Title of Proposal - Spring Hill Gold Project, 200km SE of Darwin, NT

Section 1 - Summary of your proposed action

Provide a summary of your proposed action, including any consultations undertaken.

1.1 Project Industry Type

Mining

1.2 Provide a detailed description of the proposed action, including all proposed activities.

The project involves a proposed gold mine on Mining Lease ML23812 located approximately 200km southeast of Darwin in the Northern Territory (Figure 1). The proposal includes establishing an open cut mine to extract oxide ore, which will be trucked offsite to the Union Reefs Mill for processing. The proposed site infrastructure will include the following major infrastructure components:

- ROM pad with mobile crusher and sediment basin (0.7ha).
- Administration offices (demountable, within ROM pad footprint).
- Waste rock dump (WRD) (11.63ha).
- Access tracks/haul road (1.1ha).
- Pits (3.3ha total, made up as below):
: Hong Kong 1 (2.7ha).
: Hong Kong 3 (0.3ha).
: Main Pit 2 (0.3ha).

The project footprint is expected to be approximately 17ha, much of which has been previously disturbed by mining activities over the last 130 years.

1.3 What is the extent and location of your proposed action? Use the polygon tool on the map below to mark the location of your proposed action.

Area	Point	Latitude	Longitude
EPBC area of interest	1	-13.608301915192	131.71935882851
EPBC area of interest	2	-13.60826020461	131.71940174385
EPBC area of interest	3	-13.609511518872	131.718672183
EPBC area of interest	4	-13.612180967185	131.71832886025
EPBC area of interest	5	-13.612222677075	131.71717014595
EPBC area of interest	6	-13.611346767822	131.71712723061
EPBC area of interest	7	-13.610304014483	131.71704139992
EPBC area of interest	8	-13.608656454842	131.71719160362

Area	Point	Latitude	Longitude
EPBC area of interest	9	-13.607717966375	131.71695556923
EPBC area of interest	10	-13.606529208975	131.71656933113
EPBC area of interest	11	-13.605382156702	131.71650495812
EPBC area of interest	12	-13.604673067062	131.7165907888
EPBC area of interest	13	-13.604464510881	131.71704139992
EPBC area of interest	14	-13.604068253632	131.71772804543
EPBC area of interest	15	-13.603275737144	131.71753492638
EPBC area of interest	16	-13.602608352781	131.71779241844
EPBC area of interest	17	-13.602754343271	131.71856489464
EPBC area of interest	18	-13.602942045197	131.71974506661
EPBC area of interest	19	-13.603651140022	131.72041025444
EPBC area of interest	20	-13.604297665805	131.72064628883
EPBC area of interest	21	-13.605465578873	131.71995964333
EPBC area of interest	22	-13.607134016118	131.72073211952
EPBC area of interest	23	-13.607467702155	131.71987381264
EPBC area of interest	24	-13.608301915192	131.71935882851

1.5 Provide a brief physical description of the property on which the proposed action will take place and the location of the proposed action (e.g. proximity to major towns, or for off-shore actions, shortest distance to mainland).

The project involves a proposed gold mine on Mining Lease ML23812, which is located on the Mary River WEest pastoral lease (PPL815), approximately 26km NNW of Pine Creek or 200km southeast of Darwin in the Northern Territory

1.6 What is the size of the proposed action area development footprint (or work area) including disturbance footprint and avoidance footprint (if relevant)?

17ha

1.7 Is the proposed action a street address or lot?

Lot

1.7.2 Describe the lot number and title. Mary River West pastoral lease (PPL815)

1.8 Primary Jurisdiction.

Northern Territory

1.9 Has the person proposing to take the action received any Australian Government grant funding to undertake this project?

No

1.10 Is the proposed action subject to local government planning approval?

No

1.11 Provide an estimated start and estimated end date for the proposed action.

Start date 04/2018

End date 10/2018

1.12 Provide details of the context, planning framework and State and/or Local government requirements.

In accordance with requirements of section 40 of the NT Mining Management Act 2005 (MMA), a 'Spring Hill Gold Project Mining Management Plan' (MMP) was prepared to ensure that the required information is provided to the Department of Mines and Energy for assessment. The MMP has been submitted to the NTEPA as a NOI. However, the decision of whether the project requires a Public Environmental Report (PER) or an Environmental Impact Statement (EIS) pursuant to the NT Environmental Assessment Act 1982 (EA Act) has been deferred pending the outcome of this referral.

The MMP includes sections describing the socio-economic environment in which the mine will operate, including current land use, stakeholders, workforce, employment and accommodation opportunities for the communities of Pine Creek and Emerald Creek. An investigation into the flora and fauna of the site, particularly species listed as threatened under the EPBC and management plans to mitigate the impact of the proposed action of these MNES is included in Appendix C of this referral. Specific surveys targeting microbats were undertaken and included as Appendix B to this referral.

The MMP was reviewed by the Northern Territory Environment Protection Authority (NTEPA) Mines Department and NT Department of Environment and Natural Resources (Land Resource Management) (DENR) who both recommended that the project be referred for approval under the EPBC prior to any assessment for approval to operate under the MMA. This includes deferring any decision of whether the project requires a Public Environmental Report (PER) or an Environmental Impact Statement (EIS) pursuant to the NT Environmental Assessment Act 1982 (EA Act).

Other applicable NT environmental legislation which TM Gold is required to comply includes:

- Mining Act 1982

- Bushfires Act 1980

- Waste Management and Pollution Control Act 2003

- Environmental Offences and Penalties Act 1996

- Heritage Conservation Act 1991

- Aboriginal Sacred Sites Act 1989 (Sacred Sites Act)

- Weeds Management Act 2001

- Ozone Protection Act 1996

- Water Act 1992

- Soil Conservation and Land Utilization Act 1978

- Territory Parks and Wildlife Conservation Act 2001

- Work Health and Safety (National Uniform Legislation) Act 2012

- Dangerous Goods Act 2012

- Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act 2016

1.13 Describe any public consultation that has been, is being or will be undertaken, including with Indigenous stakeholders.

A Cultural Heritage Survey has been undertaken of the site, based on the requirements of the NT Heritage Act 2011, and included as Appendix E to this referral. Traditional owners have been engaged with throughout the development of Spring Hill, however, it is proposed that the relevant Aboriginal custodians or owners will assess the significance of archaeological sites and artefacts that have been identified on the mining lease, as required under the Commonwealth Native Title Act 1993 and the NT Aboriginal Land Rights (Northern Territory) Act 1976.

TM Gold have been working closely with local contractors and providers for staff accommodation and plant and equipment for the Spring Hill project, however, no documents detailing the outcomes of public consultation are available

1.14 Describe any environmental impact assessments that have been or will be carried out under Commonwealth, State or Territory legislation including relevant impacts of the project.

An environmental assessment of the site has been undertaken and is included as Appendix C. This includes a description of vegetation communities and an investigation into the flora and fauna of the site, particularly species listed as threatened under the EPBC and management plans to mitigate the impact of the proposed action of these MNES. An additional survey of microbats was subsequently undertaken and is included as Appendix B

Following review of the MMP and subsequent Request for Information (RFI), the NTEPA and DENR recommended submission of a referral under the EPBC and have deferred any decision of whether the project requires a Public Environmental Report (PER) or an Environmental Impact Statement (EIS) pursuant to the NT Environmental Assessment Act 1982 (EA Act).

1.15 Is this action part of a staged development (or a component of a larger project)?

No

1.16 Is the proposed action related to other actions or proposals in the region?

Yes

1.16.1 Identify the nature/scope and location of the related action (Including under the relevant legislation).

Yes, provide details: Ore from this mine will be trucked to the Union Reefs Mill near Pine Creek for processing and disposal of tailings. The 2.4Mtpa capacity Union Reefs mill also processes ore from other mines in the region including but not limited to Brocks Creek Mine, Princess Louise and Cosmo Mine. The mill has been operational since 2010 and is not a new action or proposal, and is not dependent on the operation of Spring Hill.

Section 2 - Matters of National Environmental Significance

Describe the affected area and the likely impacts of the proposal, emphasising the relevant matters protected by the EPBC Act. Refer to relevant maps as appropriate. The interactive map tool can help determine whether matters of national environmental significance or other matters protected by the EPBC Act are likely to occur in your area of interest. Consideration of likely impacts should include both direct and indirect impacts.

Your assessment of likely impacts should consider whether a bioregional plan is relevant to your proposal. The following resources can assist you in your assessment of likely impacts:

• Profiles of relevant species/communities (where available), that will assist in the identification of whether there is likely to be a significant impact on them if the proposal proceeds;

• Significant Impact Guidelines 1.1 – Matters of National Environmental Significance;

• Significant Impact Guideline 1.2 – Actions on, or impacting upon, Commonwealth land and Actions by Commonwealth Agencies.

2.1 Is the proposed action likely to have ANY direct or indirect impact on the values of any World Heritage properties?

No

2.2 Is the proposed action likely to have ANY direct or indirect impact on the values of any National Heritage places?

No

2.3 Is the proposed action likely to have ANY direct or indirect impact on the ecological character of a Ramsar wetland?

No

2.4 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed species or any threatened ecological community, or their habitat?

Yes

2.4.1 Impact table

Species	Impact
Erythrotriorchis radiatus Red Goshawk (V)	Low - There are no close records of Red

Species	Impact
Charadrius leschenaultii Greater Sand Plover (V) Geophaps smithii Partridge Pigeon (V) Falcunculus frontatus whitei Crested Shrike-tit (V) Erythrura gouldiae Gouldian Finch (E) Rostratula australis Australian Painted Snipe (E) Calidris ferruginea Curlew Sandpiper (CE) Numenius madagascariensis Eastern Curlew (CE) Tyto novaehollandiae Masked Owl (V) Dasyurus hallucatus Northern Quoll (E) Phascogale pirata Northern Brush-tailed Phascogale (V) Antechinus bellus Fawn Antechinus (V) Saccolaimus saccolaimus nudicluniatus Bare-rumped Sheathtail Bat (V) Hipposideros inornata Arnhem Leaf-nosed Bat (E) Petrogale concinna canescens Nabarlek (E) Macroderma gigas Ghost Bat (V) Conilurus penicillatus Brush-tailed Rabbit-rat (V) Mesembriomys gouldii Black-footed Tree-rat (E) Mesembriomys macrurus Golden-backed Tree-rat (V) Acanthophis hawkei Plains Death Adder (V) Lucasium occultum Yellow-snouted Gecko (E)	Goshawk on the Atlas of Living Australia and The Atlas of Australian Birds to the study area. Foraging habitat exists but does not have any unique features compared to the vast area of surrounding woodland. It is unlikely this species would be significantly impacted by the relatively minor loss of potential habitat associated with the proposed development. Low - The Greater Sand Plover is unlikely to occur, so no impact considered likely. Suitable habitat does not occur on site. Low – The Partridge Pigeon was recorded in the habitat surrounding the project area during surveys. The most likely negative impact is through haul road traffic on the in the lower terrain. General fauna management and management strategies to minimise potential impacts from interaction with traffic are incorporated into section 6.2 of the management plan sections of the Mine Management Plan ‘Species-specific management plan for Partridge Pigeons’. By adopting the recommended management and mitigation strategies should reduce the likelihood of a significant impact to ‘Low’. Low - The study area is within the known range of the Crested Shrike-tit but no records according to the Atlas of Living Australia database are within 30km of the study area. Although there is potential habitat within the study area, the habitat is degraded and does not have any unique habitat features compared to the vast area of surrounding woodland. The proposed action will not cause a significant decline in the availability and quality of the habitat for this species and is therefore unlikely to lead to a decline in the size of the population or the area of occupancy of this species. Low - There are multiple sightings of Gouldian Finches with 30km of the study area and suitable habitat occurs on site. However, the proposed disturbance areas do not represent significant areas or critical habitat and there are no dams or water sources within the project area that the finches require daily access to. Low - The Painted Snipe is unlikely to occur, so no impact considered likely. Suitable habitat does not

Species	Impact
	occur on site Low - The Curlew Sandpiper is unlikely to occur, so no impact considered likely. Suitable habitat does not occur on site. Low - The Eastern Curlew is unlikely to occur, so no impact considered likely. Suitable habitat does not occur on site. Low - Given the large (1000ha) home range that encompasses a variety of habitats, it is possible that this Masked Owl may occur within the study area. However, there are no records within 60km, and the proposed action will not cause a significant decline in the availability and quality of the habitat for this species and is therefore unlikely to lead to a decline in the size of the population or the area of occupancy of this species. Low - The Northern Quoll is unlikely to occur. The study area contains habitat that is potentially suitable for the Northern Quoll and one individual was captured during surveys in 1995. However, Quolls have since undergone a significant decline in the area due to the introduced Cane Toad. No evidence of the Northern Quoll was detected during the recent field survey program despite targeted effort using multiple techniques. It is unlikely this species persists in the area as there are no recent records from the broader locality. Low - The study area contains habitat that is potentially suitable for Phascogales, however, they have undergone a significant decline in the area due to the introduced Cane Toad. It was not found during targeted fauna surveys, the only nearby records (30km from site) was from before the arrival of toads and the site does not have any unique habitat features compared to the vast area of surrounding woodland. Low - The study area contains marginal habitat for Antechinus, with better quality habitat (riparian forest) being outside the project footprint. Considering the small-scale loss of degraded habitat, it is unlikely this species would be significantly impacted by the proposed development. It was not detected during fauna surveys. Low - The study area contains woodland areas that may potentially represent suitable habitat, however, those degraded

Species	Impact
	woodland habitat types does not have any unique features compared to the vast area of surrounding woodland. The old mine stopes are known to host populations of microbats, though the Bare-rumped sheathtail bat was not detected. A buffer zone of 85m is being retained around these mine stopes to minimise impacts. Considering its unlikely presence and the adopted mitigation strategies, the likelihood of a significant impact on the species is low. (See the Flora and Fauna Technical Report in Appendix C of this referral). Low - The old mine stopes are known to host populations of microbats, though Arnhem Leaf-nosed Bats were not detected. A buffer zone of 85m is being retained around these mine stopes to minimise impacts. The study area contains woodland areas that may potentially represent suitable habitat, however, those degraded woodland habitat types does not have any unique features compared to the vast area of surrounding woodland. Riparian areas in the mining lease are not impacted by the proposed mine footprint. Considering its unlikely presence and the adopted mitigation strategies, the likelihood of a significant impact on the species is low. (See the Flora and Fauna Technical Report in Appendix C of this referral). Low - The Nabarlek is unlikely to occur. The study area does not contain suitable areas of undisturbed rocky outcrops. Moderate – Ghost bats were recorded emerging from three disused mine stopes on the site, including 2 from stope 62, five from stope 30 and 96 individuals from stope 13, with a high probability that this is a maternal roost. The Spring Hill Ghost Bat population is considered to be a ‘Significant Population’. Avoiding impacts to this species are described in this referral, in the attached Monitoring Plan (Appendix A) and in the Management plan for bats at Spring Hill in Targeted microbat survey report (Appendix B). These include: • Protecting habitat by excluding operations in identified habitat. • Adhere to an 85m buffer zone around stopes identified to be occupied by this species as advised in the Targeted

Species	Impact
	Microbat Survey Report. • Adopting a rigorous monitoring plan (Attachment A) to ensure noise and vibration are below the disturbance threshold • Scheduling works outside of known breeding season. An assessment of residual impact is provided in the following section. Low – Brush-tailed Rabbit-rats are unlikely to occur. The project area is outside the known range and does not contain suitable habitat. This species is currently thought to be restricted to the Cobourg Peninsula, small areas of Kakadu National Park, and offshore islands including Bathurst, Melville, Inglis and Eylandt (Woinarski et al. 2007). Low – Black-footed Tree-rat is unlikely to occur. There are no records of this species within 30km of the study area and suitable habitat is not present within the study area. Low – Golden-backed Tree-rat is unlikely to occur. The project is outside the SPRAT-known or predicted distribution, and there is a lack of suitable habitat on site. Low – Plains Death Adder is unlikely to occur. There is no suitable habitat within the project area and there are no records of this species within the local area. Low – This species is unlikely to occur. The project is outside the SPRAT-known or predicted distribution, and there is a lack of suitable habitat on site.

2.4.2 Do you consider this impact to be significant?

No

2.5 Is the proposed action likely to have ANY direct or indirect impact on the members of any listed migratory species, or their habitat?

No

2.6 Is the proposed action to be undertaken in a marine environment (outside Commonwealth marine areas)?

No

2.7 Is the proposed action to be taken on or near Commonwealth land?

No

2.8 Is the proposed action taking place in the Great Barrier Reef Marine Park?

No

2.9 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

2.10 Is the proposed action a nuclear action?

No

2.11 Is the proposed action to be taken by the Commonwealth agency?

No

2.12 Is the proposed action to be undertaken in a Commonwealth Heritage Place Overseas?

No

2.13 Is the proposed action likely to have ANY direct or indirect impact on a water resource related to coal/gas/mining?

No

Section 3 - Description of the project area

Provide a description of the project area and the affected area, including information about the following features (where relevant to the project area and/or affected area, and to the extent not otherwise addressed in Section 2).

3.1 Describe the flora and fauna relevant to the project area.

A Flora and Fauna Technical Report (NRC), including targeted surveys for threatened species, has been completed and is included as Appendix C of this referral.

No threatened or near threatened flora species (as listed under the EPBC Act or TPWC Act) were identified during the vegetation surveys. A list of flora species identified during the baseline flora survey is included in Appendix E of the Flora and Fauna Technical Report.

A total of 73 fauna species from 41 families were positively identified within the study area using a variety of different observation and trapping techniques. This included 42 birds, 13 reptiles, at least 14 native mammals, and four native amphibian species. The following threatened bats species were identified:

Hipposideros stenotis (Northern Leaf-nosed Bat) - Vulnerable (TPWC Act)

Rhinonicteris aurantia (Orange Leaf-nosed Bat) - Near Threatened (TPWC Act)

Macroderma gigas (Ghost Bat) - Vulnerable (EPBC Act), Near Threatened (TPWC Act)

The only non-bat threatened fauna species identified during surveys was the Partridge Pigeon (Geophaps smithii smithii), however, this was not recorded within the proposed mine footprint. One individual Northern Quoll had been captured on site during the 1995 baseline surveys, however, that was prior to the arrival of Cane Toads in 2001 and they are likely to be extinct from the area now. All other EPBC-listed species predicted in the protected matters search database were considered to have a low likelihood of occurrence.

An assessment of the liklihood of impact of the proposed action on EPBC threatened and migratory species is included in Appendix N, including an assessment of potential impacts on the Ghost Bat using the EPBC significant impact guidelines for a vulnerable species.

3.2 Describe the hydrology relevant to the project area (including water flows).

A ‘Surface Water Quality Report’ is included as Appendix J of this referral. The Spring Hill site is located in the Mary River catchment. A small number of first order streams convey runoff from the eastern side of the Bonnie Ranges into the main channel of the McKinlay River 2km east of the mining lease. Similar drainage lines convey runoff form the western side of the Bonnie Ranges towards the south and north of the project area, which meander down to the main channel of the McKinlay River. Ten major catchments were identified in the study area, six of which will possess mining infrastructure. The project is not located within a Water Control District or a Water Allocation Plan area. All drainage lines on the site are ephemeral. The disturbance footprint for mining activities does not contain any permanent watercourses or wetland habitats.

A ‘Groundwater Technical Report’ is also included as Appendix I of this referral.

3.3 Describe the soil and vegetation characteristics relevant to the project area.

A Soils Technical Report is attached as Appendix K of this referral. The site is on a series of ridges and valleys in the southern extension of the Bonnie Ranges. The Major soil features are described as predominantly sandy or loamy lithosols on slopes greater than 5%, with some associated earthy sand and red or yellow earths. Alluvial valleys and lower side slopes are predominantly lateritic podsolic yellow earths and solodic soils (Isbell, 1983). CSIRO land system maps (Christian et al., 1953; Story et al., 1969) describe the hills as having skeletal gravelly sandy loamy formed on metamorphics and associated alluvial flats as having light textured, acid soils. This land system is described as eroding upland country (Christian & Stewart, 1953). Steep terrain and short periods of torrential rainfall means the shallow soils of Spring Hill are prone to erosion from surface runoff in the wet season.

The broad vegetation description of the site is ‘deciduous open forest on the highest ridges, with lower ridges and slopes covered by mixed open forest without a prominent understory’ (Christian and Stewart 1953) and confirmed by site surveys. More detailed descriptions of the vegetation is provided in the Flora and Fauna Technical Report (Appendix C).

3.4 Describe any outstanding natural features and/or any other important or unique values relevant to the project area.

The site is on a series of ridges and valleys in the southern extension of the Bonnie Ranges. General topography of the land system is described as consisting of sharp, rocky north-south ridges and hills up to 182m or more in height, with steep slopes (up to 40–60%) and generally sharp to gentle crests dissected by numerous creeks. The Spring Hill site is typical of the surrounding ranges, though highly disturbed, and does not contain any unique or outstanding natural features.

3.5 Describe the status of native vegetation relevant to the project area.

None of the vegetation communities observed equate to a threatened ecological community listed under the EPBC Act. The Flora and Fauna Technical Report (Appendix C) describe vegetation on site as follows:

Ridge crests and slopes (low woodland)

Dominant: Eucalyptus tintinans, Corymbia dichromophloia, Erythrophleum chlorostachys.

Associated: Gardenia megasperma, Terminalia ferdinandiana, Xanthostemon paradoxus, Vachellia pachyphloia, Corymbia setosa.

(Dominant groundcover species include Sehima nervosum, Cymbopogon obtectus, Themeda triandra, Sorghum plumosum, and Heteropogon contortus)

Low undulating hills (low woodland to open woodland)

Same as for ridge crests and slopes but also with Corymbia latifolia, Eucalyptus miniata and Eucalyptus tectifica often dominating the canopy layer.

Riparian (open woodland)

The area specifically surveyed in detail where the existing road occurs within this unit was dominated by Erythrophleum chlorostachys, Corymbia confertiflora, Corymbia latifolia, and Lophostemon grandiflorus with species such as Pandanus spiralis, Xanthostemon paradoxus, Acacia holosericea, Flueggea virosa, and Brachychiton megaphyllus.

3.6 Describe the gradient (or depth range if action is to be taken in a marine area) relevant to the project area.

The general topography of the Brocks Creek Ridge land system is described as consisting of sharp, rocky north-south ridges and hills up to 182m or more in height, with steep slopes (up to 40–60%).

3.7 Describe the current condition of the environment relevant to the project area.

The slopes are rocky with a generally sparse grassy groundcover and very sparse shrub layer. Areas on top of the ridge have been subject to substantial disturbance from recent and historical exploration and mining activities, with substantial areas of cleared vegetation for drill pads and access tracks throughout the proposed bat buffer area. Recent reworkings of old waste material have resulted in these sites being maintained as areas that are mostly cleared of vegetation and consequently have relatively low habitat value apart from the historic mine stopes that support populations of cave-dwelling bats. A road runs down the length of the spine of the central ridge, with other roads in the area including one that runs down the centre of a valley.

Erosion risk is considered to be high as a result of magnesium based soil dispersion (rather than sodium based soil dispersion). Soil nutrients for the purpose of plant growth were noted to be poor across the site and a reflection of the geology, landscape, previous land uses and fire regimes.

Several weed species are present on site but not widespread, being primarily confined to disturbed areas. Weeds present on site include Mesosphaerum suaveolens (Hyptis), Cenchrus polystachios (Perennial Mission Grass), Melinis repens (Red Natal Grass) and Passiflora foetida (Stinking Passion Fruit). Of these, the Perennial Mission Grass is the only species declared under the NT Weeds Management Act 2001.

Away from the areas previously impacted by mining activities, woodland areas are in good condition, however, there are obvious impacts of fires throughout the area. The mapped historic fire record indicates there have been fires at Spring Hill in 10 out of the last 10 years, and this unnatural fire regime is having ongoing impacts on flora and fauna on the site such as limiting tree recruitment and limiting fire sensitive flora and fauna species.

3.8 Describe any Commonwealth Heritage Places or other places recognised as having heritage values relevant to the project area.

A ‘Cultural Heritage Survey Report (EarthSea 2016) is included as Appendix E of this referral.

No Commonwealth Heritage Places occur on or within 30km of the site.

The Spring Hill site includes the physical remains of a large Chinese settlement and gold mining precinct at the turn of the twentieth century. The registered heritage features of Spring Hill form part of the Pine Creek Gold Mining Heritage Trail, which allows unrestricted vehicle/tourist access into these sites and inadvertent access into the area of the proposed project. Most of the identified heritage site locations recorded are located within the proposed bat buffer zone where no further disturbance will occur. The Spring Hill Battery Complex is a Declared Heritage Place, NT Government (H96/0026, 19/8/1998), however, this site is outside the proposed project footprint and will not be impacted by the proposed action.

3.9 Describe any Indigenous heritage values relevant to the project area.

A Cultural Heritage Survey Report (EarthSea Pty Ltd 2016) has been completed and included as Appendix E of this referral.

The report identifies that “one small archaeological site of Aboriginal origin (lithic scatter) and five isolated stone artefacts on highly disturbed ground. A number of historic features of Chinese and potentially European origin associated with 19th Century mining activities were also recorded within the Area of Interest (EarthSea Pty Ltd 2016).

3.10 Describe the tenure of the action area (e.g. freehold, leasehold) relevant to the project area.

The proposed action is located within Mining Lease ML23812, which located within the Mary River West pastoral lease (PPL815).

3.11 Describe any existing or any proposed uses relevant to the project area.

Although the site is on a pastoral lease, the topography is generally too steep for grazing. The baseline survey identified evidence of horses on site, but no cattle. The Spring Hill site forms part of the Pine Creek Gold Mining Heritage Trail, which allows unrestricted vehicle/tourist access into these sites. The site is heavily frequented by tourists, bottle/relic collectors and prospectors. Anecdotally, the site is visited by people taking advantage of the good mobile phone reception available on the site.

There are no other proposed uses for the site. The proposed action will not prevent access to the Spring Hill Battery Complex Declared Heritage Place, and it is anticipated that tourists will continue to visit the site as part of the Pine Creek Gold Mining Heritage Trail. However, in accordance with the objectives of the Ghost Bat monitoring plan and nominated mitigation measures for protecting cave dwelling bats on site, public access to the bat buffer zone will be restricted to unauthorised vehicles in perpetuity through strategic placement of fences and barriers. The proposed post mining land use objective for the site will be to reinstate ‘natural’ ecosystems to be as similar as possible to the original ecosystem, after which the site will form part of the natural landscape.

Section 4 - Measures to avoid or reduce impacts

Provide a description of measures that will be implemented to avoid, reduce, manage or offset any relevant impacts of the action. Include, if appropriate, any relevant reports or technical advice relating to the feasibility and effectiveness of the proposed measures.

Examples of relevant measures to avoid or reduce impacts may include the timing of works, avoidance of important habitat, specific design measures, or adoption of specific work practices.

4.1 Describe the measures you will undertake to avoid or reduce impact from your proposed action.

AVOID

The primary strategy to avoid impacts on Partridge Pigeons is to avoid any impacts to the dam approximately 800m southwest of the project area. The dam, and areas of suitable forage that are close to the dam are likely to be significantly more important to Partridge Pigeons than areas likely to be disturbed by the proposed action. Partridge Pigeons are known to be relatively sedentary and will stay close to permanent water throughout the year unless water dries up (Forshaw 2015).

The primary strategy to avoid impacts on Ghost Bats is to avoid impacts on old mining stopes that provide habitat for Ghost Bats. This is achieved by:

Revision of the proposed action and footprint to remove three open cut pits (Hong Kong 2, Main Pit 1 and Main Pit 3) that would have impacted directly on the old mine stopesProvision of a buffer with a minimum 85m buffer between Main Pit 2 and stope #30, and 130m buffer from Hong Kong 1 pit and stope 13. The provision of an 85m buffer is based on observations in the Pilbara region by Armstrong (2010) that there was no observable impact from a drilling operation 85m from a Ghost Bat roost location, or 25m from a roost entrance. No mine shafts or stopes will be directly impacted by the proposed action.Mining will be timed to avoid impacts during the most sensitive time of the year when Ghost Bats are giving birth and raising dependant young. The only blasting to be carried out between July and October 2018 will be limited to deep within the Hong Kong 1 Pit, which is separated from the bat exclusion zone by a valley with low potential for transmission of vibration. Mining is expected to cease in October 2018, however, if there is insufficient time prior to the 2018-2019 wet season, then mining will recommence in late February 2019. This not only avoids the most sensitive period for Ghost Bats but also avoids the breeding season for other bat species listed as threatened or near-threatened under the NTTPWC Act - Northern leaf -nosed bat nosed (*Hipposideros stenotis*)

and Orange leaf-nosed bat (*Rhinonicteris aurantia*).Mining will only be conducted during daylight hours, with the hours of operation be 7am – 6pm, seven days a week during the annual period of operation. This will avoid the use of artificial lighting that may disrupt bat feeding behaviour, and avoid any noise and vibration that may impact on bats foraging and navigation. There will not be any vehicle movements through the area at night, which will avoid the potential for vehicle strike on the typically low-flying Ghost Bats.

REDUCE

Since the mine stopes will be avoided and a protective buffer put in place around them, the most likely impact will be noise and vibration from the mine activities, particularly drilling, blasting and excavation. Noise, vibration and the responses of the bats will be monitored to avoid any significant impacts to threatened bats (see attached Monitoring Plan Appendix A).

Impacts to Ghost Bats will be reduced by timing and sequencing of actions. Pit development will be sequenced to minimise disturbance to the roost habitat areas, so any disturbance associated with pit development will be coming from only a single direction. Activities will potentially be timed in consideration of daily activity cycles (as determined from the pre-mining phase of the monitoring programme) to minimise disturbance (e.g. when roosts are unoccupied).

Efforts will be made to reduce the overall footprint of the waste rock dump by back filling voids with waste rock where possible.

Blast vibration production and dissipation may be influenced by factors including attenuation character of the rock, distance to the sensitive receiver, and the size of the Maximum Instantaneous Charge (MIC). These have been incorporated into the preliminary blast vibration predictions provided by Boucher (2017), but will need to be ground-truthed by testing to provide greater confidence in the vibration attenuation coefficient of the rock on site. Blast vibration may be managed and manipulated by altering the following variables:

- Bench height- Drill hole diameter and depth- the number of holes being detonated at any one time within each MIC event- initiation delays between holes- firing to free faces or into broken material where practicable.

A tentative vibration threshold of 10mm/sec and has previously been used as the tolerance limit of Ghost Bats and Orange Leaf-nosed Bats (Bullen 2013, R. Bullen pers. comm.), however, for this project, initial vibration and noise levels will initially be set well below that tentative threshold

and gradually increased until either the nominated threshold of 10mm/secs is reached, or until a negative response from the cave-dwelling bats is objectively and empirically identified. In this case, a suitable buffer will be set below the disturbance threshold and be used as the maximum allowable threshold.

If it is determined during the early mining monitoring phase that a significant negative reaction from the bats is occurring at a level below the nominated threshold, then the new threshold will be established and maintained below the disturbance level (see attached Monitoring Plan Appendix A). It is anticipated that the vibration threshold at which physical damage to the stopes could occur is significantly higher than the threshold at which disturbance to bats occurs. Noise and vibration levels have been tentatively modelled (see blast vibration prediction report, Boucher 2017 in Appendix D).

MANAGE

Managing on-site activities to mitigate potential impacts to fauna on site will include the following:

Managing people:

All personnel, staff and contractors working at Spring Hill will be required to participate in a site-specific induction before beginning their employment. This induction will focus on workplace hazards and safe workplace behaviour, but will include environmental requirements and risks associated with the project. Environmental issues that will be covered in the induction will include, but not be limited to, weed hygiene, incident reporting requirements, details on identifying the Partridge Pigeon and reporting sightings, and the presence of threatened bat species. Workers will be advised that access to the buffer zone and stopes will be prohibited to unauthorised personnel. A record of threatened species sightings within the project area will be maintained by the on-site environmental Manager.

Managing potential road impacts

- Enforce speed limits on site access roads and the haul road.- Ensure roadside vegetation is cut back and maintained to increase visibility- Vehicle movements through the area restricted to hours of mine operations (7am-6pm)- Require an incident report to be completed for all interactions.- Restrict driving to mine management roads unless otherwise authorised.

Dust has a potential to impact on cave-dwelling bats and their habitat. Apart from crushing with a mobile crusher at the ROM pad site, there will be no processing of ore on site, which will limit dust issues. The mobile crusher will use a dust suppression system. Speed limits on haul roads will be enforced. Dust will be suppressed using conventional dust suppression techniques such

as water trucks. A dust polymer or molasses will be utilised with water, which will prover longer term dust suppression and reduce the amount and frequency of water. A ‘Dust, Noise and Vibration Management Plan’ is included as Appendix F of this referral.

Human disturbance to roost sites is considered a moderate-severe impact on Ghost Bats (TSSC 2016). Surveys of the site undertaken in July 2017 identified significant acts of vandalism to stopes on the site, including burning tires and flares being thrown into stopes that were likely to have been occupied by cave-dwelling bats (see Targeted microbat survey report Appendix B). To prevent a repeat of these acts of disturbance and vandalism to mine stopes, access to the mine stopes will be prohibited to the public and all unauthorised personnel and the perimeter of the buffer area will be fenced. As fencing itself can have a negative impact of Ghost Bats through collision (TSSC 2016), the fence will be designed to be no closer than 85m from any stope entrance, not include barbed wire in construction, and for the top strand to be constructed to as to be easily visible and avoidable by Ghost Bats. Stock exclusion fences around the residual voids will also be constructed in a similar manner. Following mine closure for the bat breeding season, access will be permanently restricted with large boulders will be placed in front of the fence to prevent the fence being pulled down for unauthorised vehicle access to the Ghost Bat buffer area. These boulders will be left in place permanently following final mine close and revegetation of the site. Managing weeds on site, especially high biomass grasses (e.g. Mission Grass, Gamba Grass) that has the potential to significantly degrade surrounding woodland that is critical for populations of bats and Partridge Pigeons on site. Control measures will include:

- Treat weed infestation prior to clearing using suitably qualified and experienced operators- conserve weed free topsoil for reuse in site rehabilitation- require weed certification for all vehicles and plant entering the site, and subject to inspection on a random basis- provide weed washdown facilities on site which will be regularly inspected and treated as required- undertake routine weed inspection and control in heavy traffic areas including roads and hardstand areas for the durations of operations- implement a policy of early detection and eradication of all new weed species not currently occurring on site, particularly those listed as declared under the Northern Territory *Weeds Management Act 2001*,- Disturbance areas will be rehabilitated as soon as possible to minimise the establishment of weed species.- Revegetation will incorporate a mix of native species, including multiple species of grass, shrub and tree seeds (A Revegetation Management Plan is included as Appendix G of this referral)- Revegetation sites will be regularly inspected and managed to prevent the dominance of aggressive introduced grasses such as Mission Grass

Pest animals will be managed on site using the following control measures:

- Feeding of pest animals will be prohibited,- Onsite waste, particularly food waste, will be managed so as not to encourage scavenging wildlife or pest animals to the area- Bins will be fitted with lids and these will remain closed between rubbish deposits- Sightings of pest animals will be reported to the on-site environmental Manager who will decide on the appropriate course of action depending on the circumstances

Cane Toads (*Rhinella marina*) are known to cause lethal poisoning of Ghost Bats, and is regarded as having a severe consequence for Ghost Bats (TSSC 2016). The following measures will be undertaken to avoid any increase in toad populations at the project site:

- Allow sediment ponds to dry out during the dry season- undertake routine toad inspection and control- remove sediment pond during rehabilitation- Efforts will be made to reduce the overall footprint of the waste rock dump by back filling voids with waste rock where possible, thereby significantly reducing the potential of the voids as toad breeding areas

OFFSET

The primary offset for this project will be an indirect offset via a research programme (see Monitoring Plan attached as Appendix A). It is proposed that the program commence prior to commencing mining, and continue during the mining period and for two years post-mining. The monitoring would include collecting data on noise, vibration, audible and ultrasonic bat calls, visual infra-red observations of the bats that occupy the stopes, and collection of genetic material that will allow for assessment of the Spring Hill population in comparisons with other populations (e.g. Kohinoor Adit population at Pine Creek). Ideally, this would identify whether the Spring Hill population represented a genetically distinct population, and possibly information regarding historic patterns of gene flow and population structure. It is likely that a PhD student or post-doctorate person will be engaged to undertake this monitoring and research which will substantially increase our knowledge of managing sound and vibration impacts on Ghost Bats into the future.

Other potential offsets will require further examination to assess their viability. There is potential to re-open several stopes that have collapsed entrances, which may result in higher habitat availability and potentially larger populations in an area where roosting habitat is a key limiting resource. A large adit identified by Low (2013) on the south-eastern side of the main ridge is no longer open. Described as the ‘Main Adit’, it was observed to have a population of Orange Horseshoe Bats (*Rhinonicteris aurantius*) during the 2013 survey. The Main Adit became sealed as a result of landslide following a large rainfall event in 2011 (Low 2013). As Orange Horseshoe Bats are known to occupy the types of deep caves or mines favoured by Ghost Bats (Churchill 2008), it is presumed that this shaft also represented potential Ghost Bat habitat, however, the grid observed across the entrance in 2013 may have been too small to permit the passage of Ghost Bats. The re-opening of this adit, and other stopes whose entrances have been completely or partially blocked with debris will allow a greater access to potential roost sites than currently exists.

It is proposed that a ‘bat gate’ be investigated as a way to prevent ongoing human disturbance or vandalism to the stopes, which has been considered to be a threatening process (TSSC 2016). The use of bat gates has not previously been undertaken for Ghost Bats in Australia despite evidence that human disturbance is a significant issue for some roost sites (Damien Milne pers. comm.). The large wingspan of the Ghost Bat would not allow the use of existing bat

gate designs, so design and research would need to be undertaken to see if there is an optimal design that would prevent human entry while still permitting passage of Ghost Bats.

4.2 For matters protected by the EPBC Act that may be affected by the proposed action, describe the proposed environmental outcomes to be achieved.

Potential impacts to an important population of the vulnerable Ghost Bat, and populations of other cave-dependant bats on site have been anticipated, and measures proposed to avoid any significant impact to these populations. Details of mitigation measured proposed are provided in above, under the headings of Avoid, Reduce, Manage, and Offset. Further details of the proposed monitoring plan, including how this monitoring will provide the baseline data, performance criteria and adaptive management, are including in Appendix A of this referral. The cumulative environmental outcome of these mitigation measures will be avoid having a significant impact on any MNES at the proposed Spring Hill site.

Direct impacts to historic mining stopes that support bats will be avoided by excluding these areas from the mine footprint and establishing a buffer zone around the stopes. The effectiveness of this measure will be ensured by fencing the area, with suitable fencing unlikely to impact bats, and this will prevent accidental ingress into this area by people or vehicles. All personnel, staff and contractors working at Spring Hill will be required to participate in a site-specific induction where obligations towards the Ghost Bats will be explained.

A significant impact to the Ghost Bat population may be more likely to occur during the period of time when there are dependant young, as a disturbance event that causes mothers to abandon pups would result in the death of those pups and potential permanent loss of a maternal roosting site. Although there are discrepancies about the timing of births, the precautionary principle will be applied and no clearing, land disturbance or new mine establishment will occur on site between July and March. The only blasting to be carried out between July and October 2018 will be limited to deep within the Hong Kong 1 Pit, which is separated from the bat exclusion zone by a valley with low potential for transmission of vibration. No mining will occur between October 2018 and March 2019, or at night while the bats are foraging, and consequently, there will be no vehicle movements or artificial lighting at night.

There is still potential for the stopes and resident bats to be impacted by vibration and noise. Although a vibration threshold of 10mm/sec has been nominated for avoiding disturbing Ghost Bats in the Pilbara (Bullen 2013), a monitoring plan (see Appendix A) will be undertaken at Spring Hill that will use small and gradual increments of noise and vibration to objectively confirm the threshold at which bats are disturbed, and the allowable threshold will be set at a lower value than the disturbance threshold. Stated outcomes for this component of the monitoring programme are as follows:

- Monitor vibration, noise, and bat vocalisations at pre-determined blast events

- developing thresholds of vibration, noise, and bat responses

- Simultaneously monitor bat behaviour in response to blasts and adjust blast design and resulting vibration as necessary

- A maximum of two blasts per day for the first five days until threshold levels of vibration disturbance is reliably established.

The effectiveness and level of commitment to this approach will be ensured by the integration of vibration and bat disturbance monitoring (Appendix A) into mine operations via the MMP, particularly the 'Environmental Management Plan: Threatened fauna species management plan'. Broadly, the objectives and key performance criteria for the success of the mitigation measures for cave-dwelling bats are as follows:

- No significant damage to identified stopes that would prevent their ongoing use by bats

- Persistence of target species (threatened bat species) in study area during operations

- No significant decline of target species in study area as a result of operations

To ensure compliance and allow effective auditing and enforcement, a log book will be maintained and stored in a systematic manner by the site environmental manager and be made available to the DoEE and NTEPA on a monthly basis, or as requested. The log book will have sequential page numbering and must be submitted without erasure of removal of any pages. Raw data relating to vibration, airblast and bat activity must be stored in electronic form in a format that can be retrieved upon request.

The following procedure for disturbance by blasting must be followed:

- Blasting must follow the specialised blast designs developed from testing the preliminary recommendations by Boucher (2017) in Appendix D of this referral

- Predicted vibration levels must be recorded in the log book

- Environmental manager must ensure that active monitoring of seismic activity, noise and bat activity is occurring in any suspected maternity roost, and in the nearest occupied stope to the location of the blast

- Environmental manager must ensure that at least one hour of pre-disturbance monitoring has

been recorded prior to blasting

- Environmental manager must advise the blast engineer that the conditions of the required corrective actions for previous blasts have been met, and that they have authority to proceed with the blast

- The precise time of the blast event is recorded in the log book

- The ground vibration and airblast levels recorded at the sensitive receptors are noted in the log book, and any exceedances of the vibration and noise threshold immediately reported to the mine manager

- Bat activity relative to the background level recorded in the preceding one hour is noted and interpreted in relation to the impact definitions described in Table 2 of the Monitoring - Plan, and results entered into the log book

- Environmental manager must advise the mine manager of the noise, vibration, and bat impact level achieved

- The Environmental manager and the mine manager must acknowledge and sign each recorded sequence of observations relating to an individual blast event

- The mine manager must ensure the corrective action is undertaken in accordance with the definitions provided in Table 2 above and immediately notify the administrators if mine activities result in a Very High or Critical level of impact to the cave dwelling bats

- If recorded ground vibration and airblast levels exceed predicted levels by more than 10%, The Environmental manager must notify the mine manager and blast engineer, who must modify the blast design to ensure the subsequent blast will not result in an exceedance

- The mine manager must ensure that no subsequent blasting occurs unless actions from the preceding blast have been resolved.

Details on how significant disturbance to threatened bats is measured and quantified is discussed in detail in the Monitoring Plan (Appendix A).

There is potential for dust as a result of mining activities and vehicle movements. Dust on roads will be minimised by enforced speed limits and suppressed with water trucks, bare areas sprayed with water with a dust polymer or similar to provide long term dust suppression, and the mobile crusher plant for crushing ore will be fitted with a dust suppression system. Refer to the ‘Dust, Noise and Vibration Management Plan’ in Appendix F.

Post mining, the site will be rehabilitated and revegetated. To ensure compliance and allow effective auditing and enforcement of revegetation success, the site will be regularly monitored, and reports generated that describe the progress towards conforming with agreed closure

criteria, including comparison with suitable analogue reference sites using Landscape Function Analysis (LFA) techniques. Refer to the ‘Revegetation Management Plan’ in Appendix G.

To ensure post-mining rehabilitation occurs as stated, the proponent is required to submit a security bond to the NT Government in accordance with section 43 of the Mining Management Act 2015 to ensure completion of rehabilitation in the unlikely event that the proponent is unable to complete the required works in accordance with the MMP

Section 5 – Conclusion on the likelihood of significant impacts

A checkbox tick identifies each of the matters of National Environmental Significance you identified in section 2 of this application as likely to be a significant impact.

Review the matters you have identified below. If a matter ticked below has been incorrectly identified you will need to return to Section 2 to edit.

5.1.1 World Heritage Properties

No

5.1.2 National Heritage Places

No

5.1.3 Wetlands of International Importance (declared Ramsar Wetlands)

No

5.1.4 Listed threatened species or any threatened ecological community

No

5.1.5 Listed migratory species

No

5.1.6 Commonwealth marine environment

No

5.1.7 Protection of the environment from actions involving Commonwealth land

No

5.1.8 Great Barrier Reef Marine Park

No

5.1.9 A water resource, in relation to coal/gas/mining

No

5.1.10 Protection of the environment from nuclear actions

No

5.1.11 Protection of the environment from Commonwealth actions

No

5.1.12 Commonwealth Heritage places overseas

No

5.2 If no significant matters are identified, provide the key reasons why you think the proposed action is not likely to have a significant impact on a matter protected under the EPBC Act and therefore not a controlled action.

The populations of Ghost Bats at Spring Hill is an important population under the definitions provided in the EPBC Act. Without management, the project may have resulted in significant impacts to this important population, however, following the mitigation measures provided in the hierarchy of controls – Avoid, Reduce, Manage, Offset, it is considered that any impacts can be avoided.

The mitigation measures proposed in this referral and attached monitoring plan (Appendix A) are SMART (Specific, Measurable, Achievable, Realistic, and Timely). They follow the precautionary principle of carefully testing the thresholds of disturbance in a way that can be measured, monitored, audited and enforced, to ensure that exceedances to these thresholds do not occur. Various scenarios have been adequately predicted, with adequate responses proposed.

The monitoring being undertaken on site provides regulatory agencies, including the Commonwealth Department of Environment and Energy, confidence that the mitigation measures proposed in this referral are being strictly adhered to, by being able to access raw data and interpreted results on a regular basis. The proposed monitoring program is designed to fill in significant knowledge gaps regarding avoiding impacts to Ghost Bats.

This monitoring plan meets the objectives of all three future actions for N.T. bats recommended by Milne & Pavey (2011):

- more surveys are required throughout the N.T. especially areas outside of the Darwin region, Kakadu National Park, and the MacDonnell Ranges;

- targeted surveys for poorly known species and/or species of conservation significance;

- establishment of long term monitoring sites (particularly at significant cave and/or mine roosts) to monitor population sizes.

The proposed monitoring programme and associated deliverables also fulfils a high priority for information and research identified by TSSC (2016), which is to assess impacts of disturbance of breeding sites, and identify appropriate buffer zones for specific activities around roost sites so mining and other activities do not lead to abandonment. The potential to reopen collapses mine stopes to create additional habitat also meets a medium priority research outcome to assess and evaluate the effectiveness of threat mitigation options such as establishment of new/artificial roost sites (as a last resort only), and mitigation options to reduce impacts of mining.

It is hoped that the proposed monitoring and research programme and associated deliverables will set a benchmark for managing all threatened cave-dwelling bat species in Australia, and substantially increase the collective knowledge of Ghost Bat ecology.

Section 6 – Environmental record of the person proposing to take the action

Provide details of any proceedings under Commonwealth, State or Territory law against the person proposing to take the action that pertain to the protection of the environment or the conservation and sustainable use of natural resources.

6.1 Does the person taking the action have a satisfactory record of responsible environmental management? Please explain in further detail.

yes.

6.2 Provide details of any past or present proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources against either (a) the person proposing to take the action or, (b) if a permit has been applied for in relation to the action – the person making the application.

Not Applicable

6.3 If it is a corporation undertaking the action will the action be taken in accordance with the corporation's environmental policy and framework?

Yes

6.3.1 If the person taking the action is a corporation, please provide details of the corporation's environmental policy and planning framework.

The TM Gold Environmental Policy is attached

6.4 Has the person taking the action previously referred an action under the EPBC Act, or been responsible for undertaking an action referred under the EPBC Act?

No

Section 7 – Information sources

You are required to provide the references used in preparing the referral including the reliability of the source.

7.1 List references used in preparing the referral (please provide the reference source reliability and any uncertainties of source).

Reference Source	Reliability	Uncertainties
Armstrong, K. N. (2010). Assessing the short-term effect of minerals exploration drilling on colonies of bats of conservation significance: a case study near Marble Bar, Western Australia. Journal of the Royal Society of Western Australia, 93,165–174. Bayliss P., Bellairs S.M., Manning J., Pfitzner K., Smith H., Gardener M., Calvert G. (2006) The impact of uncontrolled weeds on the rehabilitation success of Nabarlek uranium mine in Arnhem Land, Northern Territory. IN Proceedings of the 15th Australian Weeds Conference: Managing Weeds in a Changing Climate, Adelaide: Weed Management Society of South Australia.. Biologic Environmental Survey Pty Ltd (2014) West Angelas – Deposit B and F ghost bat assessment 2014. Unpublished report for BHP Billiton Iron Ore Pty Ltd. Boles, W. E. (1999). Avian prey of the Australian Ghost Bat Macroderma gigas (Microchiroptera: Megadermatidae): prey characteristics and damage from predation. Australian Zoologist, 31(1), 82–91.	High	No

Reference Source	Reliability	Uncertainties
Boucher G. (2017) Prediction of Blast-Induced Ground Vibration and Air Overpressure - Spring Hill Gold Project. Unpublished report to NRC, December 2017 Bullen, R. D. (2013) Rio Tinto Koodaideri Orange Leaf-nosed Bat colony; vibration disturbance survey. Unpublished report for Biota Environmental Sciences by R.D. Bullen, Bat Call WEA Bullen, R. D., and Creese, S. (2014). A note on the impact on Pilbara leaf-nosed and ghost bat activity from cave sound and vibration levels during drilling operations. Western Australian Naturalist (Perth) 29, 145–154. Christian, C.S. & Stewart, G.A. (1953). General report on survey of Katherine-Darwin region, 1946. C.S.I.R.O., 1953. Aust. Land Res. Ser. n 1. Churchill, S. (2008). Australian Bats. Crows Nest, NSW: Allen & Unwin. Churchill, S. K. & Helman, P. M. (1990). Distribution of the Ghost Bat, Macroderma gigas, (Chiroptera: Megadermatidae) in central and South Australia. Australian Mammalogy, 13, 149– 156. Curtis LK, McDonald K, Kyne P and Dennis, AJ. (2012) Queensland’s Threatened Animals: Calling it Quits? CSIRO Publishing, Melbourne. Debus S. (2012) Birds of prey of Australia. CSIRO Publishing, Collingwood, Vic. Department of Economic Development, Jobs, Transport and Resources (2015) Ground Vibration and Airblast Limits for Blasting in		

Reference Source	Reliability	Uncertainties
Mines and Quarries: Environmental Guidelines. State Government of Victoria. Retrieved from http://earthresources.vic.gov.au/earth-resources-regulation/licensing-and-approvals/minerals/guidelines-and-codes-of-practice/ground-vibration-and-airblast-limits-for-blasting-in-mines-and-quarries Department of Environment and Heritage Protection (EHP) 2017. Macroderma gigas in Species Profile and Threats Database, Department of the Environment, Canberra. Retrieved from http://www.environment.gov.au/cgi-bin/sprat/public/publicspecies.pl?taxon_id=174. Department of the Environment (2013) Matters of National Environmental Significance Significant impact guidelines 1.1 - Environment Protection and Biodiversity Conservation Act 1999. Retrieved from http://www.environment.gov.au/system/files/resources/42f84df4-720b-4dcf-b262-48679a3aba58/files/nes-guidelines_1.pdf Department of Land Resource Management (2015) Northern Territory Weed Management Handbook. Northern Territory Government,. Palmerston NT. Retrieved from https://nt.gov.au/__data/assets/pdf_file/0004/233833/nt-weed-management-handbook.pdf EarthSea (2016). PC Gold Pty Ltd: Cultural Heritage Survey, Spring Hill Project, ML23812 2016, Darwin, Northern Territory. Forshaw J. (2015) Pigeons and doves in Australia. CSIRO		

Reference Source	Reliability	Uncertainties
Publishing, Australia Grant, C., Reardon, T., & Milne, D. (2010). Ghost Bat count at Kohinoor Adit. Australasian Bat Society Newsletter, 35, 36–38. Higgins, P.J. (ed.) (1999). Handbook of Australian, New Zealand and Antarctic Birds (HANZAB). Volume Four – Parrots to Dollarbird. Oxford University Press, Melbourne. Hourigan, C. (2011) Ghost bat, Macroderma gigas. Targeted species survey guidelines. Queensland. Retrieved from: https://www.qld.gov.au/environment/assets/documents/plants-animals/biodiversity/ghost-bat.pdf Hoyle, S. D., Pople, A. R., & Toop G. J. (2001). Mark–recapture may reveal more about ecology than about population trends: Demography of a threatened ghost bat (Macroderma gigas) population. Austral Ecology 26, 80-92. Isbell, R.F. (1983). Soils: an Australian viewpoint. Melbourne: CSIRO. Leitner P., Nelson J. E. (1967) Body temperature, oxygen consumption and heart rate in the Australian false vampire bat, Macroderma gigas. Comp. Biochem. Physiol. 21, 65–74. Low Ecological Services (LES). (1996). Environmental Studies of Landscape, Flora and Fauna of the Proposed Spring Hill Project Area. Low Ecological Services (2013). Updated Environmental Assessment of Landscape, Flora and Fauna of Spring Hill Project Area. LES. (2013). Updated Environmental Assessment of Landscape, Flora and Fauna of Spring Hill		

Reference Source	Reliability	Uncertainties

Project Area. Report prepared for Thor Mining. Marchant, S., and Higgins, P.J. (eds.) (1993) Handbook of Australian, New Zealand and Antarctic Birds (HANZAB). Volume 2: Raptors to Lapwings. Oxford University Press, Melbourne. McKenzie, N. & Hall, L. (2008). Macroderma gigas. The IUCN Red List of Threatened Species 2008. Retrieved from http://dx.doi.org/10.2305/IUCN.UK.2008.RLTS.T12590A3362578.en. Milne, D.J. & Pavey, C. R. (2011). The status and conservation of bats in the Northern Territory. In B. Law, P. Eby, D. Lunney & L. Lumsden (Eds.), The Biology and Conservation of Australasian Bats (208-225). Mosman: Royal Zoological Society of New South Wales. Northern Resource Consultants (NRC). (2016). Flora and Fauna Technical Report. Spring Hill Gold Project. Prepared for TM Gold Pty Ltd. Oakwood, M. (1997). The ecology of the northern quoll, Dasyurus hallucatus. PhD Thesis, Australian National University. Oakwood, M. (2000). Reproduction and demography of the northern quoll, Dasyurus hallucatus, in the lowland savanna of northern Australia. Australian Journal of Zoology, 48, 519–539. Pettigrew J., Baker G.B., Baker-Gabb D., Baverstock G., Coles R., Conole L., Churchill S., Fitzherbert K., Guppy A., Hall L., Helman P., Nelson J., Priddel D., Pulsford I., Richards

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G., Schulz M., Tidemann C.R. (1986) The Australian ghost bat Macroderma gigas, at Pine Creek, Northern Territory. Macroderma 2: 8-19 Pizzey G., Knight F. (2007) Field guide to the birds of Australia. Angus & Robertson: HarperCollins, Pymble, N.S.W. Schulz M., Menkhorst K. (1986) Roost preferences of cave-dwelling bats at Pine Creek, Northern Territory. Macroderma 2: 2-27 Story, R., Williams, M.A.J., Hooper, A.D.L., O'Ferrall, R.E., & McAlpine, J.R. (1969). Lands of the Adelaide-Alligator area, Northern Territory. CSIRO Land Research Series 25. Melbourne: CSIRO. SVT (2016) BHP Billiton Iron Ore Environmental Noise Assessment: Southern Flank Operations. Unpublished report for BHP Billiton Iron Ore. Threatened Species Scientific Committee (TSSC) 2016. Conservation Advice. Macroderma gigas, Ghost bat. 5 May 2016. Retrieved from htt p://www.environment.gov.au/bi odiversity/threatened/species/p ubs/174-conservation-advice-05052016.pdf Tidemann, C. R., Priddel, D. M., Nelson, J. E., & Pettigrew, J. D. (1985) Foraging behaviour of the Australian Ghost Bat, Macroderma gigas (Microchiroptera: Megadermatidae). Australian Journal of Zoology, 33, 705–713. TM Gold (2017) Figure 5: Proposed configuration of the ore pits at Spring Hill, Produced by Entech		

Reference Source	Reliability	Uncertainties
Engineering, Perth. July 2017. Ward, S. & Milne, N. (2016) Threatened Species of the Northern Territory: Ghost Bat Macroderma gigas. Northern Territory Government Department of Environment and Natural Resources. Wildlife Health Australia (2017) White-nose Syndrome Response Guidelines (Version 1.0). Retrieved from https://wildlifehealthaustralia.com.au/Portals/0/Documents/ProgramProjects/WNS%20response%20guidelines%20-%201.0%20-%20May%202017.pdf Wilson, S. and Swan, G. (2010) A complete guide to reptiles of Australia (3rd Edition). New Holland Publishers, Sydney. Woinarski, J.C.Z., Armstrong, M., Brennan, K., Fisher, A., Griffiths, A.D., Hill, B., Milne, D.J., Palmer, C., Ward, S., Watson, M., Winderlich, S., & Young, S. (2010). Monitoring indicates rapid and severe decline of native small mammals in Kakadu National Park, northern Australia. Wildlife Research, 37, 116–126. Woinarski, J. C. Z., Burbidge, A. A., & Harrison, P. L. (2014). The Action Plan for Australian Mammals 2012. Collingwood: CSIRO Publishing. Woinarski J., Pavey C., Kerrigan R., Cowie I., Ward S. (2007) Lost from our landscape: Threatened species of the Northern Territory. Northern Territory Department of Natural Resources, Palmerston Worthington Wilmer J., Moritz, C., Hall, L. & Toop, J. (1994). Extreme population		

Reference Source	Reliability	Uncertainties
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Section 8 – Proposed alternatives

You are required to complete this section if you have any feasible alternatives to taking the proposed action (including not taking the action) that were considered but not proposed.

8.0 Provide a description of the feasible alternative?

Not applicable

8.1 Select the relevant alternatives related to your proposed action.

8.27 Do you have another alternative?

No

Section 9 – Contacts, signatures and declarations

Where applicable, you must provide the contact details of each of the following entities: Person Proposing the Action; Proposed Designated Proponent and; Person Preparing the Referral. You will also be required to provide signed declarations from each of the identified entities.

9.0 Is the person proposing to take the action an Organisation or an Individual?

Organisation

9.2 Organisation

9.2.1 Job Title

Executive Chairman PC Gold Pty

9.2.2 First Name

Ashley

9.2.3 Last Name

Pattison

9.2.4 E-mail

ashley@pcgold.com.au

9.2.5 Postal Address

13 Rosser Street
Cottesloe WA 6011
Australia

9.2.6 ABN/ACN

ABN

91143126710 - TM Gold Pty Ltd

9.2.7 Organisation Telephone

0414963642

9.2.8 Organisation E-mail

ashley@pcgold.com.au

9.2.9 I qualify for exemption from fees under section 520(4C)(e)(v) of the EPBC Act because I am:

Not applicable

Small Business Declaration

I have read the Department of the Environment and Energy's guidance in the online form concerning the definition of a small a business entity and confirm that I qualify for a small business exemption.

Signature:…… Date: ……

9.2.9.2 I would like to apply for a waiver of full or partial fees under Schedule 1, 5.21A of the EPBC Regulations

No

9.2.9.3 Under sub regulation 5.21A(5), you must include information about the applicant (if not you) the grounds on which the waiver is sought and the reasons why it should be made

Person proposing the action - Declaration

I, ___Ashley Pattison_____, declare that to the best of my knowledge the information I have given on, or attached to the EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence. I declare that I am not taking the action on behalf of or for the benefit of any other person or entity.
Signature:…… …. Date: …15/02/2018……

I, _____, the person proposing the action, consent to the designation of _____ as the proponent of the purposes of the action describe in this EPBC Act Referral.

Signature:…… Date: …15/02/2018……

9.3 Is the Proposed Designated Proponent an Organisation or Individual?

Organisation

9.5 Organisation

9.5.1 Job Title

Executive Chairman PC Gold Pty

9.5.2 First Name

Ashley

9.5.3 Last Name

Pattison

9.5.4 E-mail

ashley@pcgold.com.au

9.5.5 Postal Address

13 Rosser Street
Cottesloe WA 6011
Australia

9.5.6 ABN/ACN

ABN

91143126710 - TM Gold Pty Ltd

9.5.7 Organisation Telephone

0414963642

9.5.8 Organisation E-mail

ashley@pcgold.com.au

Proposed designated proponent - Declaration

I, _____, the proposed designated proponent, consent to the designation of myself as the proponent for the purposes of the action described in this EPBC Act Referral.

Signature:…… Date: ……

9.6 Is the Referring Party an Organisation or Individual?

Organisation

9.8 Organisation

9.8.1 Job Title

Principal Ecologist

9.8.2 First Name

Greg

9.8.3 Last Name

Calvert

9.8.4 E-mail

Greg@northres.com.au

9.8.5 Postal Address

12 Cannan Street
South Townsville QLD 4810
Australia

9.8.6 ABN/ACN

ABN

55126894693 - Northern Resource Consultants Pty Ltd

9.8.7 Organisation Telephone

(07) 4772 6500

9.8.8 Organisation E-mail

contact@northres.com.au

Referring Party - Declaration

I, Gregor Alan Calvert, I declare that to the best of my knowledge the information I have given on, or attached to this EPBC Act Referral is complete, current and correct. I understand that giving false or misleading information is a serious offence.

Signature: ..... Date: 15/02/2018

Appendix A - Attachments

The following attachments have been supplied with this EPBC Act Referral:

1. appendix_a_spring_hill_bat_monitoring_plan.pdf
2. appendix_b1_targeted_microbat_survey.pdf
3. appendix_b2_targeted_microbat_survey.pdf
4. appendix_c_1_ff_technicalreport.pdf
5. appendix_c_2_ff_app_a.pdf
6. appendix_c_3_ff_app_b.pdf
7. appendix_d_spring_hill_project_-_blasting_analyses.pdf
8. appendix_f_spring_hill_dust_noise_and_vibration_management_plan.pdf
9. appendix_g_spring_hill_revegetation_management_plan.pdf
10. appendix_i_1_sh_groundwater_final_report.pdf
11. appendix_i_2_sh_groundwater_final_appendices.pdf
12. appendix_j_1_sh_surfacewater.pdf
13. appendix_j_2_sh_surfacewater_appendices.pdf
14. appendix_l_tm_gold_environmental_policy_final.pdf
15. appendix_m_springhill_gis_files.zip
16. appendix_n_spring_hill_significant_impact_assessment.pdf
17. proposeddisturbancearea.jpg