



TANAMI NEWMONT GAS PIPELINE

NIGHT PARROT MANAGEMENT PLAN

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Tanami-Newmont Gas Pipeline

Assessment and management of Night Parrot in the Project Area

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Project Manager	David Morley (08) 6218 2200 Level 1, Bishops See 235 St Georges Terrace, Perth WA 6000		
Prepared by	Nicole McAlinden and Ailsa Kerswell		
Reviewed by	Hafiz Stewart		
Approved by	Warren McGrath		
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Contents

1	Introduction	4
1.1	Project description	4
1.2	Purpose of this plan	4
1.3	Environmental assessment and approvals process	4
1.3.1	Commonwealth	4
1.3.2	Northern Territory	5
1.4	Summary of ecological surveys to date	5
2	Desktop Night Parrot habitat analysis	7
2.1	Habitat analysis method	7
2.2	Findings of desktop analysis	8
2.2.1	Relevance of historical records	8
2.2.2	Roosting habitat	8
2.2.3	Foraging habitat	8
2.2.4	Predator assemblages	8
2.2.5	Fire history	9
2.2.6	Prioritisation of potential Night Parrot habitat locations	9
2.2.7	Review conclusions 1	0
2.3	Limitations of desktop habitat analysis	1
3	Night Parrot field survey	2
3 3.1	Night Parrot field survey	2 2
3 3.1 3.1.1	Night Parrot field survey Survey method Timing	2 2 2
3 3.1 3.1.1 3.1.2	Night Parrot field survey Survey method Timing Personnel.	2 2 2 2
3 3.1 3.1.1 3.1.2 3.1.3	Night Parrot field survey Survey method Timing Personnel Location	2 2 2 3
3 3.1 3.1.1 3.1.2 3.1.3 3.1.4	Night Parrot field survey Survey method Timing Personnel Location Method	2 2 2 3 3
3 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2	Night Parrot field survey Survey method Timing Personnel Location Method Response to targeted Night Parrot survey findings	2 2 2 3 3 3
 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2 4 	Night Parrot field survey Survey method Timing Personnel Location Method Response to targeted Night Parrot survey findings Night Parrot management measures	2 2 3 3 3 4
 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2 4 4.1 	Night Parrot field survey Survey method Timing Personnel Location Method Response to targeted Night Parrot survey findings Night Parrot management measures Project optimisation	2 2 2 3 3 3 4 4
 3 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2 4 4.1 4.2 	Night Parrot field survey. Survey method Timing Personnel. Location Method Response to targeted Night Parrot survey findings. Night Parrot management measures. Project optimisation Additional measures to prevent impacts to Night Parrot	2 2 2 2 3 3 3 3 4 4 4
 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2 4 4.1 4.2 4.2.1 	Night Parrot field survey. Survey method Timing Personnel. Location Method Response to targeted Night Parrot survey findings Night Parrot management measures Project optimisation Additional measures to prevent impacts to Night Parrot Site characterisation	2 2 2 2 3 3 3 4 4 4 4 4
 3 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2 4 4.1 4.2 4.2.1 4.2.2 	Night Parrot field survey Survey method Timing Personnel. Location Method Response to targeted Night Parrot survey findings Night Parrot management measures Project optimisation Additional measures to prevent impacts to Night Parrot Site characterisation Avoidance options	2 2 2 2 3 3 3 4 4 4 5
 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2 4 4.1 4.2 4.2.1 4.2.2 4.2.3 	Night Parrot field survey	2 2 2 2 3 3 3 4 4 4 5 6
 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2 4 4.1 4.2 4.2.1 4.2.2 4.2.3 4.3 	Night Parrot field survey. Survey method Timing Personnel. Location Method. Response to targeted Night Parrot survey findings. Night Parrot management measures. Project optimisation Additional measures to prevent impacts to Night Parrot. Site characterisation Avoidance options Management measures. Contingencies and corrective actions.	2 2 2 2 3 3 3 4 4 4 5 6 6
 3 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2 4 4.1 4.2 4.2.1 4.2.2 4.2.3 4.3 4.4 	Night Parrot field survey. Survey method Timing Personnel. Location Method Response to targeted Night Parrot survey findings. Night Parrot management measures. Project optimisation Additional measures to prevent impacts to Night Parrot Site characterisation Avoidance options Management measures. Contingencies and corrective actions. Rehabilitation	2 2 2 2 3 3 3 4 4 4 5 6 6 6
 3 3.1 3.1.1 3.1.2 3.1.3 3.1.4 3.2 4 4.1 4.2 4.2.1 4.2.2 4.2.3 4.3 4.4 4.5 	Night Parrot field survey Survey method Timing Personnel Location Method Response to targeted Night Parrot survey findings Night Parrot management measures Project optimisation Additional measures to prevent impacts to Night Parrot Site characterisation Avoidance options Management measures Contingencies and corrective actions Rehabilitation Monitoring and research	2 2 2 2 3 3 3 4 4 4 4 5 6 6 6 7

Appendix A ANRM Night Parrot	Analysis Report
Appendix A Antim Higher anot	

List of figures

Figure 1	Priority locations for	Night Parro	survey
0.0	,	J	

List of tables

Table 1: Attributes,	values and rationale c	considered during su	rvey prioritisation	9

Abbreviations

Abbreviation	Description		
AGIT	AGI Tanami Pty Ltd		
CEMP	Construction Environment Management Plan		
DotEE	Department of the Environment and Energy		
EA Act	Environmental Assessment Act		
ELA	Eco Logical Australia Pty Ltd		
EMP	Environmental Management Plan		
NT EPA	Northern Territory Environmental Protection Authority		
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999		
MNES	Matters of National Environmental Significance		
NOI	Notice of Intent		
RoW	Right of Way		

1 Introduction

1.1 Project description

AGI Tanami Pty Ltd (AGIT) proposes to develop a 440 km buried pipeline (the Project) to connect the Amadeus Gas Pipeline to the Granites and Dead Bullock Soak mines in the Northern Territory. The Project will include the clearing of a 25 m construction Right of Way (RoW), temporary access tracks, temporary construction camps, turkeys nest dams, a permanent 5 m access track between KP0-3 and KP390-440 and the following above ground infrastructure:

- Tanami meter station (at tie-in with the Amadeus Gas Pipeline)
- Two scraper stations located along the pipeline
- Granites Mine meter station
- Dead Bullock Soak Mine meter station

Construction of the Project is due to commence in May 2018 and is scheduled to be completed by March 2019, with 'first gas' to the Granites and Dead Bullock Soak mines by March 2019.

1.2 Purpose of this plan

Desktop assessments and field surveys to date identify a number of threatened species present, or potentially occurring in the Project Area, including Night Parrot (*Pezoporus occidentalis*).

Upon the advice of the Australian Government Department of the Environment and Energy (DotEE), further detailed assessment of the Project Area for potential Night Parrot habitat and presence of Night Parrot individuals is required, to inform the environmental assessment and development of appropriate avoidance and management measures to ensure that Project related impacts to Night Parrot are prevented.

This report therefore includes the following:

- Desktop Night Parrot habitat analysis methodology and outcomes (ANRM 2018)
- A commitment to undertake targeted Night Parrot survey prior to construction in areas of potential foraging and roosting habitat (as identified by the desktop habitat analysis)
- A commitment to avoid impacts to confirmed Night Parrot habitat, if the species is found during targeted field surveys
- Night Parrot avoidance and management measures, to prevent Project related impacts to the species, with more stringent measures to be implemented if the species is found during targeted field surveys

1.3 Environmental assessment and approvals process

The Project is currently still in the environmental assessment phase under both Commonwealth and Northern Territory legislation.

1.3.1 Commonwealth

The Project was referred to the DotEE under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) in July 2017, due to the potential for significant impacts to Matters of National Environmental Significance (MNES). In October 2017, the Project was deemed a Controlled Action with the controlling provision 'Listed Threatened species and communities' including Night Parrot. Assessment of potential impacts has been undertaken via preliminary documentation. The final package of information was submitted to DotEE on 5 March 2018 for assessment.

1.3.2 Northern Territory

The Project was referred to the Northern Territory Environmental Protection Authority (NT EPA) on 25 July 2017 for consideration under the *Environmental Assessment Act* (EA Act) through submission of a Notice of Intent (NOI).

The NT considered the NOI and decided that the Project is unlikely to have a significant impact on the environment and does not require assessment under the EA Act. This decision is in accordance with clause 8(2)(b) of the Environmental Administrative Procedures. The NT EPA recommended a number of measures be implemented during the construction and operation of the Project, as identified in the Letter to AGIT and accompanying Statement of Reasons. In summary, these measures include:

- Restrict the permanent access track to between KP0-3 and KP390-440. The remainder of the alignment should be rehabilitated.
- Prepare and implement a number of plans, including:
 - Rehabilitation management plan.
 - Weed management plan.
 - Fauna management plan.

The Energy Pipelines Act and Energy Pipeline Regulations authorises the survey, construction, testing and operational activities of the Project. A pipeline licence under the Energy Pipelines Act is required before construction or operation of the pipeline can commence. Environmental conditions, including those arising from recommendations flowing from the assessment under the EA Act, will be placed on the pipeline licence. A Pipeline Management Plan, incorporating the EMP is required for the licence. The constructor will develop and implement a Construction Environmental Management Plan (CEMP) and Operational Environmental Management Plan (OEMP) that conforms with and supports this EMP.

The *Planning Act* (NT) authorises the clearing of native vegetation on freehold land in the Northern Territory. Applications to clear native vegetation are required under Section 46(3) of the Planning Act and the application must demonstrate consideration of land clearing guidelines, presence of threatened wildlife, sensitive or significant vegetation communities, impacts on regional biodiversity, soils and topography, surface water, heritage properties and presence of Aboriginal sacred sites. AGIT will prepare and submit applications to clear native vegetation to the Northern Territory Development Assessment Services, who delegates the assessment to the Department of Environment and Natural Resources. A 'Statement of Effect' will be prepared as part of the application Assessment Panel and considered against the performance criteria in clauses 10.2 and 10.3 of the Northern Territory Planning Scheme and the 'Land Clearing Guidelines: Northern Territory Planning Scheme.

1.4 Summary of ecological surveys to date

A number of field surveys have been undertaken to date to understand potential impacts of the Project on threatened species, including the Night Parrot. These provide useful context for understanding the potential for Night Parrot to occur within the Project area. However, targeted surveys for the Night Parrot have not yet been undertaken.

A brief summary of the ecological surveys undertaken for the Project is provided below.

Flora and vegetation survey

A flora and vegetation survey of the Project Area was conducted in August 2017 (Mattiske 2017), including both a desktop assessment and field survey. The survey was undertaken by four botanists between 14 and 22 August 2017, to the exclusion of minor and major creeklines and elevated rocky areas. The survey assessed 91 survey sites based on aerial and photographic maps and field observations. Sites comprised 20 m by 20 m quadrats in addition to unconfined releve sites. Flora and vegetation were sampled systematically at each site and additional opportunistic collections made where previously unrecorded plants were observed.

This field assessment mapped a number of vegetation units that may provide suitable habitat for Night Parrot.

Reconnaissance fauna survey

A reconnaissance fauna survey was undertaken by Biostat (2017) from 14 to 20 August 2017. This survey provided an overview of landscape and habitat structures across the 440 km pipeline alignment and was conducted by two zoologists. The survey described 40 sites in the pipeline alignment which were considered representative of the landscape and habitats present in the Project area.

This survey concluded that the Project area may provide habitat for the Night Parrot.

Pre-clearance survey

A pre-clearance survey was undertaken by ELA (2018) to identify the presence of threatened species and their habitat along the pipeline alignment. This survey was conducted over two periods, from 27 February 2018 to 6 March 2018 involving four ecologists and then from 13 March to 21 March by six ecologists. The survey team worked in pairs, traversing the entire construction RoW on foot and covered approximately 600 km of survey transects, with a combined survey effort of 860 field hours. The survey identified significant trees, weeds, and targeted habitat assessments for threatened species, including Night Parrot. The survey also validated the location of preliminary rehabilitation monitoring sites.

This survey mapped 747 ha of potential Night Parrot habitat within the Project's Right of Way (RoW), based primarily on ground-truthed vegetation types and other key habitat features e.g. recent fire.

2 Desktop Night Parrot habitat analysis

To date, Night Parrot habitat within the Project area has been designated based primarily on mapped vegetation units. In lieu of detailed analysis of the species' habitat requirements and their presence in the Project area, a precautionary approach was implemented. This entailed assigning any areas with the following vegetation types as potential Night Parrot habitat:

- Eucalyptus/Corymbia/Acacia woodland over Spinifex
- Shrubland over spinifex on sandplains including paleodrainage channels

This approach is likely to have overestimated the extent of potential Night Parrot habitat within the Project area, as the specific habitat requirements of the Night Parrot are unlikely to be met at all areas within these vegetation communities.

In order to better understand the presence of potential Night Parrot habitat, further desktop assessment has been undertaken to refine potential habitat mapping and identify areas throughout the Project area that have the highest potential for Night Parrot occurrence, based on what is currently known about the species. This work has also informed the need for targeted field surveys for the species (see Section 3).

The habitat analysis is described below and presented in full in Appendix A.

2.1 Habitat analysis method

Eco Logical Australia (ELA) engaged Dr Steve Murphy, lead Night Parrot Researcher on the Night Parrot Recovery Team, to undertake a desktop habitat analysis of the Project Area, to update and refine the understanding of potential Night Parrot habitat present within the Project Area. This desktop habitat analysis considered all previous desktop and field assessments conducted for the Project and involved data analysis not previously undertaken, to contribute further to the body of knowledge on the potential for Night Parrot presence in the Project Area.

Dr Murphy's analysis included:

- Review of ecological studies completed to date (Section 2.1.1)
- Comparison of Mattiske (2017) vegetation descriptions with the current understanding of Night Parrot habitats, based on field data from recent records in Queensland and Western Australia
- Investigation of the limitations of Mattiske (2017) mapping, with a particular focus on how sampling during a dry period may limit the finding of suitable annual plants which Night Parrot are known to forage on
- Review of NT Landsystems Mapping
- Remote sensing analysis to detect areas of vegetation which respond rapidly after rainfall, dominated by annuals, which may provide suitable foraging habitat
- Assessment of cat, fox and dog activity and distribution based on a long-term empirical dataset from the Tanami, held by Desert Wildlife Service and recent field observations, which may restrict the likelihood of Night Parrot presence
- Assessment of impacts of past fire activity, on potential Night Parrot habitat, based on moderate resolution fire scar data
- Identification of historical Night Parrot records near the Project Area, with an assessment of the validity of these records and implications for this Project

- Application of a survey priority score for each 5 km by 5 km grid along the pipeline alignment based on presence of attributes known to support Night Parrot presence
- Identification of priority locations for a targeted Night Parrot survey

2.2 Findings of desktop analysis

The complete analysis by Dr Murphy is provided in **Appendix A** and a summary of key findings is provided below (ARNM 2018).

2.2.1 Relevance of historical records

A number of historical records indicate Night Parrot may have been present in the area, as recently as the 1990s. Most historical records unsurprisingly are from roads and tracks and despite uncertainty in historical records within proximity of the Project Area, a record from the Tanami track was made in 1969.

Caution must be exercised when interpreting past records or lack of records of Night Parrot. For example, despite a known population of Night Parrot in Queensland being within 10 km of a main road, there is a complete lack of evidence of Night Parrot in the vicinity of the road itself. The lack of records along the Tanami Road therefore, does not necessarily indicate that the Night Parrot is absent from the area (ANRM 2018).

2.2.2 Roosting habitat

Not all *Triodia* species present in the Project Area are likely to be suitable for roosting or nesting; however, patches are likely to occur along the entire length, and fire likely suppresses their formation (ANRM 2018). *Triodia pungens* 'Palya' form, which could be important for Night Parrot, likely occurs at least in the northern section of the Project Area, near Sangster's Bore (ANRM 2018). There is currently no spatially explicit dataset for the distribution of *T. pungens* 'Palya'.

2.2.3 Foraging habitat

Night Parrots are known to forage on annual plant species. The lack of annual food plants identified by Mattiske (2017) is not reliable evidence that these plants are absent from the Project Area.

The review of NT Landsystems Mapping and the Mattiske (2017) dataset shows probable run-on areas that likely support Night Parrot foraging habitat. Run-on areas are areas where surface water flows to and can infiltrate following rainfall events.

Remote sensing analysis by Dr Murphy (ANRM 2018) to identify vegetation that responds rapidly after rainfall has proven effective at pinpointing Night Parrot foraging areas at Pullen Pullen Reserve in Queensland. A single rainfall event from October 2017 was used to identify run-on areas for a northern subset of the Project Area, in the vicinity of Sangster's Bore. This analysis identified extensive patches of potential foraging habitat.

While no such areas were identified within the Project Area, it should be noted that the remote sensing analysis relates to only one small rainfall event in one subset of the Project Area, and these results are therefore incomplete. Further remote sensing analysis involving more time series rainfall data across the entire Project Area, coupled with field validation, would be required to ensure a comprehensive analysis of potential Night Parrot foraging habitat in the Project Area (ANRM 2018).

2.2.4 Predator assemblages

Feral predators are known to be drivers of local extinction and are common along the Project Area; however, their distributions likely vary in response to fine scale factors. At Sangster's Bore near the north of the Project Area, long-term stable dingo packs are likely to have regulated feral cat and fox densities,

contributing to the ongoing persistence of other threatened species near that location including Great Desert Skink and Greater Bilby. This area is one of the most important refuge sites for these species as well as Mulgara (ANRM 2018).

2.2.5 Fire history

Several locations across the Project Area have experienced fragmented fire patterns. Such places may have supported *Triodia* roosting and breeding habitat refugia in the past, which may have been conducive to Night Parrot populations (ANRM 2018).

2.2.6 Prioritisation of potential Night Parrot habitat locations

The above considerations were used to develop a prioritisation of potential Night Parrot habitat locations. The following table, reproduced from the desktop habitat analysis by ANRM (2018) (Appendix A) explains the value of attributes and the prioritisation of potential Night Parrot survey locations.

Code	Attribute	Value	Rationale of score
S	Contains recent threatened species record	1	Persistence of threatened species may reflect benign predator/fire situation which may be linked to suitability for Night Parrots.
F	Contains unburnt (irrespective of habitat)	1	Maintenance of long-unburnt <i>Triodia</i> critical; absence of unburnt (value = 0) nullifies habitat attributes (by multiplication).
R	Contains run-on defined by Mattiske (2017) – AbAsHm, Mg or CoHIAa	0.5	Run-on zones important for feeding, but low confidence in defining run-on zones using inference of Mattiske descriptions (hence lower value). Night Parrots known to use small patches and so absence (0) may reflect inadequate sampling or coarse scale; absence reduces score but does not nullify it.
R	Contains run-on defined by Landsystem Mapping	1	Run-on zones important for feeding; Landsystems Mapping likely to be more accurate than inferences using Mattiske mapping. Night Parrots known to use small patches and so absence (0) may reflect inadequate sampling or coarse scale; absence reduces score but does not nullify it.
Т	Contains possibly suitable <i>Triodia</i> defined by Atlas of Living Australia	1	Structurally suitable <i>Triodia</i> important for breeding/roosting. Night Parrots known to use very small <i>Triodia</i> patches; absence (0) may reflect inadequate sampling or coarse scale and so reduces score but does not nullify it.
т	Contains possibly suitable <i>Triodia</i> (basedowii) defined by Mattiske (2017)	1	Structurally suitable <i>Triodia</i> important for breeding/roosting. Night Parrots known to use very small <i>Triodia</i> patches; absence (0) may reflect inadequate sampling or coarse scale and so reduces score but does not nullify it.

Table 1: Attributes, values and rationale considered during survey prioritisation

The formula used to calculate priority areas is:

Priority score algebra: $S + (F \times (R + T))$

Where:

- S = threatened species value
- F = fire value
- R = run-on value
- T = Triodia value

Further explanation of this scoring system is included in the full report by Dr Murphy, provided at **Appendix A**.

2.2.7 Review conclusions

Records from Pullen Pullen Reserve, Queensland and Western Australia show that Night Parrot requires suitable *Triodia* in close association with relatively high productivity run-on areas such as paleodrainage areas, where vegetation responds rapidly following rain. Other key requirements are little or no fire and low predation pressure from cats and foxes.

Of the 1,185 km² of sample cells analysed along the pipeline alignment, approximately 28% (33 cells) rated a score of 2 or higher and are identified as priority locations for further investigation of potential Night Parrot presence (ANRM 2018). Targeted field survey for the Night Parrot in these areas is considered necessary.

These areas may satisfy Night Parrot requirements. One such area includes the area east of Sangster's Bore in the north of the Project Area, which is known to support other threatened species. This area has high productivity vegetation following rainfall, natural fire fragmentation and low densities of cats and foxes, likely a result of long-term stable dingo presence (ANRM 2018). These characteristics are similar to those present at Pullen Pullen Reserve, Queensland, which are considered responsible for the persistence of Night Parrot in that location (ANRM 2018).

Figure 1 below identifies locations where Night Parrot has the greatest potential to occur within the Project area, based on the understanding of Night Parrot requirements and the findings of the desktop habitat analysis (ARNM 2018). These areas will be primary focus of a program of targeted field survey for the species.

Whilst these survey areas are based on sound reasoning and an analysis of the best available data, there are some limitations to the desktop analysis and these are outlined below. Consequently, the final location of survey sites will rely on field validation by ecologists with experience working in Night Parrot habitats at other known locations (see below for details of proposed targeted field survey).

The complete report by Dr Murphy (**Appendix A**) provides additional mapping of *Triodia* records, fast responding vegetation and fire activity.



Figure 1: Priority locations for Night Parrot survey (red, yellow and orange areas are high priority)

2.3 Limitations of desktop habitat analysis

The desktop habitat analysis (ANRM 2018) identified a number of limitations including the following:

- Existing knowledge of Night Parrot is derived from a small sample at Pullen Pullen Reserve, Queensland, with some commonalities with recent findings from Western Australia
- Night Parrots are now known to utilise small landscape and habitat features which are anomalous with the surrounding habitat and are likely entirely missed or underestimated by spatial datasets, including the failure of vegetation datasets to distinguish between *Triodia pungens* and *T. pungens* 'Palya' form which is suitable for nesting
- The Mattiske (2017) vegetation survey was conducted during a dry period, and therefore likely underestimates the abundance and diversity of annual plants available to Night Parrots for feeding
- Potential for historical misidentification of Night Parrots found in database record extracts
- Limited remote sensing assessment, based on one rainfall event in a limited subsection of the Project Area

These limitations have been considered in the design of the proposed field program below and will continue to be factored into the ongoing management requirements.

3 Night Parrot field survey

Field surveys to date for the Project have focused on a habitat assessment approach, supplemented by a pre-clearance survey for evidence of threatened species habitat and presence of Desert Skink burrows and Greater Bilby tracks and burrows. To date, targeted surveys for Night Parrot presence have not been undertaken.

AGIT proposes to undertake a targeted Night Parrot survey in areas of potentially suitable habitat along the pipeline alignment, as identified by the desktop habitat analysis conducted by Dr Murphy (ANRM 2018) and outlined in Section 2. The results of the desktop habitat analysis and proposed targeted Night Parrot survey will inform the development and implementation of additional management controls as required, to avoid and manage potential impacts to Night Parrot during construction of the Project.

The identification of proposed survey sites is based on a desktop habitat analysis by Dr Murphy using existing desktop assessments and field surveys combined with further data analysis (and associated limitations).

3.1 Survey method

The EPBC *Survey Guidelines for Australia's Threatened Birds* (DEWHA 2017) provides guidance on Night Parrot surveys including targeted searches at waterholes, searches for feathers around waterholes and in nests of other birds. Use of sniffer dogs is also suggested as a possible tool. There is also interim guidance on preliminary survey for Night Parrot in Western Australia (DPAW 2017). This guidance suggests surveys should be focused primarily in areas of likely nesting and foraging habitats, with the most effective survey technique being passive acoustic survey.

In line with both advice from Night Parrot experts (incl. Dr Murphey) and existing policy advice, AGIT propose the following methodology for a targeted Night Parrot survey. The survey will concentrate effort on areas that were identified in the desktop assessment as providing the highest likelihood foraging and nesting resources. However, will also incorporate field validation of the desktop results prior to field site establishment. The surveys will be undertaken using only passive acoustic techniques, which minimises potential disturbance to any Night Parrot individuals that may be present in the Project Area during the survey.

3.1.1 Timing

- Targeted surveys will be undertaken in May June 2018. Birds exhibit high site fidelity, therefore results will be applicable for the duration of the construction period (~ 12 months commencing May 2018, subject to approval).
- Optimal surveys are to be conducted in months after good rainfall. The Project Area has received approximately 150 mm of rain from January to April in 2018, which represents one third of the average annual total, making the months of May and June suitable for Night Parrot survey.

3.1.2 Personnel

 Field surveys will be undertaken by a team of experienced ecologists. This will include at least one team member who has experience surveying known populations of Night Parrots (i.e. in WA and/or Queensland), in particular during the establishment of survey sites and deployment of survey equipment.

3.1.3 Location

- Surveys will be undertaken at up to 35 sites within the Project area in areas identified as having the highest likelihood of supporting Night Parrots.
- Currently proposed survey areas are shown above in Figure 1 and are based on the outcomes of the desktop assessment. These may be adjusted based on on-field observations.
- Once in the field, the final location of survey sites will be determined by ecologists with suitable experience in undertaking Night Parrot survey. This will include an assessment of the appropriateness of the study area (i.e. validating the results of the desktop assessment) and if the survey area is considered appropriate, then where best to deploy survey equipment. If other areas within the Project area are deemed more appropriate based on in-field observations, alternative and/or additional sites will be surveyed.

3.1.4 Method

- Surveys will be undertaken via passive acoustic recording using pre-programmed Songmeter devices (SM2, SM3 and/or SM4).
- Four devices will be deployed for at least four nights at each site, recording for two to three hours over dusk and dawn, and including at least two nights with wind speeds less than 15 km/h.
- All sites will be surveyed concurrently (subject to availability of enough recording devices)
- Data analysis using latest call recognition technologies. Dr Murphy will undertake the analysis of survey recordings
- No invasive survey methodologies will be utilised in order to avoid impacts to any potential Night Parrot present.

3.2 Response to targeted Night Parrot survey findings

Given the Night Parrot is nocturnal and cryptic in nature, there is no survey technique which can irrefutably demonstrate that Night Parrots are absent from a site, regardless of the field survey findings. However, the desktop assessment and targeted surveys as proposed above, are considered to provide an appropriate level of investigation upon which to base a suitable management response.

The response to the findings of the Night Parrot survey are as follows:

- No evidence of Night Parrot recorded existing measures already identified in the Environmental Management Plan will be implemented to avoid and reduce impacts to potential (but not occupied) habitat; existing measures already identified in the Rehabilitation Plan will be implemented to reinstate habitat in disturbed areas. No additional management measures are considered necessary.
- Evidence of Night Parrot recorded existing measures as above and a commitment from AGIT to avoid impacts to confirmed habitat areas. There are a range of ways impact avoidance can be implemented and these options are detailed in Section 4 below, along with considerations for deciding which option should be chosen. Liaison with appropriate stakeholders will also be undertaken.

The location of Night Parrot individuals, if found within the Project area, is highly sensitive. AGIT commits to engage with DotEE and other relevant stakeholders to ensure the security of any Night Parrot records.

4 Night Parrot management measures

4.1 Project optimisation

Throughout the Project design phase, the pipeline alignment and extent of disturbance has been optimised to avoid and minimise potential impacts to a number of MNES, including the Night Parrot. The original Project design included a 30 m construction RoW for the pipeline corridor, which is considered the industry standard width. The construction RoW has been reduced to 25 m, reducing the total temporary disturbance by 220 ha.

The final residual disturbance has been reduced from a 5 m access track for the full length of the pipeline to a restricted 5 m access track between KP0-3 and KP 390-440 and above ground infrastructure, totalling 130 ha to allow access for essential pipeline inspection and maintenance.

The construction period has been minimised to less than 12 months, to reduce the duration of temporary ground disturbance and associated potential impacts to MNES in the vicinity of the Project.

In addition to avoidance measures, AGIT commits to avoid and minimise potential impacts to MNES including Night Parrot through the implementation of an Environmental Management Plan (EMP) (ELA 2018a), as part of an overarching Risk Management System, compliant with ISO14001, and a Rehabilitation Plan (ELA 2018b).

4.2 Additional measures to prevent impacts to Night Parrot

In the event that the targeted Night Parrot field survey records evidence of Night Parrot individuals within the Project Area, AGIT will engage with the DotEE, members of the Night Parrot Recovery Team and local Traditional Owners (as appropriate) to:

- Ensure the security of the Night Parrots in the Project Area
- Undertake additional site characterisation within confirmed habitat areas to understand the type, extent and utilisation of habitat, in order to help inform appropriate avoidance measures
- Review the location of the pipeline alignment with consideration of the survey findings
- Identify suitable exclusion areas and buffer zones around the recorded occurrences
- Review and implement appropriate avoidance and management measures to ensure they are sufficient to avoid and minimise impacts to any Night Parrot population

The following provides an overview of potential additional avoidance and management measures that may be implemented, in the event that Night Parrot are recorded in the Project Area. These measures will be further developed and refined, if Night Parrot is found within the Project area, and with consideration of the local characteristics of the confirmed site(s). Irrespective of which option is implemented, AGIT is committed to avoiding impacts to any confirmed Night Parrot habitat.

4.2.1 Site characterisation

Should Night Parrot be confirmed within the Project area, additional field assessment will be undertaken to characterise the site. This will include:

- Type of habitat, including specific characteristics
- Habitat extent, particularly with respect to Project area
- Likely utilisation patterns of habitat area
- Other sensitive receptors within and surrounding the habitat area, with particular focus on cultural heritage

This information will be used to inform the specific measures that are required to avoid and manage impacts. It will be used to determine the most effective avoidance measures, as well as the extent of any exclusion and buffer zones.

4.2.2 Avoidance options

AGIT is committed to avoiding impacts to Night Parrot at any sites where the species may be found within the Project area. The specific measures to be implemented will depend on a number of factors, including the ecological characteristics of the site, other sensitive values at and around the sites and engineering feasibility.

A number of avoidance options will be considered. These options include, but are not limited to, the following.

Establishment of exclusion and buffer zones

A key element of avoiding impacts to Night Parrot will be the establishment of exclusion and buffer zones. The site characterisation information will be used to develop the boundaries of these areas. Exclusion zones will encompass all confirmed Night Parrot habitat and buffer zones will be of an appropriate size to prevent indirect impacts. All exclusion and buffer zones will be clearly demarcated and communicated to all construction staff.

Micrositing within the construction RoW

A 25 m construction RoW has already been identified to allow for micrositing of the pipeline at the time of construction, to avoid environmental values identified at the time of pegging.

Depending on the location of any potential Night Parrot record and recommended buffer distance between record and pipeline construction, micrositing within the 25 m construction RoW may be sufficient to avoid direct impacts to Night Parrot.

Indirect impacts of clearing and construction including noise and vibration may have the potential to disturb Night Parrot individuals sheltering in nests during the day; however, the agreed buffer will be designed in order to manage this type of disturbance.

Pipeline realignment

In the event that the width of the 25 m construction RoW is considered insufficient to establish a safe buffer around the Night Parrot record and thereby avoid impacts to the species, realignment of the pipeline outside of the current construction RoW may be required. This would allow areas of confirmed Night Parrot habitat to be avoided and appropriate buffer distances established to account for both direct and indirect impacts.

Realignment of the pipeline may potentially conflict with Traditional Owner land access restrictions and exclusions and these would need to be further investigated and reconciled where necessary to make realignment feasible.

It is possible that realignment may take the pipeline route outside of the currently approved boundaries either to fully avoid Night Parrot habitat and/or due to engineering requirements. In such a case, amended and/or new approvals would be negotiated with relevant regulators.

Horizontal directional drilling

Horizontal directional drilling (HDD) is used to safely avoid direct impacts to environmentally sensitive areas and is already identified for use within the Project Area for a number of watercourse crossings. HDD involves drilling a pilot bore beneath the environmental value to be protected. The drill path may be

straight or curved and can be adjusted at any time, to avoid obstacles. Once the bore is drilled, the pipeline is then inserted.

While HDD can be used to avoid recorded habitat, the method is likely to generate noise and vibration which may disturb Night Parrot individuals, sheltering in nests during the day. Additional management controls would be developed, if HDD was determined to be the most appropriate avoidance measure.

4.2.3 Management measures

Management measures to minimise potential impacts to Night Parrot include, but are not limited to, the following:

- The location of the exclusion and buffer zones to be flagged prior to the commencement of construction
- Restrictions on vehicle and personnel access to the flagged Night Parrot area to prevent disturbance of recorded Night Parrot habitat
- Implementation of clean on entry procedures for personnel and equipment to prevent weed incursion into flagged areas
- Restrictions on the introduction of hazardous materials and potential ignition sources into flagged areas of recorded habitat to prevent fire events
- Provision of fire control equipment for the duration of construction activities
- Construction personnel to be inducted on the occurrence of Night Parrot in the Project Area, and the requirement to comply with avoidance and management measures
- Engagement of an experienced ecologist for the duration of day time construction activities, to ensure no impacts to Night Parrot individuals which may be sheltering in nests during the day
- Ensure all waste generated by construction is appropriately disposed of, secured and removed from the site daily, to prevent attraction of feral fauna which may pose a threat to Night Parrot
- Implementation of feral cat and fox control around flagged Night Parrot records.

Management measures will be implemented for the duration of construction activities.

4.3 Contingencies and corrective actions

In the event that daily monitoring during construction indicates an impact to Night Parrot habitat that is attributable to the Project, the following contingency and corrective measures will be implemented:

- Construction activities within proximity of the flagged Night Parrot habitat will cease immediately
- Investigate the nature of impact and potential cause/s
- Report the impact to the DotEE
- Review avoidance and management measures, and identify corrective actions, in consultation with the DotEE and the Night Parrot Recovery Team to ensure the impact is mitigated and any further impacts are prevented

4.4 Rehabilitation

AGIT has committed to avoiding impacts to confirmed Night Parrot habitat and as such, no rehabilitation will be required in these areas. However, rehabilitation will occur throughout the RoW (in line with the Project's Rehabilitation Plan) along with specific weed and pest management measures. These are likely to benefit the Night Parrot.

4.5 Monitoring and research

If Night Parrots are found within the Project area, it will be the only known population in the Northern Territory. As such, it will be appropriate to develop a specific monitoring and research program for the population. The primary aims would be to ensure the species has not been impacted by the Project and to further the scientific understanding of the species.

If necessary, a monitoring and research plan will be developed by AGIT in collaboration with members of the Night Parrot Recovery Team.

References

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Appendix A ANRM Night Parrot Analysis Report









HEAD OFFICE

Suite 2, Level 3 668-672 Old Princes Highway Sutherland NSW 2232 T 02 8536 8600 F 02 9542 5622

CANBERRA

Level 2 11 London Circuit Canberra ACT 2601 T 02 6103 0145 F 02 9542 5622

COFFS HARBOUR

22 Ray McCarthy Drive Coffs Harbour NSW 2450 T 02 6651 5484 F 02 6651 6890

PERTH

Level 1, Bishop's See 235 St Georges Terrace Perth WA 6000 T 08 9227 1070 F 02 9542 5622

MELBOURNE

Level 1, 436 Johnston St Abbotsford, VIC 3076 T 1300 646 131

SYDNEY

Suite 1, Level 1 101 Sussex Street Sydney NSW 2000 T 02 8536 8650 F 02 9542 5622

NEWCASTLE

Suites 28 & 29, Level 7 19 Bolton Street Newcastle NSW 2300 T 02 4910 0125 F 02 9542 5622

ARMIDALE

92 Taylor Street Armidale NSW 2350 T 02 8081 2685 F 02 9542 5622

WOLLONGONG

Suite 204, Level 2 62 Moore Street Austinmer NSW 2515 T 02 4201 2200 F 02 9542 5622

BRISBANE

Suite 1, Level 3 471 Adelaide Street Brisbane QLD 4000 T 07 3503 7192

1300 646 131 www.ecoaus.com.au

HUSKISSON

Unit 1, 51 Owen Street Huskisson NSW 2540 T 02 4201 2264 F 02 9542 5622

NAROOMA

5/20 Canty Street Narooma NSW 2546 T 02 4302 1266 F 02 9542 5622

MUDGEE

Unit 1, Level 1 79 Market Street Mudgee NSW 2850 T 02 4302 1234 F 02 6372 9230

GOSFORD

Suite 5, Baker One 1-5 Baker Street Gosford NSW 2250 T 02 4302 1221 F 02 9542 5622

ADELAIDE

2, 70 Pirie Street Adelaide SA 5000 T 08 8470 6650 F 02 9542 5622