Ross River Dam (RRD) - Douglas Water Treatment Plant (DWTP) Pipeline Replacement

Townsville City Council

15-Jul-2021

Self-Assessment Report

RRD - DWTP

Self-Assessment Report

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Client: Townsville City Council

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Glossary

Acronym	Definition
BTF Guideline	*Significant Impact Guidelines for the Endangered Black-throated Finch (southern)*
Council	Townsville City Council
Defence	Department of Defence
DWTP	Douglas Water Treatment Plant
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999*
Guideline 1.1	*Matters of National Environmental Significance: Significant Impact Guidelines 1.1*
Guideline 1.2	*Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies Significant Impact Guidelines 1.2*
MNES	Matters of National Environmental Significance
Northern Quoll Guideline	*EPBC Act Referral guideline for the endangered northern quoll Dasyurus hallucatus*
REs	Regional Ecosystems
RRD	Ross River Dam
WONS	Weeds of National Significance

Executive Summary

The Ross River Dam (RRD) to Douglas Water Treatment Plant (DWTP) Pipeline Replacement Project (the Project) includes the replacement of an existing pipeline which transfers raw water from RRD in Townsville to the DWTP. The existing pipeline is currently in poor condition at significant risk of failure. To address this risk of failure, Council is proposed to replace this pipeline in an alternative location. The alternative location has been identified through an extensive options assessment and concept design process.

Detailed ecological and heritage assessments of the Project alignment have been undertaken to identify, avoid, mitigate and manage any potential impacts on Commonwealth values protected and managed under the EPBC Act. The Project design has been developed and refined to avoid and minimise vegetation clearing wherever feasible by co-locating the new pipeline with the existing areas of disturbance.

The proposed vegetation clearing for the Project has been limited to a maximum width of 25m. This corridor width minimises the direct impact area of the Project whilst allowing for sufficient land area for the required installation of the pipeline and ancillary works. Post construction, approximately 30% of the disturbance corridor is to be rehabilitated with native species representative of the original vegetation community.

The purpose of this report is to document a self-assessment pursuant to the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to determine if a significant impact on Matters of National Environmental Significance (MNES) or the environment on Commonwealth land is likely to occur as a result of the Project.

The results of the self-assessment against *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* concluded that significant impacts to the Northern quoll as a result of the Project are unlikely; however potential impacts to the black-throated finch may be significant and should be referred to the Commonweal Government for assessment.

The Project occurs within an 'important area' as defined in *Significant Impact Guidelines for the Endangered Black-throated Finch (southern)*. Where suitable habitat is validated to exist within mapped important areas, the species should be presumed to be present. Whilst the field assessment did not confirm the presence of Black-throated finch, potential habitat was recorded. Impacts to Black-throated finch habitat will be low; and direct impacts (clearing of vegetation) have been minimised as much as possible through the options assessment process and commitments to rehabilitate construction phase disturbance.

Large adjacent areas of suitable habitat will remain for the Black-throated finch that will allow for populations to persist, and the shape and scale of clearing will not result in a barrier to movement. However, it is anticipated that a net loss of nesting trees within 1km of a permanent water source (the Ross River) will occur as a result of the Project, which is an adverse impact to habitat critical to the survival of the species. As per the BTF Guidelines this form of disturbance can significantly impact the species.

Potential habitat for Northern quoll within the area is considered habitat critical to the survival of the species as it comprises suitable foraging and dispersal habitat in close proximity to denning habitat associated with Mount Stuart. As specified by the *EPBC Act Referral guideline for the northern quoll*, actions which are likely to impact on habitat critical to the species may have a significant impact. However, whilst some direct impacts to habitat critical to the survival of the species will occur because of the Project, this habitat is associated with foraging and dispersal habitat rather than denning habitat, which is highly abundant in the surrounding landscape. Therefore, in the context of the wider area, impacts on northern quoll, including habitat critical to the survival of the species are low and not considered significant.

The results of the self-assessment against *Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies Significant Impact Guidelines 1.2* concluded that significant impacts to the environment on Commonwealth land are unlikely, subject to the implementation of the environmental mitigation and management measures, and further investigation for surface and subsurface heritage values.

1.0 Introduction

AECOM Australia Pty Ltd (AECOM) have been engaged by Townsville City Council (Council) to undertake a self-assessment of the Ross River Dam (RRD) to Douglas Water Treatment Plant (DWTP) Pipeline Replacement Project (the Project) against the requirements of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

1.1 Background

The Project includes the replacement of an existing pipeline which transfers raw water from the RRD in Townsville to the DWTP. The existing pipeline is currently in poor condition at significant risk of failure. To address this risk of failure, Council is proposed to replace this pipeline in an alternative location.

The alternative location has been identified through an extensive options assessment and concept design process, which forms the basis of this self-assessment. The Project is progressing into detailed design in mid-2021.

Council have undertaken detailed ecological and heritage assessments of the new Project alignment to identify avoid, mitigate and manage any potential impacts on Commonwealth values protected and managed under EPBC Act as far as reasonably practical.

1.2 Purpose of this Report

The purpose of this report is to:

- Assess the impacts of the Project against the EPBC Act Significant Impact Guidelines (self-assessment).
- Present the outcomes of the self-assessment to provide supporting information for an EPBC Act Referral.

2.0 Legislative Context

The EPBC Act is the Commonwealth Governments central piece of environmental legislation. It provides a legal framework to protect and manage nationally and internationally important flora, fauna, ecological communities and heritage places, defined in the EPBC Act as Matters of National Environmental Significance (MNES). The EPBC Act also manages activities which occur on Commonwealth land, or activities undertaken by Commonwealth agencies.

The EPBC Act applies to the Project in the following ways.

- The Project occurs within areas known to contain, or potentially contain, habitat for listed threatened species identified as MNES under the EPBC Act.
- A large portion of the Project occurs within Commonwealth land, being the Mount Stuart Training Area, owned and operated by the Department of Defence (Defence).

Under the EPBC Act an ‘action’ will require approval from the minister if the action has, will have, or is ‘likely’ to have, a ‘significant impact’ on a MNES or on the ‘environment’ on Commonwealth land. Key concepts associated with this are defined below (DOE, 2013).

- *‘Action’* is defined broadly in the EPBC Act and includes: a project, a development, an undertaking, an activity or a series of activities, or an alteration of any of these things. The action includes the construction, operation, maintenance and decommissioning of a project.
- *‘Significant impact’* is an impact which is important, notable, or of consequence, having regard to its context or intensity. Whether or not an action is likely to have a significant impact depends upon the sensitivity, value, and quality of the environment, which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impacts.

- For a significant impact *'to be likely'*, it is not necessary for a significant impact to have a greater than 50% chance of happening; it is sufficient if a significant impact on the environment is a real or not remote chance or possibility.

The purpose of this report is to document a self-assessment of the Project impacts to determine if a significant impact on MNES or the environment because of activities on Commonwealth land. The Commonwealth Government provides two key policy documents to guide the self-assessment process.

- Matters of National Environmental Significance: Significant Impact Guidelines 1.1 (DOE, 2013) (referred to as Guideline 1.1).
- Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies" Significant Impact Guidelines 1.2 (DSEWPC, 2013) (referred to as Guideline 1.2).

3.0 Proposed Action

3.1 Background

The existing RRD to DWTP pipeline is approximately 9 km long, and is mostly aligned within the Riverway Drive road reserve in the suburbs of Kelso, Rasmussen and Condon in Townsville. The existing DN1200 pipe, built in 1975, is a bespoke construction comprising an inner reinforced concrete pipe that is wrapped in pre-stressed steel wire bands and encased in a grout shell.

The pipeline currently transfers bulk raw water from RRD to DWTP under both gravity and pumped operation, depending on demands at DWTP and water levels in RRD. An assessment of the pipeline has indicated the pipe is in poor condition, particularly for the section from RRD to Allambie Lane. A number of failures have been observed throughout the pipeline.

An options assessment (Section 3.3) and concept design (Section 3.4) have been completed for the Project to date, with detailed design expecting to commence in June 2021.

3.2 Need for the Project

The Townsville Local Government Area is a regional centre in Northern Queensland, which has a population of approximately 200,000 people. Approximately 85% of Townsville potable water supply is sourced through the existing infrastructure. Council have recognised that the pipeline's deteriorated condition puts Townsville's water security at significant risk.

Several failures have occurred within the pipeline to date, which have threatened Townsville's water supply, imposing severe water restrictions whilst failures were repaired. It is critical that an alternative pipeline is constructed to secure Townsville's water supply now and in the future.

3.3 Options Assessment

Two phases of options assessment were undertaken for the Project. An overarching alignment options assessment was undertaken in 2019 which considered five options as illustrated in Figure 1. Of the options considered, Option 2A was determined to be the preferred alignment based on a multi-criteria analysis and involving discussions with Defence and TMR as key stakeholders of the land which the proposed alignments were within. Option 2A has formed the basis for the Concept Design (AECOM, 2019) and the second stage of refinement and optimisation of the proposed pipeline.

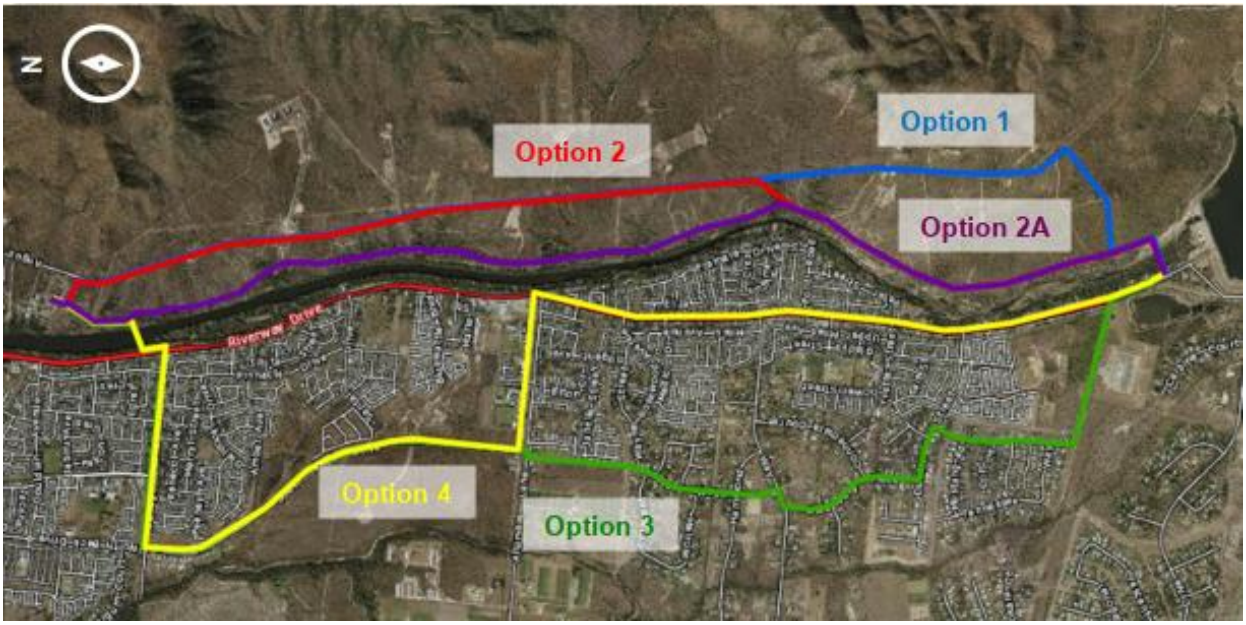

Figure 1 Alignment options considered in 2019 (AECOM, 2021a)

The second stage of the options assessment was undertaken in early 2021 and focused on alignment optimisation of the initial Concept Design (i.e. Option 2A discussed above). Optimisation of the alignment was considered on the following basis (AECOM, 2021a).

- Minimise bends to reduce restraint requirements and overall pipeline length.
- Improve constructability and reduce construction duration.
- Minimise impacts on areas with environmental and heritage values, with a focus on MNES.
- Meet land controller requirements (Department of Defence) requirements with regard to alignment, access and operations to gain approval.

From the initial Concept Design, five additional options were considered, with varying levels of departure from the initial Concept Design alignment. The options considered are presented in Figure 2 to Figure 4 below, which segment the route into 3 sections from south to north.

All options generally considered a 25 m construction corridor which is the required minimum land area for the efficient installation of belowground pipe of this size, and comprises width for trench excavation and benching; spoil placement from the excavation of the trench; plant access; and pipe laydown.

Of these five options, a shortlist was determined. The shortlisted options were assessed against criteria of cost, stakeholder impacts, environmental impacts and constructability. The short-listed options included the following.

- Initial Concept Design alignment (as described).
- Option 1: Fire Trail Alignment – includes minor amendments to the original alignment to reduce bends and use the fire trail where possible.
- Option 2: Truncation of Option 1 – includes a straighter and shorter route further to the east.
- Option 5: Powerlink and Road Alignment – includes significant deviations, utilising Powerlink, road corridor and fire trail.

Options 3 and 4 both were both discarded based on technical merit (inability to gravity flow from the dam due to the elevation of the routes).

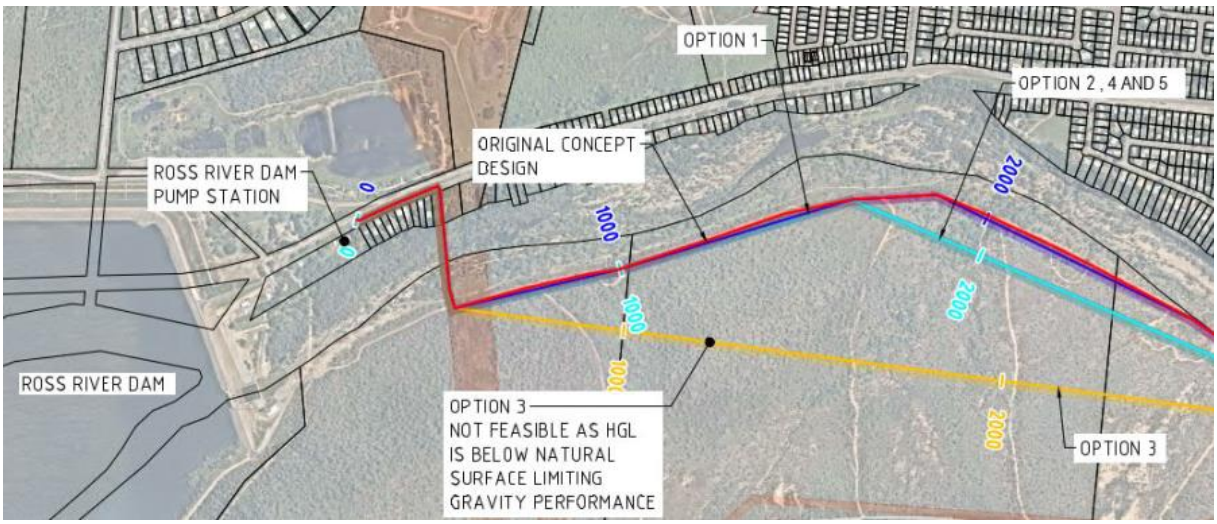

Figure 2 Optimisation options considerations – Section 1 (AECOM, 2021a)

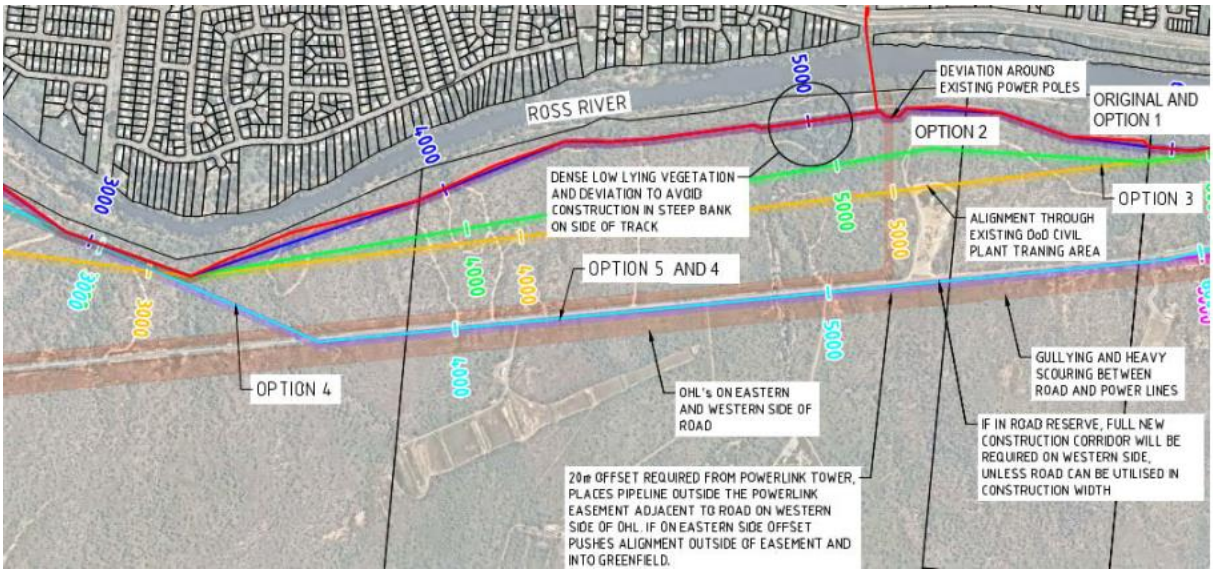

Figure 3 Optimisation options considerations – Section 2 (AECOM, 2021a)

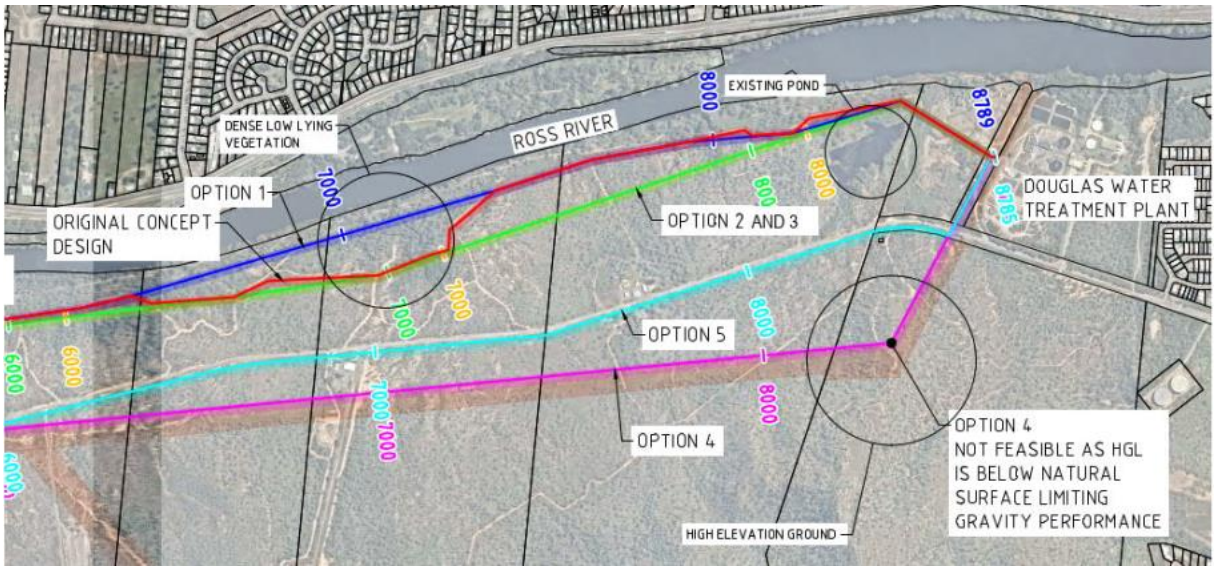

Figure 4 Optimisation options considerations – Section 3 (AECOM, 2021a)

The environmental criteria in the multi-criteria analysis reflects the environmental and cultural heritage impacts of the selected alignment and the risk of delays due to approvals. The following score definitions were used.

- **Low score definition:** Proposed alignment will have significant irreversible impacts on environment and heritage values.
- **High score definition:** Alignment will have limited / no long- term impacts. There is low risk of clearance of high value environment and heritage features.

Likely habitat for conservation significant species is generally present within the wider area for all options, with lower quality habitat existing in the previously disturbed areas, such as access tracks and fire trails. In addition, cultural heritage risk is greater within new / undisturbed corridors and those areas closer to the riverbank.

It was recognised that the highest potential for avoiding, and minimising impacts on ecology and heritage values was through the adoption of existing cleared routes in the alignment. Scoring of the environmental criteria in the multicriteria analysis was made by an estimate of the clearing requirements for remnant vegetation.

Option 1 and 5 had the highest scores from the multicriteria analysis, and offered two potential options for managing key project criteria, in particular with respect to Defence requirements and environmental impacts. Option 1 was determined to be the preferred option in consultation with Defence. The determination was based on reducing conflicts within Defences existing and future operational activities and the existing operational infrastructure.

3.4 Detailed Action Description

The RRD to DWTP Pipeline Renewal includes a new DN1400 (1400 mm diameter) pipe from RRD to DWTP on the alignment shown in Figure 5 to Figure 8. The pipeline is 9.5 km approximately in length. The Concept Design of the Project is generally detailed in two sections, being the standard corridor sections and waterway crossing sections.

A cross section of the standard corridor design is shown in Figure 9. The required disturbance footprint to construct within the standard corridor sections is 25m (maximum). An indicative cross section in shown in Figure 10, and includes the following approximate widths.

- A trench allowance of up to 6m.
- 14m for construction vehicle/plant access.
- 5m for spoil stockpiling and management.

The alignment crosses a number of small waterways and drainage features in a north / south direction. The small waterways and drainage features typically are aligned in an east / west direction and convey runoff from the Mount Stuart mountain range, through the Defence land and into the Ross River.

The Concept Design has been based on construction via open trenching at the waterway and drainage feature crossings. The width of disturbance at these crossing locations is proposed to be 25m (maximum). No allowance has been made for spoil stockpiling and management within these waterway crossing locations to reduce impacts of clearing and for environmental management purposes. The exact construction methodologies will be determined in the Detailed Design phase of the Project.

It is anticipated that the pipeline will be constructed via open trenching for the full extent of the alignment. The ground levels will be progressively reinstated and stabilised post construction with suitable erosion and sediment control as required. Revegetation will be undertaken for areas not required for permanent infrastructure, access and maintenance activities.

The design life of the asset is 100 years. During that time, it is anticipated that a range of maintenance activities would be required at varying intervals. These may include the replacement of cathodic protection anode beds, maintenance of access tracks and fire trail, operation of valves, and general condition inspections. All operational and maintenance-based activities will be subject to a maintenance plan agreed between Council and Defence.

Figure 5 Project alignment - Section 1 (northern)

Figure 6 Project alignment - Section 2 (northern)

Figure 7 Project alignment - Section 3 (southern)

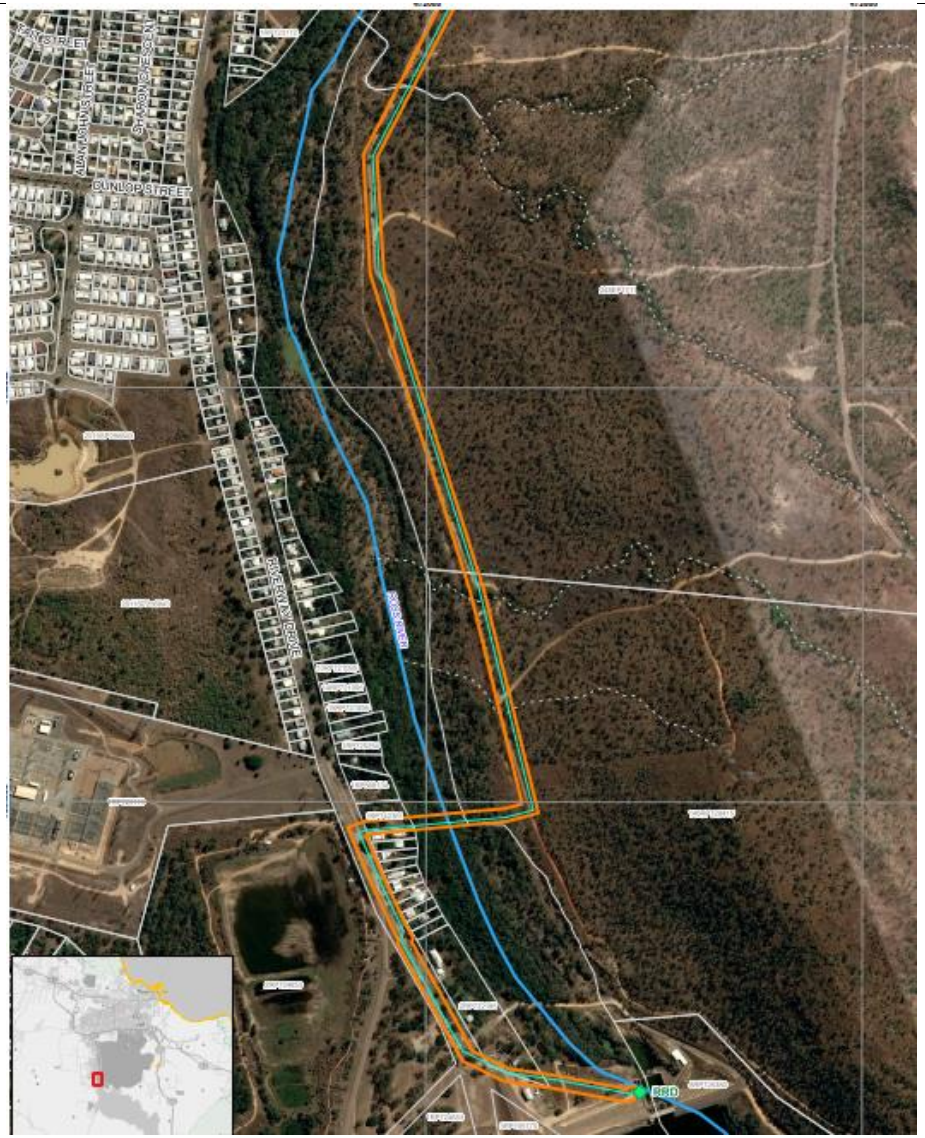

Figure 8 Project alignment - Section 4 (southern)

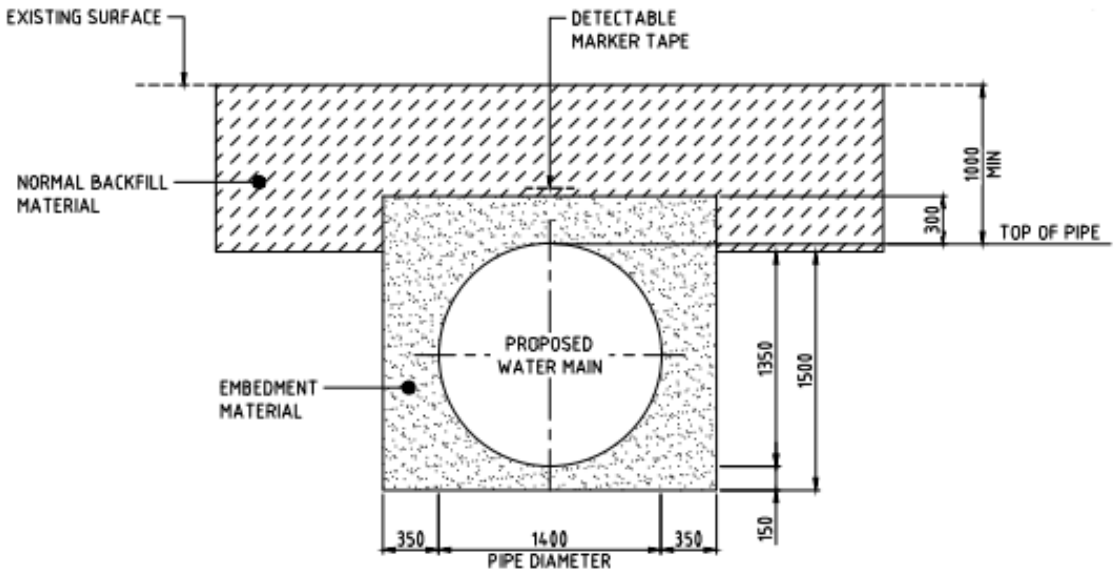

Figure 9 Standard trench detail

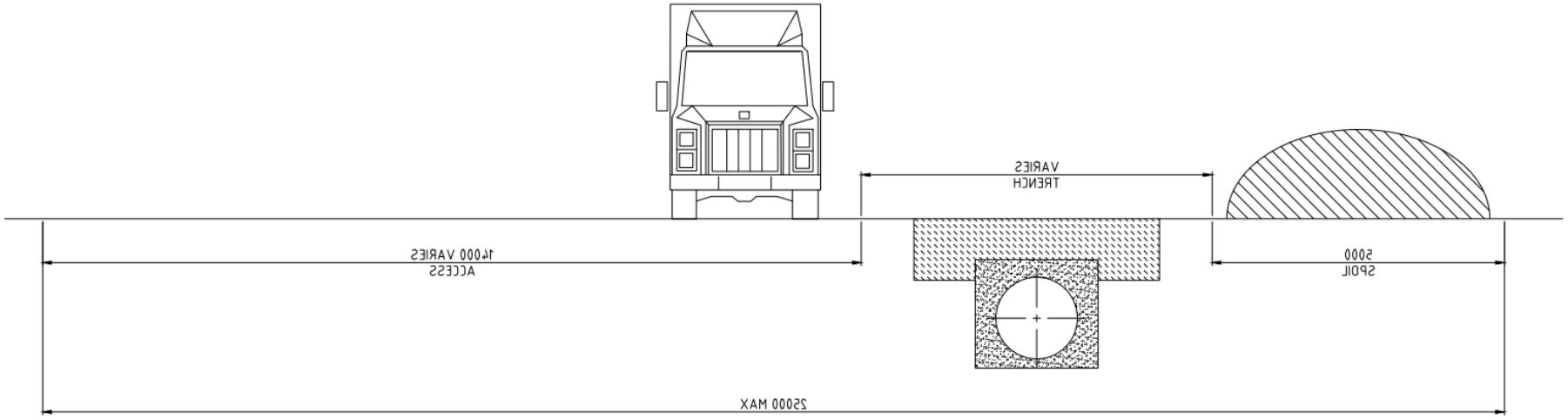

Figure 10 Standard crossing section

4.0 Assessment Against Guideline 1.1

The Matters of National Environmental Significance (MNES) relevant to this Project is 'nationally listed threatened species and ecological communities'. The *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* (DOE, 2013) (referred to as Guideline 1.1), provides a detailed criteria to determine whether a significant impact on a nationally listed threatened species may occur, and if a subsequent referral is required. The following section provides the following.

- An overview of the MNES present or likely to occur within the Project site.
- An assessment for each species against the relevant criteria under Guideline 1.1.
- A summary of the outcomes of the assessment.

4.1 Overview of Matters of National Environmental Significance

AECOM (2021b) undertook an ecological assessment to assess the potential impacts of the Project on ecological values. This included desktop assessment, field survey and an assessment of the significance of impacts on identified MNES under the Guideline 1.1. Full methodology is provided in the Ecology Technical Report in Appendix B.

A total of fifteen species listed under the EPBC Act are known, likely or have the potential to occur within the area. The overall risk to values associated with the potential Project impacts differ, based on a combination of factors including the community or species' ecological characteristics and the likely consequence of such impacts (AECOM, 2021b).

Listed species known, likely or having potential to occur within the project area were subjected to a two-step process to assess the potential for significant impacts. The purpose of the two-step approach was to focus in on the key listed species values relevant to potential project impacts and determine significant impacts (AECOM, 2021b).

Potential direct and indirect Project impacts on listed species within the Project Area were assessed by determining the worst-case scenario consequences and the likelihood of such anticipated consequences hypothetically occurring. The results of this were evaluated via a risk matrix to identify the associated level of Project risk to all relevant listed species. Listed species triggered further assessment if the risk matrix resulted in a 'potential' risk rating, whilst MNES with a 'low' risk rating required no further assessment (AECOM, 2021b).

Of the fifteen identified listed species, the risk assessment determined that thirteen species were at low risk of being significantly impacted by the Project. This included four threatened species and all potentially present migratory species. The primary reasons for this determination were as follows (AECOM, 2021b).

- *Bare-rumped shealthtail bat:* any individuals that may utilise the Project area were not considered to constitute an important population as the area is not near the limit of the species range, it was not known to be important for maintaining genetic diversity and it was not known to be a key source population as defined under Guideline 1.1.
- *Red goshawk*: although suitable habitat was found within the area including nesting as well as foraging and dispersal, habitat was not considered 'habitat critical to the survival of the species' as it does not meet the definition as per The National Recovery Plan for the Red Goshawk.
- *White-throated needletail, squatter pigeon (southern) and ghost bat:* any individuals that may utilise the area were not considered to constitute an important population, nor was there potential habitat within the area considered 'habitat critical to the survival of the species'.
- *Migratory species:* available habitat within the survey area was unlikely to support an ecologically significant proportion of the population.
- *Overall for most species*: the area of clearing impact in the context of available habitat that will remain in the surrounding area is low, and unlikely to effect the persistence of the population in the area.

Two listed species were determined to require detailed assessment against Guidelines 1.1, being:

- Black-throated finch
- Northern quoll.

Both the Black-throated finch and the Northern quoll are listed endangered under the EPBC Act and have species specific referral guidance documents. Based on the recommendations of these referral guidance documents and the quality of habitat provided by the study area, both species were considered to be at potential risk of significant impacts (AECOM, 2021b). The full assessments are provided in the following section.

4.2 Significant Impact Assessment

4.2.1 Black-Throated Finch

Distribution and Habitat (AECOM, 2021b)

The Black-throated finch (southern) historically occurred from far south-eastern Queensland, near the Queensland-New South Wales border, through eastern Queensland north to the divide between the Burdekin and Lynd Rivers. The subspecies is now extinct at most sites south of Burdekin River, and is confined to a very few remaining 'pockets' of suitable habitat. Since 1998, birds likely to be of the southern subspecies have been recorded at the following sites:

- Townsville and its surrounds (Giru, Serpentine Lagoon, Toonpan, and near Ross River Dam)
- Ingham, and sites nearby (near Mutarnee [at Ollera Creek], and near Mount Fox)
- scattered sites in central-eastern Queensland (Great Basalt Wall, Yarrowmere Station, Moonoomoo Station, Doongmabulla Station, Fortuna Station and Aramac).

The Black-throated finch (southern) occurs mainly in grassy, open woodlands and forests, typically dominated by *Eucalyptus*, *Corymbia* and *Melaleuca*, and occasionally in tussock grasslands or other habitats (for example freshwater wetlands), often along or near watercourses, or in the vicinity of water. Some of the more common species of eucalypts in woodlands and forests frequented by the subspecies include narrow-leaved ironbark (*Eucalyptus crebra*), river red gum (*Eucalyptus camaldulensis*), silver-leaved ironbark (*Eucalyptus melanophloia*), Brown's box (*Eucalyptus brownii*), yellowjacket (*Eucalyptus similis*) and forest red gum (*Eucalyptus tereticornis*).

Black-throated finches (southern) require habitat where there is access to seeding grasses and water and will utilize a variety of different habitats for foraging, particularly in north Queensland during the wet season. This subspecies feed on the seeds of grasses (such as *Urochloa mosambicensis*, *Digitaria ciliaris*, *Melinis repens*, *Chloris inflata*) and herbaceous plants. They obtain most of their food by pecking seeds from the ground. However, they will also reach or jump up to take seeds from low inflorescences, perch on stems to take seeds from inflorescences, perch on grass stems and use their body weight to bring the stems to the ground to feed and reach for inflorescences from perches other than the food plant.

Species Presence and Utilisation (AECOM, 2021b)

The Project falls within the modelled distribution of the species as well as mapped ‘important areas’ as identified in the BTF Guidelines. Known records occur within the Mount Stuart area, approximately 8 km to the east, and on the Bohle River 3 km to the west of the Project.

As per the BTF Guidelines, where suitable habitat is validated to exist within mapped important areas, the species should be presumed to be present. Whilst the field assessment did not confirm the presence of Black-throated finch; suitable nesting, foraging and dispersal habitat resources were identified. Therefore, for the purposes of this assessment, Black-throated finch is considered to be present within the Project area.

The Ross River adjacent to the Project provides a permanent water source for the species. Suitable nesting habitat within the project area that is in proximity to the Ross River includes the Melaleuca woodland on alluvial plains and Eucalyptus woodland on alluvial plains. These habitats provided an abundance of suitable nesting tree species, including *Eucalyptus crebra, Eucalyptus platyphylla* and *Melaleuca viridiflora*. These areas, as well as all other habitat types across the Project area provide

foraging habitat due to the presence of an abundance of preferred foraging grasses for the species, including: *Alloteropsis semialata*; *Capillipedium parviflorum*; *Chrysopogon fallax; Digitaria sp; Eragrostis lacunaria; Eremochloa bimaculate; Eriachne mucronate; Heteropogon contortus; Heteropogon triticeus; Panicum decompositum; Themeda triandra.*

Only the non-remnant alluvial plain habitat within the Project area provides no habitat resources for Black-throated finch and is unlikely to be utilised by the species.

Habitat Critical to the Survival of the Species (AECOM, 2021b)

Habitat critical to the survival of the species has been identified as water sources, grass seeds, and trees providing suitable nesting habitat. The Project area contains an abundance of suitable grass species and nesting trees, with the Ross River providing a permanent water source. As such both the study area and Project area are considered to contain habitat critical to the survival of the species.

Potential Impacts and Key Mitigation Measures (AECOM, 2019)

Potential impacts of the Project on this species includes loss of nesting, foraging and dispersal habitat, direct mortality, proliferation of weeds or pests and altered fire regime. Approximately 148.89 ha of nesting and foraging habitat has been identified, with a total of 12.42 ha expected to impacted and cleared for Project activities.

In addition to the general measures for avoidance, minimisation, mitigation and management outlined in Section 6.0, the following species-specific mitigation measures are anticipated to further reduce impacts to Black-throated finch habitat.

- Approximately 30% of the Project will be rehabilitated with a diversity of native grasses that are known as foraging grasses for the Black-throated finch in the ground layer. At a minimum, rehabilitation efforts will aim to restore the area to be suitable for foraging purposes.
- Pre-clearance surveys by a spotter-catcher will be undertaken in mapped habitat areas and near water sources to ensure any nests have been vacated prior to vegetation clearance.
- Any identified active nesting colonies within or adjacent to the Project alignment will be avoided during vegetation clearing with a sufficient buffer distance implemented to avoid potential disturbance and displacement until the nests have been vacated.
- Weed wash down requirements for vehicles entering and exiting the Project construction site will be strictly implemented to avoid the introduction or spread of weed species into and around the construction site.
- The Weed and Pest Management Plan will detail provisions to monitor and control the spread or establishment of exotic grass species which may degrade the habitat and reduce resource availability.
- Sediment and erosion control plans will be required by the construction tender and prepared by the contractor for the various construction activities on site. These will be required for the entire project area and will have a strong focus on minimising impacts of works near waterways.

Significant Impact Criteria (AECOM, 2021b)

An assessment against Guideline 1.1 for this species is provided in Table 1. The outcome of the assessment against the EPBC Act guidelines was that the **Project may result in a significant impact to the species.**

Table 1 Significant Impact Assessment for the Black-throated Finch (southern)

Is there a real chance or possibility that the action will:	Assessment of Significance
Lead to a long-term decrease in the size of a population.	**No.** Garnett, Szabo & Duston (2011) indicate that that Townsville has one of the largest known populations of the species and consists of no more than 600 birds. Suitable habitat was verified across the area which is also mapped as an 'important area'. Therefore, it is considered that black-throated finch occurs within the project area and is part of the known Townsville population. The Project will result in the removal of 12.42 ha of black-throated finch habitat. In the context of habitat that occurs within the study area, this removal of habitat will only result in the loss of 8.3% of available nesting, foraging and dispersal habitat. In addition, a portion of this impacted habitat will be rehabilitated to at least restore its use for foraging purposes. Impacts on the Ross River as a permanent water source for the species is also not anticipated as a result of the Project. Based on this and the magnitude of clearing, it is considered unlikely that the Project will impact on the breeding and recruitment success of the species or the area's carrying capacity to the extent that it would lead to a long-term decrease in the species estimated population of 600 individuals within the Townsville region.
Reduce the area of occupancy of the species.	**No.** The area of occupancy for black-throated finch is estimated to be 5,000 km². Habitat removal will occur within an identified 'important area' containing verified suitable habitat and is estimated to be 12.42 ha. In the context of habitat that occurs within the study area, this removal of habitat will only result in the loss of 8.3% of available nesting and foraging habitat. In addition, a portion of this impacted habitat will be rehabilitated to at least restore its use for foraging purposes. Impacts on the Ross River as a permanent water source for the species is also not anticipated as a result of the Project. Based on this and the magnitude of clearing, it is considered unlikely that the Project will reduce the area of occupancy for the species across the study area, the surrounding area or it's known estimate of 5,000 km².
Fragment an existing population into two or more populations.	**No.** For an aerial species such as the black-throated finch (southern), the Project is considered unlikely to result in the creation of barriers to movement to, between or within habitat. Therefore, it is unlikely that the Project will fragment an existing population into two or more populations.
Adversely affect habitat critical to the survival of a species.	**Possible.** Habitat critical to the survival of the species has been identified as water sources, grass seeds, and trees providing suitable nesting habitat (BTF Recovery Team, 2007). Water sources will not be impacted by the Project. The loss of grass seeds may occur, although a portion of this impacted habitat will be rehabilitated to at least restore its use for foraging purposes. However, the loss of suitable nesting habitat is expected to occur. Specifically, there will likely be a net loss of nesting trees within 1 km of a permanent water source. This may adversely affect habitat critical to the survival of the species.

Is there a real chance or possibility that the action will:	Assessment of Significance
Disrupt the breeding cycle of a population.	**No.** Breeding can occur throughout the year under optimal conditions. In the Townsville area, the peak breeding period is during the wet season between February and May. Pre-clearance procedures will be put in place to identify and avoid any nesting colonies within or adjacent to the project alignment to avoid interference with breeding individuals. Suitable nesting trees will be removed for the Project, and it is likely that this will result in a net loss within 1 km of a permanent water source (Ross River). However, overall only 8.37 ha of nesting habitat equating to 9.6% of available nesting habitat will be removed as a results of the Project. Based on this magnitude of clearing and the management of construction activities during the breeding season it is unlikely that the Project will substantially disrupt the breeding cycle of a population.
Modify, destroy, remove, isolate or decrease the availability or quality of habitat to the extent that the species is likely to decline.	**No.** The Project will result in the removal of 12.42 ha of black-throated finch habitat. In the context of habitat that occurs within the study area, this removal of habitat will only result in the loss of 9.6% of available nesting and foraging habitat and 6.6% of foraging and dispersal only habitat. In addition, a portion of this impacted habitat will be rehabilitated to at least restore its use for foraging purposes. Impacts on the Ross River as a permanent water source for the species is also not anticipated as a result of the Project. Based on this and the magnitude of clearing, it is considered unlikely that the Project will impact on the breeding and recruitment success of the species or the area's carrying capacity to the extent that the species will likely decline.
Result in invasive species that are harmful to a endangered species becoming established in the endangered species' habitat.	**No.** Invasive flora species have been identified on the Species Profile and Threats database as a key threat to the subspecies; however, it is unlikely that the Project will exacerbate invasive species beyond current levels. An EMP will be developed for the Project area which will outline measures to mitigate and manage the potential spread of pest flora and fauna species. Species-specific management will be undertaken for identified key weed and pest species at risk of spread through Project activities. Control efforts will be increased in areas particularly sensitive to invasion.
Introduce disease that may cause the species to decline.	**No.** Disease has not been identified as a main threat to the species. The EMP for the Project will detail the measures to prevent the introduction and spread of disease.
Interfere with the recovery of the species.	**No.** The *Recovery Plan for the black-throated finch (southern)* identifies the recovery objectives to manage and protect the black-throated finch and its habitat, and to promote the recovery of the southern subspecies (BTF Recovery Team, 2007). The Project does not specifically contravene any of the identified recovery actions.

4.2.2 Northern Quoll

Distribution and Habitat (AECOM, 2021b)

The distribution of the Northern quoll is discontinuous across northern Australia with core populations in rocky and / or high rainfall areas. The Northern quoll is nocturnal and occupies a diversity of habitats across its range which includes rocky areas, eucalypt forest and woodlands, rainforests, sandy lowlands and beaches, shrubland, grasslands and desert. Northern quoll habitat generally encompasses some form of rocky area or structurally diverse woodland for denning purposes with surrounding vegetated habitats used for foraging and dispersal. Rocky habitats are usually of high relief, often rugged and dissected but can also include tor fields or caves in low lying areas. Eucalypt forest or woodland habitats usually have a high structural diversity containing large diameter trees, termite mounds or hollow logs for denning purposes.

Northern quolls are opportunistic omnivores, consuming a wide range of prey including beetles, grasshoppers, spiders, scorpions and centipedes. They also eat fruit, nectar, and are known to feed on carrion and human refuse. Vertebrates eaten include 11 species of mammal (e.g. Bandicoots, Sugar gliders, Brush-tail possums and Rats), eight species of birds, reptiles (skinks and snakes) and seven species of frog. They also eat bird eggs and nectar of eucalypt and grevillea flowers. Cane toads are a food item of particular concern because their toxins appear to be a major cause of decline in Northern quoll populations.

Species Presence and Utilisation (AECOM, 2021b)

The study area falls within the modelled distribution of the species and a known record occurs approximately 20 km from the study area. Field assessment of the area did not confirm the presence of Northern quoll; however breeding / denning, foraging and dispersal habitat resources were identified.

Potential breeding and denning habitat is restricted to a small area within the study area. This habitat is located within a small rocky outcrop along the Ross River and consists of visible exposure of bedrock in the form of boulder piles and tors, deeply fissured rock and subterranean cavities surrounded by *Eucalyptus* woodland with a dense to mid-dense understory. This habitat does not occur within the project area and is situated approximately 50 m west of the pipeline corridor.

Larger areas of potential breeding and denning habitat occurs within the broader landscape surrounding the study area, associated with Mount Stuart. As this occurs within approximately 1 km of the study area, all woodland habitat types both within the study area and project area is considered to be foraging and dispersal habitat for Northern quoll. The creek and drainage lines that bisect the study area and connect the rocky terrain of Mount Stuart to the east with the Ross River may be particularly preferred as dispersal pathways for the species. Cane toads, wild dogs and feral cats were recorded within the study area during the field survey, which are a threat to northern quoll populations and impact on the quality of the habitat within the area.

Habitat Critical to the Survival of the Species (AECOM, 2021b)

Habitat critical to the survival of the Northern quoll is defined in the *EPBC Act Referral Guideline for the Endangered Northern Quoll Dasyurus hallucatus* (Northern quoll Guidelines) as:

> *…'habitat within the modelled distribution of the northern quoll which provides shelter for breeding, refuge from fire / or predation and potential poisoning from cane toads. Habitat critical to the survival usually occurs in the form of:*
>
> - *off shore islands where the northern quoll is known to exist*
> - *rocky habitats such as ranges, escarpments, mesas, gorges, breakaways, boulder fields, major drainage lines or treed creek lines*
> - *structurally diverse woodland or forest areas containing large diameter trees, termite mounds or hollow logs…*
>
> *Dispersal and foraging habitat associated with or connecting populations important for the long-term survival of the Northern quoll is also considered habitat critical to the survival of the Northern quoll.'*

Based on this definition, the dispersal and foraging habitat within the Project area could be considered habitat critical to the survival of the species as it associated with potential breeding and denning habitat located to the east at Mount Stuart. This large rocky terrain area that forms part of Mount Stuart could contain an important population of Northern quoll.

Important Populations (AECOM, 2021b)

The Northern Quoll Guideline also defines important populations for the long-term survival of the species. These include populations which are as follows.

- High density quoll populations, which occur in refuge-rich habitat critical to the survival of the species, including where cane toads are present.
- Occurring in habitat that is free of cane toads and unlikely to support cane toads upon arrival i.e. granite habitats in WA, populations surrounded by desert and without permanent water.
- Subject to ongoing conservation or research actions i.e. populations being monitored by government agencies or universities or subject to reintroductions or translocations.

The Project area is not free of cane toads and is not subject to ongoing conservation or research actions. Field surveys did not detect Northern quoll. Furthermore, the Project area are not considered to contain refuge-rich habitat critical to the survival of the species. Only a small rocky outcrop potentially supporting breeding and denning habitat occurs within the study area. These habitat features are absent from the Project area. Therefore, it is unlikely that the Project area contains an important population.

An important population may be supported by habitat associated with the rocky terrain areas of Mount Stuart, located approximately 1 km to the east of the Project area. As discussed in the above section, the majority of habitat within the project area is in the form of foraging and dispersal habitat for potential adjacent important populations.

Potential Impacts and Key Mitigation Measures (AECOM, 2021b)

Potential impacts of the Project on this species includes loss of foraging and dispersal habitat, direct mortality, proliferation of weeds and altered fire regime. Whilst potential breeding and denning habitat occurs within the area, a very small area (0.13 ha) will be impacted and cleared within the Project area. However, approximately 146.17 ha of foraging and dispersal habitat has also been identified, with 12.29 ha expected to be cleared for Project activities. The total area expected to be impacted and cleared by the project is 12.42 ha.

In addition to the general measures for avoidance, minimisation, mitigation and management outlined in Section 6.0, the following species-specific mitigation measures are anticipated to further reduce impacts to northern quoll habitat.

- It is noted that boulder piles which provide suitable denning habitat have been avoided in design.
- Hollow logs and felled hollow bearing trees should be relocated to other areas of mapped northern quoll habitat to provide denning resources.
- Fuel loads of weeds should be managed to minimise the risk of high fire intensity. Inappropriate fire regimes can result in significant impact to northern quoll.
- Water retaining voids or pits in the design should be avoided where these are not otherwise required for the control of stormwater run-off and erosion and sediment control measures. Where pits, voids or trenches are required, include appropriate cover to prevent extended water retention in these spaces and/or subsequent breeding opportunities for cane toads.

Significant Impact Criteria (AECOM, 2021b)

An assessment against the Northern Quoll Guidelines is provided in Table 2. The outcome of the assessment against the EPBC Act guidelines was that **the Project will not result in a significant impact** to the species subject to the implementation of the avoidance, minimisation, mitigation and management measures.

Table 2 Significant Impact Assessment for the Northern Quoll

Is there a real chance or possibility that the Project will:	Assessment of Significance
Result in the loss of habitat critical to the survival of the Northern quoll.	**No.** The Project area contains potential foraging resources and dispersal opportunities for Northern quoll. It is also located within approximately 1km of rocky terrain associated with Mount Stuart that potentially supports breeding and denning habitat for an important population of northern quoll. As such the habitat within the Project area is considered habitat critical to the survival of the species as defined in the Northern Quoll Guideline. The Project is estimated to remove approximately 12.4 ha of habitat critical to the survival of the species. Whilst a loss of this habitat will occur, this comprises only 8.3% of foraging and dispersal habitat that is available within the study area. Within the broader landscape context and the area of available foraging habitat surrounding the study area, this percentage loss is considerably lower. Therefore, this magnitude of clearing will not significantly reduce dispersal and foraging opportunities for an important population of the northern quoll that may occur in the adjacent areas.
Decrease the size of a population important for the long-term survival of the Northern quoll and therefore interfere with the recovery of the species.	**No.** An important population may be supported by habitat associated with the rocky terrain areas of Mount Stuart, located approximately 1 km to the east of the study area. However, as described above, a population important for the long-term survival of the species is unlikely to exist within the actual Project area itself. Whilst approximately 12.4 ha of foraging and dispersal habitat will be cleared that may be utilised by an important population at Mount Stuart, this loss comprises only a small percentage of what will remain in the surrounding area. The magnitude of clearing is not expected to lead to significant changes to foraging opportunities or the ability of surrounding important populations to disperse. As such it is considered unlikely that the Project will lead to a long-term decrease in the size of a population Northern quoll.
Introduce inappropriate fire regimes or grazing activities that substantially degrade habitat critical to the survival of the Northern quoll or decrease the size of a population important for the long-term survival of the species.	**No.** Project activities will result in a 25 m wide linear clearing which will be partially reinstated with native species post construction. These areas are subject to potential proliferation of weed species which has the potential to increase fuel loads for bushfire. To reduce this risk, weeds will be managed through the development and implementation of a Project EMP. No grazing activities will take place within the Project area.
Fragment a population important for the long-term survival into two or more populations.	**No.** Habitat within the Project area is currently bisected with cleared access tracks, which reduces its connectivity values. The Project has been co-located as much as possible with these cleared access tracks to further reduce impacts of fragmentation. The clearing impact will result in approximately 12.4 ha of potential foraging and dispersal habitat for the species being cleared in a linear corridor no more than 25 m wide at any point. The Project will not create any barriers across the creek and drainage lines within the Project area that would be the preferred dispersal pathways for northern quoll in the area. The northern quoll is highly mobile and

Is there a real chance or possibility that the Project will:	Assessment of Significance
	clearing of this magnitude would not reduce its ability to disperse within and through the project area. Given the small area of disturbance and the large extent of contiguous habitat that will remain, it is considered unlikely that the Project will lead to a long-term decrease in the size of a population of Northern quoll.
Result in invasive species or increases of them that are harmful to the northern quoll becoming established in its habitat, namely cane toads, feral cats, red foxes or exotic grasses which increase fire risk.	**No.** Weeds, feral predators and cane toads are all recognised threats to the Northern quoll. Feral cats, cane toads and wild dogs are currently present within the project area and were recorded during the field survey. However, the extent of exotic grasses is low. Given the limited extent of disturbance, it is unlikely that Project activities will result in the further proliferation of already occurring feral species to the extent that it will significantly increase the risk of harm to northern quoll. However, construction and operational activities if unmanaged, have the potential to introduce exotic grasses and provide opportunities for proliferation and potential spread. The Project EMP will explicitly address the management of weeds and pests during construction and operation of the Project. With the implementation of these management measures, the project is unlikely to result in a significant increase of exotic grasses and altered fire regimes.

4.3 Summary of Assessment Outcomes

The results of the assessments concluded that significant impacts to the Northern quoll because of the Project are unlikely; however potential impacts to the black-throated finch may be significant.

Impacts to Black-throated finch habitat will be low; and direct impacts (clearing of vegetation) have been minimised as much as possible through options assessment process and commitments to rehabilitate construction phase disturbance.

Large adjacent areas of suitable habitat will remain for the Black-throated finch that will allow for populations to persist, and the shape and scale of clearing not resulting in a barrier to movement. However, it is anticipated that a net loss of nesting trees within 1km of a permanent water source (the Ross River) will occur as a result of the Project, which is an adverse impact to habitat critical to the survival of the species. As per the BTF Guidelines this form of disturbance can significantly impact the species.

Potential habitat for Northern quoll within the area is considered habitat critical to the survival of the species as it comprises suitable foraging and dispersal habitat in close proximity to denning habitat associated with Mount Stuart. Given the extent of potential denning habitat at Mount Stuart, potential exists for the adjacent area to support a population of northern quoll that is considered important.

As specified by the *EPBC Act Referral guideline for the northern quoll* (Northern Quoll Guideline), actions which are likely to impact on habitat critical to the species may have a significant impact. However, whilst some direct impacts to habitat critical to the survival of the species will occur because of the Project, this habitat is associated with foraging and dispersal habitat rather than denning habitat, which is highly abundant in the surrounding landscape. Therefore, in the context of the wider area, impacts on northern quoll, including habitat critical to the survival of the species are low and not considered significant.

5.0 Assessment Against Guideline 1.2

Commonwealth land includes land owned or leased by the Commonwealth Government. Commonwealth land relevant to this Project is the Mount Stuart Training Area managed by the Department of Defence.

The *Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies Significant Impact Guidelines 1.2* (DSEWPC, 2013) (referred to as Guideline 1.2) provides a detailed criteria to determine whether a significant impact on the environment on Commonwealth Land may occur, and if a subsequent referral is required. The following section provides the following.

- An overview of the environmental context for the Project.
- An assessment for each relevant criteria under Guideline 1.2.
- A summary of the outcomes of the assessment.

5.1 Commonwealth Land Overview

The EPBC Act defines 'environment' as:

> *a. ecosystems and their constituent parts including people and communities ('ecosystem' is defined in the EPBC Act as 'a dynamic complex of plant, animal and micro-organism communities and their non-living environment interacting as a functioning unit')*
>
> *b. natural and physical resources*
>
> *c. qualities and characteristics of locations, places and areas*
>
> *d. heritage values of places, and*
>
> *e. the social, economic and cultural aspects of a thing mentioned in paragraphs a, b or c…*

AECOM undertook an ecological assessment (AECOM, 2021b) and a heritage assessment (AECOM, 2021c) to assess the potential impacts of the Project on ecological values and heritage values. This included desktop assessment and field survey. This information has been supplemented by general desktop review and information obtained during geotechnical investigations.

Each section below describes the values subject to assessment.

5.1.1 Impacts on Landscapes and Soils

Geology

The Townsville 1:100 000 Geological Series Sheet 8259 indicates that the site is predominantly underlain by Pleistocene floodplain alluvium. The southern eastern portion of the alignment is mapped as Julago Volcanics. The alluvium typically consists of a range of soil types, varying with location and depth (Douglas Partners, 2020).

Land zones are categories that describe the major geologies, the associated landforms and geomorphic processes in Queensland. Two land zones have been identified within and surrounding the Project area, based on the available surface geology mapping (AECOM, 2021b).

- Recent Quaternary alluvial systems, including closed depressions, paleo-estuarine deposits currently under freshwater influence, inland lakes and associated wave built lunettes.
- Mesozoic to Proterozoic igneous rocks, forming ranges, hills and lowlands. Acid, intermediate and basic intrusive and volcanic rocks such as granites, granodiorites, gabbros, dolerites, andesites and rhyolites, as well as minor areas of associated interbedded sediments.

Landscape Features

Key landscape features within and surrounding the Project area is the Mount Stuart Mountain Ranges, Ross River and Ross River Dam. Contours within the wider area range from approximately 500m elevation associated with the Mount Stuart Ranges to 20m elevation associated with the Ross River.

The Project is located within a flat and lower lying area between these two keys landforms. Contour information (2009) indicates that the surface levels of the pipeline alignment vary from 18 AHD near the DWTP, up to approximately 30 AHD at RRD (Douglas Partners, 2020). The surface levels of the Project alignment are typically undulated, but mostly gently dipping down to the north. Within the immediate Project area there have been no outstanding, rare, unusual, valuable or important landscape features identified within the Commonwealth Land.

Soils

The Australian Soil Resource Information System (CSIRO, 2014) maps the majority of the Project area within Commonwealth land as Chromosols. Geotechnical investigations confirmed the soils encountered were generally silty clay / sandy clay / sandy silt, sand / gravel, and rhyolite (Douglas Partners, 2020).

The National ASS risk mapping indicates the site is in an area of extremely low probability of potential and actual acid sulfate soils occurrence, though very little information on their likely depth was available. The geotechnical investigations confirmed there is an extremely low probability of potential and actual acid sulfate soils occurrence (Douglas Partners, 2020).

Rare or Valuable Features

There is no evidence to suggest the soils, geology or landscape features within the Project would be considered to be valuable or contain objects that are rare or otherwise valuable from an environmental or ecological perspective.

From a cultural heritage perspective there has been surface disturbance across much of the Project, however, the proximity to the significant landforms including the Ross River and Mount Stuart; the identification of potentially undisturbed areas; and the presence of a known Indigenous site, suggests potential for surface and subsurface deposits. The surface and subsurface archaeological potential of the Project is considered to be moderate to low (AECOM, 2021c).

Significant Impact Criteria

An assessment against the Guideline 1.2 is provided in Table 3. The outcome of the assessment against the EPBC Act guidelines was that **the Project is unlikely to result in a significant impact** to landscape and soils within the Commonwealth land, subject to the implementation of the mitigation and management measures, and further investigation for surface and subsurface heritage values.

Table 3 Significant Impact Assessment for Landscape and Soils

Is there a real possibility that the Project will:	Assessment of Significance
Substantially alter natural landscape features	**No.** The Project option selection has avoided direct impacts to the key landscape features in the wider area. The Project will be constructed via open trenching, and the pipeline will be subterranean with only some above ground features for maintenance. It is not anticipated that the Project will result in a permanent or notable change to the existing landscape features of the Project area. The surface and subsurface archaeological potential of the Project is considered to be moderate to low (AECOM, 2021c), indicating there could be potential for rare or valuable features to occur within the Project area. On this basis further assessment is being undertaken with the Aboriginal Party, and the Construction Environmental Management Plan (CEMP) will include an unexpected finds procedure for any ground disturbing works.
Cause subsidence, instability or substantial erosion	**No.** The Project is a subterranean pipeline which will be installed via open trenching. This involves an extensive amount of excavation. Soil will be stockpiled once excavated, and then used to reinstate and stabilise the ground levels upon completion of the installation of the pipeline.

Is there a real possibility that the Project will:	Assessment of Significance
	There is a high dispersion potential for cohesive soils tested and medium dispersion potential for the fines portion of granular soils tested. Erosion may occur under freshwater flows, which would typically occur under downslope uncontrolled stormwater discharge with concentrations of high velocity flows (leading to gully formation), or dissipated lower velocity flow (resulting in shallower sub-parallel erosion channels) (Douglas Partners, 2020). Surface erosion protection was recommended where soils are subjected to flows greater than 0.5 m/s either on batter slopes or in drainage channels. The CEMP will include the following provisions to mitigate and manage the impacts of potential erosion during construction. • Development of an Erosion and Sediment Control Plan for the Project in accordance with industry standards. • Temporary construction areas will also be rehabilitated and revegetated where appropriate. Based on the implementation of erosion control in the design and during the construction of the Project, it is not anticipated the Project will cause substantial subsidence, instability or erosion.
Involve medium or large-scale excavation of soil or minerals?	**No.** The purpose of the Project is to facilitate construction and operation of a below ground potable water pipeline. To facilitate construction medium scale exaction will be required. The Project does not intend to undertake excavation for the purpose of beneficial use, or sale of the material excavated.

5.1.2 Impacts on Water Resources

Surface Water

The Project is parallel to the Ross River. Upstream to the south, the Ross River opens into Lake Ross, a lacustrine wetland and Townsville's main potable water supply dam. A number of stream order 1 and 2 watercourses are mapped in the study area, as gullies flowing from the Mount Stuart ridges into the Ross River, which are not permanent waterbodies (AECOM, 2021b).

Groundwater

Review of nearby registered water bores (all located to the west of the Ross River) indicate groundwater levels between 9 m and 12.8 m depth. The geotechnical investigations confirmed no free groundwater was observed in the bores within the Project area, although this may be subject to changes in season and vary considerably (Douglas Partners, 2020).

Significant Impact Criteria

An assessment against the Guideline 1.2 is provided in Table 4. The outcome of the assessment against the EPBC Act guidelines was that **the Project is unlikely to result in a significant impact** to water resources within the Commonwealth land, subject to the implementation of the mitigation and management measures.

Table 4 Significant Impact Assessment for Water Resources

Is there a real possibility that the Project will:	Assessment of Significance
Measurably reduce the quantity, quality or availability of	Potential indirect impacts to the Ross River and its tributaries during construction may occur during trenching and bunding for pipeline installation and the cut and fill works for the construction of laydown pads and tracks. Other

Is there a real possibility that the Project will:	Assessment of Significance
surface or ground water.	construction impacts to Ross River and its tributaries include temporary alteration of natural flow regimes, erosion and sedimentation, reduced water quality from point and non-point sources, and contamination of hydrocarbons and other chemicals due to spills (AECOM, 2021b). Indirect impacts to waterways can generally be managed through the implementation of CEMP. Mitigation measures to include the following. • Development of an appropriate spill prevention and response plan to cover Project activities and the types and quantities of fuel, oil and chemicals held. • Stockpiling/laydown areas, plant and equipment storage areas should be located away from Ross River and its tributaries and within already cleared or disturbed areas, where possible. • Construction to be completed outside of the wet season when creeks are not inundated or flowing, where possible. • Development of an Erosion and Sediment Control Plan for the Project in accordance with industry standard. Review of nearby registered water bores (all located to the west of the Ross River) indicate groundwater levels between 9 m and 12.8 m depth (Douglas Partners, 2020). The vertical alignment for the pipeline will be confirmed during the detailed design, however a worst-case depth is expected to be 5m, which is not anticipated to impact on the groundwater within the area.
Channelise, divert or impound rivers or creeks or substantially alter drainage patterns.	The Project will cross a number of drainage features / waterways associated with the Ross River. The detailed design of the crossings of the drainage features / waterways is currently unknown, however it is proposed that the detail design will not seek to channelise, divert or permanently impound these features to ensure drainage patterns are not substantially altered. Should the chosen construction method include open trenching, the natural levels of the drainage features / waterways will be reinstated to the previous conditions post construction. Stabilisation works and revegetation will be undertaken where appropriate.
Measurably alter water table levels.	The Project does not involve use of groundwater for operation or construction, and it not anticipated to have any draw down impact on the existing water table.

5.1.3 Pollutants, Chemicals, and Toxic Substances

Significant Impact Criteria

An assessment against the Guideline 1.2 is provided in Table 5. The outcome of the assessment against the EPBC Act guidelines was that **the Project is unlikely to result in a significant impact** as a result of pollutants, chemical and toxic substances within the Commonwealth land, subject to the implementation of the mitigation and management measures.

Table 5 Significant Impact Assessment for Pollutant, Chemical and Toxic Substances

Is there a real possibility that the Project will:	Assessment of Significance
Generate smoke, fumes, chemicals, nutrients, or other pollutants which will	The construction of the Project will involve storage of chemicals, fuel and oil for the duration of the construction period on the Commonwealth Land. The exact volumes and locations of storage are yet to be

Is there a real possibility that the Project will:	Assessment of Significance
substantially reduce local air quality or water quality.	determined, however storage and use of these materials will be consistent with standard construction Projects of a medium scale. A Construction Environmental Management Plan will be developed which will manage the potential impacts of these activities and is anticipated to include appropriate spill prevention and response plan to cover Project activities and the types and quantities of fuel, oil and chemicals held.
Result in the release, leakage, spillage, or explosion of flammable, explosive, toxic, radioactive, carcinogenic, or mutagenic substances, through use, storage, transport, or disposal.	
Increase atmospheric concentrations of gases which will contribute to the greenhouse effect or ozone damage.	Greenhouse gas emissions are likely to be associated with vehicle and machinery usage during construction, and operation of infrastructure and pump stations during operation. A formal assessment of greenhouse gas emissions has not yet been undertaken given the relatively small scale of the proposed Project works.
Substantially disturb contaminated or acid-sulphate soils.	Section 5.1.1 described the extremely low probability of potential and actual acid sulfate soils occurring within the Project area. Should acid sulfate soils be encountered during construction, management and treatment would be undertaken in line with industry standard. This requirement will be included in the CEMP. A contaminated land assessment has not been undertaken for the Project, however measures will be included in the CEMP to guide the management of contamination, should it be encountered.

5.1.4 Impacts on Plants

Remnant Vegetation and Regional Ecosystems

Ground-truthed regional ecosystems (REs) are mapped in Appendix B and summarised below.

- RE 11.3.12 *Melaleuca viridiflora* woodland to open woodland to 10 m on alluvial plains.
- RE 11.3.25b *Melaleuca leucadendra*, *Melaleuca fluviatilis* and *Casuarina cunninghamiana* open forest to woodland to 22 m on alluvial drainage lines and banks of major rivers.
- RE 11.3.30 *Eucalyptus crebra sensu lato* woodland to 14 m on older alluvial floodplains.
- RE 11.3.35 *Eucalyptus platyphylla* and *Corymbia clarksoniana* woodland to 18 m on older alluvial floodplains.
- RE 11.12.9 *Eucalyptus platyphylla*, *Corymbia clarksoniana*, *Corymbia tesselaris* and *Eucalyptus drepanophylla* woodland to 14 m on lower slopes of igneous rocks.

Flora Species Diversity

The field surveys identified the presence of 99 taxa representing 37 families, with the full species list provided in Appendix B. The dominant families were Fabaceae (15 taxa), followed by Poaceae (13 taxa) and Myrtaceae (11 taxa).

Conservation Significant Flora

The desktop assessment identified 15 conservation significant flora species as having the potential to occur within 20 km of the study area, including eight EPBC Act listed species. No conservation significant species were identified in the study area during the field survey. All conservation significant flora species were also confirmed as unlikely to occur within the study area.

There was a lack of suitable habitat for several species, with marginal habitat present for conservation significant rainforest species, in the form of Eucalypt-dominated open forest with a rainforest understorey in the tributaries of Ross River.

Introduced Flora Species

A total of four introduced species were identified within the Project area that are listed under the *Biosecurity Act 2014* (all restricted, Category 3), and two of these species are also listed as a Weed of National Significance (WONS).

- Rubber vine *Cryptostegia grandiflora* (WONS).
- Lantana *Lantana camara* (WONS).
- Singapore daisy *Sphagneticola trilobata*.
- Chinee apple *Ziziphus.*

Significant Impact Criteria

An assessment against the Guideline 1.2 is provided in Table 6. The outcome of the assessment against the EPBC Act guidelines was that **the Project is unlikely to result in a significant impact** on plants within the Commonwealth land, subject to the implementation of the mitigation and management measures.

Table 6 Significant Impact Assessment for plants

Is there a real chance or possibility that the action will:	Assessment of Significance
Involve medium or large-scale native vegetation clearance	**No.** The Project design has been developed to avoid and minimise vegetation clearing wherever feasible by co-locating the new pipeline with the existing cleared track and fence line which runs above the high bank of the Ross River. This disturbance corridor (the Project area) has been limited to a maximum width of 25m. This corridor width minimises the direct impact area of the Project whilst allowing for the required installation of the pipeline and ancillary works. Only the minimum area required to maintain the pipeline easement and fire break will remain cleared during operation, with approximately 30% of the disturbance corridor to be rehabilitated with native species representative of the original vegetation community. However, this rehabilitation will be limited to the understorey with the restoration of native grass species rather than overstorey shrub and tree species. Nonetheless, rehabilitation will reduce the long-term width of clearing impact to approximately 18m (the extent of rehabilitation works will be determined definitively in the detailed design phase. A total of 12.42 ha of remnant vegetation, comprising five distinct communities, will be cleared for the Project. Based on the above disturbance and rehabilitation assumptions, approximately 30% of this area will experience permanent partial impact (where rehabilitation is proposed) and approximately 70% will experience permanent complete impact. This equates to 3.73 ha of permanent partial impact and 8.69 ha of permanent complete impact. This magnitude of impact is considered to be minor in relation to the large areas of similar vegetation available directly adjacent the Project Area as well as in the wider region.

Is there a real chance or possibility that the action will:	Assessment of Significance
Involve any clearance of any vegetation containing a listed threatened species which is likely to result in a long-term decline or which threatens the viability of the species	**No.** To determine the potential presence of a threatened plant species, a field survey and likelihood of occurrence assessment were undertaken. Field surveys did not identify any threatened plants or suitable habitat for any threatened plants which occur in the region. The likelihood of occurrence assessment considered the known habitat and ecological requirements of the species against the vegetation and habitat types and resources identified in the field survey. This process also determined that threatened plants are unlikely to occur in the Project area or be otherwise impacted by the Project.
Introduce potentially invasive species	**No.** Weed proliferation can degrade vegetation communities by increasing fuel loads (with the potential to alter fire regimes), reducing floristic diversity, altering the vegetation structure, causing vegetation dieback and altering habitat for native fauna species. The risk of the potential impacts related to the establishment and proliferation of weeds will be mitigated and managed, through measures including the adoption of a Weed and Pest Management Plan (WMP).
Involve the use of chemicals which substantially stunt the growth of native vegetation	**No.** There are no Project activities which require the use of chemicals which substantially stunt the growth of native vegetation.
Involve large-scale controlled burning or any controlled burning in sensitive areas, including areas which contain listed threatened species	**No.** No changes to current fire regimes or burning protocols are expected as a result of the Project.

5.1.5 Impacts on Animals

Fauna Habitat (AECOM, 2021b)

The Project area is primarily alluvial open woodland and riparian eucalypt woodland, with cleared areas associated with the powerline easement and access tracks. Nonetheless, various fauna habitat types were confirmed within the Project area, and mapped in Appendix B.

Fauna habitat within the Project area has been subject to disturbance from weeds, pests, erosion and other edge effects. However, microhabitat features are present within each of the habitat types, which provides habitat opportunities for several species. The habitat types recorded within the Project area are described below.

- Melaleuca woodland on alluvial plains.
- Melaleuca riparian woodland to open forest.
- Eucalyptus woodland on alluvial plains.
- Eucalyptus woodland on igneous rocks.
- Non-remnant alluvial plains.

Fauna Species Diversity (AECOM, 2021b)

A total of 116 native fauna species were recorded during the field survey, comprising 72 bird species, 27 mammal species and eight reptile species and nine amphibian species. All observed fauna were

typical for the region and analogous to the habitat types recorded on site. The full list of species is provided in Appendix B.

Fauna Breeding Places (AECOM, 2021b)

Animal breeding places were recorded throughout the Project area. Small, medium and hollows were observed within the study area, recorded in a diversity of tree species including *Eucalyptus tereticornis*, *E. platyphylla*, *Corymbia clarksoniana* and stags. Small, medium and large bird nests were observed. Notably, a large raptor nest was observed just outside the Project area.

Conservation Significant Fauna

Conservation Significant Fauna is discussed in Section 4.0.

Introduced Fauna (AECOM, 2021b)

A total of three introduced species listed under the *Biosecurity Act 2014* were identified within the study area.

- Feral dog *Canis lupus* (Category 3, 4, 6)
- Feral pig *Sus scrofa* (Category 3, 4, 6)
- Cane toad *Rhinella marina* (Prohibited matter under Schedule 1).

Other introduced fauna species likely to occur within the study area may include the feral cat (*Felis catus**), European fox (*Vulpes vulpes**), house mouse (*Mus musculus**), black rat (*Rattus rattus**), or European rabbit (*Oryctolagus cuniculus**).

Significant Impact Criteria (AECOM, 2021b)

An assessment against the Guideline 1.2 is provided in Table 7. The outcome of the assessment against the EPBC Act guidelines was that **the Project is unlikely to result in a significant impact** on animals within the Commonwealth land, subject to the implementation of the mitigation and management measures.

Table 7 Significant Impact Assessment for animals

Is there a real chance or possibility that the action will:	Assessment of Significance
Cause a long-term decrease in, or threaten the viability of, a native animal population or populations, through death, injury or other harm to individuals	**No.** Potential Project impacts to fauna include loss or alteration of habitat; disturbance, injury and mortality of fauna during construction; habitat fragmentation and introduction of weeds and pests. The shape and scale of the clearing is considered to be minor in terms of what is available directly adjacent to the Project area and in the greater region and the fauna habitat present has been subject to disturbance from weeds, pests, erosion and other edge effects. However, microhabitat features are present within each of the habitat types, which provides habitat opportunities for several species. A suite of avoidance, minimisation and mitigation measures has been proposed to reduce potential impact of the Project. The Project has been designed to avoid, to the greatest extent possible, areas value to native species. This was achieved by prioritising the co-location of the new pipeline with the existing cleared track running north-south above the high bank of the Ross River. While the extent of vegetation clearing for the proposed works will mean that impacts to fauna and their habitat is likely unavoidable, there are a range of measures proposed to minimise the level of impact. The implementation of the identified avoidance, minimisation and mitigation measures will reduce and manage the impact to native fauna to the degree that it is unlikely that a long-term decrease in, or threat to the viability of, a native animal population or populations, through death, injury or other harm to individuals would occur. More

Is there a real chance or possibility that the action will:	Assessment of Significance
	detail on habitat fragmentation and introduction of exotic pests is provided in the sections below.
Displace or substantially limit the movement or dispersal of native animal populations	**No.** The removal of vegetation for the Project largely occurs adjacent to the existing cleared track and fence line which runs above the high bank along the Ross River. The track is not currently considered a barrier to fauna movement due to its' narrow width (5-10 m) and presence of adjacent vegetation. During construction the disturbance corridor will be up to 25m wide, through terrestrial habitat and will require deep trenching throughout. During this period, some severance of fauna dispersal pathways is likely for some small bodied species (i.e. frogs, skinks, geckoes). Heightened activity during construction may also create a temporary barrier or deter some species from dispersing through the area. However, movements of birds, bats and larger bodied terrestrial species are unlikely to be significantly impacted. Furthermore, the long-term width of clearing impact will be reduced to approximately 18m and the ground and stream profiles will be returned to preconstruction levels for the operational phase. Installation of the pipe will also require open trenching in creek channels and temporary waterway barrier works in the form of bunding will be installed in creeks holding water. This will result in temporary disconnection of fish habitat. However, the stream profile will be returned post construction and fish passage is expected to be successfully restored. The final cleared corridor will present minimal fauna dispersal concerns and is unlikely to functionally disconnect populations of species east and west of the pipeline.
Substantially reduce or fragment available habitat for native species	**No.** As discussed above, the final cleared corridor will be approximately 18m wide (with an additional 7m approximately of rehabilitated habitat). Large patches of habitat are available to the east and the west of this corridor and it presents minimal fauna dispersal concerns during operation, given its narrow width and minimal anthropogenic activity (i.e. limited disturbance and potential for vehicle strike during operation).
Reduce or fragment available habitat for listed threatened species which is likely to displace a population, result in a long-term decline in a population, or threaten the viability of the species	**No.** Potential impacts to listed threatened species have been discussed in detail in Section 4.0.
Introduce exotic species which will substantially reduce habitat or resources for native species	**No.** Introduced fauna recorded during the field surveys included feral dog (*Canis lupus*), feral pig (*Sus scrofa*), cane toad (*Rhinella marina*) and Indian myna (*Sturnus tristis*). Other introduced fauna species likely to occur within the study area may include the feral cat (*Felis catus*), European fox (*Vulpes vulpes*), house mouse (*Mus musculus*), black rat (*Rattus rattus*), or European rabbit (*Oryctolagus cuniculus*). Given the limited extent of clearing and the ability of most of the potentially present feral species to persist in highly diverse habitats, it is unlikely that Project activities will

Is there a real chance or possibility that the action will:	Assessment of Significance
	result in the further proliferation of these species. Trenching in the construction phase of the Project may enhance conditions which are favourable for the establishment and or proliferation of cane toad. Where trenches are inundated by rainfalls, this may increase artificial aquatic habitat, producing favourable conditions for cane toad breeding and proliferation. Lethal toxic poisoning through ingestion of the cane toad has been identified as the cause of local extinctions of northern quoll. The risk of the potential impacts related to the establishment and proliferation of exotic animals will be mitigated and managed, through measures including the adoption of a Weed and Pest Management Plan (WMP).
Undertake large-scale controlled burning or any controlled burning in areas containing listed threatened species	**No.** No changes to current fire regimes or burning protocols are expected as a result of the project.

5.1.6 Impacts on Heritage

Natural

The Project is located within one statutory natural heritage listing and one non-statutory natural heritage listing: Mount Stuart Training Area (CHL#105570 and RNE#1029100). This site is listed for the geological values of Mount Stuart, and for the refuge offered for many plant and associated animal species. However, desktop assessment and site survey found that the Project Area does not contain any significant natural heritage values or vegetation that may provide habitat for conservation significant species. Consequently, the Project area is not considered to be of natural heritage value (AECOM, 2021c).

Aboriginal

There are no registered Indigenous heritage sites within the Project area. However, proximity to the significant landforms of Ross River and Mount Stuart and the identification of an isolated artefact 96 m to the east of suggests potential for surface and subsurface archaeological deposits throughout the Project Area. There is also potential for intangible heritage values associated with the Gabul (carpet python) Creation Story, which attaches to the Ross River.

Consequently, the Project Area is considered to be of potential Indigenous heritage value, and further assessment and consultation with Traditional Custodians is recommended (AECOM, 2021c).

Historical

There are no registered historical cultural heritage places in the Project Area. Desktop assessment and site survey found that the Project Area does not contain any built or archaeological historical heritage places. Consequently, the Project Area is not considered to be of historical heritage value (AECOM, 2021c).

Significant Impact Criteria

An assessment against the Guideline 1.2 is provided in Table 7. The outcome of the assessment against the EPBC Act guidelines was that **the Project is unlikely to result in a significant impact** on heritage within the Commonwealth land, subject to the implementation of the mitigation and management measures.

Table 8 Significant Impact Assessment for Heritage

Is there a real possibility that the Project will:	Assessment of Significance of Impact
Permanently destroy, remove or substantially alter the fabric (physical material including structural elements and other components, fixtures, contents, and objects) of a heritage place.	**No.** There are no known heritage places in the Project area. There is some potential for currently unrecorded subsurface Indigenous archaeological sites. However, any impacts on such sites will be managed in consultation with Traditional Custodians and, if required, implementation of archaeological mitigations such as monitoring or excavation. With these measures in place, archaeological impacts are anticipated to be minor.
Involve extension, renovation, or substantial alteration of a heritage place in a manner which is inconsistent with the heritage values of the place.	**No.** There are no known heritage places in the Project area.
Involve the erection of buildings or other structures adjacent to, or within important sight lines of, a heritage place which are inconsistent with the heritage values of the place.	**No.** There are no known heritage places in or adjacent to the Project area. Furthermore, the area will be remediated at the conclusion of project works, reinstating and revegetating the existing ground surface. With these measures in place, visual impacts are anticipated to be minor.
Substantially diminish the heritage value of a heritage place for a community or group for which it is significant.	**No.** There are no known heritage places in the Project area. There is some potential for currently unrecorded subsurface Indigenous archaeological sites, and for intangible heritage values associated with the adjacent Ross River. However, any impacts on tangible or intangible heritage values will be managed in consultation with Traditional Custodians. With these measures in place, impacts are anticipated to be minor.
Substantially alter the setting of a heritage place in a manner which is inconsistent with the heritage values of the place.	**No.** There are no known heritage places in the Project area. Furthermore, the area will be remediated at the conclusion of project works, reinstating and revegetating the existing ground surface. With these measures in place, landscape impacts are anticipated to be minor.
Substantially restrict or inhibit the existing use of a heritage place as a cultural or ceremonial site.	**No.** The Project area is not publicly accessible and is not currently used as a cultural or ceremonial site. Furthermore, the remediation of the area following the completion of project works will ensure that no future uses are excluded.

5.2 Summary of Assessment Outcomes

The results of the self-assessment against *Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies" Significant Impact Guidelines 1.2* concluded that significant impacts to the environment on Commonwealth land are unlikely, subject to the implementation of the environmental mitigation and management measures, and further investigation for surface and subsurface heritage values.

6.0 Avoidance, Mitigation and Management

Council have demonstrated considered of environmental impacts of the Project throughout Project development. Where possible and practical Council have sought to avoid impacts to listed threatened species and the environmental values on Commonwealth land. Where avoidance cannot be achieved mitigate and management of impacts has been proposed.

6.1 Avoidance

The following section provides a consolidated summary of the avoidance measures the Project has taken to avoid impacts to listed threatened species and the environmental values on Commonwealth land.

An extensive options assessment process has been undertaken to determine the proposed alignment (Section 3.3). This options assessment aimed to avoid minimising environmental impacts to the greatest extent practicable, whilst balancing Project cost, engineering requirements and stakeholder requirements.

The Project has been designed to avoid, to the greatest extent possible, areas of ecological value. This was achieved by prioritising the co-location of the new pipeline with the existing cleared track running north-south above the high bank of the Ross River.

The width of the construction corridor has been reduced to the minimum practical width of 25m. Direct impacts will be limited to within this corridor during construction. During operation, this corridor will be reduced to the minimum required width to support the pipeline easement and a firebreak (approximately 18m once rehabilitation works have been completed).

6.2 Mitigation and Management Commitments

Detailed mitigation planning has been undertaken in the Ecology Technical Report (Appendix B) and the Heritage Assessment Report (Appendix C) respective to the individual potential impacts. The following section provides a summarised version of the proposed mitigation and management commitments for the Project.

All Project commitments, mitigation and management measures should be captured in a Planning Environmental Management Plan (Planning EMP) to support the Detailed Design phase of the Project.

6.2.1 Preconstruction Planning

- Further assessment including consultation with the Aboriginal Party is required.
- Construction to be completed outside of the wet season when creeks are not inundated or flowing, where possible.
- Vegetation clearing will be limited to daytime hours to reduce impacts from construction light and noise on nocturnal species.
- Stockpiling/laydown areas, plant and equipment storage areas should be located away from Ross River and its tributaries and within already cleared or disturbed areas, where possible.
- Staging works such that temporary barriers to fauna movement during construction (i.e. trenches) are restricted to smaller portions of the alignment at any one time.
- Clearing vegetation should be planned in a sequential manner which directs any escaping fauna to adjacent native vegetation and to allow bats to leave roosting sites.

6.2.2 Preconstruction Documentation

- Develop a revegetation strategy focused on restoring ecological values in key areas. Approximately 30% of the Project area will be rehabilitated with a diversity of native grasses that are known as foraging grasses for the Black-throated finch in the ground layer. At a minimum, rehabilitation efforts will aim to restore the area to be suitable for foraging purposes.
- Development of an Erosion and Sediment Control Plan for the Project in accordance with industry standards.
- Develop a Construction Environmental Management Plan (CEMP) capturing all relevant environmental protection methods, and including:
    - Clear guidance on areas to be cleared and retained and identification of clear no-go zones to avoid unauthorised disturbance of areas of sensitive vegetation and habitat.
    - Retention of habitat features such as habitat trees and relocating habitat features such as felled trees and logs where practical.
    - Development of an appropriate spill prevention and response plan to cover Project activities and the types and quantities of fuel, oil and chemicals held.
    - Development of a Weed and Pest Management Plan (WMP) including known WONS and category 3 restricted invasive weeds, appropriate wash down protocols, cane toad management measures and weed monitoring requirements.
    - An unexpected finds procedure should be in place for any ground disturbing works.

6.2.3 Preconstruction Activities

- Suitably qualified fauna spotter-catchers must be engaged to undertake pre-clearance habitat searches, including shelters / nests, hollow bearing trees, and habitat areas potentially utilised by conservation significant fauna.
- Workers should be made aware of vegetation management requirements in induction training and through work instructions.

6.2.4 Construction

- Topsoil should be removed, stockpiled and reapplied in the same land zone from where it was removed for any rehabilitation/revegetation works.
- All work should be completed, and bunds removed during low flows when the flow will be contained wholly within the low flow channel.
- Any instream microhabitat within water features such as log tangles and boulders should be retained in-situ or relocated to adjacent areas where practical.
- Tall equipment such as cranes should be lowered from dusk to dawn to minimise potential for flying species to be injured or killed through machinery strike
- Monitoring of trenches during construction is to be conducted regularly to ensure no fauna entrapment.
- A clear escape path should be kept available for ground fauna during construction works
- Any injured, sick and dead vertebrate fauna must be recorded before (by fauna spotter-catchers), during and after construction and operation. Any fauna injured by Project activities should be transported to a vet or recognised wildlife carer.
- Dust suppression measures, such as water trucks and sprinklers, where required.
- To reduce vehicle or plant collision or crushing of nests, all vehicles and pedestrians will remain within designated access tracks wherever practicable.
- Suitable speed limits to be implemented during construction to reduce risk of vehicle collision for this species.

7.0 Summary and Conclusion

The purpose of this report was to document a self-assessment pursuant to the requirements of the EPBC Act to determine if a significant impact on MNES or the environment on Commonwealth land is likely to occur as a result of the Project. The Project has been assessed against the:

- *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* and the relevant species-specific guidelines for listed threatened species.
- *Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies Significant Impact Guidelines 1.2.*

The results of the self-assessment against *Matters of National Environmental Significance: Significant Impact Guidelines 1.1* concluded that significant impacts to the Northern quoll as a result of the Project are unlikely; however potential impacts to the black-throated finch may be significant.

The results of the self-assessment against *Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies" Significant Impact Guidelines 1.2* concluded that significant impacts to the environment on Commonwealth land are unlikely, subject to the implementation of the environmental mitigation and management measures, and further investigation for surface and subsurface heritage values.

It is recommended that Council refer the Project to the Commonwealth Government for a decision by the Environment Minister on whether assessment and approval is required under the EPBC Act.

8.0 References

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Appendix A

Concept Design Report & Plans

Appendix B

Ecology Technical Report

Appendix C

Heritage Technical Report