



PNX Metals Ltd

2016 / 2017

**MINING MANAGEMENT PLAN FOR
EXPLORATION ACTIVITIES
FOR
MOLINE PROJECT**

Authorisation Number – (NEW)

Submitted 6th October 2016



	Author	Reviewed by	Approved by
Date	15/09/2016	16/09/2016	6/10/2016
Name	Elke Hodge	Kate Pearce	Andy Bennett
Signature			

I, Andy Bennett, Exploration Manager, declare that to the best of my knowledge the information contained in this mining management plan is true and correct and commit to undertake the works detailed in this plan in accordance with all the relevant Local, Northern Territory and Commonwealth Government legislation.

SIGNATURE:



DATE: 6/10/16

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Digital Appendices

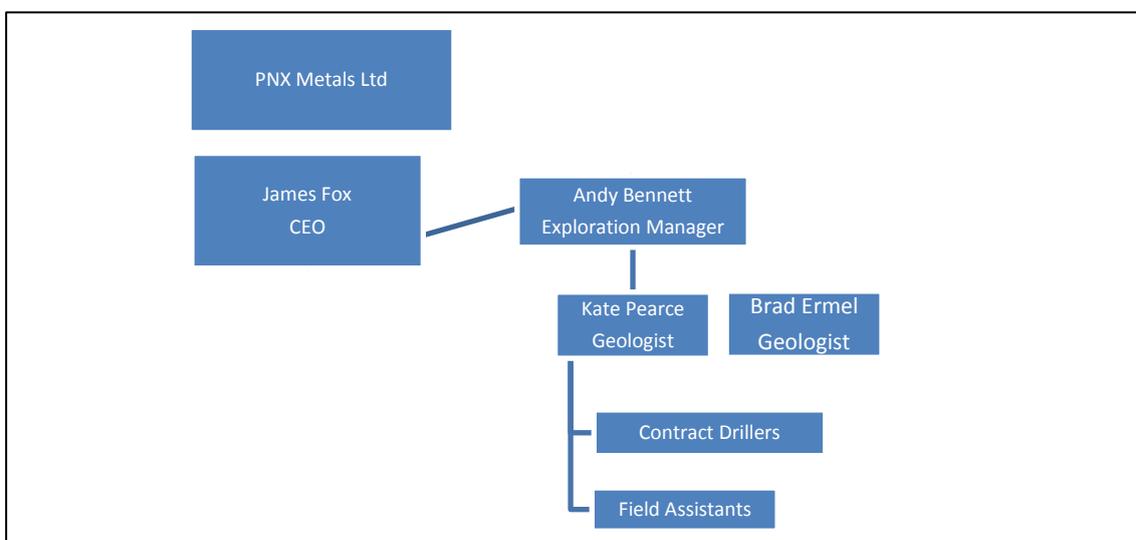
Appendix I:	Application for Authorisation Form & Nomination of Operator Form (two parts)
Appendix II:	NT NRM Search Report
Appendix III:	Relevant Standard Operating Procedures (SOP's)
Appendix IV:	Environmental Management Plan
Appendix V:	Notice of Entry to Mary River East Station
Appendix VI:	Land Access Approval
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1. Operator Details

Table 1: Operator Details

Operator Name:	PNX Metals Limited (“PNX”) PNX are exploring the Moline Project as part of an earn-in deal with Newmarket Gold Inc (“Newmarket”) who are the titleholders
Key Contact Person/s:	Mr Andy Bennett
Postal Address:	Level 1, 135 Fullarton Rd, Rose Park SA 5067
Street Address:	Level 1, 135 Fullarton Rd, Rose Park SA 5067
Phone:	+61 (0) 8 8364 3188
Fax:	+61 (0) 8 8364 4288
Email:	andy@pnxmetals.com.au

1.1 Organisational Structure



1.2 Workforce

Exploration activities for the Moline project will utilise up to six personnel, including one geologist (Andy Bennett, Kate Pearce or Brad Ermel), one field assistant (contracted), up to three drilling personnel (contracted driller and two offsiders) and one supervisor/manager/director (from time to time).

PNX has secured a local contractor ‘*Geodrilling*’ to perform drilling and associated activities for the upcoming 2016 exploration programme. A local contractor from Hayes Creek has proven efficient and effective at preparing drill pads and will likely be doing earthmoving works.

While onsite, all staff and contractors will be required to work up to 12 hour days and will be based at accommodation in the township of Pine Creek

2. Identified Stakeholders and Consultation

The stakeholders identified for this Exploration Project are listed in **Table 2**. Consultation for this project will be undertaken with the identified stakeholders on an 'as needed' basis, with all consultation documented and detailed.

Open communication will be maintained with DME, DLPE, NT WorkSafe and all other relevant government departments over the life of the project both through formal reports and written communications and informal contact. Equally, consultation with identified external stakeholders especially land owners, primarily the underlying pastoral lease holder, is seen as important early commitments in the exploration and mining process.

PNX has a number of external and internal reporting requirements including:

- Mining Management Plans (MMP);
- National Pollutant Inventory (NPI) reports;
- Internal operational reports;
- Audit and inspection reports; and
- Monitoring reports.

As required by the *Mining Management Act* and Regulations, PNX is required to submit annually, an updated MMP detailing the planned operations for the upcoming year, and reporting on the work completed in the previous reporting period. Also under the Act, PNX Metals Ltd. must report to DME any environmental incidents of significance.

PNX personnel met with the pastoralist Kevin Gleeson of Mary River East Station during May 2015 and since that time, PNX has maintained email correspondence with Kevin (**Appendix V**) to formally notify entry to his property. It was suggested that timing for drilling would be around October – November 2016. With the recent passing of Kevin Gleeson, PNX staff have maintained telephone and email contact with his wife Carol. PNX have been advised that the planned exploration intended for 2016 will have no impact on the day to day operations of the Mary River East Station and have been given approval in writing (**Appendix VI**).

PNX personnel also met with staff at the NLC during May 2016 to discuss the planned activities in the Moline Project area. PNX were referred back to the AAPA. PNX geologists were introduced to Bessie Coleman, a representative of Traditional Owners, who later participated in a cultural heritage survey of the proposed disturbance area. PNX are committed to ongoing consultation with the Jawoyn Three Clan Group throughout the life of the project.

PNX are in regular contact with other exploration companies, including Newmarket as titleholders (through Mark Edwards), and Rockland Resources (through exploration manager Geoff Beckitt).

PNX also met with DME staff in the Geological Survey in May 2016 (Ian Scrimgeour and others) and through routine reporting requirements maintain in regular contact with the Mines Department.

PNX presented at the Katherine Regional Exploration and Mining Forum in May 2015 and introduced PNX as a new and active participant in the region, engaging with many and varied interested industry contractors and community members. PNX have also presented and had exhibition booths at the NT Resources Week, held in Darwin in 2015 and 2016.

All of PNx's major activities utilise local contractors and services, including drilling, assaying, earthmoving, geological supplies, whereby PNx are integrating into the local communities.

Table 2: Identified Stakeholders

Type of Stakeholder	Identified Groups or Departments
Company	Newmarket Gold Inc (Management, Geological, OHS and Environmental Teams) PNX Metals Ltd Rockland Resources
Community	Katherine community, residents and businesses (KMSA) Adjacent Tenement holder/s Local Police Local Fire & Emergency Response Group (volunteers) Tindal RAAF base Mary River East Pastoral Station Chamber of Commerce and Industry Jawoyn Association Amateur Fisherman's Association of the Northern Territory
Commercial	Mine Site contractors / Materials & Service Supply Organisations Telstra Power and Water Corporation Darwin – Adelaide Railway (GWA) APA - Amadeus Gas pipeline
Regulatory	NT Department of Infrastructure NT Department of Land Resource Management Power and Water Corporation NT Department of Business NT Department of Mines and Energy NT Department of Lands, Planning and Environment NT Department of Land Resource Management NT Department of Education Commonwealth Department of the Environment Aboriginal Areas Protection Authority NT Environment Protection Authority NT WorkSafe NT Department of Police, Fire and Emergency Services NT Bushfires Council Pine Creek Community Government Council Adelaide River Community Government Council
Non Government Organisations	NT Bushfire Council Minerals Council of Australia – NT Division Northern Land Council APA Group – NT Division

3. Project Details

Details for the Moline Project tenements and location maps are provided in **Figures 1 and 2** and **Table 3** below.

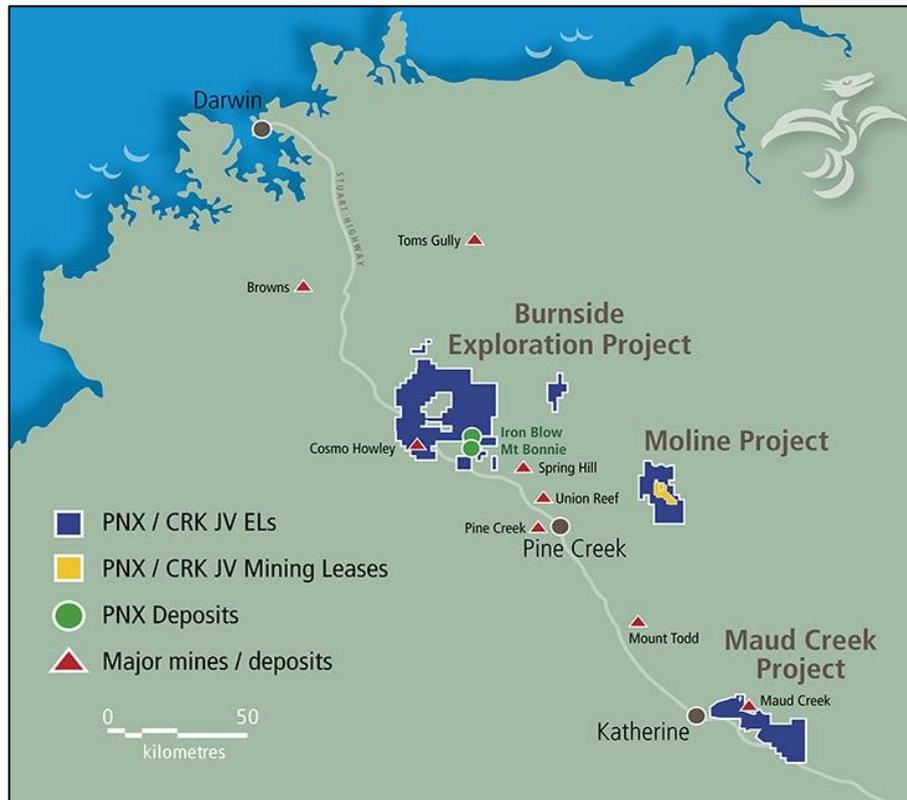
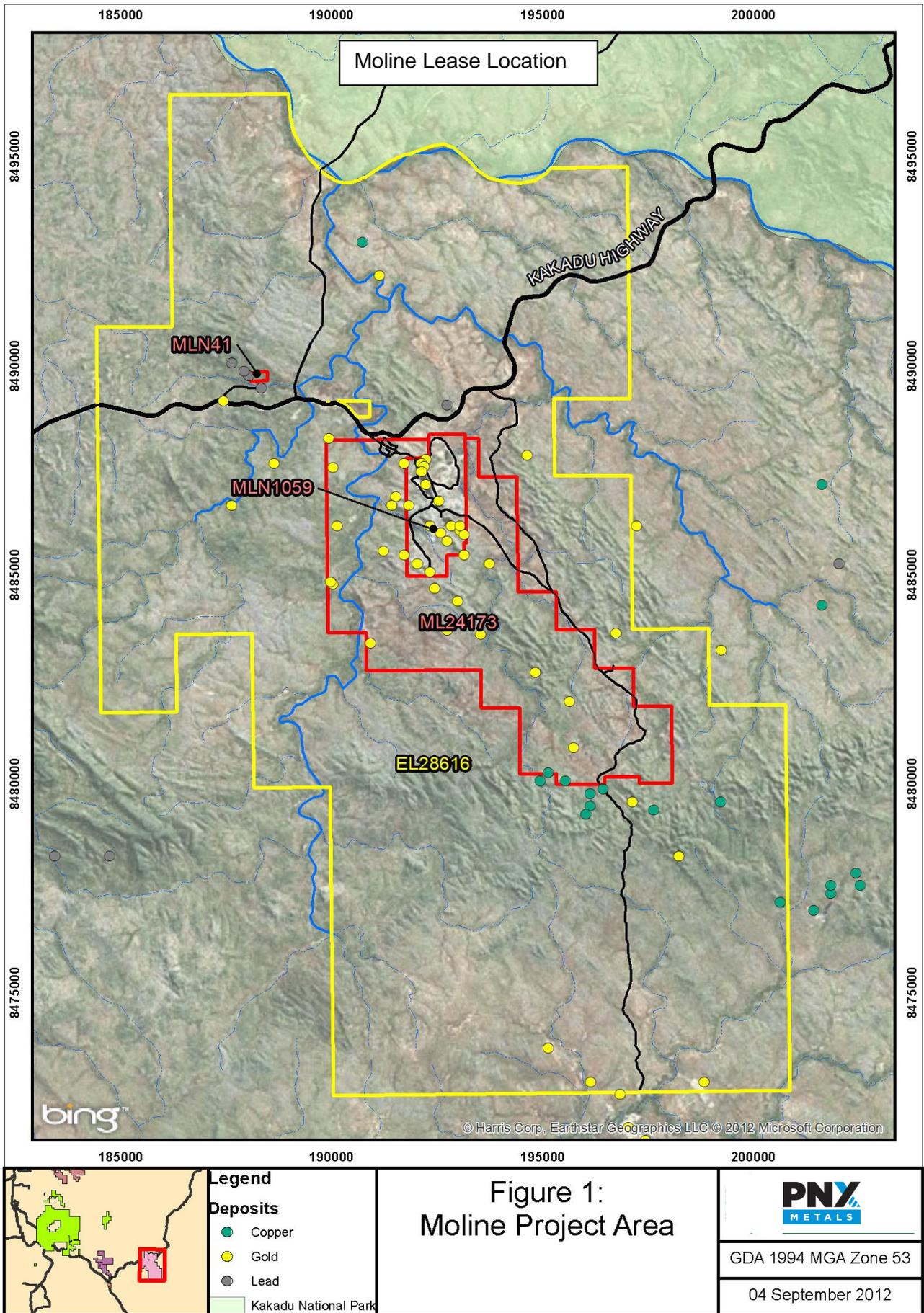


Figure 1: Moline Project Location

Table 3: Project Details

Project Name:	Moline
Location:	The Moline tenements are located approximately two hundred kilometres south-east of Darwin, or fifty kilometres north-east of Pine Creek. The location of the area in relation to the capital city of Darwin is illustrated in Figure 1.
Site Access:	Departing Darwin, the site is reached by driving 200km south on the Stuart Highway, then turning on to the Kakadu Highway in the vicinity of Pine Creek township, and travelling a further 50km. The access road to the main site is located shortly after the Moline Golf Course, and immediately to the right after crossing the O’Neil Creek Bridge.
Mining Interest/s:	MLN41, ML24173, MLN1059 & EL28616
Title holder/s:	Newmarket Gold Inc (“ Newmarket ”). (Refer to Appendices I & II for nomination of operator form and authorisation application – signed originals of which were handed in person to the Mines Department)



3.1 Previous Activities and Current Status

Gold was discovered at the Northern Hercules (then known as Houschildt's Rush) in 1882. The first workings were conducted by Chinese who selectively mined and hand crushed ore, however their production is unrecorded.

Underground mining occurred from **1891 to 1900** and again from **1954 to 1957**, for total production of about 33,000 ounces of gold, with an average recovery of 27g/t Au. Workings extended to the 120m level, but most production was from the oxidized zone above 60m. The highly pyritic primary mineralization essentially proved too difficult to treat without prior roasting. A former mill on the site processed uranium ore and tailings from various mines within the South Alligator region.

Between **1981 and 1990**, the Moline tenement group was subjected to a continuous program of exploration for gold and, to a lesser extent, base metals, initially by Greenbushes, and subsequently by Cyprus, Arimco and Zinnanda.

Comprehensive regional exploration included geological mapping, rock chip sampling, soil sampling and airborne geophysics. Detailed drilling was carried out at Hercules, Moline, School, Tumbling Dice and many other prospects. A feasibility study indicated ore reserves at Hercules and Moline to be 3.1 million tonnes @2.5g/t Au at 0.5g/t cut off.

In **1988**, a Preliminary Environmental Review was compiled for the Cyprus and Greenbushes JV and Between **1989 and 1992** open pit mining by Cyprus and Arimco produced approximately 110,000 ounces of gold from two main orebodies (Hercules and Moline) and 20 satellite pits. Total production of approximately 1.6 million tonnes with an average recovered grade of 2.14g/t Au was mainly from oxidised ores to a maximum depth of about 65m below surface.

In **January 1992**, just prior to completion of open pit and underground mining, the total remaining Proven and Probable Reserves totalled 312,000 tonnes @ 2.54g/t Au, with Indicated Resources totalling 308,000 tonnes @ 2.71g/t Au. This included the total Moline Project area. Total remaining reserves and resources at Hercules Pit were 164,000 tonnes @ 4.1 g/t Au with a stripping ratio of 9.6:1.

After completion of open pit mining by Cyprus in **1992**, and acquisition of titles by M. Teelow, exploration was continued successively by Newcrest, Aztec and Compass Resources under various option agreements. As a result there is a comprehensive database for planning further exploration.

In **1992 and 1993** Newcrest Mining carried out ground magnetic surveys, geological mapping and diamond drilling of three holes. There are no indications of any discoveries from this drilling.

In **1993 and 1994** Aztec carried out geological mapping, soil sampling and one diamond drillhole, also without any apparent exploration success.

In **1995** Compass Resources NL, after conducting a data collation and review, carried out soil and drainage geochemistry. Compass drilled a total of 24RC holes for 1200m at three prospects, including the southern end of High Chinese Prospect, where Drillhole MCD11 intersected 2m@ 33.5g/t Au from 8m depth and MCD20 intersected 8m @ 4.05g/t Au from surface. This drilling was designed to test a 1km long soil and

rock chip geochemical anomaly (open to the south). These very encouraging drill results were apparently not followed up.

In **2006-2007** Terra Gold undertook exploration activities at Moline as well as removal of some of the low-grade stockpiles that were left at the cessation of mining and processing activities in 1992.

GBS Gold also carried out some exploration and removal of some remaining low-grade stockpiles in **2008**. Crocodile Gold Australia Pty Ltd (now Newmarket) acquired the assets of GBS Gold in November **2009**.

The major site infrastructure that has previously been developed at Moline is listed below and is shown in **Figure 3**:

- Three open pits (Hercules, School, Moline Pits);
- Main waste rock dump plus three smaller WRDs;
- One old tailings dam (closed and capped);
- One water dam;
- Footings of the former processing mill;
- Caretakers residence (former mining camp mess); and
- Access tracks.

Newmarket Gold has kept the Moline Project in care and maintenance with the exception of the removal of 80,000 tonnes from the remaining low grade ore stockpile to Union Reefs Plant for processing between **2011** and **2012**. The care and maintenance is covered in a separate Mining Management Plan by Newmarket under Authorisation 0525-01. This MMP is only for exploration activities being undertaken by PNX.

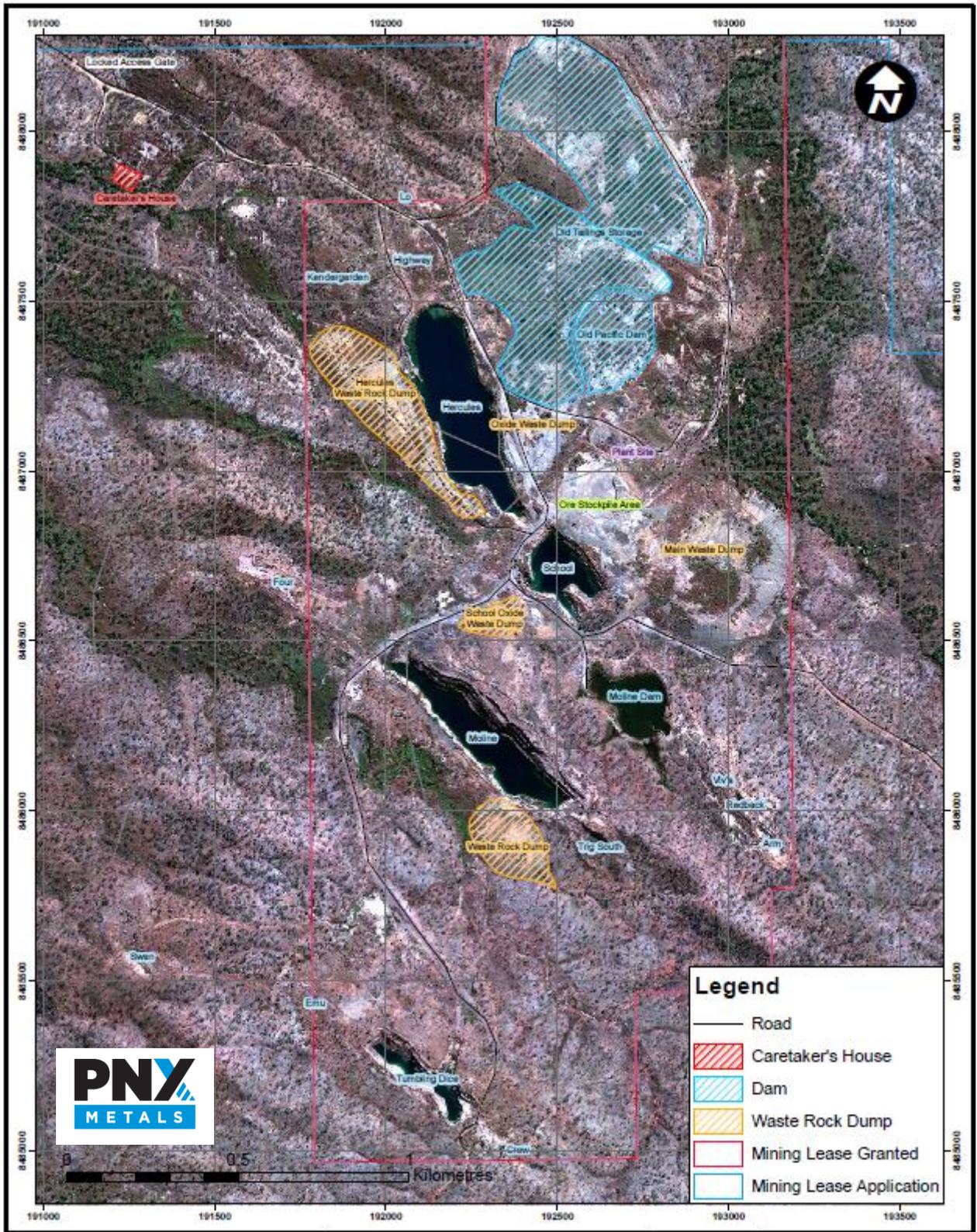


Figure 3: Moline Mine Area Historical Activities

3.2 Proposed Activities

A 16-hole 2125m Reverse Circulation drill programme has been designed to investigate the mineralisation below the existing open pits at Hercules, Moline, Tumbling Dice and School. The planned holes are summarised in **Table 4 and Figure 4**. The maximum depth will be 200m.

All sites are located in areas of significant historical disturbance and are around the edges of the old pits. No new disturbance other than drill pads is required. Existing tracks that were established for past mining activities will be utilised. Sumps will be required at drill pads with drill pads expected to be no larger than 20x20m in dimension. Standard operating procedures relevant to these activities are provided in **Appendix III**. No water will be required for the program.

All core will be transported offsite to the Brock Creek core facility near Hayes Creek to be logged and processed.

Table 4: Proposed Drilling Locations at Moline

Prospect	Hole ID	E_MGA94Z53	N_MGA94Z53	COLLAR	EOH	DIP	AZI_G	LINE
Hercules	MO_01	192192.1	8486951	140.3	180	-60	76.7	1325N
Hercules	MO_02	192150.6	8486993	141.6	200	-60	76.7	1375N
Highway	MO_03	192055.1	8487579	139.5	110	-60	76.7	1975N
Moline	MO_05	192333.5	8486031	136.9	135	-60	42.88	14550N
Moline	MO_06	192315	8486050	136.2	140	-60	42.88	14575N
Moline	MO_07	192218.1	8486166	137.9	130	-60	42.88	14725N
Moline	MO_08	192186.2	8486169	137.5	140	-60	42.88	14750N
Moline	MO_09	191886.1	8486360	131.9	115	-60	42.88	15100N
School	MO_10	192533.7	8486544	142.3	120	-60	42.88	14750N
School	MO_11	192475.2	8486591	140.4	150	-60	42.88	14825N
Tumbling Dice	MO_12	192226.7	8485036	150.4	105	-60	42.88	13950N
Tumbling Dice	MO_13	192180.3	8485058	148.6	130	-60	42.88	14000N
Tumbling Dice	MO_14	192147.8	8485060	146.9	160	-60	42.88	14025N
Tumbling Dice	MO_15	192163.2	8485113	150.3	100	-60	42.88	14050N
Tumbling Dice	MO_16	192034.3	8485158	148.5	110	-60	42.88	14175N
Tumbling Dice	MO_17	192031.4	8485191	149.9	100	-60	42.88	14200N

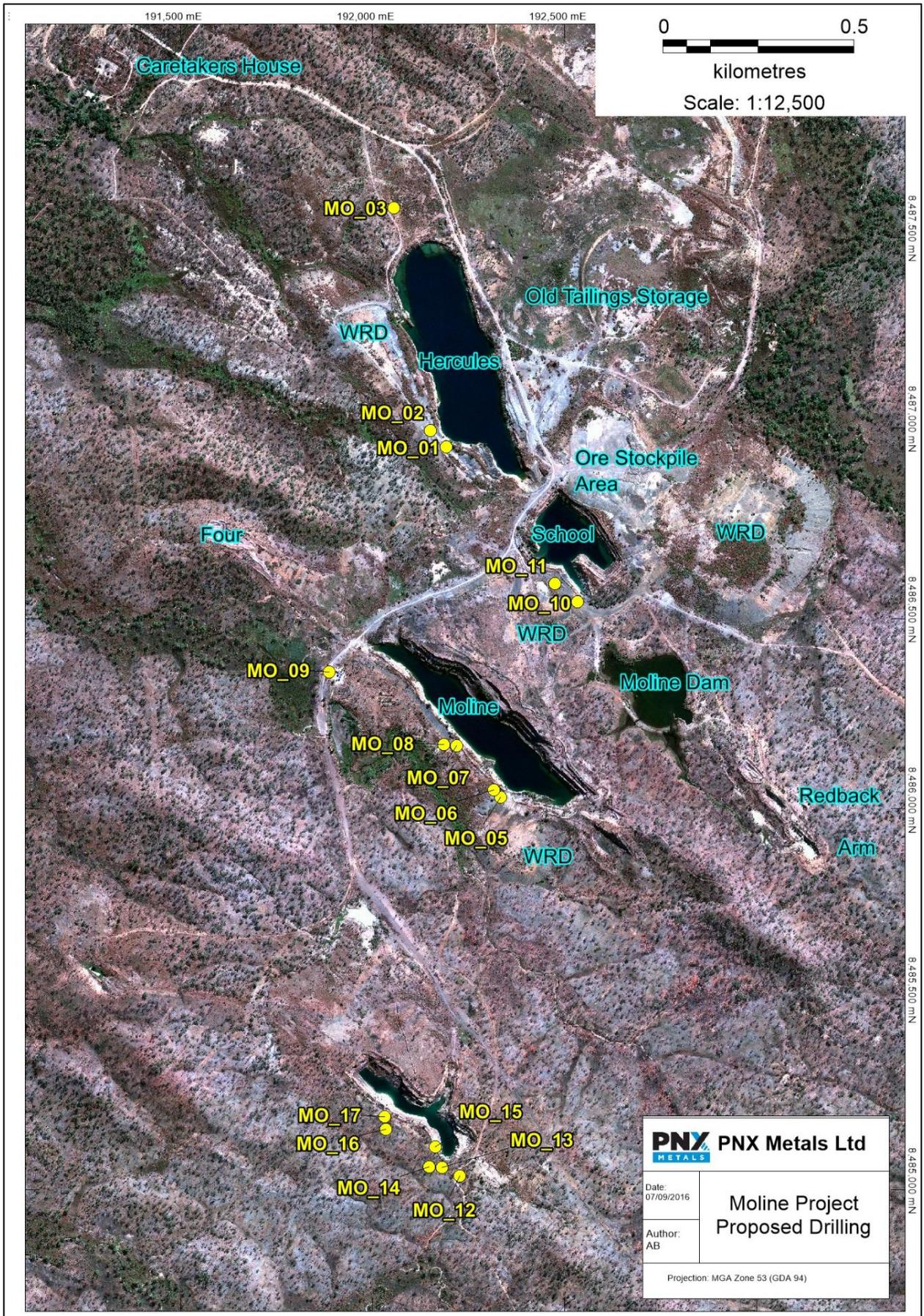


Figure 4: Moline Drilling Locations and Access

Table 5: Summary of Proposed Disturbance for Moline

Mining Interests (i.e. titles)	MLN1059
What time of the year will exploration occur?	November 2016
How long is exploration expected to occur?	3 weeks
Type of drilling (i.e. RAB, RC, Diamond, aircore)	Reverse Circulation
Target commodity	Gold and Base metals
Is drilling likely to encounter radioactive material?	No
Number of proposed drill holes	16
Maximum depth of holes	200m
Number of drill pads 16 (Length: 20x Width: 20m)	0.64 Ha
Is drilling likely to encounter groundwater? (Y, N, unsure)	Unsure
Number of sumps (Length: 2x Width: 2x Depth:2 m)	16 sumps @ 2x2x1m (0.006Ha)
Length of line / track clearing (Kilometres: 0.49 x Width: 3 m)	0
Number of costeans (Length: x Width: x Depth: m)	0
Total bulk sample (tonnes) (Length: x Width: x Depth: m)	0
Will topsoil be removed for rehabilitation purposes?	Yes, if present.
Previous disturbance yet to be rehabilitated on title (ha) if known	None by PNX
Camp (Length: 490 x Width: 3m)	0
Total area disturbed (hectares)	0.646
Other:	N/A

4. Current Project Site Conditions

Most of the current site conditions specific to the Project area are summarised in the NT NRM search report provided in Appendix II, and discussed in the sections below.

4.1 Climate

The climate of the Darwin-Katherine region is broadly classified as tropical monsoonal. Two distinct seasons can be identified, with two subsidiary transitional periods between them. The dry season occurs from May to September and is characterised by prevailing south easterly winds. The hot, "dry-wet" transition from October to November has high humidity and variable winds. The wet season occurs from December to March with dominant northwest to westerly winds. The hot, "wet-dry" transition of April has variable winds, though dominantly westerly.

Virtually all rainfall occurs in the summer wet season, with rainfall intensities are high, being typical of the wetter portions of the north western regions of Australia.

There are on average 7.7 days per season when a cyclone exists in the northern region of Australia. The north western Gulf of Carpentaria near Gove has the highest concentration of cyclone days. The Gulf of Carpentaria averages two cyclones a year, while the Arafura and Timor Seas average one a year. Cyclones in the Gulf of Carpentaria move very erratically, whereas those in the Arafura and Timor Seas tend to follow more regular tracks to the southwest. Over half the cyclones generated in the northern region move either southwest or southeast into adjoining regions. Data from the Bureau of Meteorology website of cyclone frequency for the Northern Australian Region is presented in **Figure 5**.

Bureau of Meteorology regional climate data is provided from the Pine Creek Council, approximately 50 km south west of the project area. The likelihood of a cyclone passing over the Moline site is fairly low due to its southerly location, but associated winds and rainfall may affect the site.

The mean daily maximum temperature in the region over the last 11 years 2000 to 2011 (**Figure 6**) is 29.8°C in the coolest month of June to 37.0°C in the hottest month of October. Mean daily minimum temperatures in the region range from approximately 16.5°C during the dry season to 24.3°C in the wet season.

Mean rainfall in the region during the wet season (November – April) is 1,479 mm while dry season rainfall averages 70mm. Maximum rainfall occurs in February and based on the last decade, extreme rainfall events can record up to 757 mm in a month and 1,657 mm in a year (see **Figure 7**).

There is a distinctive and predictable seasonal wind pattern in this area. During the dry season southeast trade winds dominate and during the wet season, winds can be more variable, predominantly north westerly. Wind speed is highest from April to August with daily averages fluctuating around 6.5 to 7.4 km/hr, dropping to around 5.5 km/hr from November to March (**Figure 8**).

Annual evaporation in the region is greater than rainfall at an average of 2300 mm with highest evaporation occurring in October (**Figure 9**).

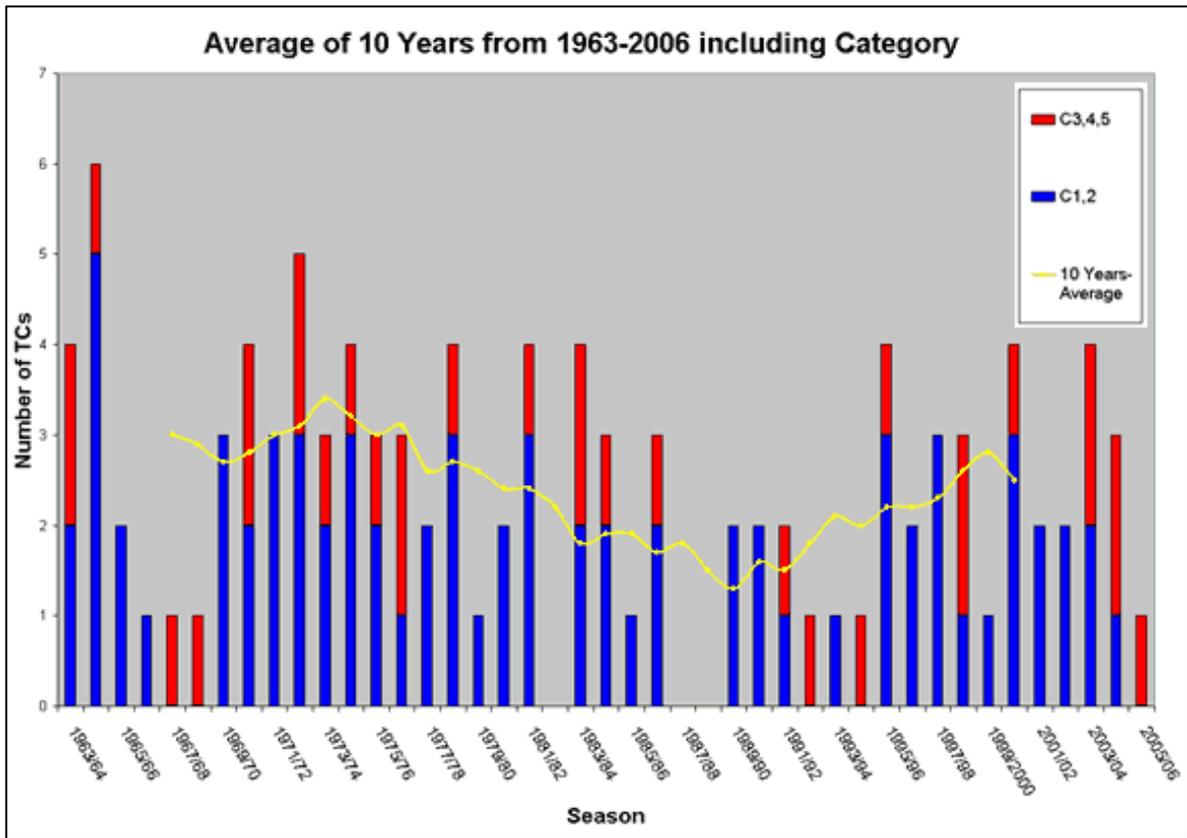


Figure 5: Annual Cyclone Frequency in the Northern Australia Region (BOM)

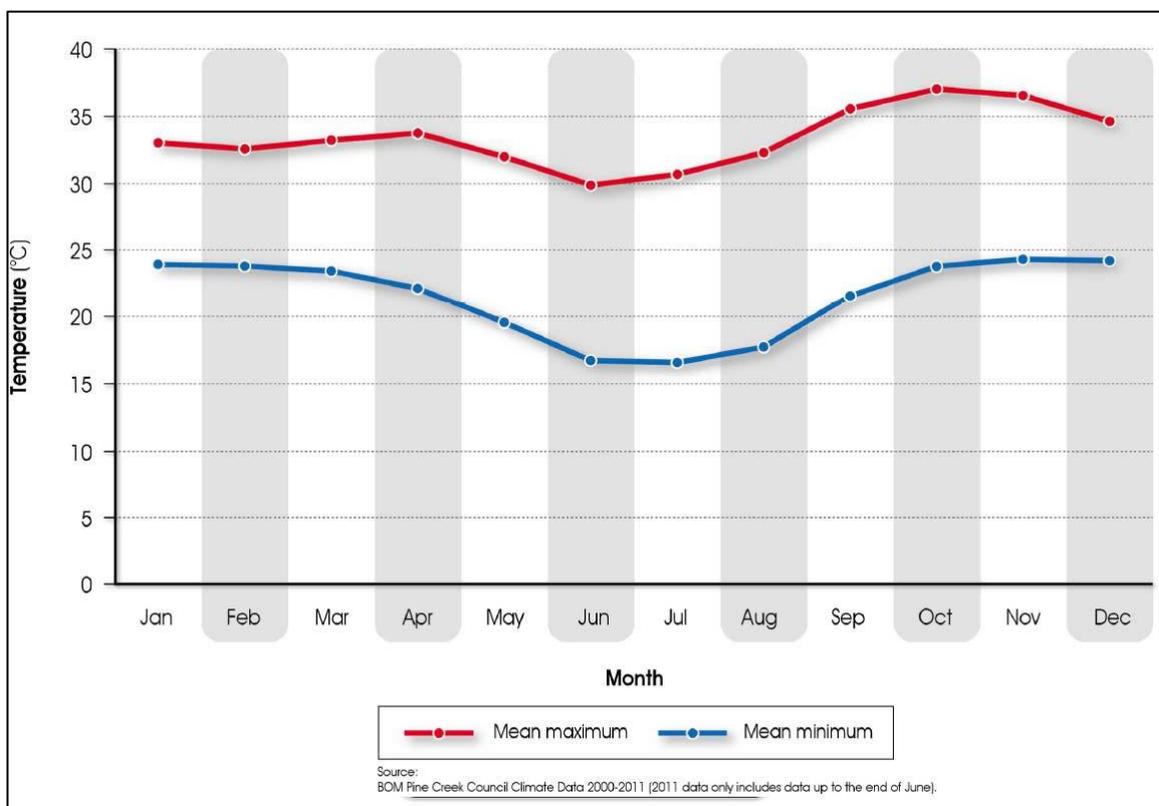


Figure 6: Mean maximum and minimum temperature in the region

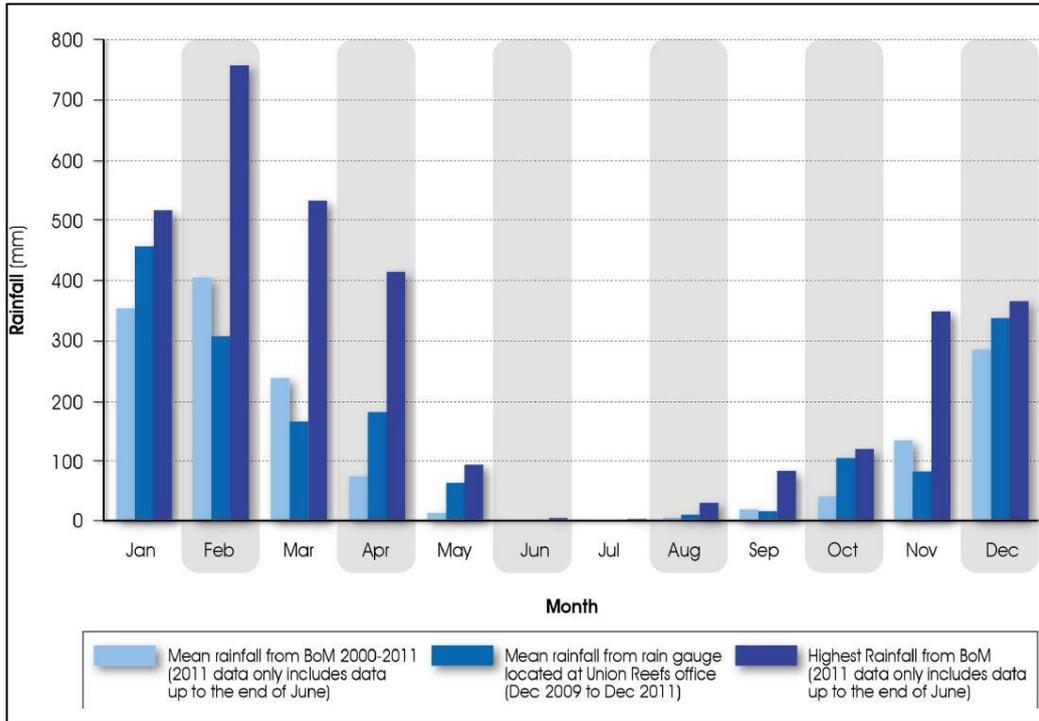


Figure 7: Mean rainfall and rainfall extremes in the region

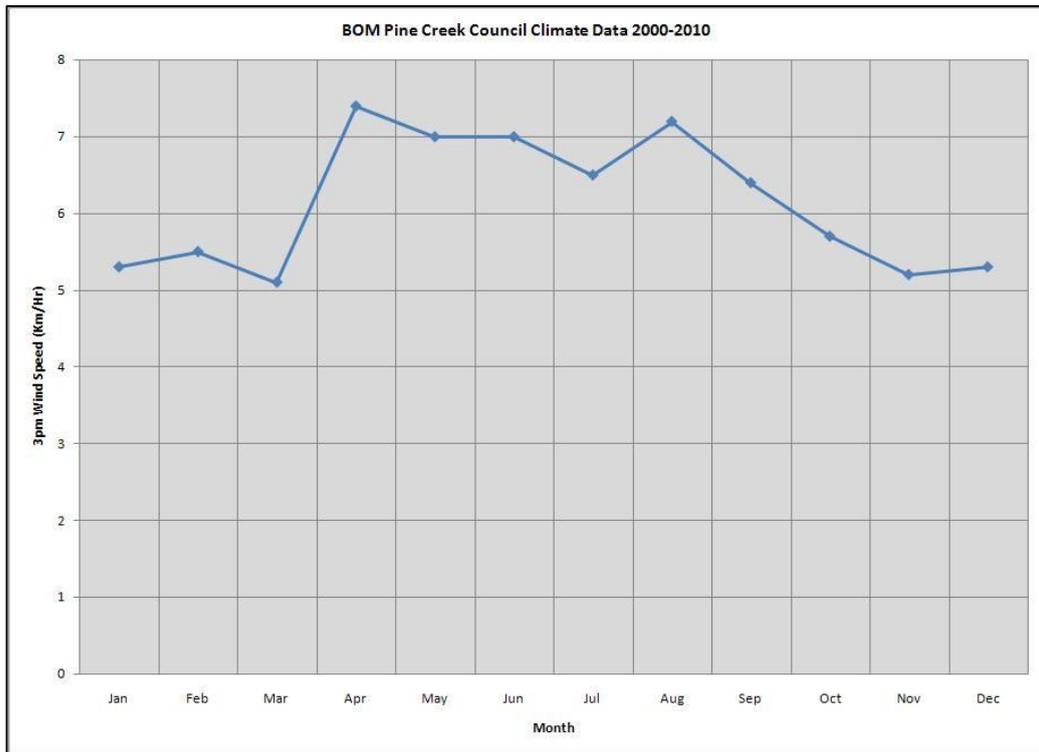


Figure 8: Mean wind speed in the region

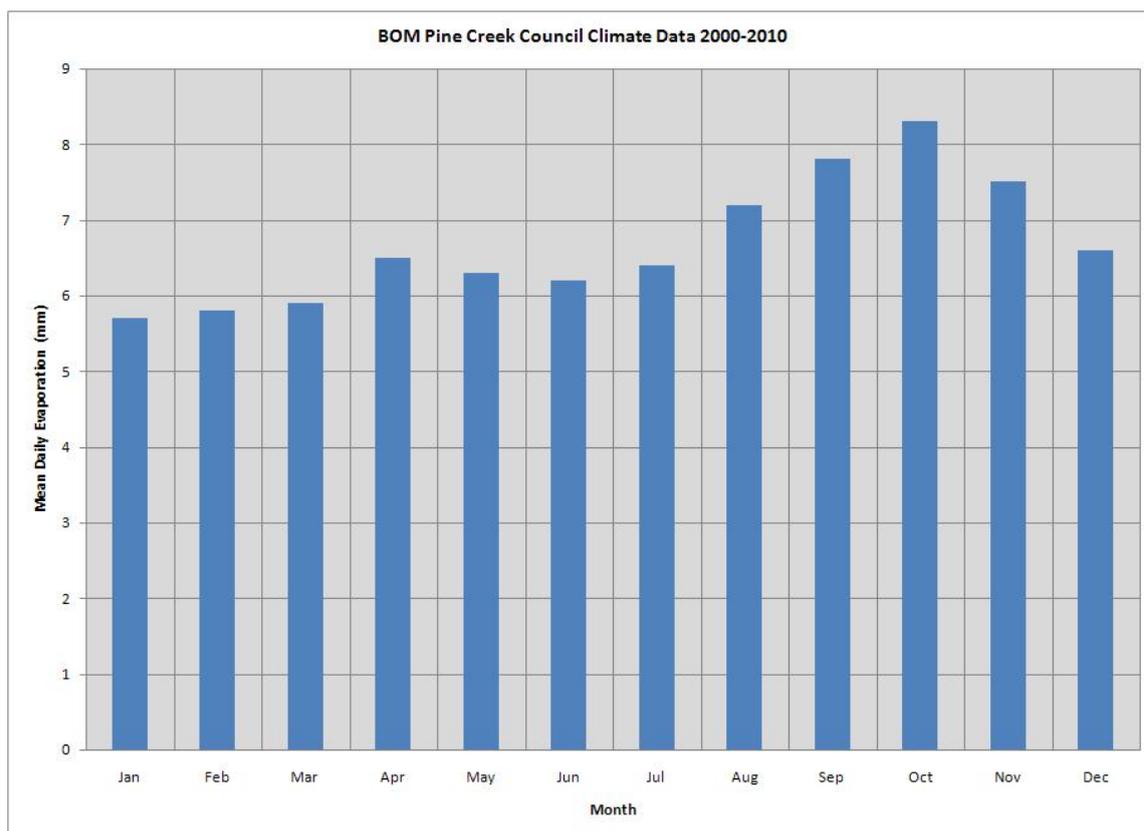


Figure 9: Mean daily evaporation in the region

4.2 Geology and Land Systems

4.2.1 Topsoil and Subsoil

Soils within the project area are in general moderately permeable and well drained (NRETAS, 2014). Topsoil is generally shallow with a depth of 0.1m below ground surface and is a dark greyish brown sandy clay loam (tenosols). Subsoil is generally also shallow (depth to 0.4 meters below ground surface) and is a light olive brown clay loam.

4.2.2 Topography and Geology

The Moline Project Area is situated at the northern end of a mineralised belt, which extends southwards to the major Mt Todd orebodies located 50km to the south. Metasediments of the paleo-proterozoic Pine Creek Inlier, isoclinally folded about axes plunging at low angles towards the southeast, are traversed by west-dipping shear zones trending between NW-SE and N-S, which localize shoots of pyretic mineralization containing gold and base metals. Country rocks comprise greywackes, siltstones, cherts, calc-silicates and black shales belonging to the South Alligator and Finnis River Groups in the southeast (Moline Project Area) and black shales and limestones, possibly of the Mt Partridge Group, in the northwest (Evelyn area).

The Moline Project Area consists of three main mineralized trends that are related to sub-parallel axial planar faults and shears in anticlinal fold axes that strike NW-SE. The three main trends are the Moline Project Area Trend, Hercules Trend and the Tumbling Dice Trend that each extend for

strike lengths of about 2-3 km. Gold mineralization is generally in sulphidic quartz veins and can be associated with pyrite, pyrrhotite, sphalerite, galena, chalcopyrite, arsenopyrite and bismuthinite as well as sericite, adularia, tourmaline and carbonates in cherts banded iron formations and shales. The lodes are generally narrow (about 5m) but collectively form mineable zones up to 25m wide in broad zones of mineralization up to 50m wide. The lodes and host rocks generally dip 45 to 60 degrees to the southwest and the depth of oxidation is about 35m.

The geology of the Moline Project Area is shown in **Figure 10**.

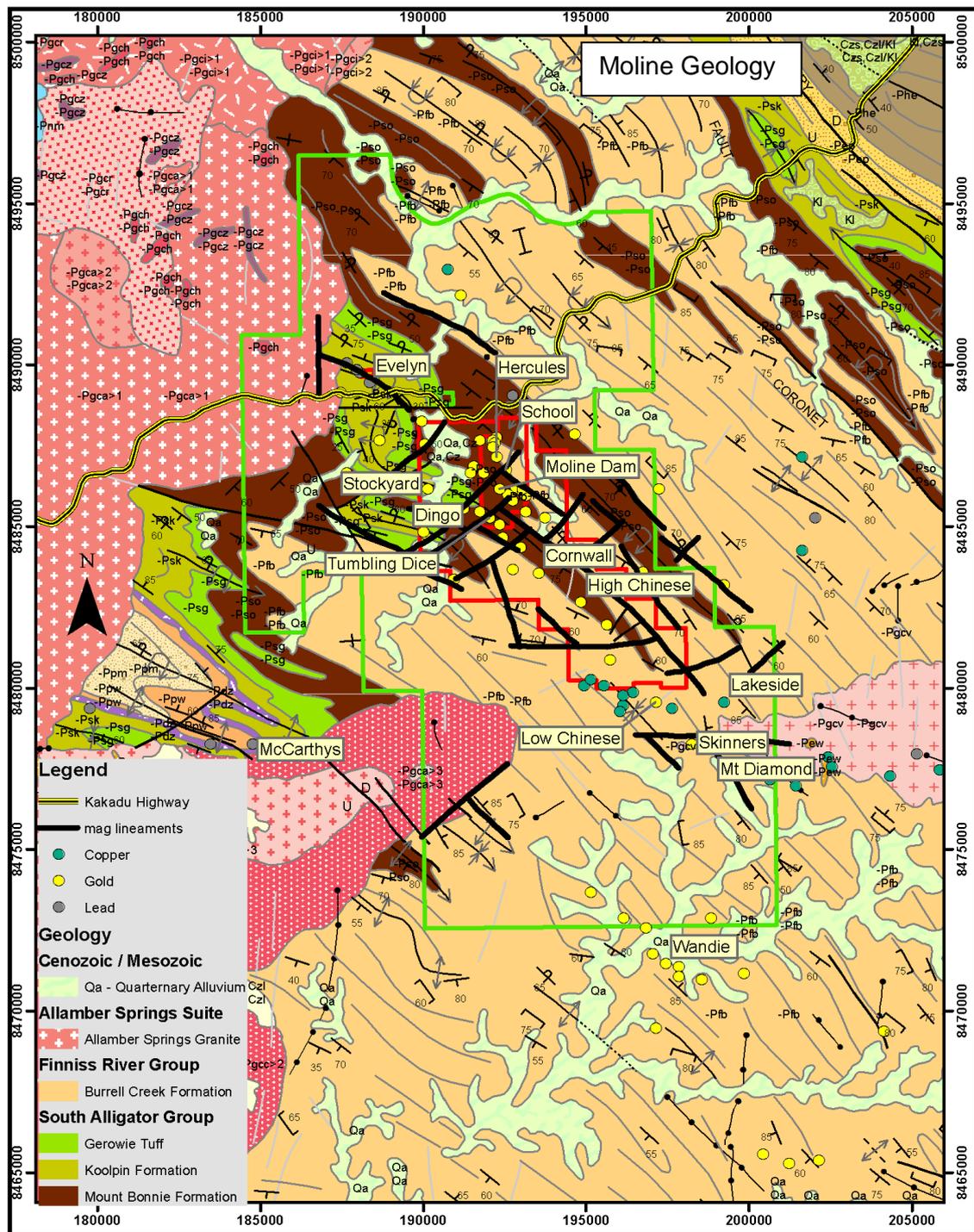


Figure 10: Moline Geology

Land units occurring within the Moline project site include:

- Low hills and gentle slopes dissected by small creeks, colluvial wash slopes and alluvial flats, the latter with moderately deep alluvial sands and loams crossed by incised stream channels. Some laterite outcrop (Bend Land System);
- Ridges with steep slopes and sharp crests. Much dissected by immature creeks in steep valleys with small, narrow and poorly developed alluvial flats (Baker Land System);
- Low erosional rises and alluvial flats with wide wash slopes and areas of residual gravels (Rumwaggon Land System).

The topography of the Moline Project Area is shown in **Figures 3 and 4**.

4.2.3 Vegetation

The vegetation of the project area consists largely of woodlands and open woodlands.

Disturbed areas are heavily colonised by *Andropogon gayanus* (Gamba Grass), which was aerial seeded in the mid 1990's. This activity was the authorised method of mine closure and rehabilitation to pastoral use at the time.

Fauna and flora studies were carried out by WLPU Consultants (Australia) Pty Ltd and were reported in the Moline Project Area Project Preliminary Environmental Review compiled on behalf of Cyprus Gold and Greenbushes in April 1988.

4.2.4 Flora

No rare, threatened or endangered plant species were identified in the WLPU study. No species endemic to the project area were identified in the WLPU study. The NT NRM search report noted two threatened flowering plants (Appendix II) which may occur in the searched area. These were Jacksonia and Bladderwort.

4.2.5 Fauna

Newmarket Gold environmental monitoring staff observed several Australian Bustards on the site, along with many native bird species, especially near the Moline Project Area Dam. Broilgas have also been sighted in the wetland area near Moline pit.

A search for threatened species under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) has been undertaken and a report has been provided in **Appendix VIII**. Species which may potentially occur in the project area are provided in **Table 6**.

Table 6: Significant species potentially occurring in the project area

Common Name	Scientific Name	Status	
		Commonwealth	Northern Territory
Birds			
Red goshawk	<i>Erythrotriorchis radiatus</i>	Vulnerable	Vulnerable
Gouldian finch	<i>Erythrura gouldiae</i>	Endangered	Endangered
Partridge pigeon	<i>Geophaps smithi smithi</i>	Vulnerable	Vulnerable
Masked owl	<i>Tyto novaehollandiae kimberli</i>	Vulnerable	Vulnerable
Australian Bustard	<i>Ardeotis australis</i>	Not Listed	Vulnerable
Migratory Birds			
Fork-tailed Swift	<i>Apus pacificus</i>	Not Listed	Not Listed
Great Egret, White Egret	<i>Ardea alba</i>	Not Listed	Not Listed
Cattle Egret	<i>Ardea ibis</i>	Not Listed	Not Listed
Melville Cicadabird	<i>Coracina tenuirostris melvillensis</i>	Not Listed	Not Listed
White-bellied Sea- Eagle	<i>Haliaeetus leucogaster</i>	Not Listed	Not Listed
Rainbow Bee-eater	<i>Merops ornatus</i>	Not Listed	Not Listed
Derby White-browed Robin	<i>Poecilodryas superciliosa cerviniventris</i>	Not Listed	Not Listed
Rufous Fantail	<i>Rhipidura rufifrons</i>	Not Listed	Not Listed
Common Sandpiper	<i>Actitis hypoleucos</i>	Not Listed	Not Listed
Oriental Plover, Oriental Dotterel	<i>Charadrius veredus</i>	Not Listed	Not Listed
Oriental Pratincole	<i>Glareola maldivarum</i>	Not Listed	Not Listed
Whimbrel	<i>Numenius phaeopus</i>	Not Listed	Not Listed
Grey Plover	<i>Pluvialis squatarola</i>	Not Listed	Not Listed
Marsh Sandpiper, Little Greenshank	<i>Tringa stagnatilis</i>	Not Listed	Not Listed
Terek Sandpiper	<i>Xenus cinereus</i>	Not Listed	Not Listed
Mammals			
Bare-rumped sheath-tail bat	<i>Saccolaimus nudicluniatus saccolaimus</i>	Critically Endangered	Data Deficient
Brush-tailed Tree-rat	<i>Conilurus penicillatus</i>	Vulnerable	Vulnerable
Northern-quoll	<i>Dasyurus hallucatus</i>	Endangered	Critically Endangered
Golden-backed Tree-rat	<i>Mesembriomys macrurus</i>	Vulnerable	Critically Endangered
Northern Brush-tailed Phascogale	<i>Phascogale pirata</i>	Vulnerable	Endangered
Reptiles			
Estuarine Crocodile	<i>Crocodylus porosus</i>	Not Listed	Not Listed
Freshwater Crocodile	<i>Crocodylus johnstoni</i>	Not Listed	Not Listed
Fish			
Freshwater sawfish	<i>Pristis microdon</i>	Vulnerable	Vulnerable

*It is important to note that the DEWHA database has limitations based on the "coarseness" of the geographic data for some matters. In particular, assessment of the presence of threatened or migratory species is limited because the data are presented for the general area, rather than for a specific site.

4.2.6 Weeds and Pests

The Weeds Management Act 2001 identifies those flora species that are listed as declared weeds for the Northern Territory. All declared weeds are divided into three classes:

- Class A (must be eradicated)
- Class B (growth and spread to be controlled)
- Class C (species not to be introduced).

The following weed species have been observed in the project area:

- Gamba Grass (*Andropogon gayanus*)
- Mission Grass (*Cenchrus polystachios*)
- Hyptis (*Hyptis suaveolens*)
- Annual Mission Grass (*Cenchrus pedicellatus*)
- Rubberbush (*Calotropis procera*)
- Wild Passionfruit (*Passiflora foetida*).

Gamba Grass is widespread and although it is a Class A/B declared weed, Moline Project Area is within the Management Zone of this species. In this zone, the spread of Gamba needs to be controlled and contained. The Management Zone for Gamba stretches to the east to Kakadu National Park, to the south as far as Katherine, and west to the Daly River.

Gamba grass coverage is extensive around the disturbed areas at Moline Project Area and in downstream creek lines due to the aerial revegetation seeding in the mid-1990s. Comprehensive management by Newmarket has taken place from 2010 - 2013, with management extending to grazing, vehicles remaining on established tracks, avoiding tracks during seeding times, prescribed burning to reduce fire load, seed store and survival, and ground based treatment using a knock down herbicide along vehicle tracks.

In addition, an IPM strategy has been implemented to target Gamba grass and other weed species. The strategy involved utilising herbicide and a grazing program. The grazing program will be further developed over 2013.

Due to the isolated infestation on the Moline Project Area, a combined research team from federal and state government and tertiary education departments utilised the Moline Project Area to further understand the spread of Gamba Grass. This included a field day involving all interested parties in May 2010, followed by research field work by researchers from Charles Darwin University (CDU) and NRETAS Weeds Branch.

Feral animal species identified in the project area include water buffalo, pigs, cats, and cane toads (*Bufo marinus*). Further listings are provided in Appendix II.

Newmarket has a feral animal management program and a contract feral animal management provider.

4.3 Hydrology And Hydrogeology

4.3.1 Surface Water

The Moline Project Area is within the Mary River catchment area. Two ephemeral creeks border the site: both flow from south to north. O'Neil Creek is to the western side of the site, with Eureka Creek to the eastern side.

Moline Project Area mine site water inventory includes Hercules Pit, Moline Pit, School Pit, Moline Project Area Dam and a seasonal wetland area to the south of Moline Pit. Newmarket have 12 surface water monitoring stations, that are monitored either monthly or quarterly. Results of these are reported in the Newmarket MOPA MMP (2014-2018) and summarised briefly below .

Surface water sampled from *upstream* monitoring location MOSW02 at Eureka Creek reported an average pH of 6.47 and an average EC value of 43 $\mu\text{S}/\text{cm}$. The pH and EC values recorded were within ANZECC 95% guidelines. All metal concentrations were reported within ANZECC 80% threshold guidelines with the exception of total aluminium concentrations which were reported within SWG.

Surface water sampled from *downstream* monitoring location at MOSW08 at O'Neil Creek reported an average pH of 6.71 and an average EC value of 144 $\mu\text{S}/\text{cm}$. The pH and EC values recorded were within ANZECC 95% guidelines. Metal concentrations were generally reported within ANZECC 80% threshold guidelines with the exception of aluminium, cadmium and zinc concentrations.

Hercules Pit water is acidic while Moline and School Pit water was observed to be very acidic with a pH exceeding SWG and EC values exceeding ANZECC 95% threshold guidelines. Moline Dam was observed to have near neutral pH values and EC values within ANZECC 95% threshold guidelines. Surface water samples collected across the site was generally observed to have aluminium, cadmium, copper nickel and zinc concentrations exceeding ANZECC 80% threshold guidelines with the exception of Moline Dam which generally reported metal concentrations within the 80% threshold guideline.

4.3.2 Groundwater

From a groundwater investigation in 1987 (Rockwater Pty Ltd, 1987) the groundwater conditions within the project area reported groundwater contained within the bedrock to be fresh to brackish, in the range 200 to 1,200 mg/l TDS. The most reliable sample, pumped from a shaft in Northern Hercules deposit, contained about 750 mg/l TDS. Arsenic content of the mineral zone groundwater is suspected to be relatively high because of the presence of arsenopyrites.

Groundwater is known to occur in mineral deposits within the Moline Project Area (Rockwater Pty Ltd, 1987). Superficial deposits comprise recent alluvium in major drainages and localised Cainozoic solids. These deposits are not very extensive and generally not considered thick enough to contain useful groundwater supplies for mineral processing.

Groundwater is contained in bedrock fractures, and vugs associated with quartz. Minor amounts are reported to be intersected near the base of the oxidised zone and larger amounts at greater depth. It is expected that the fracturing parallels the structures associated with the mineralisation in the deposits.

Newmarket are currently monitoring eight bores on a quarterly basis as part of the MOPA Care and Maintenance MMP (2014-2018). Field readings for pH for at the site ranged from 6.21 at MOMB04 to 7.09 at MOMB02 and electrical conductivity readings were reported to range from 1,234 $\mu\text{S}/\text{cm}$ at MOMB04 to 3,467 $\mu\text{S}/\text{cm}$ at MOMB05. Field pH and electrical conductivity readings were reported within ANZECC (2000) livestock drinking water drinking guidelines. Groundwater samples submitted for laboratory analysis of selected metals reported all total and dissolved metal concentrations within ANZECC livestock drinking water guidelines with the exception of arsenic. Arsenic was reported to exceed the SWG within MOMB04 in March 2013 with a concentration of 1,000 $\mu\text{g}/\text{L}$ (dissolved concentration). Anion and cation concentrations were reported within ANZECC livestock drinking water guidelines (where established).

4.4 Current Land Use

The lease is within the Mary River Pastoral Lease (Lease number 815). PNX were advised in 2016 that there is no grazing activity currently occurring in the area of interest south of the Arnhem Highway

Nearby is the southern border of the World-Heritage Listed Kakadu National Park, a federal joint managed park.

4.4.1 Aboriginal and Heritage Sites

PNX engaged In-Depth Archaeology to undertaken a desktop review of all NT Projects in 2015. This included a search of the National Native Title Tribunal (NNTT) registers. The search showed that native title determinations had been extinguished over the Moline Project area. Archaeological reports were also reviewed from the Heritage Branch library and the NT Heritage Branch Register to gain information for places and objects protected under the Heritage Act.

PNX followed this up in 2016 by engaging again with In-Depth Archaeology to undertake a field inspection of the proposed drilling site in co-operation with a representative of the Traditional Owners. The report for this work has not yet been received, but GIS files showing areas to avoid were provided, and are shown in **Figure 11**. There is no impact on the proposed drilling activities.



Figure 11: Moline planned drill hole locations with exclusion zones identified in the 2016 heritage survey

5 Environmental Management System

PNX's Environmental Management Policy is shown in **Figure 12** and the Environmental Management Plan is provided in **Appendix IV**. The basic premise of the environmental management plan is to minimise the environmental impact of activities and to ensure that the environmental risks are identified and managed prior to disturbance. Routine activities undertaken on site are described by SWPs (Procedures) and new activities are subject to a JSA (job safety analysis) prior to commencement, both of which cover safety and environmental aspects.

As the operations are being undertaken as part of a joint venture, PNX also have obligations to comply with Newmarket's environmental systems, where they are relevant. In particular, where new ground disturbance is planned, PNX will utilise Newmarket's qualified environmental scientists to obtain Clearance Permits. These permits will be appended to future MMP's as evidence that environmental and cultural aspects have been considered and authorised. Clearance permits from Newmarket Environmental Team for the 2016 Moline drill programme have yet to be undertaken.

5.1 Environmental Policy and Responsibilities

Figure 12 shows PNX's Environmental Policy. Details regarding PNX responsibilities in relation to environmental management are detailed in the Environmental Management Plan, provided as **Appendix IV** to this Exploration MMP.

Environmental Policy

PNX Metals Ltd is committed to minimising environmental impacts during all phases of exploration, development, and production through a best practice environmental approach.

Carefully managed exploration programmes have little or no long lasting impacts on the environment and the company has formed a best practice policy for the management of its exploration programmes.

The company is committed to achieving the highest standards of environmental management in its activities by complying with and, where possible, exceeding governmental requirements.

To achieve this objective PNX adopts the following policies:

- Encourage environmental stewardship and responsibility amongst all employees and contractors through education, training and management actions.
- Promote knowledge of, and compliance with the appropriate laws and regulations.
- Develop a culture of continuous improvement and pursuit of excellence in environmental practice.
- Rehabilitate land affected by its mineral exploration with the goal of returning it to its pre-exploration condition
- Communicate freely and openly with relevant authorities, stakeholders, local communities, special interest groups and the public at large to ensure that the company clearly understands its environmental expectations.
- Monitor environmental impact and rehabilitation to ensure long term success.
- Publicly report and showcase the company's environmental achievements
- At least annually review and maintain our Environmental Policy and Procedures performance.

A handwritten signature in blue ink, appearing to read 'James Fox', written over a horizontal line.

16/6/2016

James Fox (Managing Director and CEO)

Figure 12: PNX Environmental Policy

5.2 Statutory Requirements

PNX Metals will comply with statutory legislation presented in Table 7.

Table 7: Statutory Requirements

Northern Territory	Commonwealth
<i>Building Act</i> <i>Bushfires Act</i> <i>Control of Roads Act</i> <i>Crown Lands Act</i> <i>Dangerous Goods Act</i> <i>Dangerous Goods (Road and Rail Transport) Act</i> <i>Disasters Act</i> <i>Electrical Workers and Contractors Act</i> <i>Energy Pipelines Act</i> <i>Environmental Assessment Act</i> <i>Environmental Offences and Penalties Act</i> <i>Fences Act</i> <i>Heritage Conservation Act</i> <i>Lands, Planning and Mining Tribunal Act</i> <i>Litter Act</i> <i>Mineral Royalty Act</i> <i>Minerals (Acquisition) Act</i> <i>Mineral Titles Act</i> <i>Mining Management Act</i> <i>Motor Vehicles Act</i> <i>Northern Territory Aboriginal Sacred Sites Act</i> <i>Northern Territory Employment and Training Authority Act</i> <i>Northern Territory Land Corporation Act</i> <i>Northern Territory Rail Safety Act</i> <i>Ozone Protection Act</i> <i>Parks and Wildlife Commission Act</i> <i>Pastoral Land Act</i> <i>Plant Health Act</i> <i>Public Health Act</i> <i>Soil Conservation and Land Utilisation Act</i> <i>Territory Parks and Wildlife Conservation Act</i> <i>Traffic Act</i> <i>Validation (Mining Tenements) Act</i> <i>Waste Management and Pollution Control Act</i> <i>Water Act</i>	<i>Aboriginal Land Rights (Northern Territory) Act</i> <i>Aboriginal and Torres Strait Islander Heritage Protection Act</i> <i>Australian Heritage Council Act 2003</i> <i>Environment and Heritage Legislation Amendment Act (No 1) 2003</i> <i>Environment and Heritage Legislation Amendment Act (No 1) 2006</i> <i>Environment Protection and Biodiversity Conservation Act</i> <i>Native Title Act</i> <i>National Environmental Protection Measures (NEPM)</i> Newmarket Gold Moline Project Area MMP 2014-2018 ADDITIONAL INFO 1 220414 24 <i>Weeds Management Act</i> <i>Work Health and Safety (National Uniform Legislation) Act</i>

In addition, PNX Metals Ltd. will comply with industry codes of practice with respect to environmental Management.

5.3 Non-Statutory Requirements

PNX where appropriate will work with the non-government organisations presented in **Table 8**.

Table 8: Non-Statutory Requirements

Organisation	Identified Groups or Departments
Non-Government Organisations	NT Bushfire Council Minerals Council of Australia –NT Division

5.4 Inductions and Training

All PNX employees, contractors and visitors to the site must undergo a site specific induction, which is conducted by the senior company representative on site and includes relevant site safety and environmental information, along with a competency assessment questionnaire and sign-off. An induction manual is provided to all workers, and specific items discussed in the induction manual include:

- Environmental responsibilities
- Respecting landowners
- Respecting heritage sites and traditional owners
- Minimise disturbance by good planning, keeping to existing tracks
- Spill prevention and remediation
- Rehabilitation strategies
- Importance of weed prevention
- Fire management
- Surface and groundwater management when drilling
- Fuel and chemical storage
- Air quality
- Incident reporting obligations

PNX maintains its own safety and environmental procedures to ensure that personnel are properly informed and trained when carrying out field work. Procedures relevant to work requested in this MMP are appended.

PNX have completed a Risk Management Plan (RMP). An Emergency Response Plan is developed specifically for each project area. This provides staff with site specific information about muster points and evacuation responses at times of emergency. PNX manage the training and communication of site specific requirements primarily through the use of SWP's and JSA's. A JSA is performed for any new activity, and will include involvement from earthmoving and drilling contractors. This process is used to collaboratively explore safety and environmental risks and site specific management strategies.

At the start of each campaign, all staff and contractors will be given a copy of the Emergency Response Plan and given laminated copies to be kept in each vehicle for the duration of the exploration programme. Emergency response Plans are also distributed to the Newmarket Emergency Response Team, Exploration Department and Safety Department so that they can familiarise themselves with the areas that we are working.

In terms of training, the basic training requirements for PNX are completion of the site inductions, drivers license, radiation licence (for XRF operation) and current first aid certificate. However, recruiting and contractor procurement looks favourably to those personnel or companies who have additional competencies, for example White Cards, 4WD defensive driving, cultural awareness experience or environmental qualifications.

PNX keeps all records of training competencies of its employees and requests Contractors do the same.

Ongoing awareness and communication of environmental issues will be reinforced through email notifications, bulletin boards and induction programs. Toolbox meetings on site will be held regularly (one per shift during site activity) between PNX and its contractors, and PNX will liaise with the Newmarket's Environmental Department where information and advice is shared.

The DME's operation advice and advisory notes are made available to staff and contractors including:

- Weed management (AA7-017)
- Clearing and rehabilitation of grid lines and tracks (AA7-005)
- Construction and Rehabilitation of Costeans and Pits (AA7-006)
- Ground Water Sampling Methodology (AA7-024)
- Surface Water Sampling Methodology (AA7-025)
- Construction and Rehabilitation of Exploration Drill Sites (AA7-029)
- Environmental Incident Reporting (AT8-006_S29)
- A-Z guide to Weed Identification Tables (www.lrm.nt.gov.au)
- Clearing Guidelines, Fact Sheets and Reports (LRM)

5.5 Identification of Environmental Impacts

Table 9 below summarises the environmental aspects and impacts detailed in the EMP (Appendix IV)

Table 9: Environmental Aspects and Impacts

Aspect	Impact	Risk Rating	Control measures (prevention & minimisation)	Management measures (monitoring & remediation)
Earthworks associated with Drill Site Preparation, Camp, Track Construction and Site Rehabilitation	Damage to native flora and fauna, and habitat	Moderate	Consultation and authorisations with landowners, Aboriginal Traditional Owners and relevant Government Departments	<p>Manager site visits to monitor works and carry out checks/audits – rehabilitation register</p> <p>Photographic evidence to be collected to monitor before, during and after disturbance activities and included in rehabilitation reporting</p> <p>Inductions, toolbox talks, daily pre-start meetings and JSA's are the primary tools to identify, communicate and manage the environmental risks</p> <p>Incident reporting process (including implementation of corrective actions)</p> <p>If, on inspection, vehicles require wash-down, they will be directed to a washdown facility in Katherine</p> <p>Selection of specialist environmental consultants to assist if/when required (e.g. weed mapping, vegetation mapping, biodiversity studies, groundwater studies)</p>
	Damage or destruction of native vegetation		Inductions	
	Introduction and/or spread of weeds		Communication and use of Advisory Guidelines AA7-005 and AA7-029 guidelines and MMP conditions	
	Disturbance to natural drainage patterns		Use existing access tracks to sites where possible.	
	Damage to third party infrastructure		New tracks planned to take route of least disturbance, reestablishing known tracks where possible, avoiding large trees, historic sites, any identified vegetation, drainage / creek lines.	
	Soil erosion		Drill pads kept to minimum size for safe operation and access tracks kept to minimum width for vehicle access.	
	Inversion of soil profile		Design curved tracks to create less visible impact and lower vehicle speeds and reduce dust	
	Dust generation		Routes checked and inspected prior to commencing disturbance (eg. avoid trees	
	Soil compaction			
	Disturbance to cultural heritage sites			
Short to medium term loss of visual amenity				

Aspect	Impact	Risk Rating	Control measures (prevention & minimisation)	Management measures (monitoring & remediation)
	Disruption to land use (e.g. grazing and recreation)		<p>with nests) - Newmarket Clearing/Ground Disturbance Permit.</p> <p>Use blade up method when clearing access tracks to preserve root stock and promote regrowth and minimise erosion potential</p> <p>Vehicles required to be washed down prior to arrival on site and on departure from site.</p> <p>Avoid clearing of riparian vegetation</p> <p>Avoid making windrows when constructing tracks – use whoa boys and diversion drains to divert water from tracks</p> <p>During disturbance, topsoil to be stored nearby in low mounds together with any plant litter</p> <p>During rehabilitation, top soil replaced and area ripped along contours and re-contoured (if sloping ground) to allow natural revegetation to occur</p>	
Fuel/oil/chemicals storage and transfer	<p>Hydrocarbon spills causing localised contamination of soil and/or groundwater</p> <p>Pollution of surface and ground water</p> <p>Fire</p>	Low	<p>Drill rig inspection before commencement</p> <p>Use of biodegradable drilling fluids</p> <p>Have spill kits available at refueling points and at drill site</p> <p>Spills to be remediated immediately</p>	<p>Manager to monitor works and carry out checks/audits</p> <p>Small spills to be cleaned up prior to moving to next site using spill kits</p> <p>During contractor selection ensure regular maintenance programs are integral to operations</p> <p>Daily pre-start vehicle checks</p>

Aspect	Impact	Risk Rating	Control measures (prevention & minimisation)	Management measures (monitoring & remediation)
			<p>No fuel is stored on site - refueling is done off-site in Katherine. Fuel transferred on location via hand pump with protective matting – a hydrocarbon spill kit is available on site to clean up any small spills</p> <p>Only quantities of chemicals required for day-to-day use will be kept on site; excess will be stored off site</p> <p>Repair leaks as soon as possible</p> <p>Containment bunds and matting will be used if it becomes necessary to store fuels/oils/chemicals on site. The volume of bunded areas will be greater than the volume of stored substances. An area to be designated on high ground away from water courses</p> <p>Maintained fire suppression equipment to be in every vehicle</p> <p>MSDS data sheets for all hazardous materials.</p>	<p>Incident reporting process (including implementation of corrective actions)</p>
Drilling operations	<p>Contamination of groundwater aquifers</p> <p>Escape of groundwater outside containment</p> <p>Ground and soil compaction</p> <p>Erosion hazard</p> <p>Hydrocarbon Spills</p>	Low	<p>Favour the lighter, track mounted rigs or large tired vehicles when choosing a contractor to minimise compaction and pad size</p> <p>Drillers will plug and grout if multiple aquifers intersected or if flowing water encountered.</p> <p>Plug hole collars with temporary cap as soon as drilling completed, and</p>	<p>Manager site visits to monitor works and carry out checks/audits – rehabilitation register</p> <p>Photographic evidence to be collected to monitor before, during and after disturbance activities and included in rehabilitation reporting</p> <p>Inductions, toolbox talks, daily pre-start meetings and JSA's are the primary tools to</p>

Aspect	Impact	Risk Rating	Control measures (prevention & minimisation)	Management measures (monitoring & remediation)
	<p>Animal entrapment in sump or drill hole</p> <p>Fire</p> <p>Dust emissions from RC drilling</p> <p>Noise</p>		<p>permanent plug when downhole testing is finished</p> <p>Ensure sumps are of sufficient size when drilling in high groundwater areas – have ability to dig extra sumps on hand</p> <p>Minimise vehicle movements; avoid movement in wet weather</p> <p>Dispose of drill cuttings in sumps or downhole</p> <p>Remove all rubbish and sample bags</p> <p>Avoid placing sumps in drainage systems</p> <p>Sumps to be open for as limited time as possible.</p> <p>Maintained fire suppression equipment to be in every vehicle. Back burn around rig if in imminent danger from wildfire</p> <p>Topsoil to be stored nearby in low mounds together with any plant litter and respread as soon as practical when the site is no longer required</p> <p>Refueling of vehicles to be conducted away from drainage lines and always conducted over absorbent matting</p>	<p>identify, communicate and manage the environmental risks</p> <p>Incident reporting process (including implementation of corrective actions)</p> <p>If, on inspection, vehicles require wash-down, they will be directed to Katherine for wash-down.</p> <p>Selection of specialist environmental consultants to assist if/when required</p> <p>Groundwater quality tests</p> <p>Monitor radioactive properties of rocks either with pXRF or Geiger counter (none expected)</p>
General waste handling	<p>Spread of windblown debris</p> <p>Poor aesthetics</p> <p>Increase in pests and insects</p>	Low	<p>Inductions to instruct personnel on correct waste management</p> <p>Covered bins will used for the collection and storage of waste on site</p>	<p>Manager to monitor works and carry out checks/audits periodically.</p> <p>Incident reporting process</p>

Aspect	Impact	Risk Rating	Control measures (prevention & minimisation)	Management measures (monitoring & remediation)
			<p>All refuse to be removed offsite to waste disposal facilities in Pine Creek</p> <p>Work areas will be maintained and rubbish removed on a daily basis to ensure that sites are not frequented by wildlife</p> <p>Rubbish to be well contained/tied down during transport</p>	
Driving	<p>Creation of dust and noise</p> <p>Vehicle accidents causing wildlife or stock collision</p> <p>Soil compaction</p> <p>Disturbance to cultural heritage sites</p> <p>Introduction/spread of weeds</p> <p>Disruption to land use (e.g. grazing and recreation)</p>	High	<p>Induction to enforce high risks involved with driving</p> <p>Drive to suit conditions and reduce speed to minimise dust</p> <p>Keep to existing tracks</p> <p>Drive with lights on to maximise visibility to other road users</p> <p>Avoid travel at dawn and dusk if possible.</p> <p>Minimise vehicle movements; avoid movement in wet weather</p> <p>Vehicles required to be washed down prior to arrival on site.</p>	<p>Re-enforce safe driving practices through tool box talks.</p> <p>4WD defensive driver training preferred.</p> <p>Record illegal travelers on private roads.</p> <p>Incident reporting process.</p>

5.5 Environmental Audits, Inspections and Monitoring

Pre-Clearing Inspections

PNX consult with Newmarket's Environmental and Exploration departments with regard to any exploration disturbance on the Moline Project.

Initial liaison work in relation to the areas to be accessed and drilled include:

- topography, surface water courses and ground water, including any monitoring bores
- flora, fauna and weeds
- location of historic or archaeological sites
- firebreaks or controlled burning required
- other environmental aspects to be aware of for the particular sites.

The above are all covered in the Newmarket's "Clearing Permit" process, which is signed off before any clearing of tracks and pads commence. The Clearance Permit is undertaken by qualified environmental scientists who have the skills to identify relevant flora and fauna, so that any impact on threatened or vulnerable species can be avoided.

Drill Rig Inspections

Before arriving at site, drilling companies (or other companies if relevant) will be expected to have completed a "PNX Pre-commencement Drill Rig Safety Inspection Report". This includes that vehicles and rigs have been washed-down and are free from contaminants including weed seed, and checking that all oils and fluids brought to site are appropriate and will be stored and disposed of correctly.

Exploration Site Inspections

Exploration areas will be periodically inspected, criteria covered in the inspections will include that:

- Clearing has been undertaken to best practice
- Topsoil has been correctly stockpiled
- Oils and drilling fluids are correctly stored and disposed of
- Drillpad closure and rehabilitation after drilling is complete
- Waste is being correctly managed
- Photographic records are kept for monitoring purposes

5.6 Environmental Performance

As this is the first MMP for this Project, there is nothing yet to report against.

Please refer to **Table 10** for preliminary performance objectives in preparing this MMP. Performance Objectives

Performance objective for the proposed work programme are set in accordance with PNX's EMP (**Appendix IV**) and progress is tracked as per **Tables 12-13** below.

Table 10: Commitment Table Key

Target Status	Definition	Symbol
Achieved	Action/project has been met within the given timeframe	*
In progress	Action/project is currently in progress and has either a changed project objective or an extended timeframe for completion.	*
Not achieved	Action/project has not been met within the given timeframe	*

Table 11: Environmental Commitments for PNX Moline Project

Commitments	Section in MMP	Comments	Performance	
			Outcome	Comments
Native Flora and Fauna Management Commitments				
Under take a desktop threatened species search	Appendix II Appendix VIII	Undertake a search for threatened species in each project area on the EPBC protected matters and the NT NRM Infonet website	*	Completed
Establish an Environmental Observation Register	Appendix IX	Create register for staff to record sightings of native and introduced Flora and Fauna species in each project area. Create folder for photographs taken of Flora and Fauna that cannot be identified in the field for later identification.	*	Environmental Observation Registers have been located in each field vehicle. Staff will record the details of each sighting and records will be collated each week. If the species cannot be identified, where possible, staff will photograph for later identification.
Maintain Environmental Observation Register	Appendix IX	Log sightings of native flora and fauna into Environmental Observation Register	*	Environmental Observation Register to be included with future MMP submissions. Ongoing
Weed and Pest Management Commitments				
Inspect mobile equipment and clean prior to entry and exit project site	Appendix IV: PNX Environmental Management Plan		*	Visual inspections of all vehicles accessing site to be undertaken Drilling contractor to be sent pre-commencement checklist
Establish an Environmental and Community Observation Register for pest species		Create register for staff to record sightings of native and introduced Flora and Fauna species in each project area. Create folder for photographs taken of Flora and Fauna that cannot be identified in the field for later identification.	*	Environmental and Community Observation Register have been located in each field vehicle. Staff will record the details of each sighting and records will be collated each week. If the species cannot be identified, where possible, staff will photograph for later identification. Started populating in May 2016
Maintain Environmental and Community Observation Register for pest species		Log sightings of native flora and fauna into Environmental and	*	Environmental and Community Observation Register to be included with future MMP submissions.

		Community Observation Register		Started populating in May 2016
Develop and implement a safe work procedure to minimise the physical effects of bite and stings from ticks, mosquitoes etc.			*	SOP004 Bites and Stings
Cultural Heritage Management commitments				
Desktop review of the status of cultural and heritage matters for the entire Burnside area		Engage contract Archaeologist to perform desktop study	*	Completed 2015 Follow up site survey in July 2016 specific to drill site
Undertake heritage surveys for all areas where land disturbing activities are planned.		Consult with NLC and organise archaeological surveys prior to any land clearing	*	Met with NLC in May 2016 , no further action required Archaeological site survey in July 2016 specific to drill sites
Protect cultural heritage sites	Appendix III	Engage archaeological heritage surveys prior to any land clearing activities	*	AAPA searches conducted Archaeological site survey in July 2016 specific to drill sites
Maintain Heritage and Cultural significance Register		Collect details on PDA or GPS or record and update register weekly at Toolbox meeting	*	
Socio-Economic Management Commitments				
Undertake regular consultations and communication with underlying pastoral lease holders		Consult with pastoralist regularly and openly	*	Communications maintained with face to face meetings, telephone contact as well as via email. A register of communications with landholders, community and stakeholders
Written notice of entry to landholders and compensation agreement	Appendix V, VI	Written correspondence informing landholders of PNX intentions for entering their property in the June-December 2016 exploration season	*	Letters hand delivered to landholders during site visit May 2016.
Establish an Environmental and Community Observation Register for recording trespassers in and around work areas		Create register for staff to record sightings of trespassers (such as pig hunters, campers and possible fire lighters) in each project area. Create folder for photographs taken of car number plates.	*	Environmental and Community Observation Register have been located in each field vehicle. Staff will record the details of each sighting of trespassers or suspicious activities in and around project areas, records will be collated each week. If possible photographs should be taken of car number plates so that the information can be distributed to Station Managers and Newmarket Exploration Team in case there is a need for further follow up.
Apply to Newmarket, Environment Team for Ground Disturbance Permits		Apply for ground disturbance permits when MMP has been approved.	*	Have maps and paper work ready to be submitted to Newmarket Enviro. Only seek permits if MMP is granted. Enviro will need to do a site visit to assess the area before signing off on permits.
Fire management commitments				
Establish an Environmental and Community Observation Register for recording incidence of wildfire and any controlled burning events in		Create register for staff to record prescribed burns and wild fires in Environmental and Community Observation Register	*	Started collection in May 2016
Log incidence of wildfire and any controlled burning events in			*	Environmental and Community Observation Register to be included in future MMP

Obtain a permit to burn prior to any controlled burning		Bushfires NT	NA	No controlled burning has been undertaken at this point
Undertake a fire history assessment	Appendix II		*	NT NRM search done
Rehabilitation management commitments				
Rehabilitate drill hole locations within 6 months	Section 2.4.1	All staff and contractors will be given a copy of the Advisory note: Construction and Rehabilitation of Exploration Drill Pads, NTGS Department of Resources, May 2011.	*	.
Establish and implement a rehabilitation register		Use the DME Rehabilitation checklist as a guide to register. Keep all holes drilled by PNX on the list so that they can be revisited over time to monitor erosion, weeds, subsidence etc	*	This register will accompany all future MMP's.
Investigate site conditions		Inspections and checklist to establish conditions for future development of rehabilitation plans or management options.	*	Visual inspections undertaken, formal documented inspections to be undertaken in the upcoming reporting period. Initial site visits have taken place with detailed site inspections to be carried out before any clearing takes place
Apply to Newmarket Environmental Team for clearance permits before any site clearing occurs		Newmarket Environmental Team	*	Permits will be applied for prior to drilling

5.6 Emergency Procedures and Indecent Reporting

For safety and environmental emergencies, PNX is fortunate to have the services of Newmarket's Emergency Response Team (ERT) based at Cosmo Deeps Mine site within mobile phone range. PNX provide the ERT with current and accurate Emergency Response Plan for each area within the Chessman Project that the PNX staff will be working. This includes a map which is updated each site move and an email sent each day to Newmarket HSEC personnel. Emergency Services are also available in Pine Creek.

The Newmarket ERT team and site medic are resourced with a fully equipped ambulance and fire/emergency response vehicle to assist with both safety and environmental emergencies if required.

All PNX staff have current First Aid Certificates. All light vehicles are equipped with a current Emergency Response Plan (relevant to the area that the team is working within), first aid kits and have UHF radios to call for assistance should an emergency arise. Satellite phones and SPOT messengers are also available to the exploration team.

The ERT undergo half-day weekly training in areas such as firefighting, vehicle incidents, search and rescue, medical assistance and first aid and emergency situation handling / communication. This includes the use of emergency response vehicles, turnout PPE, firefighting equipment and methods, breathing apparatus (BA),

hydraulic cutting and lifting equipment, GPS & maps, first aid and medical equipment, defensive driving and radio / satellite phone communications.

The Emergency Management (Response) Plan includes:

- Critical incident management for all persons and environments affected by the emergency event;
- Liaison with government authorities, community and community services;
- Protecting all persons, the environment and property;
- Salvaging of damaged goods, plant and equipment;
- Wildfire management in conjunction with stakeholders, community, community services and government authorities;

All PNX personnel and contractors will receive training in the emergency response procedures as an integral part of the Newmarket site induction. For each project area the PNX team will develop a site specific Emergency Response Plan. The PNX Emergency Response Plan should be consulted for further detailed information regarding emergency response management, which will be addressed by the Mine Rescue Team.

Environmental events will be reported using the Accident and Incident Investigation form (following the flowchart as seen in **Figure 13**) and notified according to the Mining Management Act to the DME using Form CF7-001 if rated at “Class 2” or above. All environmental incidents will be recorded in the site register.

This procedure requires that:

- All events and incidents are to be reported to PNX Management and the Newmarket’s General Manager – Exploration as soon as the hazard or incident is identified and the severity will be assessed;
- All environmental incidents with a severity Class 2 or greater will be recorded and reported to DME as required by Section 29 the Mining Management Act 2001 (refer Guideline AT8-006_S29); and
- Incidents and events will be investigated to improve systems and prevent recurrences. Reportable incidents may include spillages, burst pipelines, bund failures, significant dust issues, unapproved clearing of vegetation, unauthorised release of water to environment etc.

Checks and routine inspections by the PNX Metals Ltd Exploration Manager as well as periodic inspections by the Newmarket Environmental team will ensure prompt reporting of any identified hazards or problems.

Major environmental events will be reported to the site supervisor who will then carry out an investigation and inform both the PNX Management team and the Newmarket General Manager – Exploration and Environment Team. In the case of a serious accident or critical incident, it is the responsibility of the PNX Exploration Manager to file the incident report and investigation to the Chief Executive Officer of the Department of Mines and Energy in accordance with Section 29 of the Mining Management Act. The site supervisor may carry out the investigation, yet the responsibility for a full investigation rests with PNX Exploration Manager.

PNX Exploration Manager will also be notified immediately of any incident occurring and will liaise with Newmarket staff in relation to response, remediation and reporting activities.

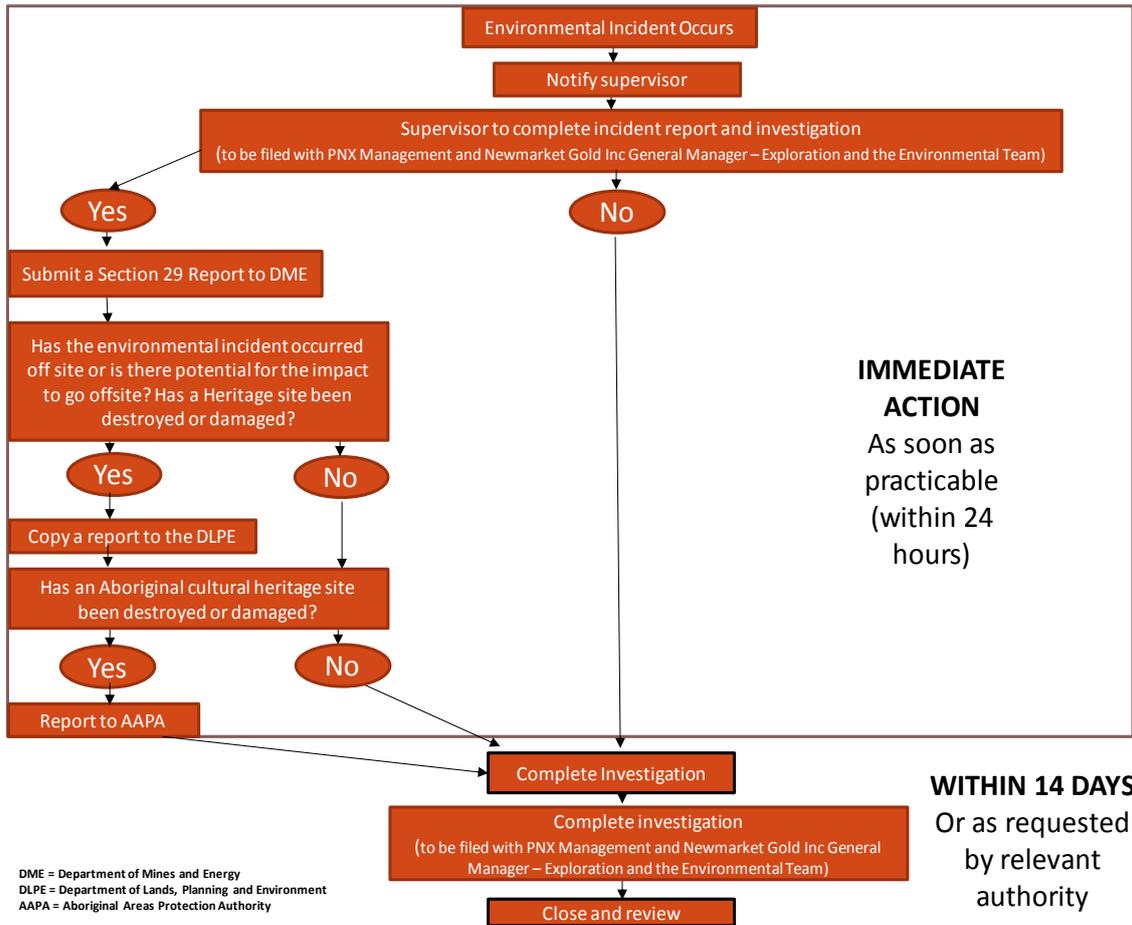


Figure 13: PNx Metals Environmental Incident Flowchart

5.6 Exploration Rehabilitation

PNX Metals Ltd will follow the guidelines set out in the Advisory Notes, as supplied on the DME website.

Table 12: Exploration Rehabilitation

Disturbance	Rehabilitation Activities	Schedule (Timing)	Closure Objectives / Targets	Monitoring Techniques
Drill holes	<p>Diamond holes will be grouted if multiple aquifers intersected, or artesian flows encountered otherwise capped and buried 40cm below surface according to AA7-029 guidelines.</p> <p>RC holes will be backfilled with drill spoils, then capped and buried according to AA7-029.</p>	<p>At the completion of each drill hole or <3 months after downhole geophysical or geochemical testing complete.</p>	<p>All holes plugged / capped and stable by end of drilling programme (est. December 2016).</p>	<p>Inspection of holes to be undertaken at the end of the drilling programme and again at the end of the wet season to ensure no hole failures. Remediation to be undertaken if failures found.</p>
Drill pads	<p>All materials to be removed from the pad e.g. core trays/bags, waste items.</p> <p>At the end of the programme, the RC drill spoil to be tipped back down the hole (deepest to shallowest ensuring limited oxygen exposure of any sulphide material brought to the surface during the drilling process, limiting acid production).</p> <p>Empty sample bags to be removed from site and disposed of at Pine Creek dump</p>	<p>At the completion of the drilling programme</p>	<p>All pads rehabilitated by end of drilling programme (est. December 2016).</p>	<p>Inspection of pads to be undertaken at the end of the drilling program and again at the end of the wet. Remediation to be undertaken if failures found.</p>

Disturbance	Rehabilitation Activities	Schedule (Timing)	Closure Objectives / Targets	Monitoring Techniques
	Topsoil (if available) and logs respread over drill pad on completion of hole.			
Sumps	<p>Earth moving contractors employed to rehabilitate the sumps and drill pads.</p> <p>Sumps to be pushed in with soil mounded over to accommodate future soil compaction and subsidence. Sumps provide a water source for animals and will not be left to dry out before filling in as they pose a risk for animals drowning.</p>	At the completion of the drilling programme	All sumps rehabilitated by end of drilling programme (est. December 2016).	Inspection of sumps to be undertaken at the end of the drilling programme and again at the end of the wet. Remediation to be undertaken if failures found.
Costeans	N/A	N/A	N/A	N/A
Bulk sample pits	N/A	N/A	N/A	N/A
Tracks / Gridlines	<p>Existing access roads will be maintained and graded with erosion control (if required – e.g. diversion drains and whoa boys).</p> <p>Non-required tracks will be ripped and access blocked with large fallen trees/logs.</p>	Non-essential tracks will be ripped on completion of use.	All non-essential tracks to be ripped at the end of the drilling programme (est. December 2016).	Inspection of tracks to be undertaken at the end of the drilling programme and again at the end of the wet. Remediation to be undertaken if failures found.
Sample bags	To be disposed of at Pine Creek dump	At completion of the drilling programme.	All drill pads to be cleared by end of drilling programme (est. December 2016).	Inspection of drill pads to be undertaken at the end of the drilling programme.

Disturbance	Rehabilitation Activities	Schedule (Timing)	Closure Objectives / Targets	Monitoring Techniques
Camp	N/A – personnel will stay at Pine Creek	N/A	N/A	N/A

5.6 Exploration Rehabilitation Register

As this is the first MMP for this Project, there is nothing yet to report against.

Please refer to **Table 12** for preliminary performance objectives in preparing this MMP

6. Costing of Closure Activities

The Department of Mines and Energy Exploration Security Calculation Tool has used to obtain the figures detailed in **Table 13**. The full Exploration Security Calculation Tool workbook including assumptions used has been provided as **Appendix VII** to this Exploration MMP. The total estimated security is **\$5,873.74** prior to discounts and levies.

Table 13: Security Calculation Summary



DEPARTMENT OF MINES AND ENERGY

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AF7-014

last review: September 2012

M & E Security Calculation Tool
Exploration Operations

PNX Metals Ltd - Moline Project

Security Calculation Summary

Details			
Contact Name	Andy Bennett	Authorisation #	New
Project	Moline	Date	5/10/126
MMP			

Calculation Trigger			
New Authorisation	MMP Renewal/amendment	Audit Finding	Client Request

Domains	Calculated Cost
Site Infrastructure	\$0.00
Exploration	\$2,963.00
Post Closure Management	\$2,144.60
Sub-Total - All Domains	\$5,107.60
CONTINGENCY @15%	\$766.14
TOTAL COST	\$5,873.74
10% Discount	\$587
Amended amount	\$5,286
1% levy	\$53

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Useful Links and Resources

- Advisory Note: Construction and Rehabilitation of Exploration Drill Pads, NTG Department of Resources, May 2011.
- Field Guide Northern Territory - Android Apps on Google Play. 2016. *Field Guide Northern Territory - Android Apps on Google Play*. [ONLINE] Available at: <https://play.google.com/store/apps/details?id=au.gov.nt.artsandmuseums.fieldguide&hl=en>. [Accessed 12 May 2016].
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