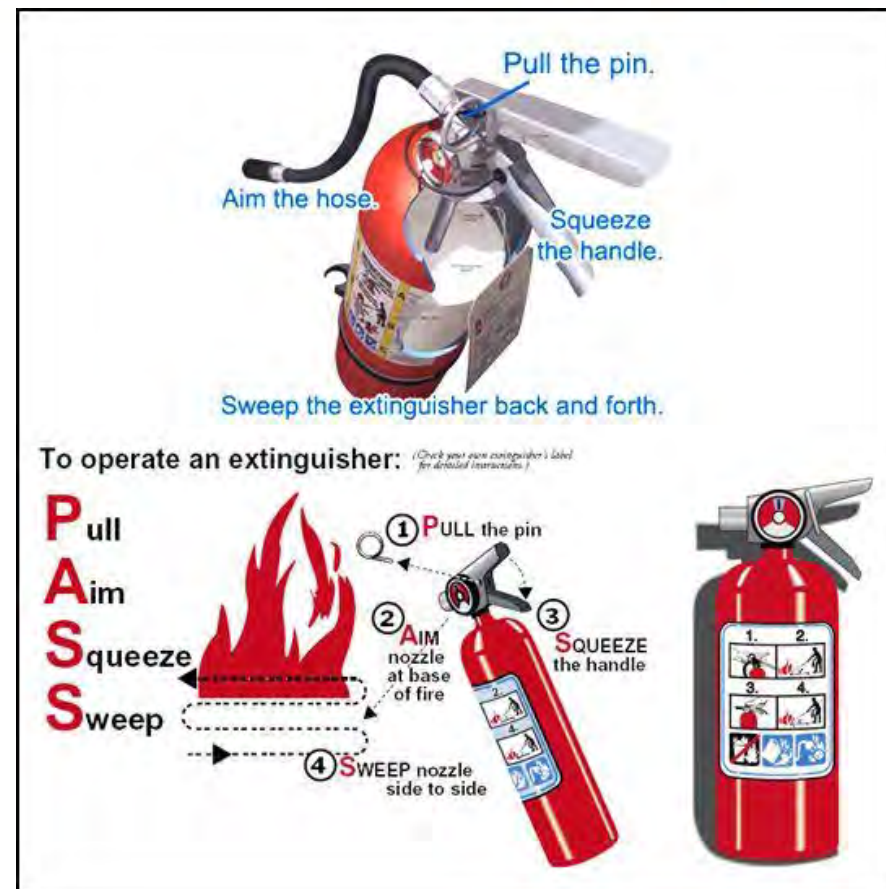
Fluids through a vein (IV) with electrolytes.

Prevention:

If you play sports, or do hard manual labour i.e. doing a rod pull, doing a cable or vent bag run Drink fluids that contain electrolytes. Drinking only water while you are active can lead to acute hyponatremia. Don't drink a lot of water at one time, sip throughout the day, drinking lots of water at one time won't give the kidneys time to filter water through effectively and may cause cells to absorb more water than required. (see attached video)

Fire Extinguishers

ID sign	Typical appearance	Extinguisher Type cylinder contains	Class A Wood, paper, textiles etc, normal combustibles	Class B Flammable liquids, petrol, paints	Class E Electrical fires	Class F Cooking oil, animal fats & vegetable oils
		Dry Chemical Powder	YES	YES	YES	NO
		Co2 Carbon Dioxide	NO	YES	YES	NO
		Water	YES	NO	NO	NO
		Foam	YES	YES	NO	NO
		Wet Chemical	YES	NO	NO	YES



The majority of fire extinguishers at Tanami are Dry Powder type and are suitable for most situations
Wet Chemical extinguisher is located in the kitchen for use in the event of a cooking oil fire

Bush Fire

- Fire is a natural and regular part of the Tanami Environment but can pose hazards to the safety of personnel, infrastructure and operations.
- Annual Fuel load hazard reduction burning is conducted in consultation and with the assistance of the traditional owners and the CLC Rangers following the wet season.
- Bush fires most commonly occur at the start of the wet season when electrical storms are common and the vegetation is very dry.
- Bush fires in the Tanami tend to be wide ranging and may persists for days.
- Strong winds can move fires rapidly and unpredictably
- If you see bush fire in the area then you should notify your supervisor.
- The fire will be monitored for potential impact to people and the operation and appropriate actions taken to minimise or eliminate any risk. This may include evacuation.



**Fire in demountable accommodation blocks can and will grow and spread very rapidly.
The Materials in the buildings and furnishings create a toxic and flammable vapour.**

* Help Prevent Fires and keep everyone safe by;

- * *DO NOT SMOKE IN ROOMS OR BREEZEWAYS*
- * *ENSURE ALL CIGARETTE BUTTS ARE PROPOERLY EXTINGUISHED AND DISPOSED OF IN THE SMOKING BINS PROVIDED*
- * *ENSURE THAT ALL PERSONAL ELECTRICAL DEVICES ARE TAGGED AND TESTED BEFORE USING ON SITE*
- * *REPORT ANY ELECTRICAL FAULTS TO YOUR SUPERCISOR IMMEDIATELY*

- * In The event of a fire
- * Raise the Alarm and evacuate the area
- * If small attempt to put the fire out using the fire extinguishers.
- * If Fire is too large or spreading too quickly do not attempt to put it out.
- * Evacuate the area and wait for assistance and emergency response.

Fire extinguishers are located throughout the camp, offices, workshops all light vehicles and active work areas

Lightning



- ⌘ Lightning is a significant risk in the Tanami.
- ⌘ There is no lightning detection or monitoring system:
- ⌘ Use 30:30 Rule
- ⌘ Keep a constant lookout for thunderstorm clouds in the region. They can develop in as little as 15 minutes.
- ⌘ If thunder is heard and intra-cloud and/or cloud to ground lightning can be seen, you are already in a higher risk situation.

FLASH BANG RECKONING

- ⌘ Once thunder can be heard, keep estimating the distance to the lightning activity by using the Flash to Bang reckoning method
- ⌘ Every 3 seconds of delay between a flash to thunder, equates to a distance of 1 kilometre.
- ⌘ Where 30 second flash-to-thunder time interval, the lightning activity is about 10 km away.



Lightning



30:30 RULE

- ✱ When you see lightning, count the time until you hear the associated thunder, and if this time delay is **30** seconds or less, **go immediately to a safe location.**
- ✱ If you cannot see the lightning, just hearing the thunder means you are **most likely already within striking range**, and it is time to **seek whatever appropriate shelter is available.**
- ✱ After the storm conditions have apparently dissipated or moved on, wait a further 30 minutes, after hearing the last thunder before leaving the safe area location. Should thunder be heard within this period, recount from the last thunder heard.

HIGH RISK LOCATIONS IN ELECTRICAL STORM

- **PROCESS PLANT**
- **DRILL RIGS**
- **ROM OR WASTE DUMPS** - Hilltops and ridges
- Flammable hydrocarbons and accelerants
- Standing near a Lightning protection down-conductor, mast, or earthing system.
- Communications towers, and tall metallic masts -
- Any use of fixed line telephones, especially corded headsets.
- Small, unprotected buildings, barns, sheds
- Areas on tops of buildings
- Open fields, car parks
- Swimming pools, lakes
- Areas near wire fences, clothes lines, overhead wires, pipelines
- Standing beneath isolated trees, or touching or standing near any tree
- Riding/driving tractors or other open roof machinery
- Contact with metal objects and electrical appliances
- Tents
- Showering

SAFER

- Inside a metal-skinned car, other vehicle.
- Inside a substantial (normal headroom) metal-clad building
- Inside a large building, keeping away from windows and any appliances connected to outside electrical conductors

- ✱ **What to do if the safest action is not possible**

If the thunderstorm is above you (flash-to-thunder time < 5 seconds) and you are not in a safe location, then all you can do is minimise the risk of being struck, or affected by the indirect effects of lightning.

You should then try to:

- ✱ Seek a depressed area; avoid high places
- ✱ Keep away from large isolated trees; (however, some protection is afforded in a forest if care is taken not to touch or stand too close to any particular tree)
- ✱ If in a group, stand at least 3 metres apart
- ✱ If isolated in an exposed area and your hair stands on end then **lightning is about to strike.**
- ✱ **Assume a crouched position with your feet together, or sit with your feet tucked in close to your body.**

When Electrical storms are in the vicinity all work in High Risk areas will cease immediately until given the all clear to return to work by your supervisor.

HIGH RISK AREAS AND ACTIVITIES THAT MUST CEASE IN THE EVENT OF LIGHTNING WITHIN 10KM (30 Sec) INCLUDE:








- All activity on the Process Plant
- Drilling and Drill Rigs
- Any access to ROM and Waste Dumps
- Work on or in vicinity of Powerlines and Pipelines
- Operating Open Cab Machinery
- All Electrical Works
- Refuelling
- Fuel Farm and Hydrocarbon storage areas.
- Wash Bay

Incident reporting



All incidents must be reported as soon as possible and before the end of the shift to your supervisor.

Incidents include;

-  *All injuries*
-  *Property damage*
-  *Hazards*
-  *Environmental (Fauna fatality, Spill, other)*
-  *Social responsibility incident*
-  *Near Miss*
-  *Security*

Environment & Social Responsibility



Waste Management

The standard you walk past is the standard you accept.



- * All Food scraps are to be placed in the Kitchen and Admin Kitchen bins ONLY. Putrescible rubbish is burnt as soon as it is taken to the burn pit.
- * Do not place food scraps or empty plastic food containers in bins, not all bins are cleared regularly and will smell and attract dingoes.
- * All batteries are to be placed in the marked battery bins for off site disposals (Admin Building)
- * E-waste and electronics is not to be disposed of in general rubbish.
- * Printer Toner, cartridges etc. should be placed only in the Blue toner bin outside the admin office.
- * Hydrocarbon waste (filters, rags etc.) are to be disposed of in the red and blue hydrocarbon bins located near the workshop.
- * Waste Oil is transferred to 44gl drums for disposal off site or in a turbo burner.
- * Contractors are required to remove hydrocarbon waste (Oil, rags, filters, Grease and Mud containers) from site.
- * Gates at tip are to be kept shut at all times to prevent windblown dispersal of rubbish and discourage dingoes.

If you see rubbish, scraps or junk lying around, don't just walk past it – pick it up.



Waste Management



It is important that any Aluminium cans and drink containers are disposed off correctly and not left lying around.

Small animals, lizards and snakes will get there heads stuck trying to drink the residue.



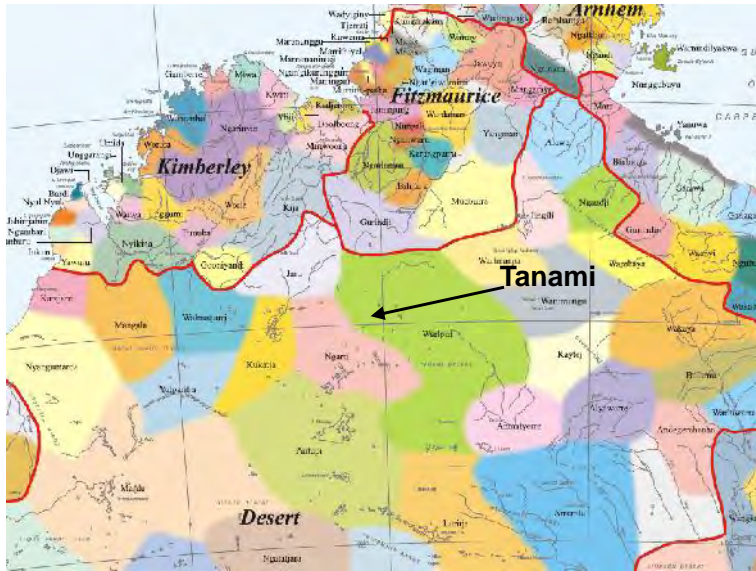
Dispose of food scraps and food containers only in the Kitchen bins.

Food waste in general bins will attract dingo's and cause a safety hazard around site.

They will open the bins...

Tanami Social Responsibility Overview

Northern Star Resources acknowledges the Traditional Owners of the Tanami region, the Warlpiri people*, and we pay our respects to their Elders, past, present and future.



**the Company acknowledges multiple groups other than Warlpiri represent the Traditional Owners of the Tanami Region*

Northern Territory/Tanami Facts:

- 30% of the population identify as Aboriginal (64,000 of 227,900 according to 2009 ABS data)
- Unlike the State of Western Australia, the Northern Territory is governed by the Aboriginal Land Rights Act 1976
- This allows Aboriginal people to gain 'freehold' tenure on their traditional land in the NT
- Our Tanami Operations are located on Aboriginal freehold land, and we must gain permission from Traditional Owners to access and operate our mine, by agreeing to a range of conditions
- These conditions relate to respecting the values of Traditional Owners, delivering benefits back to communities in return for the opportunity to extract mineral wealth, and committing to leave the land in an environmentally sound state, post mining.

Central Land Council (CLC):

- The CLC is the representative body for the Tanami regions Traditional Owners
- All company communication must go through the CLC
- The CLC organises regular mine liaison meetings where we can meet with Traditional Owners and discuss agreements, heritage management, local employment, community investment

Heritage Management:

- Our Tanami Operations are home to many important heritage sites which are protected under traditional lore and western law (*Aboriginal Land Act, NT Aboriginal Sacred Sites Act, Aboriginal and Torres Strait Islander Heritage Protection Act etc.*).
- Not all sites may seem of value (birth sites, camps, water holes), as Aboriginal people hold different values
- Northern Star Resources Limited expects all employees and contractors to follow the conditions of its Heritage Management Standard, Heritage Management Plan and subsequent site procedures
- Failure to do so will result in disciplinary action, and may be deemed a chargeable offence under the above legislation

Stakeholder policy



NSR believes Mining can be a positive force for social and economic development, whilst retaining our social responsibility to develop constructive relationships with all our stakeholders.

It's important that we respect the rights of all stakeholders with whom we interact as well as those who host our mining operations, and that we do so in a transparent, culturally appropriate, and gender inclusive manner.

We hold all employees accountable for their responsibilities to stakeholders at all stages of the Company's activities and operations.

NSR supports fostering a stable, healthy and safe environment in which to live and work by addressing grievances in a strategic, fair, timely and consistent manner.

Social responsibility



NSR understands that stakeholders are an integral part of our business, and it is our goal to help create shared value for the communities in which we operate.

To achieve this, we are committed to building meaningful partnerships with our local communities and other stakeholders, especially the Traditional Owners whose land we operate on.

Such partnerships are based on both mutual trust and shared-value, and are consistent with both our company values and stakeholder aspiration.

Relationships with indigenous people commitment



NSR respects the relationship Australia's Aboriginal and Torres Strait Islander peoples have with their traditional country and acknowledges their entitlement to have this properly considered in its ongoing activities.

We acknowledge that Indigenous peoples place value on both tangible and intangible assets, and that we should respect this cultural trait.

We are committed to providing training opportunities and employment to Indigenous people within the local community as well as participating culturally sensitive training and education for our employees.

NSR aims to conduct its operations in a way that fosters the support of the Indigenous communities.

All employees and contractors are expected to uphold these values at all times.

Cultural heritage management



There are a number of exclusion and restricted zones located on and around NST's Mining and Exploration Leases.

These areas are not marked by signs or on maps for cultural reasons, some are very close to and overlap roads and tracks even on the mining lease.

To prevent unauthorized access or disturbance you must:

- Stay on existing roads and tracks.
- Not clear or disturb any areas without an authorized ground disturbance permit (even on the mining leases).
- Ground disturbance permits must be authorized by the Geology Manager or delegate.
- Exploration work must comply with CLC Access Agreements and MMP conditions.

At all times, all our business activities will comply with the requirements of relevant legislation:

- ✧ *Native Title Act (C) 1993*
- ✧ *Aboriginal Land Rights Act (NT) 1976*

If Aboriginal artifacts are located during the course of work, please cease work and inform your Supervisor.



Legal Penalties



In the NT, penalties for extreme negligence or environmental destruction are significant

- ✦ *Individuals: \$550,000 and/or 5 years in jail*
- ✦ *Companies (owners, directors): \$5.5 million*

Internal Northern Star Resources penalties for breaches of environmental legislation or requirements include:

- ✦ *Termination of employment*
- ✦ *Withdrawal of accommodation (effective termination)*
- ✦ *Loss of contract*



You must:

- ✦ Drive on designated roads
- ✦ Be aware of and slow down for wildlife
- ✦ Report any fauna mortalities on an Animal Mortality Register (in your work area)
- ✦ Do not feed or disturb the wildlife

Report sightings of:

- ✦ Native animals (esp. mammals)
- ✦ Introduced animals (i.e. cats, foxes, rabbits)
- ✦ Dead or injured animals
- ✦ Animals in danger (i.e. birds stuck in tailings)
- ✦ Animals that may be a threat to personnel (i.e. snakes in active work areas)



Snakes



- * **The Tanami Region has one of the highest concentrations of reptiles per square metre in Australia.**
- * Most are harmless however highly venomous snakes are common in the region and around the site.

- * **Anti venom is not kept on site and a snake bite requires urgent evacuation.**
 - * *The closest aid is at least two hours away.*
- * **We can avoid getting bitten by**
 - * *Stay on the paths at camp and looking ahead of where you are going. (Don't read your phone walking through the camp at night)*
 - * *Walking steadily and heavily through the scrub*
 - * *Thinking before you pick up wood, steel rubbish around site.*
 - * *Keeping food stored securely and in rooms to prevent rodent populations increasing.*
 - * *Keeping Weeds, grass and scrub down around camp and work areas.*
 - * *Not approaching or interfering with snakes*
 - * *Wearing appropriate PPE at all times. (Long trousers, boots etc.)*
- * **If You see a snake.**
 - * *Do not approach.*
 - * *If it is within 2m stand very still and make no sudden moves it will ignore you (it can also move faster than you)*
 - * *Ask someone to watch the snake while you or they notify a trained registered snake handler.*
 - * *Only trained and registered snake handlers are permitted to catch and remove snakes.*
 - * *A list of trained snake handlers is located on notice boards around site.*
 - * *Snake bite kits are located in all laundries, dry mess, gym and offices.*
 - * *Baby snakes can be just as dangerous if not more dangerous than adults.*

Venomous Snakes



ARKIVE
www.arkive.org



Mulga (Common)

Aka: king brown snake

Agitated if disturbed – when they throw their heads from side to side and hiss loudly.

Mulgas bite savagely, even hanging on and chewing as they inject massive amounts of highly toxic venom, which destroys blood cells and affects the muscles and nerves.

Though commonly known as a king brown snake, the mulga is actually a member of the black snake genus.



Western Brown Snake (Common)

Less aggressive than its eastern brown. Part of the group of snakes that causes the most fatalities in Australia.

Western browns are fast moving and nervous in temperament. When disturbed, they will run for cover, striking quickly if cornered, then making a quick getaway.

Though their venom is not as toxic as the eastern brown's, they deliver three times as much.

Bites are usually painless and difficult to see due to the small fang marks.



Desert Death Adder (Rare)

Nocturnal ambush hunter.

Spends its days burrowed in loose red sand, especially under clumps of porcupine grass.

Fauna – Dingo's



You will see dingo's around Site, including at the Accommodation Village

Dingoes are of **cultural significance**, and must be respected and protected

Dingoes are **wild animals**; they are **not** domesticated.

Encouraging dingoes and feeding them is **illegal** and **strictly prohibited**

 ***Strict penalties are enforced for feeding Dingoes***

The presence of the mine and Village facilities has negatively impacted on natural dingo populations

Note: Dingo's will take your boots if you leave outside your room or anything you leave outside





The Tanami desert is considered by government and other bodies as “one of the **most important biological areas** to be found in Australia as it provides refuge for several of **Australia’s rare and endangered species**”¹

The Tanami hosts many unique and endemic species such as:

- ✧ *Dwarf Desert Spike-rush (Vulnerable)*
- ✧ *Desert Walnut (culturally significant)*
- ✧ *Desert Bloodwood (culturally significant)*

How can **YOU** help?

- ✧ *Drive only on designated roads*
- ✧ *Keep out of the vegetation*
- ✧ *Comply with Site Disturbance Permit*



Weeds



It is a condition of Operating in the NT that we comply with the Weeds Management Act (NT).

This requires we have a proactive Weed Management Plan that is designed;

- * To minimise the impacts on local flora and fauna.
- * To prevent introduction of exotic fauna and flora species.
- * To control and reduce the spread of any existing weeds.
- * To progressively rehabilitate areas as per the requirements of the Mining Management Plan

- * Weeds spaying is conducted around the offices, infrastructure and camp.
- * Weeds control programs are conducted periodically by the CLC Rangers
- * All vehicles and equipment arriving at site must be inspected by NST staff for weed and seeds.
- * All trucks must dust or wash down at the wash bay prior to entering site.
- * All staff are issued with a short field guide to common weeds and weed reporting form.

Your responsibilities are

- * *Avoid soil disturbance and stick to existing tracks*
- * *Reporting the location of weeds you may see to your supervisor (a guide to common weeds of the Tanami is provided in your induction pack)*
- * *Pulling out any weeds you see growing around your work areas and dispose in a burn bin*
- * *Regularly washing your vehicle at the wash bay to remove build up of dirt and mud that will contain seeds.*
- * *Following and ensuring others follow procedures for vehicles and equipment arriving at site.*

Some Common Weeds in the Tanami



Buffel grass (*Cenchrus ciliaris*)

Form: Grass

Origin: Native to Africa and south western Asia.

Flowers/Seedhead: Flowers most of year, usually after rain.

Description: Tufted erect or spreading perennial to 1 m high with a tough rootstock. Often roots from lower nodes. Base of leaf blade with a ring of short hairs (ligule). Leaf blade bluish-green, to 30 cm long and to 1.3 cm wide.

Distinguishing features: Distinguished by seedheads in a dense hairy cylindrical spike to 10 (rarely to 25) cm long and to 2 cm wide; 1–4 spikelets surrounded basally by bristles with forward directed barbs and forming soft purple burrs to 16 mm long, with one bristle longer than others.

Dispersal: Seeds are spread by wind, water, stock and machinery.



Ruby Dock *Acetosa vesicaria*

Form: Herb

Origin: Native of northern Africa and east to India (Punjab).

Flowers/Seedhead: In terminal panicles. Flowers autumn to early summer.

Description: Erect succulent annual herb to 1 m high. Stems hollow and vertically ridged. Leaves alternate, 5–11 cm long, on a stalk often longer than the leaf blade. Capsule wings often tinged bright pink to purple, showy.

Distinguishing features: Distinguished by fibrous roots; succulent ovate to triangular leaves; winged fruits with valves 12–23 mm long, about 15 mm wide.

Dispersal: Spread by seed in fruit that are wind- and water-dispersed.

Some Common Weeds in the Tanami



Rubber bush (*Calotropis procera*)
(Invasive and toxic to humans and Livestock)

Form: Shrub/Tree - perennial

Origin: Native of Tropical Africa and Asia

Flowers/Seedhead: 3–6 cm wide. Flowers all year round.

Description: Erect shrub 1.5-2m high. Leaves Elliptical 10-20cm long and arranged in pairs opposite each other. Flowers five waxy purple petals in groups of up to 15 in upper stems and seed pods Fruit: An inflated pod, 8 to 12 centimetres long and nearly as wide, rounded at the base and somewhat pointed at the tip. When ripe, the fruit bursts and releases the seeds. Seeds have long silky hairs for dispersal on the wind.

Distinguishing features: Leaves are elliptical 10 to 20 centimetres long, 4 to 10 centimetres wide and arranged in pairs opposite each other, and each pair at right angles to previous pair. They have short tip and a heart shaped base. Underside of leaves has a tuft of hairs at the base of the mid vein.

Dispersal: Spreads by movement of seeds (and on wind)



Mexican poppy (*Argemone ochroleuca*)
(All parts of plant are Toxic to Humans and Livestock)

Form: Herb

Origin: Native of Mexico

Flowers/Seedhead: 3–6 cm wide. Flowers all year round.

Description: Erect annual herb to 1.5 m high. Leaves 6–20 cm long, mottled white and dark green, with undulate margins and yellow-spined lobes. Capsule 1.5–4 cm long, ovoid, with a remnant style (often attached after capsule has split), splitting from the top on maturity. Seeds dark brown or black, finely pitted on the surface.

Distinguishing features: Distinguished by yellow sap; pale yellow petals 2.2–2.6 cm long and 1–1.7 cm wide, stigmatic lobes spreading out from the style; capsule with largest spines 5–13 mm long; seeds nearly round, about 1.5 mm wide.

Dispersal: Spreads by movement of seed.

Hydrocarbons & Chemicals - Storage



All hydrocarbon and chemical containers must have **secondary containment**, such as impervious bunds (concrete, plastic)

- ✿ Bunds must hold 110 % of the largest container, or 25 % of the total storage volume (whichever is larger)
- ✿ Double-skinned fuel tanks do not require Bunding; all couplings, fittings and refuelling points do require secondary containment
- ✿ Storage and handling must comply with Australian Standards as a minimum (i.e. AS:1940 - 2004 Flammable and Combustible Liquids)



Our expectations of you



- Think about why you are here?
- Think about why you want to go home safe?
- Adhere to the Cardinal Rules, your life and at very least your Job may depend on it!
- Respect this land and the traditional owners. *(This is freehold land)*
- Report all incidents/accidents, better to report than try and hide them
- Don't be afraid to speak up (respectfully challenge), if we don't know.....we cant help!

Please Remember:

✱ *Your Safety and the safety of those around you is important. If you can't do the job safely – **STOP THE JOB** - make the area safe and discuss with your work mates, supervisors or managers.*

Time to do your questions



- ✦ Complete all the questions and complete all paperwork.
- ✦ Make sure all your emergency contacts and medications have been updated if changed!

WEED SIGHTING REPORT

NAME OF WEED.....
PERSON REPORTING.....DATE.....
LOCATION OF PLANT.....
.....GPS (E)..... (N).....

NAME OF WEED.....
PERSON REPORTING.....DATE.....
LOCATION OF PLANT.....
.....GPS (E)..... (N).....

NAME OF WEED.....
PERSON REPORTING.....DATE.....
LOCATION OF PLANT.....
.....GPS (E)..... (N).....

NAME OF WEED.....
PERSON REPORTING.....DATE.....
LOCATION OF PLANT.....
.....GPS (E)..... (N).....

NAME OF WEED.....
PERSON REPORTING.....DATE.....
LOCATION OF PLANT.....
.....GPS (E)..... (N).....

NAME OF WEED.....
PERSON REPORTING.....DATE.....
LOCATION OF PLANT.....
.....GPS (E)..... (N).....



WEEDS ON SITE

A field guide to help NSR Personnel identify
the most common weeds on site



NORTHERN STAR TANAMI

WHAT ARE ENVIRONMENTAL WEEDS? WHAT HARM CAN THEY REALLY DO?

These are plants that invade the native vegetation and result in affecting the survival and distribution of the native plants, simply put they can take over an area very affectively, pushing the native plants out. Some weeds can reduce the biodiversity by over taking the native plants, which can results in depriving native animals of food and shelter, which can change the landscape and animal activities dramatically.

The Tanami bioregion has many different plant and animal species, some of which are found nowhere else in the world.

WEED DISTRIBUTION

Currently we are inspecting equipment and machinery that is entering the site to prevent the introduction of new weeds, also cleaning and inspecting equipment and machinery that has worked in an area with known weeds present.

We are responsible for monitoring and managing the areas of known weeds presents.

All Tanami Gold personnel can assist with this management by following these very easy steps. The last page of this booklet is made for information to be noted onto.

- Avoid soil disturbance and stick to existing tracks.
- Washing vehicles regularly.
- Do not move or relocate soil that is infested with weeds.
- Dispose of any seeds or plants affectively, place them in a lined bin that will be burnt.
- If a plant is suspected as a weed, collect a specimen or take a photo/
- Note where the plant was located GPS, draw a map or physically show someone.
- Note as much information as possible, how many plants, did they have flowers or seeds.

Please pass on any information to your supervisor.

Commonly known as **Purpletop Rhodes grass**

Chloris inflate

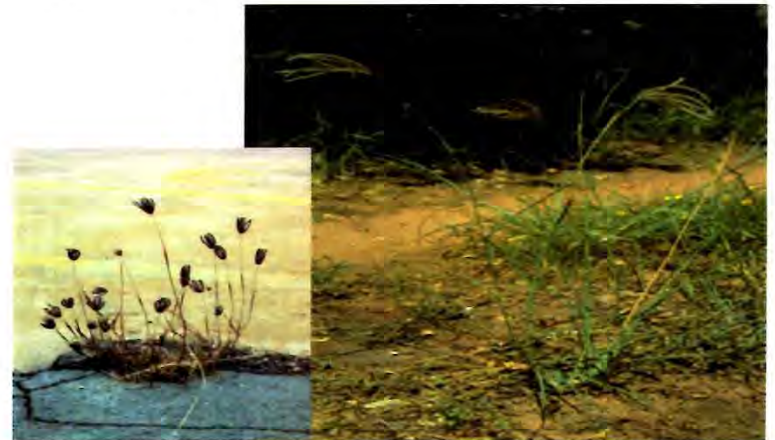


Comes from Central and South America

Annual/perennial grass to 1m high, occurs on cultivated or disturbed land, waterways and roadsides. Seeds are dispersed by wind, water and machinery.

Germination is by seed and occurs during the warmer months.

This is a known weed at Central and plant sightings should be noted and information passed onto your supervisor



Commonly known as **Buffel grass**

Cenchrus ciliaris

Comes from Africa, Asia and Europe

Perennial grass in clumps to 2m, leaf blue-green in colour, occurs on sandy soil, once established grows well but very sensitive to high levels of soil aluminium and manganese, very tolerant and favoured by fire, has a moderate tolerance to salinity, drought tolerant and will survive prolonged waterlogging.

This is a known weed at Central and plant sightings should be noted and information passed onto your supervisor



Commonly known as **Mexican poppy**

Argemone ochroleuca

Comes from Central America-Mexico



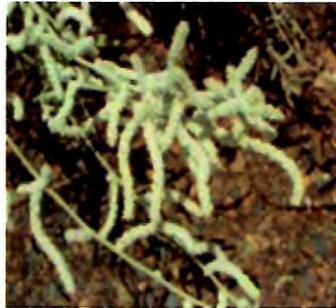
Annual herb to 1m high, leaves are spiny and greyish green, germinates from seeds, seed masses are prickly and buoyant so can travel via water, animals and machinery. Occurring in waterways, roadsides and grazing pastures, all parts of the plant are toxic to grazing stock and humans.

Noted sightings at Coyote, please pass on any information to supervisor



Commonly known as **Kapok Bush**

Aerva javanica



Comes from Africa and Asia

Shrubby perennial herb to 1.6m high, found on sandy and calcareous soils in arid and semi-arid regions, masses of white flowers, seeds dispersed by animals and wind, common to disturbed land.

This is a known weed at Central and plant sightings should be noted and information passed onto your supervisor



Commonly known as **Rubber tree**

Calotropis procera



Comes from tropical Asia and Africa

Shrub or small tree to 4m high, leaves are a grey-green, a grey-green pod with seed/fruit inside, spread by wind, water and suckering roots, common at roadsides, watercourses, over grazed land or previously cultivated land, toxic to humans and possibly grazing stock.

No noted sighting on site but is know to be in the Tanami region, please pass on any information to supervisor



Commonly known as **Paddy Melon**

Citrullus cololcynthis



Comes from Turkey, Africa and Asia

It is a annual vine with stems that have rough hairs, the fruit is yellow/green-mottled and seeds are transported mainly by animal droppings but also by water and machinery.

This plant is easily confused with the common watermelon.

No noted sighting on site but is know to be in the Tanami region, please pass on any information to supervisor



Commonly known as **Gallon's Curse**

Cenchrus biflorus

Comes from tropical Africa and India

Annual grass up to 90cm high, found on sandy soils in arid and semi-arid regions, seeds dispersed by bur adhering to animals fur, occurs on disturbed land.

This is a known weed at Central and plant sightings should be noted and information passed onto your supervisor



Commonly known as **Deenanath grass**

Pennisetum pedicellatum



Comes from tropical Africa and India

Annual bunch grass to 1m high, grows through summer, is drought tolerant, occurs at roadsides, disturbed land in sandy soils or fertile loamy soils and is tolerant to acidic and alkaline soils. Germinates by seed and seeds are spread by wind mainly.

This is a known weed at Central and plant sightings should be noted and information passed onto your supervisor



Commonly known as **Ruby Dock**

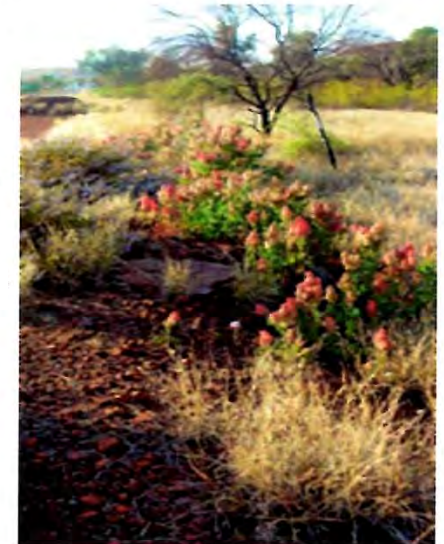
Acetosa vesicaria



Comes from Northern Africa and East of India.


Ruby dock is a succulent annual herb to 1 m high, stem is hollow, drought resistant, generally invades disturbed land and occurs along water ways, contains oxalates and nitrates which can cause poisoning in grazing stock, it's seed is spread by water and wind and the seed/fruit is bright red or pink. Seed germination generally occurs with rains during the cooler months.

This is a known weed at Central and plant sightings should be noted and information passed onto your supervisor



DOCUMENT AUTHORISATION

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	Name	Position	Signature	Date
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1. PURPOSE

The purpose of the Central Tanami Project (CTP) Waste Management Plan is to:

- Outline the requirements and provide guidance to employees on how to manage hazardous and non-hazardous waste streams in their work area.
- Outline the legal requirements of the sites operational license and other legal conditions.
- Ensure waste is collected, stored, handled, transported and disposed of in an appropriate manner in accordance with Northern Star Resources' (NSR) Environmental Management Standard and Northern Star (Tanami)'s (NST) Environmental Management System.
- Minimise the creation of waste through efficient use of resources.
- Maximise reuse and recycling of waste materials. Appropriately dispose of all generated waste materials to prevent environmental harm and minimise volumes disposed to landfill.
- Educate employees and contractors on waste management requirements at CTP as outlined in Northern Star Resources' Environmental Management System.

2. SCOPE

This management plan applies to all operations at CTP or as controlled by the NST management team and its workforce. The scope of this management plan includes activities by contractors, their employees and sub-contractors.

Activities and process outlined in this management plan include waste generated through the operational life cycle and covers the generation, collection, storage, transportation and disposal of hazardous, non-hazardous wastes and waste water.

Note that detailed information relating to Waste Rock, Hydrocarbons and Closure are covered under their respective management plans.

3. ROLES AND RESPONSIBILITIES

Role	Key Responsibilities
Site Manager	<ul style="list-style-type: none"> ▪ Ensure adequate resources are provided to manage, handle, store, transport and dispose/recycle waste products both onsite and offsite safely to prevent harm to the environment. ▪ Ensure this management plan is implemented and communicated to all relevant personnel. ▪ Ensure all bins and other waste collection systems are appropriately managed. ▪ Dispatch and receipt of recyclable materials. ▪ Controlled waste tracking of hazardous materials.
Corporate ESR Advisor	<ul style="list-style-type: none"> ▪ Ensure the management of wastes onsite is in compliance with all Health and Safety requirements. ▪ Provide guidance on the disposal of wastes whereby the potential for injury or illness exists. ▪ Ensure this management plan accurately reflects waste management requirements and practices at CTP.
Area Supervisors/Foreman	<ul style="list-style-type: none"> ▪ Ensure employees are aware of waste management procedures.
Employees	<ul style="list-style-type: none"> ▪ Be aware of the requirements applicable to their area. ▪ Ensure all correct disposal processes and procedures are followed for the removal of waste from work areas. ▪ Report any issues or hazards relating to waste to their direct supervisor. ▪ Ensure all incidents/hazards involving waste are reported to the Site Manager by the end of shift.
Perth Supply Chain	<ul style="list-style-type: none"> ▪ Ensure that the waste management requirements for contractors are included within applicable contracts.
Contractors	<ul style="list-style-type: none"> ▪ Ensure that all contractor employees are aware of waste management requirements.

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4. LEGAL REQUIREMENTS AND OTHER COMMITMENTS

There are external and internal requirements in place at CTP that guide the management and use of waste. These requirements include the commitments made in the CTP MMP and the subsequent Authorisation issued by the NT Department of Primary Industry and Resources (DPIR) and Northern Star Resources' Environmental Management System.

4.1 Legal Requirements

The following legal requirements apply to the transport, storage, recycling and disposal of waste at CTP Operations:

Northern Territory:

- CTP Authorisation, which requires compliance with MMP commitments;
- Mining Management Act 2001
- Waste Management and Pollution Control Act
- Litter Act
- Dangerous Goods Act
- Environmental Assessment Act
- Work Health and Safety (National Uniform Legislation) Act 2011
- National Environment Protection Council (Northern Territory) Act 1994
- NT EPA Environmental Guidelines

Commonwealth legislation:

- Environment Protection and Biodiversity Conservation Act 1999
- National Environment Protection (Movement of Controlled Waste between States and Territories) Measure 1998

4.2 Other Commitments

Other commitments that apply to the transport, storage, recycling and disposal of waste at CTP include;

- Australian Standard 1940:2004 - The Storage and Handling of Flammable and Combustible Liquids
- NSR, EMS Waste Management Requirements.

5. RISK MANAGEMENT AND IDENTIFICATION OF WASTE STREAMS

CTP personnel and contractors are required to identify and manage risks associated with waste management. Risks are identified through formal risk assessments (internal or external), hazard reports, accident and incident investigations, workplace inspections and internal or external audits. All identified risks are documented in the CTP Risk Register.

When a new waste stream is identified it is a requirement that a risk assessment be completed to assess the suitable disposal options and the operational risk register updated.

New waste streams are identified via:

- General site environmental inspections
- Waste audits
- Risk assessments conducted with new contracts/projects
- New chemical to site process
- Change Management Plans

6. OPERATIONAL CONTROLS

6.1 Physical Controls: Hazardous Waste Management

A hazardous waste is classified as any waste which can cause immediate harm to people, property or the environment if stored or handled inappropriately. All facilities utilised for the collection and on-site storage of hazardous wastes need to have secondary containment. Secondary containment shall be designed and constructed from materials compatible with the wastes to be stored.

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The hazardous waste streams produced at CTP include:

- Asbestos waste
- Vehicle and personal batteries
- Chemicals
- Contaminated rags
- Contaminated soil/peat moss
- Coolant
- eWaste (Electronic)
- Fauna carcasses
- Fluorescent tubes/globes
- Hydrocarbon filters
- Grease
- Oil from food production
- Waste degreaser (parts washers)
- Sewerage/Grey Water
- Waste oil/Oily water

The following section describes each hazardous waste stream at CTP, including the work area where the waste is produced, method of disposal and disposal location.

6.1.1 ASBESTOS WASTE

If asbestos waste is generated then barricade area and contact the Site manager and NSR's HSLP department for further information.

6.1.2 BATTERIES

Waste batteries come in a variety of forms including light and heavy machinery, general use dry cell (i.e. AA, AAA, C and D), radios and cap lamps. Waste batteries are produced in all areas across the operation. Machinery batteries are stacked plastic bunds in the recycling laydown yard. General use dry cell batteries are collected in the Administration office and sent offsite in dedicated battery containers. If no battery containers are present, batteries can be stacked on plastic bunds in the area. Once battery bunds are full the Site Manager arranges them to be sent offsite for recycling. An SDS for each type of battery needs to be sent with the battery boxes.

6.1.3 CHEMICALS

Waste chemicals are produced on site on an ad-hoc basis, generally in relatively small quantities. Any chemical that is no longer required is considered a waste chemical. Chemicals are dealt with on a case by case basis according to the manufacturer's SDS. Advice must be sought from the NSR Environment Department before any chemicals are disposed of on site. It is preferred that waste chemicals are returned to the manufacture for suitable disposal.

Any paint, glue or expanding foam that is deemed hazardous should be sent back to the manufacturer where possible. Non-hazardous paint cans (or cans with minimal volumes) should be left outside in an undercover area with their lids off. Once the contents have gone hard the can must be disposed of in the domestic landfill.

6.1.4 CONTAMINATED HYDROCARBON WASTE E.G. RAGS, HOSES

Hydrocarbon contaminated wastes (e.g. greasy/oily rags) are produced at workshops across the operation. All workshops collect their hydrocarbon contaminated material in dedicated skip bins, which are sent off site for recycling/disposal when full.

6.1.5 CONTAMINATED SOIL/WATER/PEAT MOSS

Peat moss is used to clean up spilt hydrocarbons on hard surface such as the fuel farm. Contaminated soil is generated from spills that occur on soft surfaces such as underneath drill rigs.

Contaminated peat moss is taken to the Bioremediation facility for treatment.

All contaminated soil/water generated from hydrocarbon sumps or wash bays must be taken to the bioremediation farm.

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At all other areas across site, contaminated soil can be disposed of into the oily waste bin (for sending off site for disposal) or at the bioremediation facility. The disposal of peat moss within skip bins is limited to 5 x 20L sealed bags.

6.1.6 COOLANT

Waste coolant is generated in relatively small amounts from vehicle servicing activities. Waste coolant is either disposed of in waste oil tanks.

6.1.7 E-WASTE

Electronic waste (eWaste) from computer hardware and mobile telephone technology is collected and sent offsite. Electronic waste should be packaged onto a pallet and strapped and wrapped so the contents are safe for transport.

6.1.8 FAUNA CARCASSES

Fauna carcasses found in operational areas (including on roads) are buried in nearby bush away from the village and mine infrastructure. Carcasses are not to be disposed of in the landfill.

6.1.9 FLUORESCENT TUBES/GLOBES

Fluorescent tubes are produced from the village and the administration/office areas at the mine. Fluorescent lights contain a very small amount of mercury inside the glass tube. Fluorescent tubes are collected in a dedicated bin and sent offsite for recycling.

6.1.10 HYDROCARBON FILTERS

Hydrocarbon filters are generated from the servicing of all machinery. All workshops drain filters and then store them in the hydrocarbon waste skip bin, which once full is sent offsite for recycling.

6.1.11 GREASE

Waste grease is generated from vehicle and equipment maintenance. Waste grease is placed in 205L drums which are wrapped in black plastic, strapped down then delivered to stores for transport offsite for recycling.

6.1.12 OIL (FROM FOOD PRODUCTION)

Waste oil from food production is generated in the kitchen at the CTP Village. Waste oil is drained into a 1000L pod or 205 L drum and sent offsite for recycling.

6.1.13 PARTS WASHER DEGREASER WASTE

Parts Washers containing solvent-based degreaser are serviced by contractors who are responsible for removing the waste degreaser and replacing with clean degreaser. Any waste generated is taken offsite for recycling.

6.1.14 SEWAGE/GREY WATER

Sewage and grey water is managed from the CTP offices and village through a system of sewage ponds. A new septic treatment system is proposed for implementation in 2017.

6.1.15 WASTE OIL/OILY WATER

Waste oil is generated through regular servicing and replacement of oil in machinery. Waste oil and oily water collected is transported off site for treatment or recycling. It is the responsibility of each work area to contact a recycler and raise a PO for disposal.

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6.2 Physical Controls: Non-Hazardous Waste Management

A non-hazardous waste is classified as any waste which will not cause immediate harm to people, property or the environment if stored or handled inappropriately.

The non-hazardous waste streams produced at CTP include:

- 1000L pods
- 20L or 205L steel drums
- 20L plastic drums
- Air Filters
- Air conditioners
- Aluminium cans
- Aluminium lab trays
- Building/Construction materials
- Cardboard and paper
- Copper wire
- Core trays
- Drill rods
- Fire extinguishers
- Food waste
- Gas cylinders
- General waste
- Glass bottles
- Glass – all others including laminated glass
- Paint tins (metal)
- Paint Pails (plastic)
- Pallets
- Paper
- Plastic
- Printer cartridges
- PVC and poly pipe
- Rubber
- Scrap metal
- Steel core trays
- Tins from food production
- Tyres
- Wood

6.2.1 1000L PODS

1000L pods are used across site for storage of hydrocarbons and chemicals. 1000L pods that are empty are returned to the manufacture for reuse. 1000L pods that are damaged need to be rinsed (at the appropriate location i.e. washdown bays), the steel base is to be removed (disposed of in a scrap steel bin) and the plastic pod squashed and disposed of at the landfill.

6.2.2 20L OR 205L STEEL DRUMS

20L or 205L steel drums that have contained a hazardous material or hydrocarbon are stored on concrete pads in the scrap laydown for offsite removal and recycling.

6.2.3 20L PLASTIC DRUMS

The majority of 20L Plastic drums are generated as part of drilling activities. Drilling contractors are required to remove their plastic drums from site, as part of their contract.

Plastic drums that have contained a hazardous material or hydrocarbon must be fully drained into waste oil collection drums. Drums are collected in a skip and once full are sent offsite for recycling.

6.2.4 AIR FILTERS

Air filters are generated at the various workshops from servicing vehicles. Air filters need to be placed in general rubbish bins and disposed of in the landfill.

6.2.5 AIR CONDITIONERS

Old Air conditioners need to be degassed and then disposed of at the scrap steel lay down area. Reclaimed air-conditioner gas is returned to the manufacturer.

6.2.6 ALUMINIUM CANS

Aluminium can recycling bins are located throughout site. Cans are collected behind the dry mess. These wastes are sent offsite for recycling.

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6.2.7 BUILDING/CONSTRUCTION MATERIAL

Building and construction material includes items such as concrete, pipe work and packaging waste. If the waste contains steel this should be placed in the steel lay down area. Any wood should be disposed of at the landfill burn pit. Other non-combustible materials or plastics are to be disposed of at the landfill bury pit.

6.2.8 CARDBOARD AND PAPER

Cardboard and paper waste is taken to the landfill and placed in the 'burn pit'.

6.2.9 DRILL RODS

Drill rods are placed at the drill rod laydown area and sent offsite for recycling.

6.2.10 FIRE EXTINGUISHERS

Fire extinguishers in poor condition need to be emptied, have their tops removed and then are disposed of in a scrap steel bin or sent offsite to a recycler. Fire Extinguishers can also be used for training purposes before recycled.

6.2.11 FOOD WASTE

Food waste is taken to the landfill and placed in the 'burn pit'. Food waste is to be burnt immediately to prevent attracting scavengers.

6.2.12 GAS CYLINDERS

Empty gas cylinders are returned to the manufacturer.

6.2.13 GENERAL WASTE

General waste such as food waste and food packaging is produced across CTP. All general waste is disposed of at the site landfill (burn pit) and is burnt immediately.

6.2.14 GLASS BOTTLES

Glass bottles are disposed of to the landfill (bury pit).

6.2.15 GLASS – ALL OTHER INCLUDING LAMINATED GLASS

All other glass waste is disposed of in the site landfill (bury pit).

6.2.16 PAINT TINS (METAL)

Any remaining paint is disposed of by either using it or tipping it into a sealed container and allowing the paint to become hard/dry out before disposing of it in landfill (bury pit). Empty paint tins (metal) are disposed of in a scrap steel bin.

6.2.17 PAINT PAILS (PLASTIC)

Any remaining paint is disposed of by either using it or tipping it into a sealed container and allowing the paint to become hard/dry out before disposing of it in landfill (bury pit). Empty plastic paint pails are disposed of in landfill (bury pit).

6.2.18 PALLETS

Pallets are separated into Chepp pallets, good quality reusable pallets and poor quality/damaged pallets. Chepp pallets are collected and sent back to Toll for reuse. Good quality reusable pallets are collected and used for transport of core trays. Pallets of poor quality are disposed of at the landfill facility (burn pit) and burnt on a regular basis.

6.2.19 PLASTIC

Plastic waste is generated across site and includes packaging, drill bags and hard hats. Plastic is disposed of in landfill (bury pit).

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6.2.20 PRINTER CARTRIDGES

Printer cartridges are generated by site offices. Used cartridges are put into the bin outside Administration building. Once full, bins are emptied into black planet Ark bags. These bags are transported offsite to 'Close the Loop' where they are recycled into various products.

6.2.21 PVC AND POLY PIPE

PVC and poly pipe is generated across site and is stockpiled in the poly pipe lay down area. PVC and poly pipe is shredded onsite by a recycling contractor and is transported offsite where it is recycled.

Note: As PVC and poly pipe are recycled separately they must be stored separately.

6.2.22 RUBBER

Rubber (excluding tyres) including pipe lining from the processing plant is taken to landfill (bury pit)

6.2.23 SCRAP METAL (GENERAL)

Scrap metal is either collected in skip bins or delivered to the scrap metal lay down yard north of the mill. Scrap metal in skip bins is sent to offsite for recycling. Scrap metal in the lay down yard is collected by the recycler.

6.2.24 STEEL CORE TRAYS

Damaged steel core trays are generated at the Core Shed or by the drillers. Steel core trays are disposed of in the scrap metal skip bins and sent off site for recycling.

6.2.25 TYRES

Tyres are stockpiled and are sent off site for recycling or disposal. If an appropriate disposal site exists on site (e.g. and active waste dump or it being actively backfilled, disposal can occur on site. Records are required to be maintained of all tyres disposed on site (location and number).

6.2.26 WOOD

Any scrap wood is taken to the landfill facility (burn pit). These items are burnt on a regular basis.

6.3 Physical Controls: Closure

When a decision is made to fully close the site and remove all remaining infrastructure the Mine Closure Plan should be referred to for the correct disposal procedure.

6.4 Physical Controls: Waste disposal locations

There are a number of disposal locations for waste disposal at CTP. These are:

- Landfill facility – including bury pit and burn pit
- Bioremediation facility
- Recycling yard
- Waste oil collection tank
- Waste hydrocarbon storage area (skip bins and containers for hydrocarbon wastes)
- Scrap steel storage area

See Appendix A – Waste Disposal locations for a map with all of these locations on it.

6.4.1 LANDFILL BURN PIT OPERATION

The CTP Landfill facility 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 burn pit receives waste that is most susceptible to distribution by wind and feral animals and native fauna (paper and food scraps). The burn pit also receives combustible, non-toxic materials such as wood, damaged pallets or cardboard. 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

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remnants from the burning process (e.g. ash, unburned metal) will be periodically transferred by front end loader to the bury pit.

6.4.2 LANDFILL BURY PIT OPERATION

The bury pit is checked regularly (weekly), formally inspected monthly, and is included on the site inspection schedule. The bury pit is periodically covered with soil to minimise the distribution of waste material by wind, or feral animals or native fauna.

7. SYSTEM CONTROLS

7.1 Contractor Management

7.1.1 SITE BASED CONTRACTORS

Contractors involved in waste management at CTP have the following clauses included in their contracts:

- Requirement to be in compliance to applicable laws and regulations and site procedures;
- Requirement to ensure that the contractor and their personnel are aware of their obligations to meet legal requirements, license conditions, contract conditions, Northern Star Resources standards and site procedures;
- Requirement for the responsible management of waste, including emergency response and clean-up as required;
- Requirement for proper labelling and placarding on waste containers and transport vehicles.

The contractors will be required to manage waste material in accordance with this document.

7.1.2 CONTRACTORS INVOLVED IN WASTE TRANSPORT AND/OR TREATMENT

NST engage transport contractors and waste treatment companies/facilities that are compliant with the relevant, applicable legislative requirements.

Transport contractors and treatment companies/facilities are to maintain a waste tracking system and provide tracking receipts including location and method of disposal to NST for reporting purposes.

When at CTP, contractors must comply with all HSLP, Environment and Social Responsibility Standards.

As part of the pre-selection, waste transport and/or treatment companies/facilities are required to provide a copy of documents, procedure and/or management plans including:

- Environmental Policy;
- Environmental Management Plan;
- Relevant licences;
- Disposal/treatment method (where appropriate);
- Disposal/treatment location (where appropriate);
- Provide evidence that their drivers are appropriately trained (where appropriate);
- Provide evidence that the vehicles used are maintained (where appropriate);
- Accident/Incident reporting procedures; and
- Emergency response procedures.

7.2 Records

7.2.1 RECYCLING RECORDS

Records of volumes of recycled materials are maintained by NST. These include:

- Scrap metal
- Hydrocarbon waste

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7.3 Inspections

NST conducts inspections in accordance with the CTP workplace inspection schedule and inspection checklists. These inspections include consideration of waste management practices, including checking for correct waste segregation, disposal practices.

7.4 Audits

Regular audits are required to systematically and objectively verify conformance with management systems, compliance with legal requirements and provide feedback to improve health, safety loss prevention, environmental and social performance.

7.5 Preventative and Corrective Actions

Actions raised through inspections, task observations, hazard reports, accident/incident reports and audits are captured and tracked through INX:InControl.

Actions raised through other processes (e.g. meetings, improvement opportunities) are tracked within management team.

8. BEHAVIOURAL CONTROLS

8.1 Training

Training is conducted in the follow forms:

- The NSR general online induction and CTP site induction educates new comers to site on correct waste management practices.
- Toolbox presentations on waste management periodically.
- Waste Disposal Locations are on noticeboards around site.

9. REPORTING

9.1 Internal

Internal reporting of waste performance will include:

- Results and corrective actions on inspections supervisors of the work area.
- Volumes of key waste streams (e.g. hydrocarbon wastes and scrap metal)

9.2 External

External reporting of waste performance will include:

- Mandatory reporting of known, suspected and/or new contaminated sites.

10. EMERGENCY RESPONSE

As part of the CTP Emergency Response Plan, procedures exist for the following scenarios:

- Hydrocarbon release
- Chemical release

NST personnel are capable of responding to significant spills, containment, implementing clean up, and safety procedures.

11. DEFINITIONS AND ACRONYMS

Facility	Structures which store, transfer, deliver, contain, and treat waste products.
Grey water	Water that has not come in contact with toilet waste, e.g. wash basins, washing machines, showers and baths.

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Hazardous Waste	Waste material that can cause immediate harm to people, property or the environment if stored or handled inappropriately.
Sewage Water	Water that has come in contact with toilet waste.
Waste	Unwanted product of a process.

12. RELATED DOCUMENTS

Document Title	Document Number

13. ASSOCIATED COMPLIANCE DOCUMENTS

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14. APPENDICES

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Authorisation History – Authorisation No. 0266-04

MMP	Authorisation No	Tenement	Hole Type	Holes Approved	Additional Holes	Tracks Approved (km)	Additional Tracks
Mar-10	0266-04	MLS153 (including MLS119-MLS133)	RC & DD	60		6	
		MLS167	RC & DD	60		10	
		MLS168	RC & DD	40		4	
		MLS180	RC & DD	40		8	
		ML22934	RC & DD	40		6	
Subtotal	Original 0266-04			240		34	
Jul-10	0266-04	MLS153 (including MLS119-MLS133)	RC & DD	300	240	20	14
		MLS167	RC & DD	300	240	20	10
		MLS168	RC & DD	40		4	
		MLS180	RC & DD	40		8	
		ML22934	RC & DD	40		6	
Subtotal	Revised 0266-04			720	480	58	24
Feb-11	0266-04	MLS153 (including MLS119-MLS133)	RC & DD	250	-50	20	0
		MLS167	RC & DD	250	-50	20	0
		MLS168	RC & DD	40	0	4	0
		MLS180	RC & DD	40	0	8	0
		ML22934	RC & DD	40	0	6	0
		EL26925	RC & DD	50	50	5	5
		EL26926	RC & DD	50	50	6	6
		EL26925	AC\RAB	300	300	30	30
		EL26926	AC\RAB	400	400	45	45
FINAL	Revised 0266-04			1,420		144	

Authorisation History – Authorisation No. 0266-05

MMP	Authorisation No	Tenement	Hole Type	Holes Approved	Additional Holes	Tracks Approved (km)	Additional Tracks
Sep-12	0266-05	Liability for 0266-04 included in 0266-05		448		34.4	
		EL26926 (test pits (5m x 0.8m x 3m deep)	Test pits	48			
		MLS153 (including MLS119-MLS133)	RC & DD	7			
		MLS167	RC & DD	20		1	
		MLS180	RC & DD	90		5	
		ML22934	RC & DD	255		6	
		EL26925 (RC)	RC & DD	45		3	
		EL26925 (RAB)	RAB\AC	295		4	
		EL26926 (RAB)	RAB\AC	300		15	
		EL8797 (RAB)	RAB\AC	25		1.3	
		Farrands Hill (RAB)	RAB\AC	30		0	
		MLS153 (RAB)	RAB\AC	50		0	
Subtotal	Original 0266-05			1,565		69.7	
Sep-14	0266-05	Liability for 0266-04 included in 0266-05		448		34.4	
		EL26926 (test pits (5m x 0.8m x 3m deep)	Test pits	48			
		MLS153 (including MLS119-MLS133)	RC & DD	7			
		MLS167	RC & DD	20		1	
		MLS180	RC & DD	102	12	5	
		ML22934	RC & DD	267	12	6	
		EL26925 (RC)	RC & DD	45		3	
		EL26925 (RAB)	RAB\AC	95	-200	4	
		EL26926 (RAB)	RAB\AC	0	-300	15	
		EL8797 (RAB)	RAB\AC	25		1.3	
		Farrands Hill (RAB)	RAB\AC	30		0	
		MLS153 (RAB)	RAB\AC	50		0	

MMP	Authorisation No	Tenement	Hole Type	Holes Approved	Additional Holes	Tracks Approved (km)	Additional Tracks
		ML22934 (RAB\AC)	RAB\AC	100	100	5	5
		CTP Project Area EL28474, EL26926, and EL26925	RAB\AC	200	200	33	33
		Cave Hills Project : EL22229, EL10411, EL22378, EL10355 and EL23342	RAB\AC	100	100	9.1	9.1
		Groundrush Project : EL28474 & ML22934	RAB\AC	100	100	5	5
Subtotal	Revised 0266-05			1,589	24	110.4	41.1
Sep-15	0266-05	Liability for 0266-04 included in 0266-05		448		16	
		EL26926 (test pits (5m x 0.8m x 3m deep)	Test pits	48		0	
		MLS153 (including MLS119-MLS133)	RC & DD	7		0	
		MLS167	RC & DD	20		1	
		MLS180	RC & DD	102		6	
		ML22934	RC & DD	392	125	14.1	2.1
		EL26925 (RC)	RC & DD	45		3	
		EL26925 (RAB)	RAB\AC	45	-50	4	
		EL26926 (RAB)	RAB\AC	0		15	
		EL8797 (RAB)	RAB\AC	25		1.3	
		Farrands Hill (RAB)	RAB\AC	30		0	
		MLS153 (RAB)	RAB\AC	50		0	
		ML22934 (RAB\AC)	RAB\AC	100		5	
		CTP Project Area EL28474, EL26926, and EL26925	RAB\AC	100	-100	33	
		Cave Hills Project : EL22229, EL10411, EL22378, EL10355 and EL23342	RAB\AC	100		9.1	
		Groundrush Project : EL28474 & ML22934	RAB\AC	250	150	27	22
FINAL	Revised 0266-05			1,714	125	134.5	24.1

COMPLAINT AND GRIEVANCE MANAGEMENT STANDARD

1. RATIONALE

A natural part of any human relationship, including that between mining companies and communities can include disputes (a grievance that may lead to a complaint). While often commonplace, complaints that are left unresolved or unmanaged can lead to increased risk of conflict, including violence and threats to the well-being of local communities, as well as a potential to delay or stop to business activity, prevention of the Company's access to resources, may lead to the damage or loss of assets, injury to personnel, or undermine the Company's corporate reputation. An integrated and active approach to resolving and managing complaints and grievances, in the form of a well thought out grievance mechanism, will significantly reduce these risks.

2. SCOPE

This standard is applicable to Northern Star Resources Limited's (Northern Star or the Company) owned and managed operations and properties at all phases of the mine life cycle, including exploration, design, construction, operation and closure.

3. STANDARD

3.1 Complaint and Grievance Management

- 3.1.1 Procedures for the identification, tracking, and resolution of local community complaints and/or grievances related to site activity shall be developed for each Northern Star site.
- 3.1.2 Individual employees at each locality will be identified to act as the liaisons with Stakeholders for the receipt and resolution of complaints. As required, these employees will be trained in the procedures designed to manage and resolve complaints related to site activity for both initial review and internal handover/resolution of the complaint.
- 3.1.3 Root cause analysis will be undertaken for all grievances requiring third order procedures as defined below.

3.2 Complaint and Grievance Resolution

- 3.2.1 First Order Complaint – for the handling of those complaints that may be resolved between the site and the complainant, the following shall be established:
 - A depository or points of access where Stakeholders may make their concerns known to the site. Such contact points may be a fixed community liaison office, key Company employees, and/or other, as deemed appropriate to the local context to ensure accessibility.
 - Definition of minimum-requirements for acceptance of complaints.
 - Definition of levels of authority for Northern Star personnel to resolve complaints (eg. General Manager, Stakeholder Relations Manager, Admin).
 - Written records of complaints, receipt of complaints to complainants, and final resolution.
 - Review of progress made in resolving complaints, and corrective actions taken to resolve any gaps in performance.
- 3.2.2 Second Order Complaint – or the handling of those complaints that cannot be resolved directly by the site and complainant, and may require referral to or involvement of other parties the following will take place:
 - As above, with the addition of the identification and use of external parties who are qualified and willing to assist in the process of resolving complaints, such as government officials, Traditional Leaders or Elders, trusted individuals within the community, local NGOs, or others.
- 3.2.3 Third Order Complaint – for the handling of those complaints that are not resolved and must be referred to official agencies or judicial processes the following will take place:
 - As above, with the qualification that the procedure then will follow the statutory procedures of the agency chosen to resolve the complaint.
- 3.2.4 The Procedure shall clearly define the criteria for escalating complaints from one order to another.

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COMPLAINT AND GRIEVANCE MANAGEMENT STANDARD

3.2.5 Those personnel responsible for the procedures shall ensure that internal departments and/or individuals (employees) implicated in a complaint are made aware and involved in the investigation and resolution, as necessary.

4. DEFINITIONS

Complaint	means	a formal response to a grievance, usually (though not always) with legal grounds.
Grievance	means	a hardship or wrongdoing, whether perceived, legitimate or otherwise.
Local Community	means	a group of peoples residing within a defined proximity of a site of business activity.
Northern Star	means	Northern Star Resources Limited and its wholly owned subsidiaries.
Stakeholder	means	any individual or entity that may be impacted by the Company's business activity.

5. APPENDICES

Nil.

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DRILLING – SITE PREPARATION TECHNICAL PROCEDURE

1. PURPOSE

This Technical Procedure outlines the processes that must be followed to ensure the safe and correct methods of coordinating drill site preparation.

2. SCOPE

To be used by all Supervising Geologists or Geology Technicians employed or contracted by Northern Star Resources Limited (Northern Star or the Company).

3. SITE PREPARATION FLOWCHART FOR REVERSE CIRCUCLATION (RC) DRILL RIG

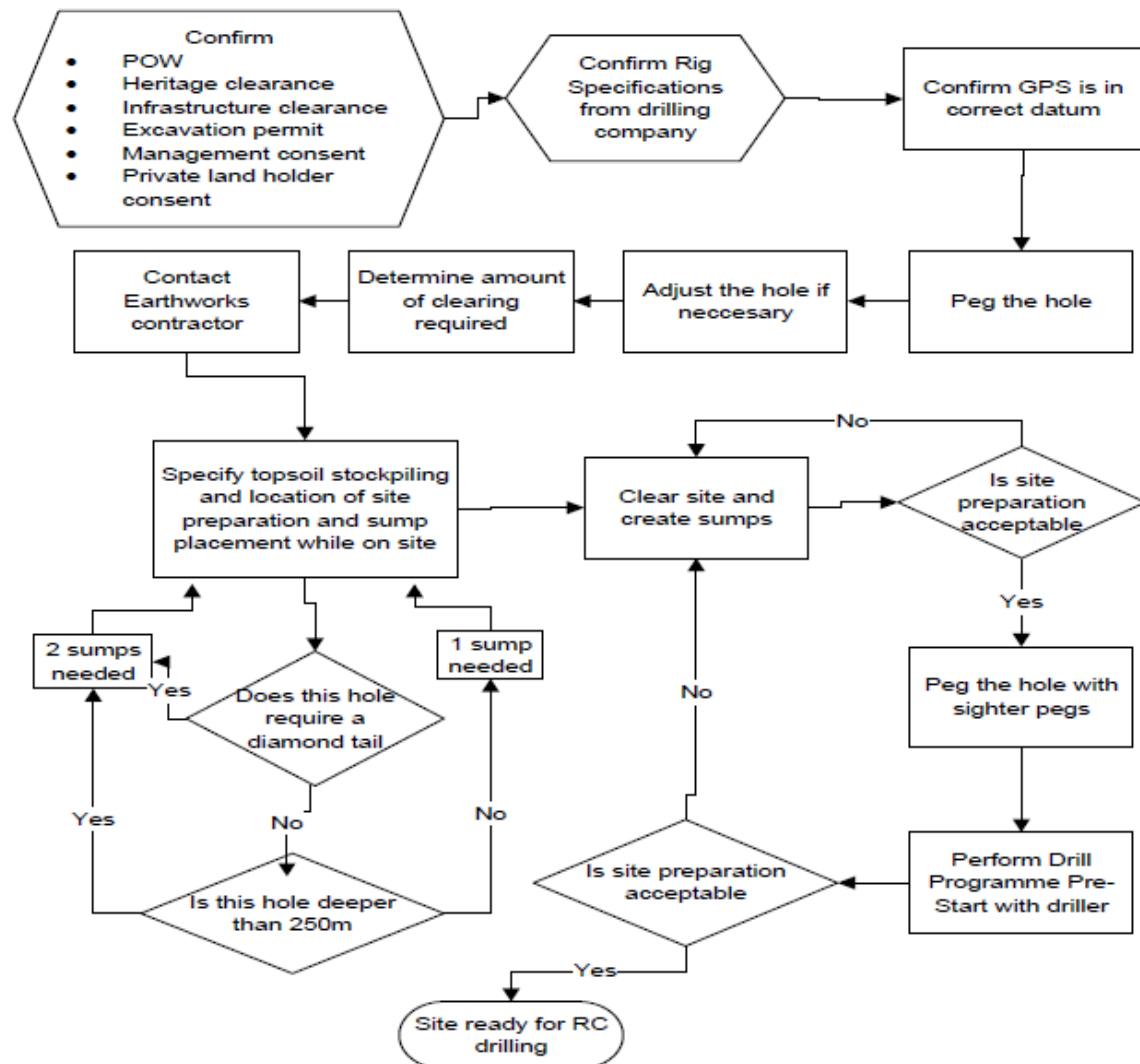


Figure 1: Site Preparation Flowchart for an RC drill rig. © Digirock Pty Ltd 2011

4. CONFIRM CLEARANCES AND PERMITS

A number of clearances and permits have to be granted before site preparation can occur. These are listed below.

- Confirm that the Program of Works (POW) for the drilling program has been completed **and permission granted by the relevant government department.**
- If working on a pastoral lease, notification must be provided to the pastoralist or lessee prior to commencing activities.
- If access is on private land, confirm that you have written consent from the land holder and keep them updated with your progress.

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DRILLING – SITE PREPARATION TECHNICAL PROCEDURE

- Confirm that the relevant clearances have been obtained from the traditional owners and confirmation is received from the relevant governmental agency responsible for Indigenous Affairs.
- Confirm that you have permission from any service providing authority if you are using their service road or facilities, e.g. Australian Pipeline Authority (APA), Western Australian Main Roads or local governmental agency.
- If you are working on a mine site, an excavation permit is required if you are drilling near existing infrastructure.
- Before any clearing or earth moving disturbance, obtain written consent from the Company Chief Geological Officer or Chief Exploration Geologist.

5. BEFORE SITE CLEARING

Phone the drill company to find out dimensions of the equipment they have and the way that they like to set out their vehicle configuration. Ask them to supply you with a 'preferred lay out diagram' (see Appendix 1 and 2 for examples), although pay careful attention to the area they suggest you clear – as it often exceeds the clearing requirements or the clearing dimension you have postulated in your PoW. Aim to clear the smallest area while allowing a safe working area for the drill crew. If some drill sites are in awkward areas, ask the Drilling Contractor about different configurations of the equipment.

Confirm that the GPS is in the right datum.

Peg the location of the drill hole with a wooden survey peg tied with pink flagging tape. Write the GPS coordinates on the southern side of the peg (to prevent fading if left for a long time).

Adjust the hole collar location, if appropriate, to conserve vegetation or to avoid old workings, power lines or riverbeds. Most drill holes can be moved within a 5-10m radius of the original collar position and still test the original target.

Work out what direction (azimuth) the hole will be drilled in, so as to determine the correct area to be cleared. If the azimuth states 000, then the hole is being drilled north and the cab of the drill rig will be facing south. If a vertical hole is planned, then the drill site can be oriented in any direction but seek advice to most efficiently clear.

Once a proposed drill hole has been pegged and sighter pegs have been surveyed in, the Geologist must then assess the amount of clearing that is required. A minimum amount of area and vegetation is to be disturbed, with large trees to be avoided unless it is absolutely necessary. A drill site must be large enough to accommodate a drill rig, all of the support trucks and samples so that a safe work environment exists, but must also conform with environmental legislation so as to disturb as little of the vegetation as possible.

5.1 Working Around Old Workings, Slopes or Edges

The Drill rig should not be set up closer than two metres from an open shaft and the open shaft must be barricaded with a physical barrier to prevent accidental entry. **All** old workings should be thoroughly investigated BEFORE earthmoving is to occur, to prevent accidental collapses and damage to equipment. If in doubt, move the hole.

The Drill rig must not be set up closer than four metres from the edge of a waste dump rill and the edge must have a physical and high visibility barrier to prevent accidental access to the edge.

The Drill rig must not be set up closer than two metres from the edge of steep terrain and the edge of the terrain must be barricaded with a physical and high visibility barrier to prevent accidental access.

6. EARTH WORKS

6.1 Pads

Contact your earthworks contractor or whoever is clearing the pad, and talk through the requirements (of each site) and confirm that they know the dimensions that are being cleared and clearing requisites. Provide them with drillhole location maps and a pad diagram if required. If necessary, peg the corners of the area to be cleared to give the operator working limits.

The earthmoving operator should be instructed that the topsoil should be stockpiled for subsequent rehabilitation. All top soil and vegetation (small shrubs/trees and dead wood) disturbed during the site preparation should be piled to one side of the drill pad, in a clear area – **not** at the base of larger trees or close to existing infrastructure. They should be told if the area needs to be shaped to create a level

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area if working on the side of a hill or a valley. Extra areas may need to be cleared if the rig needs to turn around etc. Try to limit the area cleared to something practicable as this is what is in the mine regulations, as you stated per your Form 5, and also this needs to be rehabilitated at a later date. Advise the contractor that it is not necessarily a circle of fixed dimension around that peg, but it is mainly where the vehicles are going to be parked in front of the peg, if it is an angled hole only. Show them Appendix 1 so that they get an understanding of the general layout and dimensions required.

Drill pads should be as flat as possible and not exceed a slope of five degrees. All areas around the rig and support vehicles should be free of trip hazards, including rocks and potholes.

Cut and fill pads which drop off down slope will need bunding around the edges to minimise the risk of falling vehicles and personnel. In addition, those on flat ground will need a fire break.

The size of the area to be cleared will be dependent of the drill rig. Minimum pad sizes are:

- **RC** – 20m x 15m,
- **Diamond** – 20m x 20m,
- **Rotary Air Blast (RAB)/Aircore (AC)** – 20 x 10m.

Given the small size of equipment and fast pace of drilling, RAB and AC only require that loose debris and obscuring objects be removed. Major earthwork will not always be necessary.

ALL EARTHWORKS MUST BE SUPERVISED BY A NORTHERN STAR EMPLOYEE TO ENSURE PROCEEDURE IS FOLLOWED AND SITE PREPARATION MEETS REQUIREMENTS.

6.2 Tracks

You may also need to create access to the drill pad. You would have postulated a certain clearing acreage in your PoW and would have allocated part of that to track clearing. Tracks must avoid restricted areas (such as heritage sites) which are to be clearly flagged using Northern Star signs. Personnel competent using the relevant computer program will generate maps which clearly show the coordinates and buffer zones concerning restricted areas, as well as the proposed tracks.

All access tracks to exploration sites should be established using a raised blade and kept to one blade width to minimise the disturbance of topsoil and rootstock. Approval must be sought from the supervisor in charge before any ground disturbing work that may be required is undertaken. Try to limit track clearing where possible by using existing tracks to minimise the environmental impact of exploration activities. Large trees and scrubs should be avoided. Clearing tracks should only be done once alternatives for access have been considered.

RAB and AC do not necessarily need graded tracks, but the most efficient access to the drill site will need to be flagged and driven with restricted areas avoided.

7. DRILL HOLE SUMP PREPARATION

It is a legal requirement that all water coming to the surface during exploration drilling be contained. It is for this reason that sumps must be prepared for each planned exploration drill hole to catch the water table displaced whilst drilling. Particular drilling companies may have preferences for directions and distances. Refer to Appendix 1 or 2 for sump locations.

You will generally want to put it on the side away from the sampling gear (provided this is downhill) so that the offside does not have to walk through a trench or return hose while carrying samples.

The dimensions of the sumps may vary on the amount of water expected to be intersected. If there has been previous drilling, try to find out how much water was intersected to give you an idea of the size of sump required. If there has been no previous drilling, the local station owner or local contractor may have some knowledge of the water table in the area, so ask their advice.

The number of sumps required will vary between drill holes but initial site preparation should have one sump for shallow (<250m deep) RC, RAB and AC holes and two sumps for diamond holes and RC holes planned to depths greater than 250m.

If the hole is going to have a diamond tail then it may be better to set up the drill pad with two sumps and the RC drilling can use one of these.

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A minimum of two sumps are required for diamond drilling because the water that comes out of the hole is recycled, mixed with muds when necessary and pumped back down the hole.

All sumps should run **downhill** whenever possible, which may be at odds with the preferred drilling equipment layout. Talk to the drilling contractor to help devise the safest and best solution.

In some instances (such as RC pre-collar followed by diamond tail) it may be necessary to modify the sump layout to ensure that the water flows into the diamond sump. If this is the case the drill site will require three sumps; one for an RC pre-collar, placed perpendicular to the sighter pegs in line with the proposed collar location to contain water from the outside return of the RC rig, with the remaining two at some other point within the drill site layout for the diamond rig. However if this type of setup is required it is important that there is enough room on the drill pad for samples and safe work areas.

All sumps should be bunded using the material excavated. This serves to add depth to the sumps with no extra material needed, and also to capture an often pressurised outside return. In addition, all sumps should have an egress ramp so any worker or fauna that may accidentally enter the sump can easily get out. Suitable sumps would measure no more than 4 x 2 x 1.5m but can be smaller dependant on hole depth and the amount of expected ground water. A cross section of an ideal sump is provided in the Appendix 3.

Whereas sumps created for RAB, AC and RC are designed to contain ground water (fresh or salty), diamond drill sumps will be used to recycle water mixed with drilling muds which can form a viscous fluid. Therefore, diamond sumps should be covered with netting to prevent fauna from entering the water and becoming stuck.

Prior to removing the earthmoving machinery from the newly excavated site, the earthmoving contractor must have confirmation from the Northern Star Resources site supervisor (or their representative) that the site is excavated to compliance.

8. PERSONAL PROTECTIVE EQUIPMENT (PPE)

The following PPE is required while carrying out drill site preparation. PPE should be inspected regularly to ensure sound working condition. Damaged PPE is not to be used at any time.

- Hard Hat;
- Steel Capped Safety Boots;
- Safety Glasses;
- Hearing Protection;
- Long Sleeve Shirt; and
- Long Trousers.

9. REFERENCES

- Mines Safety and Inspection Act 1994
- Mines Safety and Inspection Regulations 1995
- Site Preparation for a Reverse Circulation (RC) Rig – Digirock Pty Ltd

10. ACCOUNTABILITY

Role	Responsible for:
Exploration Manager	Ensuring this procedure is implemented and adhered to.
Senior Geologist	Ensuring new staff and contractors are inducted and signed off on this procedure.
Senior Field Supervisor	Review and update as required. Assist Senior Geologist with induction and sign off.
Other Employees and Contractors	Compliance with this procedure.

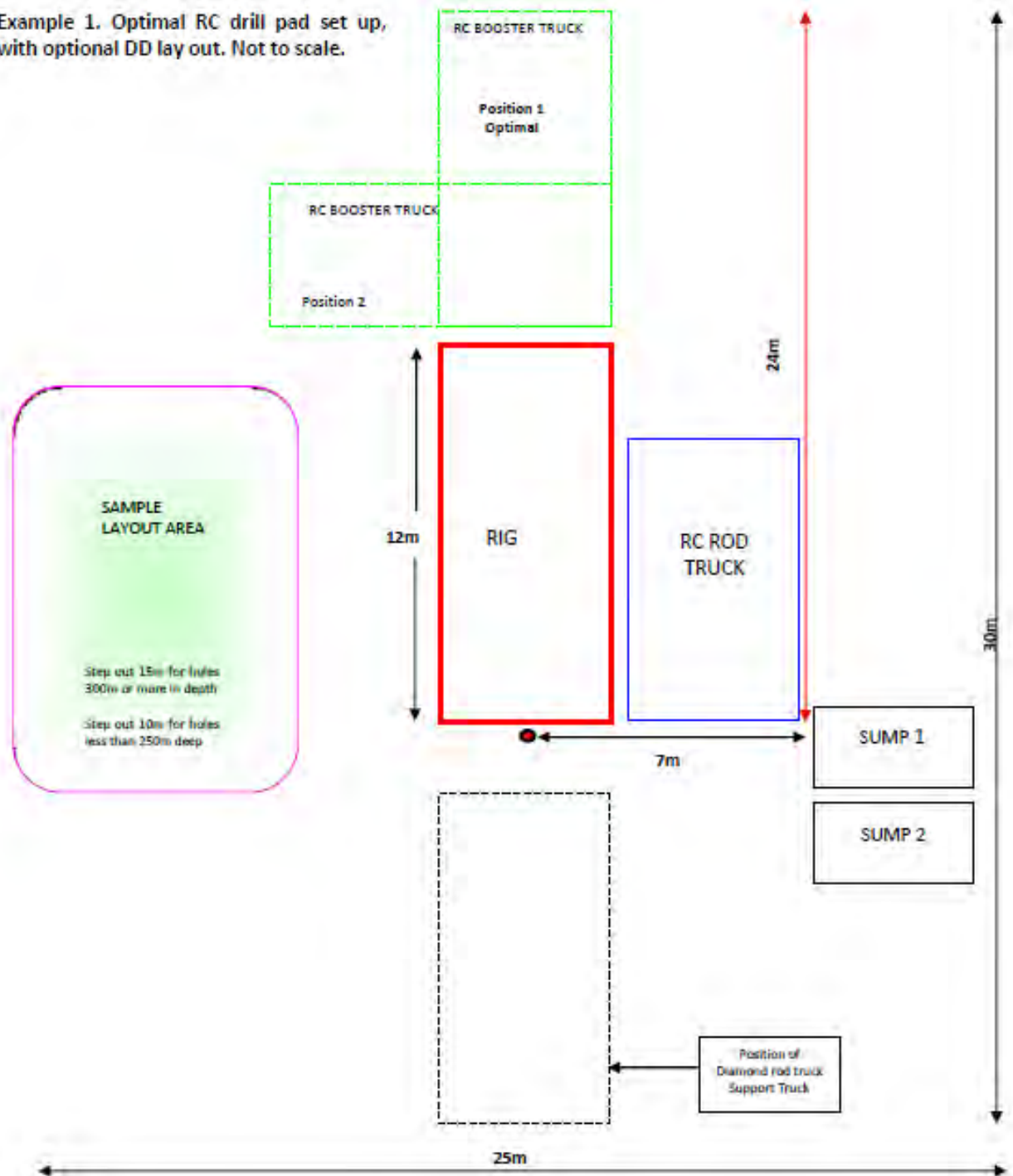
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11. APPENDIX 1 - OPTIMAL REQUIREMENTS FOR EXPLORATION DRILL SITE PREPARATION

Example 1. Optimal RC drill pad set up, with optional DD lay out. Not to scale.



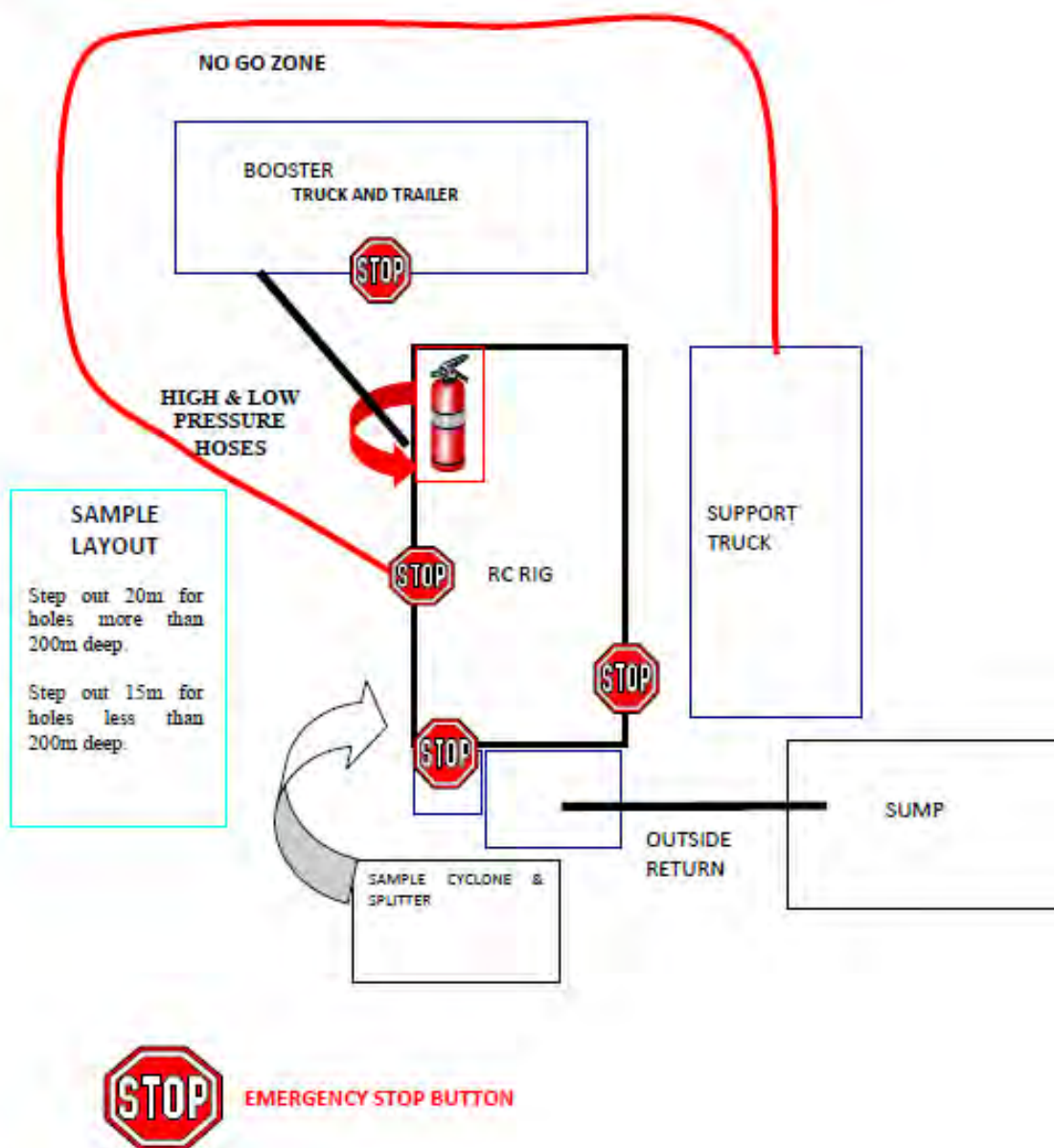
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12. APPENDIX 2 - SAMPLE OPERATION LAYOUTS

Example 1. Typical acceptable RC rig lay out.



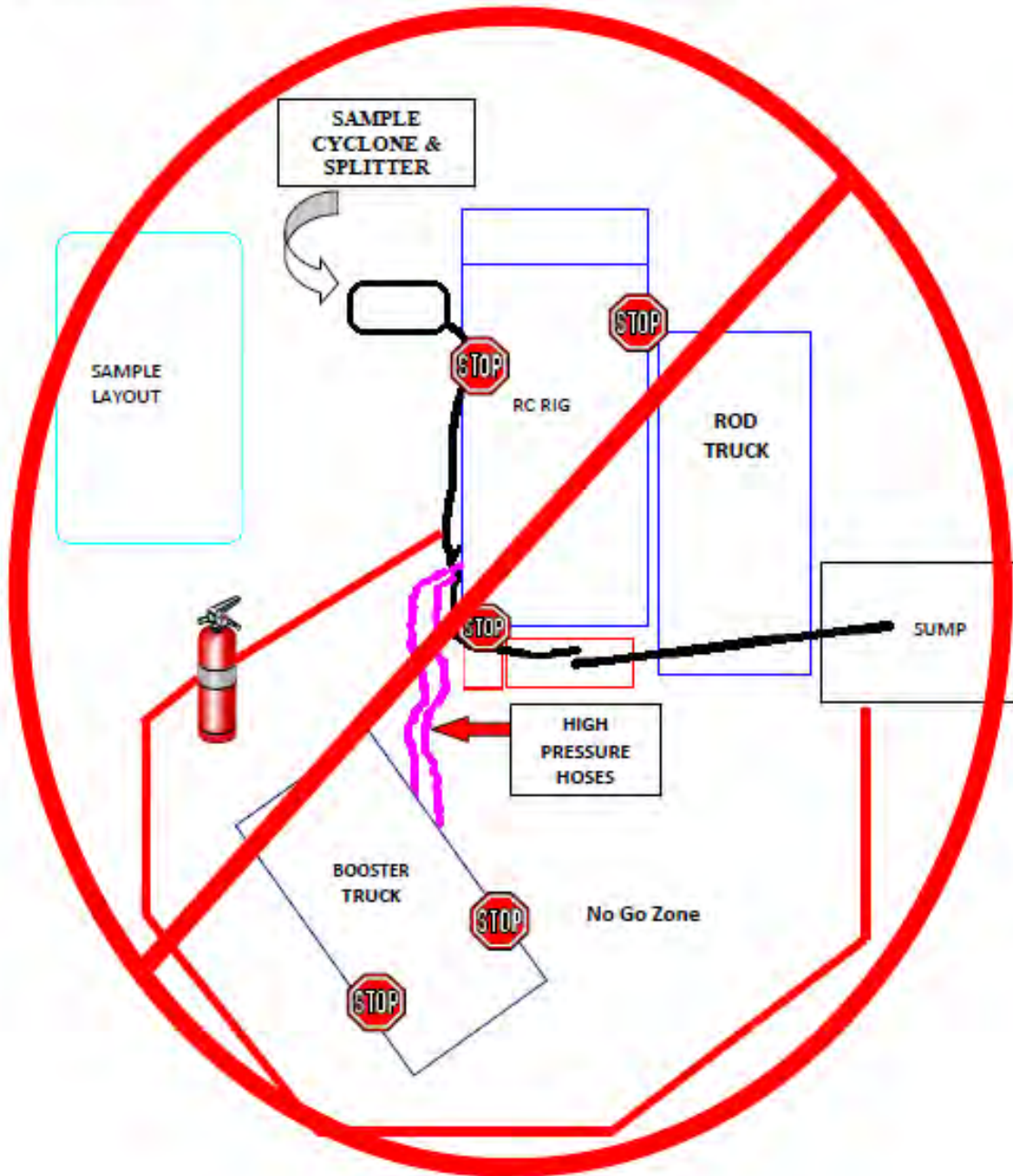
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Example 2. Unacceptable RC drilling lay out. High pressure hoses are near driller and offside.



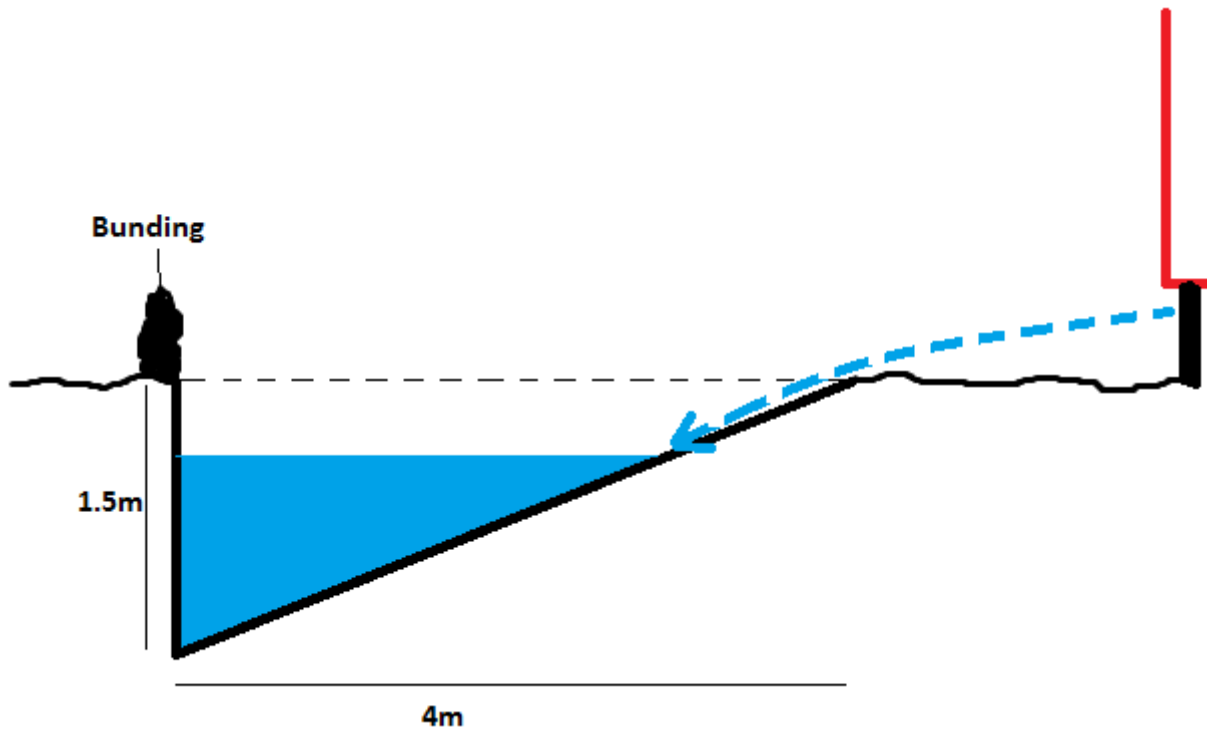
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13. APPENDIX 3 - SUMPS

Example 1 – Cross section of sump showing egress ramp and bunding around the perimeter.



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1. PURPOSE

This Technical Procedure outlines the processes that must be adhered to during drill site rehabilitation.

2. SCOPE

To be used by all Supervising Geologists or Field Assistants employed or contracted by Northern Star Resources Limited (Northern Star or the Company).

3. PURPOSE OF REHABILITATION

Rehabilitation (Rehab) is a means of minimising the footprint left by exploration activities (largely drilling) to ensure the protection of the environment and facilitate its regeneration. Rehabilitation must be complete within six (6) months of finishing drill program. Any alteration or expansion of drilling program must be approved by an Environmental Officer, and the Department of Mines and Petroleum (DMP).

Ideally, pads and tracks have been planned to minimise the time and cost of rehabilitation.

4. BEFORE REHAB CAN COMMENCE

Rehab marks the end of a particular phase of drilling. Before rehab can commence, the particular hole must be 'released for rehab' by the Database Administrators (DBAs) who would will have finished scrutinising the laboratory results and QAQC. The Senior Geologist will then instruct the field crew to begin rehab.

5. REHABILITATING A DRILL PAD

Before beginning rehab, photograph the drill site.

5.1 Collar Rehabilitation (Figure 1)

Drill collars should be plugged once the drill hole is complete and will need to be cut in accordance with rehab guidelines.

- Use a collar cutter to rehabilitate collars.
- When using the manual collar cutter stand squarely in front of the drill hole and use your arms to rotate the cutter, do not use your body.
- Cut the collar off approximately 40 cm below the ground surface.
- Cap the collar with a concrete hole plug and cover with soil leaving a 10 cm high mound over the collar to ensure water does not pond over the collar. Ideally, the covering material should be low-permeability to serve as an additional plug. The soil should be compacted and moulded over the hole to allow for subsidence and prevented water pooling.
- The intention is that water will not ingress the hole causing erosion.
- Un-collared holes will need to be plugged at least 1m below ground.

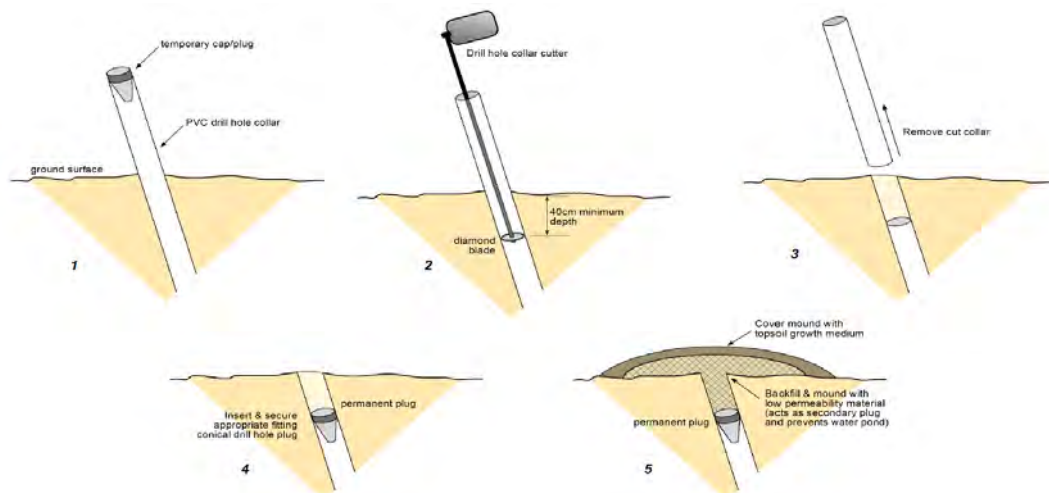


Figure 1 – Diagrams illustrating the requirements for collar cutting.

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5.2 Pads

Dependent on site conditions and surrounding landscape, it may be necessary to conduct earthworks to stabilise and reshape the site. The site should be rehabilitated to as near original condition as possible, following the completion of the drilling program.

Ground which has become compacted by the use of heavy machinery and traffic should be ripped **along contour, not down slope**, to loosen soil to aid revegetation and minimise erosion. A dozer is the best machinery to use.

Earth and overburden that was excavated from the pads should be pushed, raked or pulled back over. The stockpiled topsoil and vegetation should be re-spread over the site and re-seeded if necessary.

Cut and fill drill pads are to be re-shaped around the natural terrain to create a long-term safe and stable landform and promote the regeneration of native fauna.

Any oil contaminated soils or hydrocarbon spills which were not addressed during drilling will have to be bagged and removed to a bio-remediation area.

All sample cuttings and cyclone spoil should be emptied or pushed into the sump. The green plastic bags must be recovered and removed. However, drill sample may be retained in an **approved** sample farm.

The collar location should be marked by a wooden peg. Attached to the peg should be an aluminium tag detailing the hole ID, co-ordinates and relevant survey data.

ALL EARTHWORKS MUST BE SUPERVISED BY A NORTHERN STAR EMPLOYEE.

5.3 Sumps

Once the sumps have dried out and spoil from around the drill pads has been emptied into them, the sump can be backfilled with the excavated soil and vegetation (with slight mounding of the sumps to allow for future settling). The filled sump can then be scarified to encourage regeneration.

Note: If rehabilitating an active work area or an area where cattle graze, safety signage and if appropriate, fencing should be erected around rehabilitated sites (especially sumps) as these areas can become very boggy in heavy rain and the ground underfoot may be unconsolidated.

ALL EARTHWORKS MUST BE SUPERVISED BY A NORTHERN STAR EMPLOYEE.

Take a photograph of the rehabilitated drill pad to accompany the photograph you took before.

6. PERSONAL PROTECTIVE EQUIPMENT (PPE)

The following PPE is required while carrying out drill site preparation. PPE should be inspected regularly to ensure sound working condition. Damaged PPE is not to be used at any time.

- Hard Hat;
- Steel Capped Safety Boots;
- Safety Glasses;
- Hearing Protection;
- Long Sleeve Shirt; and
- Long Trousers.

7. REHABILITATING TRACKS

If a new track has been created, when practicable, rip the tracks. Ripping should be done parallel to the contours of the topography to prevent erosion during run off. However, if further work is planned in the area, leave the main access track. Do not rehab existing station tracks. Avoid driving on rehabilitated tracks.

8. UPDATING THE REHAB REGISTER

Northern Star will keep a record of progress made on rehab. The rehab register must be kept updated and sent to the DBAs.

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9. EXPLORATION REHABILITATION REPORT (APPENDIX 1)

In accordance with DMP guidelines, upon completion of rehab an 'Exploration Rehabilitation Report' must be completed and sent to the relevant environmental department. This serves as a compliance audit.

10. REFERENCES

Mineral Exploration/Rehabilitation Guidelines: Government of Western Australia and Department of Mines and Petroleum Environment.

11. ACCOUNTABILITY

Role	Responsible for:
Exploration Manager	Ensuring this procedure is implemented and adhered to.
Senior Geologist	Ensuring new staff and contractors are inducted and signed off on this procedure.
Senior Field Supervisor	Review and update as required. Assist Senior Geologist with induction and sign off.
Other Employees and Contractors	Compliance with this procedure.

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DRILLING – REHABILITATION TECHNICAL PROCEDURE

12. APPENDIX 1 – EXPLORATION REHABILITATION REPORT

This form has been extracted from the DMP Website.

APPENDIX D

EXPLORATION REHABILITATION REPORT

(Complete upon completion of rehabilitation of the exploration programme and return to the relevant Perth or Kalgoorlie Environmental Inspectorate)

TENEMENT DETAILS

Programme of Works (POW) No. _____ Company: _____

Tenement Nos. and Types:

Date Programme Commenced: _____ Date Programme Completed: _____

Exploration Activity		Y/N or NA	Comments
Drill Holes	Immediate Capping		
	Plugged below ground level		
Drill Pads	Minimal Clearing		
	Rehabilitated		
Sumps	Constructed		
	Topsoil stored separately		
	Ramped		
	Rehabilitated		
Sample Bags	Removed		
	Bag Farm removed		
	Hostile Material eg. acid forming material, heavy metals, naturally occurring radioactive material and asbestoform removed or appropriately buried		
	Rehabilitated		
Hydrocarbons	Spills removed		
	Remediated		
Access Tracks	Access Closed Off		
	Rehabilitated		
Gridlines	Rehabilitated		
Minimal Topsoil Disturbance			
Rubbish & Infrastructure Removed			
Campsite Removed and Rehabilitated			

GENERAL COMMENTS (include any variations to the approved POW or areas not yet rehabilitated)

<i>All statements made and information given is true and correct.</i>

All statements made and information given is true and correct.

Name: _____ Position: _____

Contact Ph: _____ Email: _____

Signature: _____ Date: _____ Page 9 of 13

Department of Mines and Petroleum, Mineral House, 100 Plain Street East Perth, WA 6009,
Tel: +61 8 9222 3333, Fax: +61 8 9222 3862, Email: dmp@dmp.wa.gov.au, Web: www.dmp.wa.gov.au

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DRILL RIG AND DRILL SITE AUDIT

To be performed at pre-commencement and monthly intervals. A copy of the original audit is to be stored at the rig for revision and updated as required.

<i>DOCUMENT OWNER:</i> GM Exploration		<i>PREPARED BY:</i> Greg Mills			
<i>Title</i> DRILL RIG AND DRILL SITE AUDIT PRE COMMENCEMENT INSPECTION	<i>Date Effective</i> 15 APRIL 2014	<i>Revision</i> 1.0	<i>Set Review</i> 3 Yearly	<i>Planned Review</i> June 2016	<i>Page</i> 1 of 21
Approved By	Revision	Date	Initial		
General Manager Exploration Safety Representative	1.1	17/2/15	P.T G.M		
	1.2	29/5/2105	GM		

This audit

Item	Description	Please ✓		Comments / Action
SECTION 1. SITE PREPARATION				
1.1	Tracks to the drill site are suitable for drilling, support and emergency vehicle access.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.2	Escape routes are available in high risk areas. <i>(e.g. risk of bushfire, flash flood)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.3	Access routes to the drill site clearly marked for emergency vehicles to navigate to the drill site.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.4	All land disturbance (tracks, pad, sumps) is limited to that necessary for safe operation and conforms with approvals and conditions of the Authorisation.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.5	A traffic management plan has been implemented, including the designation of parking areas. <i>(e.g. steep terrain, poor oncoming visibility on access tracks)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.6	If working in the proximity to open pits there are no signs of cracking or ground instability.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.7	The prepared ground and constructed drill pads are level, stable and solid enough to support the rig on stabilisers.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.8	The drill pad is clear of hazards and has a suitable surface to work on	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Title	Date Effective	Revision status	Set Review	Planned Review	Page
DRILL RIG AND DRILL SITE AUDIT PRE COMMENCEMENT INSPECTION	15/4/14	1.2 29/5/15	3 yearly	15/4/17	2 of 21

Item	Description	Please ✓		Comments / Action
1.9	Overhead powerlines, overhanging vegetation, underground services and other obstructions have been clearly identified.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.10	The drill rig, service vehicles and plant are positioned to minimise exposure to hazards. <i>(e.g. sump, edge steep drop, outside return)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.11	Check drill site and immediate surrounds for the presence of weeds. Note presence and inform environment officer for removal/spraying.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.12	Where required, edge protection bunding is in place for the drill site.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.13	Sumps have been constructed to contain all drilling fluids. <i>(Ensure capacity is adequate to prevent overtopping due to rain events)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.14	Sumps are barricaded and fauna netted if required. Sumps have an point egress for fauna should anything enter the sump.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.15	Safety and warning signs are present, clear, legible and suitably located.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
1.16	Indications that clearing is contributing to unacceptable rates of erosion/sedimentation (e.g. along access tracks).	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 2. SAFETY CONTROLS				
2.1	At least two emergency stops are installed for the drill rig, and there is a testing regime in place. <i>(view records)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.2	All sources of potential energy are identified and isolated when performing maintenance or repairs. <i>(view procedure)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.3	All sources of stored energy are identified and isolated when performing maintenance or repairs on pressurised systems. <i>(view procedure)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.4	Fire-fighting resources are available and adequate for the fire risk potential at the drill site. <i>(e.g. drilling in long grass)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.5	Is there sufficient and fit for purpose PPE at the rig.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Title	Date Effective	Revision status	Set Review	Planned Review	Page
DRILL RIG AND DRILL SITE AUDIT PRE COMMENCEMENT INSPECTION	15/4/14	1.2 29/5/15	3 yearly	15/4/17	3 of 21

Item	Description	Please ✓		Comments / Action
2.6	All vehicles at the site are parked in a fundamentally safe way. <i>(e.g. wheels turned into window on hills or chocked)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.7	Are all controls, gauges and labels on the drillers console in good order, labelled and easy to read	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.8	Have all the drill crew been inducted for the relevant NSR site	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.9	Have all the NSR geological crew been inducted on the rig.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.10	Has a risk assessment been conducted for the drill programme? <i>(copy of risk assessment should be at rig)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.11	Are all aware of the findings of the risk assessment	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.12	Is the driller informed of the drill programme parameters	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.13	Is the driller satisfied the rig and equipment are appropriate for the programme	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.14	Is there adequate drilling equipment, tools, spares and supplies to complete work safely without undue delay.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.15	Do the rig and support vehicles have adequately stocked first aid kits with contents in serviceable date. <i>(view 1st aid kits)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.16	Are the driller and crew adequately experienced for the type of drilling being conducted or type of location asked to drill in. <i>e.g. steep terrain or angle drilling</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.17	Have all the drill crew been trained to Senior First Aid level	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.18	Does the rig have adequate fire extinguishers (minimum of 2 x 9kg)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.19	Are the extinguishers tagged (within 6 months) and showing green on the gauge? <i>(check 2 at random)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.20	Where practicable, an automatic fire suppression system is installed on each item of plant. <i>(e.g. Rig, Booster)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

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2.21	Has the fire suppression system been inspected in the last 12 months <i>(verify date from drillers records)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.22	Are fire suppression emergency buttons accessible and well labelled	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.23	Can the rig stabilisers be locked or do they have over centre valves	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.24	Are ladderways and walkways in good condition and have adequate toe room on steps. All ladderways, stairs and elevated walkways must have hand rails in place	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.25	A comprehensive pre start is conducted daily on the rig	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
2.26	An emergency muster point is defined for each drill site and all are aware of its location	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 3. ROTATING, MOVING AND HOT PARTS				
3.1	Are all moving, rotating and hot parts guarded or shielded, or has a risk assessment been conducted to identify any hazards associated with rotating and moving parts, and assess the risks of an employee being exposed to those hazards. <i>(view risk assessment if not guarded)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
3.2	Where required, an action plan with due dates and responsibilities has been developed for the installation, modification or replacement of guarding.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
3.3	A competent person regularly reviews drilling operations to ensure the adequacy of guarding and systems of work for rotating, moving and hot parts.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 4. COMPRESSED AIR SYSTEMS				
4.1	Hoses, couplings, seals and air lines are appropriately rated for the compressed air system being used and are in good condition	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Item	Description	Please ✓		Comments / Action
4.2	Where practicable, engineered systems with designated connection points are installed.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.3	At least one emergency stop is installed for each auxiliary compressor unit, and there is a testing regime in place. <i>(view test records)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.4	An air pressure relief system is installed for each compressed air line.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.5	A competent person regularly inspects the compressed air system, and takes immediate corrective action where necessary.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.6	Air receivers and pressure relief valves are regularly inspected, tested and certified by a competent person. <i>(view certification, take copy)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.7	Fit-for-purpose restraining devices are installed on each compressed air hose. <i>(e.g. whip checks)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.8	The anchor points for restraining devices are appropriately rated and fit-for-purpose.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.9	Blockages in compressed air systems are removed according to a safe system of work. <i>(view procedure)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.10	There is a preventative maintenance program in place for compressed air systems. <i>(view records)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.11	Access to high-risk areas associated with compressed air systems is restricted.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.12	Compressed air is only used for appropriate purposes.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.13	Sample return hose is restrained from whipping	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
4.14	Outside return is setup to prevent projectile damage to personnel or equipment	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

SECTION 5. HYDRAULIC SYSTEMS AND HOISTING EQUIPMENT

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Item	Description	Please ✓		Comments / Action
5.1	Pipework, hoses, couplings, seals and hydraulic lines are appropriately rated for the hydraulic system in use and are in good condition	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.2	Where practicable, non-flammable and non-toxic hydraulic fluids are used.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.3	Where practicable, engineered systems are installed and hydraulic hoses and lines are shielded against wear.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.4	Where practicable, screens are installed or hoses and lines configured to minimise interaction with hot components or electrical sources.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.5	A competent person regularly inspects the hydraulic system, and takes immediate corrective action where necessary.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.6	There is a safe system of work to search for or confirm hydraulic leaks that does not involve the use of hands or fingers. (view procedure)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.7	There is a preventative maintenance program in place for hydraulic systems.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.8	Access is restricted to high-risk areas associated with hydraulic systems.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.9	All hydraulic controls on the drillers console are clearly labelled and identified	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.10	Are pressure gauges in good condition and easily read	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.11	Are hydraulic lines spiral wrapped, clamped or supported.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.12	Is the mast sound, no obvious cracks, loose or missing bolts	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.13	Is the mast adequately supported by hydraulic rams and locking pins	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

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5.14	Are hoisting cables, winch ropes, wirelines in good condition (e.g. no kinks, frays or broken wires)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.15	Are pulleys and chains in good order and lubricated	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
5.16	Is all lifting equipment in good order and stamped with WLL ratings	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 6. HAZARDOUS SUBSTANCES AND DANGEROUS GOODS				
6.1	A hazardous substances and dangerous goods inventory is maintained and reviewed regularly, and reduced where practicable.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.2	Current material safety data sheets (MSDS) are available for all products used on site. (select min 2 items and inspect MSDS for items)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.3	Control and response measures are in place to manage the uncontrolled release of hazardous substances and dangerous goods.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.4	Containers, hoses, couplings, seals and lines are rated for the substance in use.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.5	Hazardous substances and dangerous goods are stored and handled safely.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.6	Screens are installed or hoses and lines configured to avoid interaction of flammable substances with hot components and ignition or electrical sources.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.7	Where practicable, self-bunded containers, banded pallets or portable bunds are used for hazardous substances or dangerous goods. (must be banded if stored at laydown area)	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.8	Appropriate fire-fighting equipment is available where flammable substances are stored and used.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.9	There is a preventative maintenance program in place for all	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

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	flammable substance systems. <i>(e.g. inspection of containers)</i>			
6.10	Sufficient spill response equipment is available to deal with a complete failure of the largest container of hazardous substances or dangerous goods.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.11	Spills of hazardous substances or dangerous goods are cleaned up immediately and cleaning aids disposed of appropriately. Any spills are reported immediately	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.12	Appropriate personal protective clothing and equipment (PPE) is provided to avoid contact when handling hazardous substances or dangerous goods.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.13	All hazardous materials are in the manufactures labelled containers or a suitable fit for purpose labelled containers. <i>(e.g. Not drinking water containers)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
6.14	Is the drill crew trained in the handling of hazardous substances and the correct selection and application of PPE	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 7. ELECTRICAL EQUIPMENT				
7.1	Electrical work is undertaken only by licensed electricians.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7.2	Electrical equipment and installations are correctly isolated before maintenance or repair work commences.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7.3	Safety switches and residual current devices (RCDs) are used.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7.4	Voltage reducing devices (VRDs) are used on welding equipment.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7.5	There is an electrical inspection, testing and tagging program in place to ensure electrical equipment and safety devices are maintained in good working order by a competent person.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7.6	Electrical equipment is rated for the expected working conditions.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

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7.7	The site plan allows for the appropriate placement of electrical equipment and cables.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7.8	There is a safe system of work for using electrical equipment and systems under all conditions likely to be encountered.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7.9	All portable electrical equipment is in good order and has a current inspection tag.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
7.10	All lighting towers, caravans, gensets, power distribution boards, RCD's, 12v to 240v vehicle inverters or other fixed electrical plant MUST be inspected by a qualified electrician for integrity and earthing before being used on an NSR mine site or project. Exemptions must be sort from the General Manager Exploration	<input type="checkbox"/> Yes	<input type="checkbox"/> No	Previous non-compliance has had potential for fatality. MUST be passed out before use.
SECTION 8. MANUAL TASKS				
8.1	Where practicable, hazardous manual tasks are eliminated or mitigated through the use of engineering controls.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
8.2	There is a safe system of work to reduce the risk of injury to personnel from hazardous manual tasks associated with drilling activities. <i>(view procedures e.g. running samples)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
8.3	There is a safe system of work to reduce the risk of injury to personnel from hazardous manual tasks associated with handling loads.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
8.4	There is a safe system of work to reduce the risk of injury to personnel from hazardous manual tasks associated with using hand tools, plant and equipment. <i>(e.g. rod breakout)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
8.5	There is a safe system of work to reduce the risk of injury to personnel from hazardous manual tasks associated with tyre changing and repairs.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
8.6	There is a safe system of work to reduce the risk where personnel are likely to be exposed to repetitive tasks or vibration.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

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8.7	Non-engineered or modified tooling is not used.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
8.8	There is a safe system of work to ensure work at night can be performed safely.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 9. WORKING AT HEIGHT				
9.1	Where practicable, working at height hazards are eliminated through the use of engineering controls.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
9.2	There is a safe system of work for working at height, including rescue plans. <i>(view procedures)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
9.3	Where practicable, alternative means of access are provided rather than working at height.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
9.4	Areas of fall risk are controlled with edge protection, handrails or other engineering controls.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
9.5	There is a fall protection system in place for tasks that involve working at height.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
9.6	Driller and offsiders are trained in working at heights and use of fall arrest equipment.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
9.7	Fall arrest equipment is certified and in good condition <i>(inspect harness and lanyards for condition and suitability)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
9.8	A system is in place for inspection of fall arrest equipment prior to use	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 10. FALLING OBJECTS				
10.1	A competent person regularly inspects rig components, and takes immediate corrective action to eliminate the hazard of falling objects.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
10.2	There is a preventative maintenance program in place for rig components. <i>(e.g. inspection of diverter box mounts)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
10.3	Where practicable, components with high risk of falling are	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

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	secured with a restraint.			
10.4	Work tasks are planned and “working at height” toolkits used to minimise the requirement for tooling deployed at height.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
10.5	Where practicable, attachment points are provided to secure tools with a lanyard.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
10.6	Drop zones are adequately delineated to restrict access underneath work area.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 11. WORKING IN HOT ENVIRONMENTS				
11.1	There is a system in place to prevent heat-related illness.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
11.2	All personnel are aware of the underlying causes of heat strain, recognise its symptoms and know how to respond.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
11.3	Personnel at risk from heat stress are monitored for signs of heat strain.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
11.4	Where practicable, weather protection and cool rest and recovery areas are provided.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
11.5	There is a safe system of work for new employees and those returning to work after a break to acclimatise to working in hot environments.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
11.6	Where practicable, hours of work are scheduled so that physically demanding work is done in cooler periods of the day.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
11.7	All personnel are provided with clothing suitable for the environment.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 12. FATIGUE AND WELLBEING				
12.1	There is a safe system of work to prevent fatigue and support mental wellbeing at the workplace. <i>(e.g. scheduled breaks or rotations)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Item	Description	Please ✓		Comments / Action
12.2	There is a fatigue management plan for exploration activities and all personnel are trained in its application.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
12.3	All personnel are aware of the underlying causes of fatigue and stress, can recognise the symptoms and know how to respond.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 13. AIRBORNE CONTAMINATES AND GASES				
13.1	There is a general dust management plan and all personnel are trained in its application.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
13.2	Where fibrous, radioactive or toxic minerals may be present, the dust management plan incorporates a management plan for them.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
13.3	There is a safe system of work for monitoring and managing hazardous gases released during drilling, and personnel are trained in detection and device application.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
13.4	If there is a likelihood of encountering fibrous, radioactive, toxic metal-bearing minerals or hazardous gases, all the drilling crew is aware and know how to respond.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
13.5	Where practicable, wet drilling methods are used in areas identified as high-risk for fibrous minerals and other airborne contaminants.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
13.6	Where wet drilling is not possible for control of airborne contaminants, suitable PPE is available and used.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
13.7	Where practicable, dust produced by drilling is collected and contained or dust suppression methods used.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
13.8	Where dust collection and containment are not practicable, dust is directed away from areas where personnel may be present.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
13.9	All personnel exposed to atmospheric contaminants are fit tested and trained in respirator use.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
13.10	Disposable P2 respirators are replaced regularly to prevent build-up of dust.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

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SECTION 14. NOISE				
14.1	There is a noise control plan.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
14.3	Noise suppression devices and techniques are used.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
14.4	Where the noise exposure standard could be exceeded, hearing protection is provided to enable effective communication.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
14.5	Prominent signage delineates areas where hearing protection is required.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
14.6	Noise labels are attached to items of fixed plant, where appropriate.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
14.7	There is a hearing protection procedure in place and all personnel know when and where hearing protection is required.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
14.8	All exposed personnel are fit tested and trained in hearing protection use.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 15. RADIATION				
15.1	A radiation management plan approved by the State Mining Engineer and Radiological Council is in place for uranium, thorium or mineral sands exploration.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
15.2	Where a nuclear borehole logger is used all personnel at the site are aware and trained in radiation safety to avoid exposure.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 16. HOT WORK				
16.1	There is a safe system of work for hot work.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
16.2	Hot work is not undertaken when total fire ban conditions exist.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
16.3	Hot work is restricted to specially designated areas that, where practicable, are within the line of sight of other crew members.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

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16.4	Fuel and ignition sources are minimised at the work area.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
16.5	The drill crew is aware of any Northern Star Resources requirements for a hot work permit to be issued prior to commencing hot work.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 17. EXTREME WEATHER AND BUSHFIRES				
17.1	Incident management and emergency response plans are in place to deal with severe weather events and bushfires, and all personnel know how to respond.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
17.2	Severe weather events and bushfires are tracked and monitored.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
17.3	All personnel are aware of the likelihood of flooding or flash flooding, and know how to respond.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
17.4	There is a safe system of work so personnel are not exposed to lightning strikes.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
17.5	If there are signs of suspected lightning strike, plant and equipment are checked for damage before use. <i>(Must be isolated for 24hrs)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
17.6	There is a safe system of work for crossing of watercourses.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
17.7	There is a safe system of work to ensure loose objects are anchored or secured and do not become projectiles in high winds.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 18. LIGHT VEHICLES AND PLANT				
18.1	The original equipment manufacturer (OEM) recommendations for light vehicle inspection and maintenance are followed.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
18.2	Light vehicle modifications and load configurations are assessed to determine their likely effect on stability and profile, and address risks.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

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18.3	There is a safe system of work to manage the ground, road and weather conditions likely to be encountered by light vehicles. <i>(e.g. toolbox meetings)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
18.4	A daily pre start is conducted on all vehicles and plant	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
18.5	All vehicles have current registration	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
18.6	All vehicles are in roadworthy condition	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 19. HEAVY VEHICLES				
19.1	The OEM recommendations for rig movement are followed.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.2	Rig modifications are assessed to determine their likely effect on stability, design specifications and profile, and address risks.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.3	There is a safe system of work to manage the ground, road and weather conditions likely to be encountered by heavy vehicles.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.4	Changes to ground, road and weather conditions that may affect heavy vehicle movement are monitored.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.5	There is a safe system of work for manoeuvring drill rigs and equipment, including identifying the roles and responsibilities of designated spotters.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.6	There is a preventative maintenance program in place to avoid in-transit damage to heavy vehicles.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.7	After rig movements, a pre-start check of the rig and its components is undertaken by a competent person.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.8	All batteries and cables in good condition and secured	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.9	If a support fuel tender is in use does it have an auto shut off nozzle	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

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19.10	Is there a secure anchor point for the fuel nozzle	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.11	Do all heavy vehicles have rated anchor points to safely enable recovery manoeuvres	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.12	Is suitable and rated recovery equipment carried on board	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.13	Is there a procedure or JHA for the recovery of heavy vehicles	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.14	A daily pre start is conducted on all heavy vehicles	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.15	All heavy vehicles have current registration	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
19.16	All heavy vehicles are in roadworthy condition	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 20. REMOTENESS OF EXPLORATION DRILLING				
20.1	There is a safe system of work to plan and monitor travel to and from work in remote locations.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
20.2	Communication, emergency response and incident management plans are in place that reflect the remote conditions and address operational needs, and ensure personnel are trained in their application and how to use the equipment.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 21. HOUSEKEEPING				
21.1	The site plan allows for the orderly movement of personnel, equipment and materials.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
21.2	Tools and equipment are properly stored after use.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
21.3	Daily inspections and clean-ups are undertaken.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
21.4	There are designated areas for storage and rubbish disposal.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

Item	Description	Please ✓		Comments / Action
21.5	There are designated areas for eating and ablutions. <i>(all human waste must be buried)</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
21.6	At the completion of drilling, drill holes are plugged and all rubbish, hydrocarbon spills are removed to approved locations	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
21.7	All vehicles are clean and well presented. <i>(Attention paid to indications of fluid leaks and/or build-up of mud/dirt that may transport weeds).</i>	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
21.8	Confirm all vehicles and plant have been washed down for dirt/mud, seeds upon arrival on site at wash down bay.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
21.9	No trip hazards are present at the drill site.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
21.10	Hydrocarbon waste management is accordance with site procedures.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
SECTION 22. TOOLS AND LIFTING EQUIPMENT				
22.1	All tools are fit for purpose, not modified, are complete as to manufactures specifications and in good working condition.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
22.2	All lifting equipment is rated for the task, stamped with WWL/SWL, in good working condition, not damaged, fatigued or damaged Equipment is stamped and in date of a certified inspection.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
22.3	Breaker bars or extended leverage are not used	<input type="checkbox"/> Yes	<input type="checkbox"/> No	
22.4	All pressurised gas cylinders stored upright are adequately secured from falling. Cylinders are in date and in good condition.	<input type="checkbox"/> Yes	<input type="checkbox"/> No	

SIGN OFF SECTION

Northern Star Auditor:	Name	Sign	Drilling Company:	Name	Sign
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Title	Date Effective	Revision status	Set Review	Planned Review	Page
DRILL RIG AND DRILL SITE AUDIT PRE COMMENCEMENT INSPECTION	15/4/14	1.2 29/5/15	3 yearly	15/4/17	18 of 21

Signature		Driller Name:	
Date:		Signature:	
Follow Up Actions Date:		Drill Rig No.	

A copy of this document should be retained at the rig for guidance and referral for improvements if required.

REMEDIAL ACTION REQUIRED	By Who	By Date

<i>Title</i>	<i>Date Effective</i>	<i>Revision status</i>	<i>Set Review</i>	<i>Planned Review</i>	<i>Page</i>
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<i>Title</i> <i>DRILL RIG AND DRILL SITE AUDIT</i> <i>PRE COMMENCEMENT INSPECTION</i>	<i>Date Effective</i> <i>15/4/14</i>	<i>Revision status</i> <i>1.2 29/5/15</i>	<i>Set Review</i> <i>3 yearly</i>	<i>Planned Review</i> <i>15/4/17</i>	<i>Page</i> <i>21 of 21</i>
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SITE DISTURBANCE PERMIT

Permit Number:			
Name:		Date:	
Department:		Phone:	
Equipment in use i.e. Excavator:			
<p>All sections of the Disturbance Permit shall be completed and authorised before commencement. Only work documented within this Disturbance Permit may be performed. If disturbance work extends beyond the scope of this document a revised permit is to be acquired. In all disturbance activities best efforts must be made to minimise disturbance to natural bushland where possible.</p>			
1. Detailed Procedure:	Yes	No	Reference#/Procedure
Is a Job Hazard Analysis required?			
If so, has the Job Hazard Analysis been completed?			
Machine operator suitably qualified for the work?			
2. Location of work:		For detail, attach map if necessary: <input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Scope/Reason for work:			
4. Excavation method to be used:			
5. Excavation Dimensions:	Length:	Width:	Depth
6. Supervisor/Manager Approval Checklist			
Services		Comments	
Identify any current or historical services? <input type="checkbox"/> Yes <input type="checkbox"/> No			
If yes, have delineations been set on the ground? <input type="checkbox"/> Yes <input type="checkbox"/> No			
Heritage			
Works covered by a Sacred Site Clearance Certificate?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
Are there any Restricted or No Work Areas?		<input type="checkbox"/> Yes <input type="checkbox"/> No	
If yes, what is the Certificate number?		If yes, has a map or delineation been provided? <input type="checkbox"/> Yes <input type="checkbox"/> No	
Department Of Mines And Energy			
What Exploration/Mining MMP covers these works?			
Environment			
Is the work within drainage or natural water courses? <input type="checkbox"/> Yes <input type="checkbox"/> No		IF YES, THIS WORK CANNOT PROCEED WITHOUT DME APPROVAL	
Is there any evidence of burrowing, fresh tracks or scat from threatened species as defined within the CTP Site Induction? <input type="checkbox"/> Yes <input type="checkbox"/> No		IF YES, THIS WORK CANNOT PROCEED – SEEK ADVICE FROM YOUR SUPERVISOR	
EXCAVATION SITE APPROVAL			
I authorise the work defined in the scope of work to commence			
Supervisor or Delegate Name:			
Signature:			
Date:			
AUTHORISATION/ACCEPTANCE:			
I have answered and understood all questions and checked Environmental & Cultural aspects & documented precautions that must be taken prior to signing on			
Permit Holder Name:			
Signature			
Date:			

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HYDROCARBON AND CHEMICAL SPILL CLEAN UP PROCEDURE

1. PURPOSE

The purpose of this procedure is to describe actions to be taken when a hydrocarbon or chemical spill is identified, along with post-spill actions. It is imperative that the appropriate response is carried out in order to prevent any potential environmental or safety impacts.

2. STANDARDS OR OBJECTIVES

To minimise the impact of hydrocarbon or chemical spills on the environment.

3. RESPONSIBILITY

The Site Manager or delegate shall:

- ensure that relevant action is taken to minimise the potential for hydrocarbon and chemical spills;
- provide resources to stop the source and contain the spill promptly when required;
- ensure that the spill is cleaned-up and that bioremediation treatment is undertaken in accordance with this procedure;
- ensure that the technique used to stop the flow of the spill is undertaken in a safe manner and that advice and facilities are provided to mitigate any potential for explosion or fire;
- ensure that CTP staff and contractors receive training and are competent to follow this procedure;
- report the incident to relevant authorities where required; and
- ensure that an Environmental Incident Report is completed and corrective action is implemented as required.

The Environmental Officer shall:

- provide technical advice and physical assistance for the clean-up of the spill and for treatment of contaminated material following advice obtained from relevant authorities (if deemed necessary);
- participate in the investigation of spill incidents and implementation of correction actions;
- monitor the spill register located in the spill kit of the fuel bowser at minimum weekly;
- clean up and report all orphan spills;
- monitor the progress of bioremediation of all spills and till regularly as required;
- monitor supplies of spill equipment and materials on a monthly basis and replenish when stocks require;
- ensure the incident is reported to management;
- review and update this procedure as required (at minimum annually);
- manage and direct the storage and disposal of contaminated material when required in coordination with the Site Manager; and
- advise relevant authorities and report where required.

All staff and contractors shall:

- ensure that immediate action is taken to stop the source, contain the spill and clean up the spill provided it is safe to do so and report the spill in accordance with this procedure.
- Report any spills to supervisors or Environment department staff as soon as practicable after a spill has occurred.

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HYDROCARBON AND CHEMICAL SPILL CLEAN UP PROCEDURE

4. DEFINITIONS

A spill is defined as a loss of hydrocarbon or chemical where contamination of soil, land or water occurs.

Bioremediation (or biological remediation) is defined as the natural breakdown of fuels, oils and other hydrocarbons.

5. PREVENTION

Best management practices should be implemented to minimise the potential for spills as detailed below.

- Fuel is stored in self-bunded isotainers designed to comply with Australian Standard AS1940 and AS1692;
- Drums of hydrocarbons or other chemicals are to be stored on portable bunds at all times;
- Take care to avoid spillage when refueling directly from the fuel bowser to a vehicle, machinery or storage container (e.g. a drum);
- When transferring fuel from a storage container to a vehicle or machinery, do so slowly and cautiously to avoid spillage; and
- When two or more people are involved in fuel transfer (e.g. from a barge) ensure commands are explicitly clear and concise to avoid any miscommunication that may lead to spillage.

6. CHEMICAL SPILLS

The response for a chemical spill will vary depending on the properties and volume of the chemical. If a spill occurs the SDS should be reviewed immediately following its containment and the Site Manager.

7. SPILL CLEAN UP EQUIPMENT

All work areas are required to have spill kits specifically designed for the hydrocarbons or chemicals within their work area. Absorbent materials (mats and peat moss) are a stock item and available from the CTP stores. All work areas are required to have a shovel and broom to help spread and collect absorbent material when cleaning up a spill.

7.1 Hydrocarbon spills PPE Requirements

- As a minimum the PPE required may include:
- Hydrocarbon spills;
- Standard riggers gloves or similar; and
- Safety Glasses.

7.2 Chemical Spills PPE Requirements

Note: PPE requirements for chemical spills will be dependent on the nature of the chemical. Check the Safety Data Sheet (SDS) for specific PPE requirements before cleaning up any spill.

- Elbow length chemical gloves;
- Goggles;
- Full face respirator; and
- Disposable overalls.

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HYDROCARBON AND CHEMICAL SPILL CLEAN UP PROCEDURE

8. SPILL RESPONSE PROCEDURE

When a spill does occur, the primary responses should be to stop the source, contain the spill, clean up and report. It may be necessary to alert additional resources for assistance depending upon the size and nature of the spill.

Spills of hydrocarbons and chemicals can occur in many ways and no matter what the size must be cleaned up immediately. The general response to hydrocarbon and chemical spills is to follow the 3 C's (Control, Contain & Clean-up) principle.

- **Control** the spill by isolating the source, i.e. switching the pump off, closing the valve.
- **Contain** the spill by creating a bund/barrier to minimise the total area impacted. This could be achieved by applying a material to soak up the hydrocarbon/chemical, creating an earth wall or using absorbent booms.
- It may be necessary to block drains or other infrastructure to contain a spill.
- **Clean-up** the spill using the hydrocarbon or chemical spill cleanup kits.

8.1 Alert

Before attempting to control spill the area must be safe to do so and additional resources contacted if required. A guide is provided below however staff should always call for assistance if in doubt or a greater risk to human health or the environment is perceived.

When alerting someone, follow the emergency response procedures:

- Remain calm;
- Ensure the safety of yourself then the safety of others;
- Raise the alarm via radio or satellite phone clearly stating the following:

"Emergency Emergency Emergency";

Your name;

Location of emergency;

Nature of emergency; and

Assistance required.

- Confirm message has been understood;
- Do not terminate the call until advised to do so;
- If you are not at risk and competently trained, try to control the emergency by using systems available to you;
- If the risk to your safety is unacceptable, evacuate to a safer location; and
- If you are notified of an emergency, you should proceed to the Muster Point and following commands from the Site Emergency Controller.

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HYDROCARBON AND CHEMICAL SPILL CLEAN UP PROCEDURE

Size of spill	Alert (who and when)	Reporting (who and when)
0 -1 litres or < 30cm in diameter	Staff to alert Supervisor by the end of shift	Staff to record on spill register located in spill kit near refueling bowser.
1-20 litres	Staff to alert Supervisor by the end of shift. Supervisor to alert Environmental Officer by the end of shift.	Staff to complete Quick Spill Card by the end of shift and submit to Site Manager or Environmental Officer.
More than 20 litres	Staff to alert Supervisor and/or Site Manager immediately following Emergency Response Procedures. Site Manager or delegate must report to Authorities within 24 hours if the spill is greater than 200 litres or in an ecologically sensitive environment.	Staff to complete Environmental Incident Report in INX by the end of shift and notify Site Manager or Environmental Officer.

8.2 Control the Source

- Before attempting any spill clean-up ensure the area is safe. Be aware of fumes. Approach from upwind;
- If safe to do so, the source of the spill should be restricted or stopped (eg if a valve is inadvertently left open, it should be closed, if safe to do so);
- If the source is manually controlled by a co-worker (e.g. vehicle refuelling in mining areas) then communicate with controller to immediately stop source;
- If you are not at risk and competently trained, try to control the emergency by using systems available to you;
- If the risk to your safety is unacceptable, evacuate to a safer location; and
- If you are notified of an emergency and directed to do so proceed to the Muster Point and following commands from the Site Emergency Controller.

8.3 Contain and Clean up

Hydrocarbons generally float on water and thus containment and clean-up procedures differ for land and water spills as detailed below.

8.3.1 RECOMMENDED PROCEDURE FOR SPILLS ON SOIL OR HARDSTAND AREAS

- Locate spill station;
- Use absorbent booms to surround as much of the spill as possible. Unless the soil is extremely compacted or wet, little sideways movement should occur. However, to minimise spread of contamination, place booms around the spilled material;
- The remaining spill area should then be covered with a layer of absorbent material which will absorb free liquid. A rake can be used to help spread the absorbent material.
- Await further instruction from the Site Manager or Environmental Officer.

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HYDROCARBON AND CHEMICAL SPILL CLEAN UP PROCEDURE

- If the standard spill kit absorbent material (e.g. peat moss) is used then the material should be cleaned up following procedures detailed in spill kit.
- Where contamination has penetrated to depths that cannot be filled, excavation may be required. In this situation, the Site Manager shall organise for the contaminated soil to be land-farmed on site.

8.3.2 RECOMMENDED PROCEDURE FOR SPILLS ON WATER

- Floating Absorbent booms must be used for all spills on water to contain the impacted area. Where this occurs over a large area booms can be connected together. Once contained, material should be soaked up using mats or pumped from the surface to a location with the capacity to treat the spill. Absorbent matting may need to be replaced with fresh sheets depending on the size of the spill.

Note: Oil Water Separators are designed to remove small fractions of hydrocarbons from water and will not function if required to treat heavy volumes of hydrocarbons.

9. CONTAMINATED SOIL BIOREMEDIATION FACILITY

The CTP bioremediation facility is located opposite the workshop and consists of a small dirt bunded area outside of natural drainage channels, the bunding ensures that the area is not affected by surface sheet-wash in heavy rain and that material in the area remains contained.

Contaminated soils are collected and removed to the CTP Bioremediation Facility where they are treated. All rubbish is to be removed from the contaminated material prior to disposal at the facility.

Material at the farm is regularly wetted and turned to promote the biological breakdown of hydrocarbons.

Bio-remediated soil is treated and may be reused once it has achieved the site discharge limit of 100 mg/ kg TPH.

10. REPORTING

All spills over 1L or greater than 30cm in diameter must be reported via an accident / incident reporting system. Accident / incident reporting of hydrocarbon spills can be defined in the following categories;

Size of spill	Reporting (who and when)
0-1L	Staff to record on spill register located in spill kit near refueling bowser. Staff to notify supervisor by the end of shift.
1-20L or greater than 30cm diameter	Staff to complete Quick Spill cards for spills over 1L or greater than 30cm in diameter and less than 20L. Supervisor to be notified and assessment of additional reporting requirements made.
Greater than 200 litres and/or Non-trivial/ negligible; or Has entered a waterway; or has left the premises	Any spill over 20L is to be reported immediately. Any spill above 20L in volume requires an accident / incident report form to be completed following Accident/Incident Reporting and Investigation. Hydrocarbon accidents / incidents that are assessed are subject to a detailed investigation as per the Northern Star accident / incident investigation process. If the spill is more than 200 litres and/or not trivial or negligible, has entered a waterway or left the premises then the Site Manager or a delegate shall report the incident to the Northern Territory Environment Protection Authority as soon as possible and within 24 hours, using a "SECTION14 INCIDENT REPORT (Waste Management and Pollution Control Act)" Form.

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HYDROCARBON AND CHEMICAL SPILL CLEAN UP PROCEDURE

Following the Environmental Incident Reporting Procedure, the Environmental Officer (or delegate) will assist the Site Manager with an investigation of the incident to identify cause and any residual environmental impacts (flora, fauna) that require management.

11. APPENDICIES

Appendix 1 – Spill Clean-Up Materials and Equipment

Appendix 2 – Quick Spill Report Card




Appendix 2 – CTP Bioremediation Facility

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HYDROCARBON AND CHEMICAL SPILL CLEAN UP PROCEDURE

APPENDIX 1 – SPILL CLEAN-UP MATERIALS AND EQUIPMENT.

Peat Moss	
	<p>It should be used to absorb smaller volumes of spilt oil, fuel or other liquid hydrocarbon, or spills on sealed surfaces. This material may be used in hard to get at areas.</p>
Matting Rolls and Squares	
	<p>Matting rolls and squares are identical, except a roll is a bulk quantity. Both are used to absorb and clean a spill.</p>
Mini Booma	
	<p>Small, absorbent booms (left) are only suitable for containing a spill on land. Larger plastic booms are suitable for absorbing spills in water bodies.</p>

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APPENDIX 2 – QUICK SPILL REPORT CARD



Report No. **15026**

Quickspill Report

FOR SPILLS LESS THAN 20L ONLY
SPILLS GREATER THAN 20L MUST BE REPORTED TO NORTHERN STAR VIA InControl

Date: _____ **Time:** _____

Fluid Spilt: _____

Specific Location: _____

Cause (e.g. blown hose): _____

Machine No: _____ **Volume < 20L:** _____

Spill cleaned up using (circle):
Mats Kitty Litter Booms Peat Moss

Other: (Details) _____

Location of Disposal (circle)
Waste Peat Bln Biofarm Red Skip (Wren Oil)

FORWARD TO SHIFT BOSS/SUPERVISOR WITHIN 24 HOURS

NSR138

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APPENDIX 3 – CTP BIOREMEDIATION FARM



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