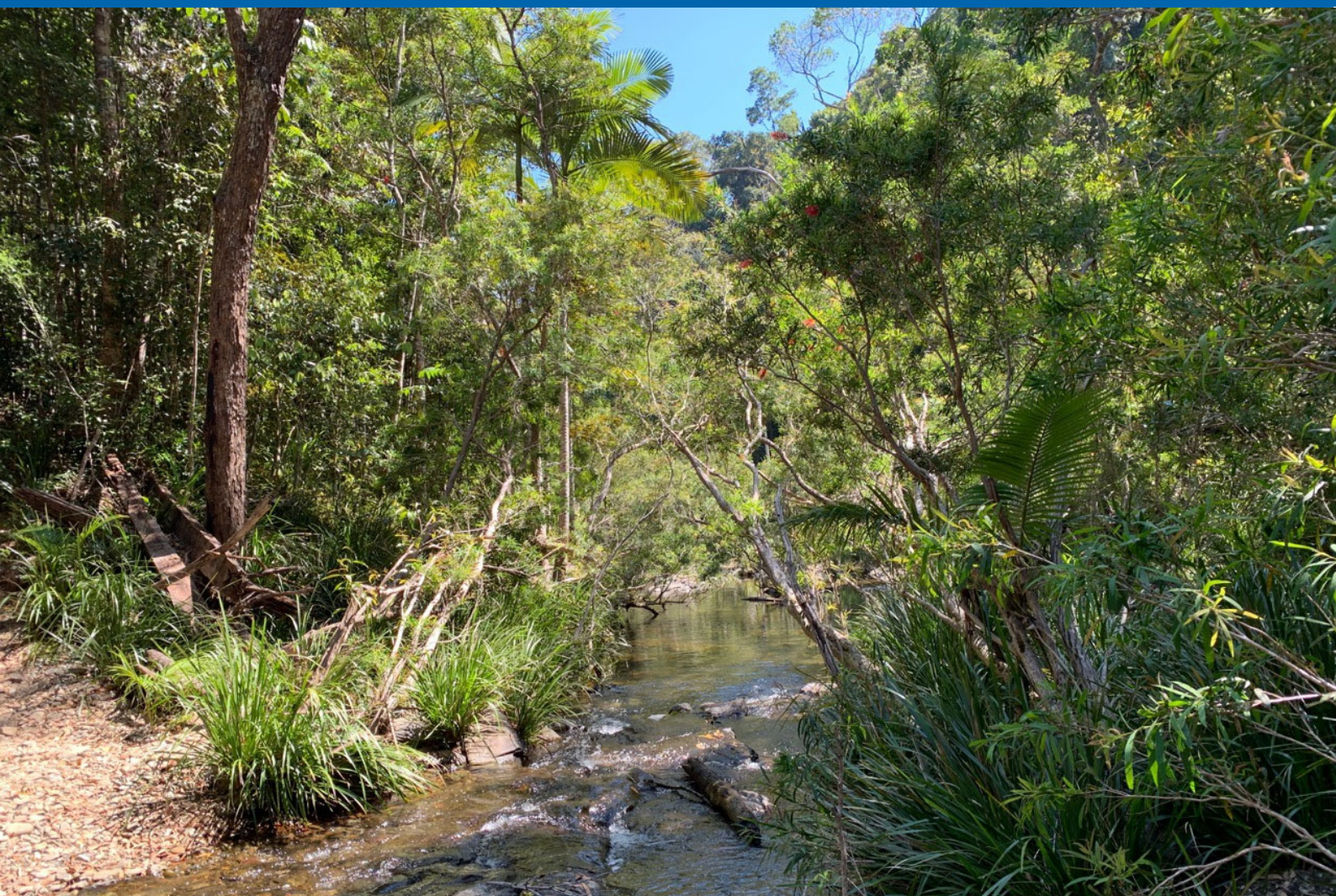


Department of State Development, Tourism, and Innovation

Wangetti Trail South Section (Wangetti to Palm Cove)

Preliminary Construction Environmental Management Plan

July 2021



Abbreviation and acronyms

Abbreviation/acronym	Definition
ACH Act	*Aboriginal Cultural Heritage Act 2003*
AHD	Australian height datum
CEMP	Preliminary Construction Environmental Management Plan
CESCP	Concept Erosion and Sediment Control Plan
CHMA	Cultural Heritage Management Agreement
CMP	Cassowary Management Plan
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DATSIP	The Department of Aboriginal and Torres Strait Islander Partnerships'
DAWE	Department of Agriculture, Water and the Environment
DES	Department of Environment and Science
DR	Department of Resources (previously referred to as Department of Natural Resources Energy and Mines)
DSDILGP	Department of State Development, Infrastructure, Local Government and Planning (previously referred to as Department of State Development, Infrastructure and Planning)
DSDTI	Department of State Development, Tourism and Innovation
DTMR	Department of Transport and Main Roads
EMP	Environmental Management Plan
EPBC Act	Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*
EP Act	*Environmental Protection Act 1994*
ESCP	Erosion and Sediment Control Plan
FNQ	Far North Queensland
GED	General Environmental Duty
GHD	GHD Pty Ltd
IECA	International Erosion Control Association
ILUA	Indigenous Land Use Agreement
km	Kilometre
MNES	Matters of national environmental significance
MSES	Matters of state environmental significance
NC Act	*Nature Conservation Act 1992*
PPE	Personal Protective Equipment
QPWS	Queensland Parks and Wildlife Service
RE	Regional ecosystem
RPP	Riverine protection permit
SMP	Species Management Plan
TDPD	Tourism Development Projects Division (TDPD)
TI Act	*Transport Infrastructure Act 1994*

Abbreviation/acronym	Definition
TMP	Preliminary Traffic Management Plan
VM Act	*Vegetation Management Act 1999*
WPDMP	Preliminary Weed, Pest and Disease Management Plan
WTWHA	Wet Tropics World Heritage Area

Table of contents

Table index

Figure index

Appendices

1. Introduction

1.1 Project background

The Department of State Development, Tourism and Innovation (DSDTI) – Tourism Development Projects Division (TDPD) is proposing to establish the Wangetti Trail – Wangetti South (Project) Section, a 29.7 kilometre (km) shared use trail to accommodate both mountain bike users and hikers from the southern boundary Lot 2 SP309094 in the township of Wangetti, to Palm Cove (refer to Figure 1-1).

The Wangetti South Section will comprise of the following components:

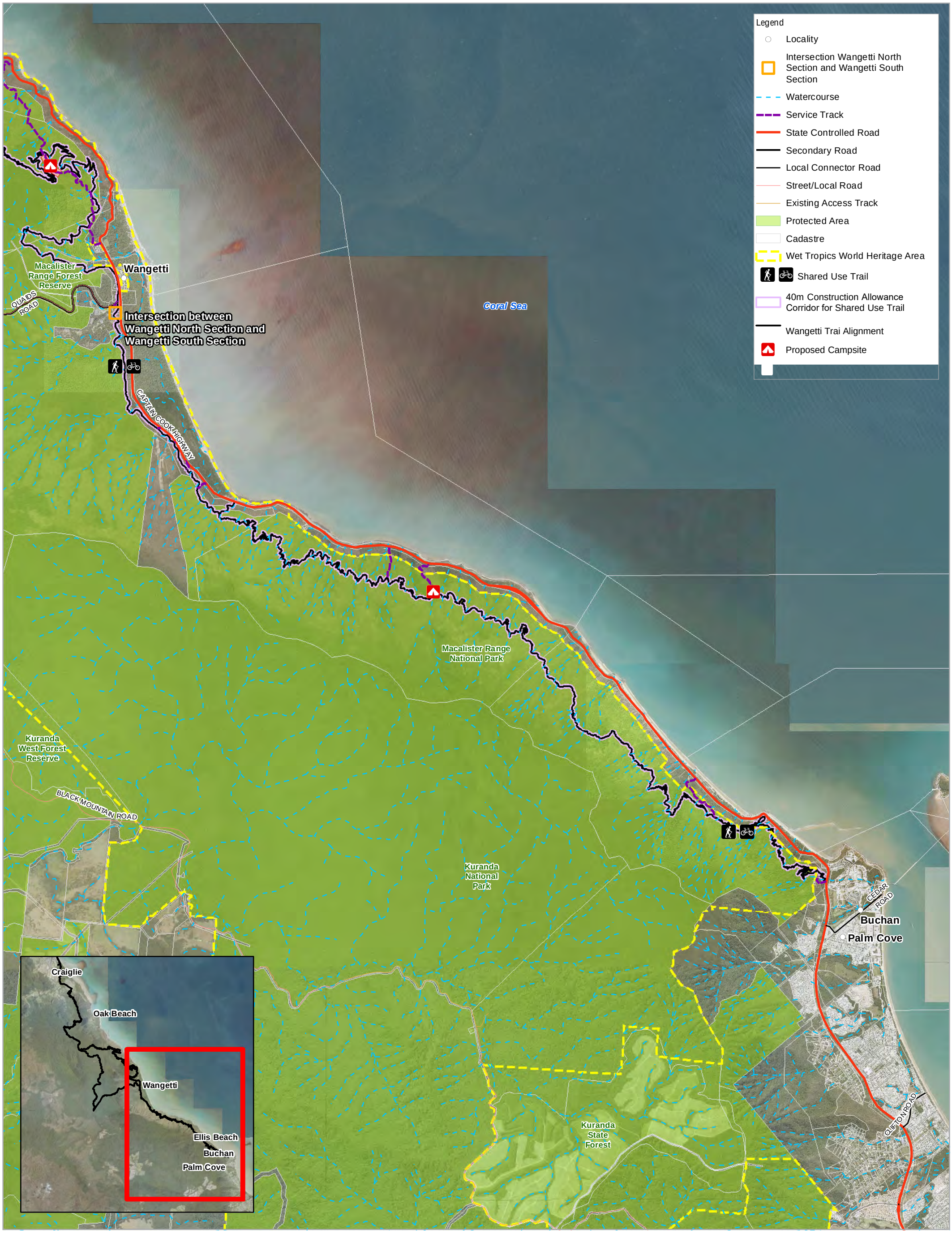
- 29.7 km shared use trail to accommodate both mountain bike users and hikers, consisting of natural ground and surface treatments, which will be a maximum of 1.5 m wide. The 1.5 m wide trail will be located within a 40 m survey corridor, referred to as the construction allowance corridor, to allow flexibility for the most suitable placement of infrastructure during the construction phase to minimise impacts to the greatest extent possible. The trail has been designed to be a 'Mountain Biking – intermediate (blue square with blue outline) as defined in the Australian Mountain Bike Trail Guidelines Trail Difficulty Rating System (MBTA TDRS) and grade 3 for hikers, as defined in the Australian Walking Track Grading System (AWTGS), which also equates to Class 3 in the Australian Standard for Walking Tracks, Part 1: Classification and Signage (AS 2156.1-2001). The trail will have an average gradient of <10% and a maximum gradient no greater than 15% (for short distances only). Built structures proposed as part of the trail include gully crossings, bridges, staircases, platforms, rock armouring and signage, where appropriate and required.
- A number of waterway crossings along the shared use trail that will comprise of the following: rock armouring, boulder crossings and low-level bridge (minor water crossing) (refer to Appendix A showing the locations of the waterways within the project area).
- Dark Jungle (public camping node and amenities block).
- The formalisation of existing access tracks into service tracks to provide restricted access to the shared use trail and Dark Jungle for construction purposes, operational purposes, maintenance purpose and for emergency purposes.

Further details of the construction methodology associated with Wangetti South Section is captured in the World Trail Pty Ltd (2020), Wangetti Trail Construction Methodology Manual April 2020.

The Wangetti South Section is being proposed over four properties located within the Douglas Shire Council and Cairns Regional Council local government areas. The project area intersects both the Macalister Range National Park and the Wet Tropics World Heritage Area (WTWHA).

The project is being delivered by TDPD as part of an adventure-based ecotourism development in north Queensland. The shared use trail will provide walkers and mountain bike riders with a unique experience to traverse through natural areas of north Queensland covering bushland and coastal areas, including the Wet Tropics of Queensland (Wet Tropics), and national parks.

Development of a Preliminary Construction Environmental Management plan (CEMP) is required to demonstrate the management of environmental values within the project area during the construction phase of the Wangetti South Section. It forms part of a sub-plan in the Preliminary Environmental Management Plan (EMP) for the Wangetti South Section.



Paper Size ISO A3

0 0.5 1 1.5 2

Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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DITID
Environment Assessment Stage 2 Wangetti Trail

Wangetti South Section
Project Locality Plan

Project No. 41-32458
Revision No. 5
Date 1/12/2020

FIGURE 1-1

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Print date: 01 Dec 2020 - 13:22

Data source: DITID/GHD: Wangetti Trail Alignment (11/2020); DNRME: Roads (2019), Cadastre (2019), Watercourse (2014), Place Names (2016), Rail (2016), Imagery (2016); DES: Protected Area (2018); WTMA: Proposed Camp and Amenities Block (2020), Zoning Boundary (2019); GHD:Section Intersections - Mowbray North, Wangetti North, Wangetti South (2020), Services Tracks (2020), 20m Construction Buffer for the Shared Use Trail (2020) . Created by: xlee

1.2 Purpose

GHD Pty Ltd (GHD) has been commissioned to develop a Preliminary Construction Environmental Management plan (CEMP) for the Wangetti South Section to guide construction activities associated with the Wangetti Section project to prevent or minimise the environmental impacts and disturbance on site and to the surrounding environment during the construction phase. An overview of all legislative requirements with respect to Commonwealth, State (Queensland) and local legislation and a summary of the statutory approvals associated with the project has been included in this document. This CEMP has also been prepared to satisfy the environmental obligations during the construction phase and complements the overarching Wangetti South Section Environmental Management Plan.

1.3 Structure of the CEMP

The structure of the CEMP has been developed to align with requirements in the Department of the Environment – Environmental Management Plan (DEMP) Guidelines 2014. Table 1-1 below demonstrates that this CEMP has considered the sections of the DEMP Guidelines.

Table 1-1 Structure of the CEMP

Section	Consistent with the DEMP Guidelines
1.0 Introduction	Compiles with Section 3.4, 3.5 and 3.6 in Department of Environment Environmental Management Plan Guidelines 2014
2.0 Potential environmental impacts and risks	Compiles with Section 3.8, 3.10, 3.12 and 4.0 in Department of Environment Environmental Management Plan Guidelines 2014.
3.0 CEMP Provisions	Compiles with Section 3.12 and 3.13 in Department of Environment Environmental Management Plan Guidelines 2014
4.0 Rehabilitation of works areas	Compiles with Section 3.13 in Department of Environment Environmental Management Plan Guidelines 2014
5.0 Monitoring	Compiles with Section 3.9 and 3.14 in Department of Environment Environmental Management Plan Guidelines 2014
6.0 Audit	Compiles with Section 3.14 in Department of Environment Environmental Management Plan Guidelines 2014
7.0 Review	Compiles with Section 3.14 in Department of Environment Environmental Management Plan Guidelines 2014
8.0 Emergency incident planning and response	Compiles with Section 3.11 in Department of Environment Environmental Management Plan Guidelines 2014

1.4 Assumptions and limitations

This report has been prepared by GHD for Department of State Development, Tourism and Innovation and may only be used and relied on by Department of State Development, Tourism and Innovation for the purpose agreed between GHD and the Department of State Development, Tourism and Innovation as set out in this report.

GHD otherwise disclaims responsibility to any person other than Department of State Development, Tourism and Innovation arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.

The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.

The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.

The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report. GHD disclaims liability arising from any of the assumptions being incorrect.

GHD has prepared this report on the basis of information provided by Department of State Development, Tourism and Innovation and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.

2. Legislative requirements

Wangetti South Section is to comply with all legislative requirements with respect to Commonwealth, State (Queensland) and local legislation and a summary of the statutory approvals associated with the project is outlined in Table 2-1 below.

Table 2-1 Statutory approvals associated with Wangetti South

Legislation and Approval Type	Relevance to the project area
Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) DAWE Referral	Wangetti South is considered to involve undertaking an action which has, will have, or is likely to have, an impact on a Matters of National Environmental Significance (MNES). Therefore, project has been referred and is a controlled action that requires approval (reference EPBC 2020/8722).
Wet Tropics Management Plan 1998 *Wet Tropics Permit* Wet Tropics Management Authority (WTMA)	Wangetti South Section is located within the Wet Tropics World Heritage Area. The project has been approved (Wet Tropics Permit No: WTMA20001a) and a permit issued under Part 4, Division 1, Section 45 of the Wet Tropics Management Plan 1998 (*Wet Tropics World Heritage Protection Management Act 1993)* to allow for the proposed works to occur within the Wet Tropics Management Zone.
Nature Conservation Act 1992 (NC Act) Authority required to construct trail and public camping areas under s34 of the NCA.	Subject to s34 of the NC Act, a lease, agreement, license, permit or other authority over, or in relation to land in a protected area may be granted if the activity is consistent with the management principles for the areal and, if a management plan has been approved for the area, the management plan. The grant of an authority will be considered by the Chief Executive of the Department of Environment and Science (DES) for the construction of Wangetti Trail and public camping areas in the protected area estate.
Nature Conservation Act 1992 (NC Act) Protected plant clearing permit	Where the alignment intersects a flora survey trigger area, a protected plant clearing permit or exemption notice will be required.
Species management program (SMP) under the *Nature Conservation Act 1992* (NC Act)	Given a number of protected fauna species that are located within the project area are high-risk, a SMP may be required to allow for tampering with an animal breeding place for endangered, vulnerable and near threatened and special least concern fauna species listed under the *Nature Conservation (Wildlife) Regulation 2006*..
Native Title Act 1993 Indigenous Land Use Agreement (ILUA) or notification procedures	TDPD has been conducting meaningful engagement with Traditional Owners who have a native title claim or assert a native title interest in relation to trail area as outlined in Section 1.7 to address native title requirements for the project. Indigenous Land Use Arrangements (ILUA) will be negotiated between native title parties and the State accordingly.

Legislation and Approval Type	Relevance to the project area
Under the *Aboriginal Cultural Heritage Act 2003* (ACH Act) a Cultural Heritage Management Plan (CHMP) or similar may need to be established with the relevant Aboriginal parties	TDPD has been conducting meaningful engagement with Traditional Owners who have interests in relation to trail area to address cultural heritage requirements under the ACH Act for the project. Archaeological reporting, including a Cultural Heritage Management Plan between the proponent and the Traditional Owners outlining how the project will be managed to avoid or minimise harm to Aboriginal cultural heritage (to the extent that harm cannot reasonably be avoided)will be negotiated before works commence The Department of Aboriginal and Torres Strait Islander Partnerships' (DATSIP) Duty of Care Guidelines are required to be followed to assist in conducting due diligence.
Under the *Planning Act 2016* and Planning Regulation 2017 a Material Change of Use development permit assessable under the Douglas Shire Council planning scheme and a Material Change of Use development permit assessable under the Cairns Regional Council Planning Scheme	A material change of use development permit application will be required for Wangetti South to establish the use within the project area. Pre-lodgement meetings have been undertaken with the former Department of State Development, Infrastructure and Planning (referred to now as Department of State Development, Infrastructure, Local Government and Planning (DSDILGP), Douglas Shire Council, Cairns Regional Council, Department of Environment and Science (DES), former Department of Natural Resources Energy and Mines (referred now as Department of Resources (DR)), Department of Agriculture and Fisheries (DAF) and Department of Transport and Main Roads (DTMR).
Under the Planning Regulation 2017 and *Vegetation Management Act 1999* (VM Act) an Operational works development approval for clearing of native vegetation	Wangetti South does not trigger operational work involving clearing native vegetation under Schedule 10, Part 3, Division 4, Table 1, Item 1 under the Planning Regulation 2017, as the proposed works is considered to meet the definition of government supported transport infrastructure and is therefore exempt from the clearing of remnant Category B, Category C and Category R vegetation.
Under the Planning Regulation 2017 and *Fisheries Act 1994* Development Permit for operational works for constructing/raising waterway barrier works Compliance with Accepted development requirements for operational work that is constructing or raising waterway barrier works and	Boulder rock crossing will trigger a development permit for operational works waterway barrier woks where the work does not comply with DAF's accepted development requirements. Bed level crossings associated with the project are considered to meet the accepted development requirements for operational work that is constructing or raising waterway barrier works' and riverine protection permit exemption requirements WSS/2013/726.

Legislation and Approval Type	Relevance to the project area
Water Act 2000 Riverine Protection Permit Exemption Requirements.	
Under the Planning Regulation and *Coastal Protection and Management Act 1995*. Development permit for operational works for interfering with quarry material on state coastal land above the high-water mark within a Coastal Management District (CMD)	Parts of the project area are proposed within mapped coastal management district and therefore the proposed works would trigger a development permit for operational works for interfering with quarry material on state coastal land above the high-water mark within the coastal management district under Schedule 10 of the *Planning Regulation 2017.*
Under the *Land Act 1994* land owners consent for works on State Land	Land owner's consent is required from DR for work on state land to support material change of use development application.
Riverine protection permit (RPP) under the *Water Act 2000*	There are a number of DR mapped watercourses along the proposed alignment. Bed level crossings are considered to meet the Riverine Protection Permit (RPP) exemption requirements WSS/2013/726. TDPD is an entity under schedule 2 of the RPP Exemption Requirements and therefore can follow the RPP exemption requirements WSS/2013/726 for any works proposed in a watercourse. Proposed works will be required to work within the vegetation clearing limit and excavation and placement of fill limit requirements. Where works result in the clearing of less than 0.5 ha of least concern regional ecosystem in a category B, C, R or X or carried out under an accepted development vegetation clearing code (other than if the vegetation is in a category A area), then the exemption requirements apply. Where works result in the excavation of 500 cubic metres or less, then the exemption requirements apply. Where works result in the placement of less than 150 cubic metres of fill, then the exemption requirements apply.
Road corridor permit under the *Transport Infrastructure Act 1994* (TI Act)	Part of the project area is located within State controlled road reserve namely Captain Cook Highway which is managed by DTMR. Works within a state-controlled road reserve triggers a road corridor permit from DTMR.

Legislation and Approval Type	Relevance to the project area
Under the *Land Act 1994* Permanent closure or short-term occupation within road reserves	Permanent road closures or short-term occupation and construction within road reserves (excluding state-controlled roads) will be required during the construction phase of the project.
General Biosecurity Obligation (GBO) under the *Biosecurity Act 2014*	During the construction and operation phase of the project, activities are to be undertaken in accordance with the General Biosecurity Obligations whereby all reasonable and practical measures are to be undertaken to prevent or minimise biosecurity risks. The Act identifies seven categories of restricted matters. Where activities are proposed contrary to the restriction for each category under the Act, a Restricted Matter Permit is required.
General Environmental Duty under the *Environmental Protection Act 1994*	Under the provisions of the EP Act, all persons, whether undertaking an activity authorised under the EP Act, are required to comply with the General Environmental Duty. The duty requires that: 'A person must not carry out any activity that causes, or is likely to cause, environmental harm unless the person takes all reasonable and practicable measures to prevent or minimise the harm.' This is applicable to all phases of the project.
Environmental offset requirements under the *Environmental Offsets Act 2014* *Commonwealth Environment Protection and Biodiversity Conservation Act 1999 - Environmental Offsets Policy October 2012*	DES has advised that state environmental offsets will be triggered for the project which will be administered under s34 and s35 of the NC Act. EPBC Act offsets are proposed in relation to impacts on the southern cassowary.

2.1 Wet Tropics Management Plan 1998 (superseded 3rd July 2017)

The project has been approved (Wet Tropics Permit No: WTMA20001a) and a permit issued under Part 4, Division 1, Section 45 of the Wet Tropics Management Plan 1998 (superseded 3rd July 2017) (*Wet Tropics World Heritage Protection Management Act 1993)* to allow for the proposed works to occur within the Wet Tropics Management Zone. While the project was assessed in accordance with the Wet Tropics Management Plan 1998 plan, the project is considered to comply with the intent of the Wet Tropics Management Plan 2020.

An assessment has been undertaken against the provisions of the Wet Tropics Management Plan 1998 (superseded 3rd July 2017) and is presented in Table 2-2.

Table 2-2 Assessment against the provisions of the Wet Tropics Management Plan 1998 (3 July 2017 version)

Wet Tropics Management Plan 1998 (3((3rd July 2017 version)	Response
Zone B – Zone B is comprised of land that is mostly of high integrity but not necessarily remote from disturbance. It is intended that, in Zone B, land be undergoing recovery or rehabilitation towards its natural state or becoming remote from disturbance by activities associated with modern technological society; and a visitor may expect opportunities for solitude in a natural area requiring a degree of self-reliance; and management presence be limited mainly to activities required for the recovery or rehabilitation of the area.	The majority of the project is located within Zone B under the Wet Tropics Management Plan 1998. The proposed trail is considered to meet the intent of Zone B by providing opportunities to connect with nature and to be surrounded by nature along the trail. The trail will allow for winding around natural obstacles and integrating within the natural environment. Vegetation disruption, including canopy cover, is minimised. The Wangetti South Section has been designed to minimise built structures like bridges, boardwalks and viewing platforms. These built structures pose a number of challenges: • They are normally constructed from imported materials and can be intrusive in the natural environment • They can burn during bushfires or prescribed burns • They can be difficult to construct in remote areas, due to the challenges of importing the materials • They increase the maintenance burden. Where built structures are required, the design and finish will prioritise the use of local timbers and other materials that will age gracefully with time. Above all, the materials must be durable enough to withstand the harsh tropical climate and natural environment. Any built structures must be designed and engineered to be fit-for-purpose, to have minimal impact to the surrounding environment, to have minimal maintenance requirements and will need to take a minimalistic approach to materials given the remote nature of the trail, resulting in a minimal impact on the scenic beauty of the Wet tropics.
The management purpose of Zone B is, to the greatest possible extent— a. To protect and enhance the integrity of land in the zone b. If the land is disturbed— (i) To restore land in the zone to its natural state, as opportunities arise (ii) To include the land in zone A once it is sufficiently recovered or rehabilitated.	
Zone C – Zone C is comprised of land on which, or adjacent to which, there is disturbance associated with community services infrastructure. It is intended that, in Zone C— c. Land be mostly natural, but with some disturbance associated with community services infrastructure (community services infrastructure means infrastructure for community	Where the trail is located within Zone C land, it is considered to meet the intent of Zone C areas, being, land be mostly natural, but with some disturbance associated with community services infrastructure. The Wangetti South Section has been designed to minimise built structures like bridges, boardwalks and viewing platforms. These built structures pose a number of challenges: • They are normally constructed from imported materials and can be intrusive in the natural environment • They can burn during bushfires or prescribed burns

Wet Tropics Management Plan 1998 (3((3rd July 2017 version)	Response
services such as, for example, transport services, electricity supply, water supply and telecommunications services), other community facilities and visitor facilities d. A visitor may expect various low-key opportunities for nature appreciation and social interaction in a natural setting, but with some disturbance by activities associated with modern technological society e. Management presence may be obvious.	• They can be difficult to construct in remote areas, due to the challenges of importing the materials • They increase the maintenance burden. Where built structures are required, the design and finish will prioritise the use of local timbers and other materials that will age gracefully with time. Above all, the materials must be durable enough to withstand the harsh tropical climate and natural environment. Any built structures must be designed and engineered to be fit-for-purpose, to have minimal impact to the surrounding environment, to have minimal maintenance requirements and will need to take a minimalistic approach to materials given the remote nature of the trail, resulting in a minimal impact on the scenic beauty of the Wet tropics.
The management purpose of Zone C is— f. To accommodate community services infrastructure, other community facilities and visitor facilities; but (b) to the greatest possible extent— (i) To ensure any adverse impact of activities carried out in the zone on the area's integrity is minimal and acceptable under this plan (ii) To otherwise protect and enhance the integrity of land in the zone.	

2.2 Wet Tropics Management Plan 1998 (11 September 2020)

Under the latest Wet Tropics Management Plan 1998 (11 September 2020), Wangetti South Section project area is located within Zone A, B and C.

2.2.1 Zone A

The intent of Zone A is:

- The main management purpose of zone A is to protect and conserve the world heritage values and integrity of land in the zone.
- Other management purposes of zone A are—

a. if land in the zone is disturbed—to restore and enhance the world heritage values and integrity of the land if, and

b. to the extent, it is reasonably practicable; and

c. to enable visitors to access parts of the land in the zone to appreciate and enjoy the area.

Part of the shared use trail and Dark Jungle are located within Zone A and are defined as limited visitor infrastructure under the Plan. Limited visitor infrastructure includes walking or cycling track, information board, small-scale viewing platform, small-scale toilet facility, visitors' shelter and camping platforms.

2.2.2 Zone B

The intent of Zone B is:

- The main management purpose of zone B is to protect and conserve the world heritage values and integrity of land in the zone.
- Other management purposes of zone B are—
  a. if land in the zone is disturbed—to restore and enhance the world heritage values and integrity of the land if, and to the extent, it is reasonably practicable; and

  b. to enable visitors to access parts of the land in the zone to appreciate and enjoy the area; and

  c. to be a buffer between zone A and community services infrastructure.

The shared use trail is partly located within Zone B and the proposed use is defined as limited visitor infrastructure and is considered to be consistent with the intent of Zone B.

2.2.3 Zone C

The intent of Zone C is:

- The main management purposes of zone C are—
  a. to protect and enhance the world heritage values and integrity of the land in the zone, subject to paragraphs (b) and (c); and

  b. subject to paragraph (c), to accommodate—

     i. community services infrastructure and visitor infrastructure; and

     ii. particular existing uses of parts of the zone shown on the zoning map; and

  c. to minimise any adverse impact of any activities allowed to be carried out in the zone on the world heritage values and integrity of the land in the zone.

Another management purpose of zone C is to ensure, so far as is reasonably practicable, that any visitor infrastructure on land in the zone is built and maintained in a way that—

a. is ecologically sustainable; and

b. is sensitively integrated into the surrounding landscape; and

c. enhances visitors' understanding and appreciation of the natural and cultural heritage of the area.

Part of the service tracks are located within Zone C and the project is anticipated to meet the intent of Zone C.

2.3 Wet Tropics Strategic Plan 2020 – 2030

The Wet Tropics Strategic Plan 2020 - 2030 provides a 10-year policy framework to guide decision-making under the *Wet Tropics World Heritage Protection and Management Act 1993*. The primary purpose of the Wet Tropics Strategic Plan 2020 - 2030 is to enable the identification, protection, and conservation of the Wet Tropics for future generations. It states the desired outcomes that will be delivered and outlines the actions that will achieve this. An assessment has been undertaken against the provisions of the Wet Tropics Strategic Plan 2020–2030 with respect to Wangetti South Section and is outlined in Table 2-3.

Table 2-3 Assessment against the provisions of the Wet Tropics Strategic Plan 2020 – 2030

Wet Tropics Strategic Plan 2020 – 2030	Response
1. Climate change and other threats Respond to the impacts of climate change and priority cross-tenure threats to the area	With respect to the production of greenhouse gases as a result of machinery use, selection of machinery is to be fit-for-purpose and low emission, wherever possible. Construction mitigation measures will be required to be incorporated into the contractor's CEMP. The contractor is also required to comply with the general environmental duty under the *Environmental Protection Act 1994* (EP Act) and Environmental Protection (Air) Policy 2008, as well as appropriate provisions under the contract documentation.
2. Support Rainforest Aboriginal Peoples Promote and incorporate the rights, interests and aspirations of Rainforest Aboriginal Peoples in the management of the area.	During the development of the project, cultural heritage representatives were engaged to provide advice regarding the significant Aboriginal areas, significant Aboriginal objects and or evidence, of archaeological or historic significance along the trail. As part of the Project, TDPD has been engaging with Traditional Owners regarding the proposed works and to avoid impacts on cultural heritage values.
3. Involve the community Optimise community participation and connection with the area through innovative interpretation, with a focus on education, volunteering and social inclusion.	The Wangetti South Section experience will be uniquely Australian, emphasising the culture, history and way of life of the Traditional Owners, the Yirrganydji people. It will encourage a sense of exploration and a spirit of adventure. It will foster an appreciation of the natural environment and the diversity of flora and fauna within it. The Project will provide economic, cultural and educational benefits to the community, as summarised below. *Economic* Wangetti South Section has the potential to diversify the tourism product offering in North Queensland, involve Traditional Owners and increase jobs by utilising Queensland's natural assets. The construction phase of the Project will provide an opportunity for the creation of local jobs and employment through the sourcing of material and equipment or through manual labour, while the operational phase of the Project will increase visitors to the area, supporting the local economies of Cairns, Wangetti and Port Douglas. The Wangetti South Section will provide access to a World Heritage listed assets –the WTWHA, which will create value for money experiences for tourists and provide opportunities for tourism
4. World-class tourism and recreation Enhance the World Heritage presentation and support opportunities for natural and cultural tourism and recreation	

Wet Tropics Strategic Plan 2020 – 2030	Response
	operators to extend their offerings and capture markets that are seeking access to unique nature-based experiences (PWC, 2018). *Cultural and spiritual* The Wangetti South Section supports a healthy wellbeing and lifestyle by encouraging the physical, mental, and spiritual activity of participants. Contact with nature can enhance spiritual health, which underpins all other aspects of health (PWC, 2018). *Educational* The Wangetti South Section will create several educational opportunities, including the community, schools and universities to increase their knowledge and understanding around wildlife and conservation in WTWHA, with the opportunity to develop education programs to help teach and upskill students (PWC, 2018).
5. Minimise impacts Manage activities that may have been an impact on the area appropriately through permit and zoning system.	Wangetti South Section has received a WTMA permit and therefore will be undertaken in accordance with Strategy 5 of the Wet Tropics Strategic Plan 2020 - 2030.

3. Potential environmental impacts and risks

3.1 Key environmental factors

Eight preliminary key environment factors have been identified in the referral for Wangetti South Section and they include:

- Biodiversity – Flora
- Biodiversity – Fauna
- Waterways
- Soils and topography
- Public amenity
- Waste management
- Biosecurity
- Cultural heritage

Table 3-1 presents the eight preliminary key environmental factors relevant to construction, the proposal activities that would affect the factors and the site-specific environmental values, uses and sensitive components that will be affected. Table 3-1 also identifies potential Matter of National Environmental Significance (MNES) and Matters of State Environmental Significance (MSES) that could be potentially impacted by construction activities.

Table 3-1 Key environmental factors relevant to construction

Key environmental factor	Activities that would affect the factor	Applicable MNES and MSES
Biodiversity – Flora	• Vegetation clearing - permanent and temporary loss of vegetation and habitat (direct impact). • Construction vehicle movements. • Construction plant operation. • Soil erosion and sediment generated from earthworks. • Illegal collection of flora species by construction crew and members of the public • Introduction and spread of invasive species from material brought into the project area. • Damage to flora species by construction crew not using designated routes. • Notophyll vine forest – these forest areas are environmentally significant and need to be protected from potential visitor impacts. This includes protecting some of the large native orchids (dendrobium sp.) that may be at risk from being removed and exploited.	MNES and MSES flora species that are known, likely or may occur in the Wangetti South Section: • *Archontophoenix myolensis* (Myola palm) • *Anoectochilus yatesiae* (Marbled jewel orchid • *Canarium acutifolium* • *Dendrobium fellowsii* • *Dendrobium mirbelianum* (Dark-stemmed antler orchid) • *Diplazium cordifolium* • *Diplazium pallidum* • *Myrmecodia beccarii* (Ant plant) • *Phaius pictus* • *Phalaenopsis amabilis subsp. rosenstromii* (Native moth orchid) • *Polyscias bellendenkerensis* • *Randia audasii* • *Rhomboda polygonoides* • *Toechima pterocarpum* (Orange tamarind) • *Vappodes lithocola* (Dwarf butterfly orchid) (also known as *Dendrobium lithocola,* and the Queensland Flora Census 2019 groups this species into *Dendrobium biggibum)* • *Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium bigibbum)* • *Zeuxine polygonoides* (Velvet jewel orchid) (also known as *Rhomboda polygonoides))*
Biodiversity – Fauna	• Vegetation clearance resulting in injury and mortality to the local fauna. • Vegetation clearance has the potential to impact on breeding areas for local fauna. • Construction vehicle movements. • Construction plant operation. • Soil erosion and sediment generated from earthworks. • Storage and management of waste from construction crew	MNES and MSES bird species that are known likely or may occur: • *Casuarius casuarius* (Southern cassowary) • Migratory birds (e.g. eastern curlew, great sand plover) • Non-migratory species (e.g. masked owl) MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section

Key environmental factor	Activities that would affect the factor	Applicable MNES and MSES
	• Injury and mortality of wildlife resulting from direct collision with vehicles and mountain bike riders • Illegal collection of wildlife by construction crew and members of the public • Disturbance of wildlife behaviour by increased noise from hikers and mountain bike riders • Introduction and spread of invasive species by the movement of hikers, cyclists and maintenance vehicles • Interference of local wildlife by domestic animals • Barrier effects and reduced movement to wildlife	• *Litoria dayi (*Australian lace lid*)* • *Litoria nannotis (*Waterfall frog*)* • *Litoria nyakalensis (*Mountain mistfrog) • *Litoria rheocola (*Common mistfrog) • *Litoria serrata (*Tapping green eyed frog) MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section • *Dasyurus maculatus gracilis* (Spotted-tailed quoll) • *Dasyurus hallucatus* (Northern quoll) • *Dendrolagus lumholtzi* (Lumholtz's tree-kangaroo) • *Hipposideros semoni* (Semon's leaf-nosed bat) • *Phascolarctos cinereus* (Koala) • *Pteropus conspicillatus* (Spectacled flying-fox) • *Rhinolophus robertsi* (Large-eared horseshoe bat) • *Saccolaimus saccolaimus nudicluniatus* (Bare-rumped sheath-tailed bat) • *Xeromys myoides* (Water mouse) MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section • *Stiphodon semoni* (Opal cling goby) • *Stiphodon rutilarueus* (Orange cling goby) • *Stiphodon pelewensis* (Emerald cling goby) • *Stiphodon surrufus (*Birdsong cling goby)
Biosecurity	• Introduction or spread of weeds/ pests/pathogens from construction/ operation activities or materials • Interference of local wildlife by domestic animals	MNES and MSES species as outlined in the Biodiversity – Fauna and Flora rows above. Wet Tropics World and National Heritage Area. Protected Areas - estates protected under the NC Act.
Waterways	• Earthworks - Soil erosion and sediment. • Installation of waterway crossings.	MNES and MSES amphibian and aquatic species as outlined in Biodiversity – Fauna row above.

Key environmental factor	Activities that would affect the factor	Applicable MNES and MSES
	• Earthworks and other construction activities have the potential to cause indirect degradation of aquatic habitats, particularly to opal cling goby habitat as shown in Appendix B. • Use of construction machinery in and around aquatic habitat. • The shared use trail has potential to contribute to sedimentation to the environment. The movement of hikers and mountain bike riders have the potential to cause localised habitat degradation through exposure to run-off and sedimentation, and trail widening to avoid muddy or puddled areas.	Wet Tropics World Heritage Area Waterways protected under the *Fisheries Act 1994* and *Water Act 2000* Coastal management districts protected under the *Coastal Protection and Management Act 1995*.
Soil and land management	• Earthworks - Soil erosion and sediment. • Soil compaction as a result of construction equipment moving in the area. • Construction equipment causing displacement of soils and/or rocks. • Chemicals and fuel used on-site during construction impacting on the natural environment.	Wet Tropics World Heritage Area MNES and MSES amphibian and aquatic species as outlined in Biodiversity – Fauna row above. Protected Areas - estates protected under the NC Act. Waterways protected under the *Fisheries Act 1994* and *Water Act 2000* Coastal management districts protected under the *Coastal Protection and Management Act 1995*.
Public amenity and health	• Vegetation clearance • Construction vehicle movements. • Construction plant operation • Soil erosion and earthworks. • Storage and management of waste from construction crew. • Construction activities may be visible to varying degrees by people living, working, and travelling through the surrounding areas. • Noise and vibration generated by construction plant, vehicles and equipment impacting on sensitive receptors including wildlife.	MNES and MSES species as outlined in the Biodiversity – Fauna row above Wet Tropics World and National Heritage Area Waterways protected under the *Fisheries Act 1994* and *Water Act 2000* Coastal management districts protected under the C*oastal Protection and Management Act 1995*. Protected Areas - estates protected under the NC Act.

Key environmental factor	Activities that would affect the factor	Applicable MNES and MSES

	• Noise generated by members of the public using vehicles illegally within the project area.
	• Potential air and dust impacts to sensitive receptors as a result of construction activities, attributable to exhaust emissions and fugitive dust.
	• During construction, construction activities have the potential to increase bushfire hazard. The use of construction machinery within the project area have the potential to ignite fires and include, but not limited to mini excavators; chainsaws, compactors, general construction tools and equipment such as drills, saws, sanders, etc.
	• Bushfires occurring within the project area impacting threatened flora and fauna species.
	• Steep terrain, remote location, the presence of dangerous animals and plants and potential of extreme weather events are associated with Wangetti South Section and could adversely impact on construction personnel in the following ways:
	  ○ Bites from snakes, spiders, and insects.
	  ○ Allergic reactions to plant species along the trail.
	  ○ Heat/cold exposure, falls and sprains, etc.
	  ○ Another hazard is the operation of a helicopter to transport construction material to the project area.
	  ○ Potential hostile intersection with fauna species
	  ○ Extreme weather events requiring evacuation
	• Disruption to traffic along Captain Cook Highway from construction vehicles
	• Interference with wildlife by construction vehicles
	• Impacts to sensitive environmental areas as a result of vehicles not using designated service tracks	

Key environmental factor	Activities that would affect the factor	Applicable MNES and MSES
	and/or members of the public using vehicles illegally within the project area. • Congestion of vehicles at existing parking areas.	
Waste management	• Clearing of vegetation and cut and fill activities will be required to allow for the construction of the trail, camp sites and access tracks resulting in vegetation waste and excess spoil. • Construction camps will produce general waste. • Inappropriate waste management by construction personnel.	MNES and MSES species as outlined in the Biodiversity – Fauna and Flora rows above. Wet Tropics World and National Heritage Area. Protected Areas - estates protected under the NC Act. Waterways protected under the *Fisheries Act 1994* and *Water Act 2000*
Cultural heritage	• Potential to find unrecorded cultural heritage and to disturb identified cultural heritage • Additional access to sensitive and restricts sites that may impact on Traditional Owner cultural values. • Damage to sensitive environmental areas within Wet Tropics World Heritage Area because of vehicles not using designated service tracks and/or members of the public using vehicles illegally within the project area.	MNES and MSES species as outlined in the Biodiversity – Fauna and Flora rows above. Wet Tropics World and National Heritage Area. Protected Areas - estates protected under the NC Act.

3.2 Risk assessment

The purpose of this section is to qualitatively determine the risk of potential impacts to environmental factors that could occur as a result of undertaking construction activities for Wangetti South Section without having environmental controls in place. The risk assessment methodology has been based off the risk assessment methodology in the Department of Agriculture, Water and the Environment (DAWE) Environmental Management Plan Guidelines 2014.

3.2.1 Ranking impact criteria

Each potential impact was ranked according to specific criteria namely likelihood and consequence, using the criteria in Table 3-2 and Table 3-3, respectively, where

- Likelihood is based on how likely it is that the event/issue will occur after control strategies have been put in place
- Consequence is what the consequence/result will be if the issue does occur.

These ratings are then combined using the risk assessment (refer Table 3-4) to generate a risk rating of low, medium, high or severe and have been derived from the AS/NZS ISO 31000:2009 Risk management – Principles and guidelines (Standards Australia 2009).

Table 3-2 Qualitative measure of likelihood (Australian Government Department of the Environment, 2014)

Likelihood	Qualitative measure
Highly likely	Is expected to occur in most circumstances
Likely	Will probably occur during the life of the project
Possible	Might occur during the life of the project
Unlikely	Could occur but considered unlikely or doubtful
Rare	May occur in exceptional circumstances

Table 3-3 Qualitative measure of consequences (Australian Government Department of the Environment, 2014)

Consequence	Qualitative measure
Minor	Minor incident of environmental damage that can be reversed
Moderate	Isolated but substantial instances of environmental damage that could be reversed with intensive efforts
High	Substantial instances of environmental damage that could be reversed with intensive efforts
Major	Major loss of environmental amenity and real danger of continuing
Critical	Severe widespread loss of environmental amenity and irrecoverable environmental damage

Table 3-4 Risk assessment (Australian Government Department of the Environment, 2014)

	Consequence				
	Minor	**Moderate**	**High**	**Major**	**Critical**
Highly likely	Medium	High	High	Severe	Severe
Likely	Low	Medium	High	High	Severe
Possibly	Low	Medium	Medium	High	Severe
Unlikely	Low	Low	Medium	High	High
Rare	Low	Low	Low	Medium	High

Table 3-5 summarises the predicted initial impacts the proposed construction activities can on have on environmental factors within the project area without environmental controls in place.

The subsequent residual impacts for each environmental factor based upon implementation of recommended management measures are outlined in Section 4.

Table 3-5 Risk assessment of construction activities on environmental factors for Wangetti South Section without environmental controls in place

Environmental value	Impact	Probability	Consequence	Risk
Biodiversity - flora and fauna	Construction activities resulting in the removal of vegetation, including MNES and MSES outside of the designated works area.	Possible	Moderate	Medium
	Construction activities may impact flora and fauna biodiversity in the area by reducing acceptable habitat and breeding areas for fauna and flora species.	Possible	Moderate	Medium
	Fauna strikes with vehicles are an increased risk during construction phase.	Possible	Moderate	Medium
	Development within Ecologically Significant Areas	Unlikely	Moderate	Low
	Injury or loss of native flora and fauna from the use of construction vehicles and/or equipment. Injury or loss of native flora and fauna from drivers not using designed service tracks to access the work area.	Possible	Moderate	Medium
	Additional disturbance to aquatic environments associated with construction	Possible	Moderate	Medium

Environmental value	Impact	Probability	Consequence	Risk
	and increased foot traffic and potential deviation from designated trail areas			
	Additional disturbance and disruption of flora and fauna due to increased access of area	Possible	Minor	Low
	Additional noise and vibration associated with construction/ may negatively impact flora and fauna*	Possible	Minor	Low
	Light sources generated from the construction activities adversely impacting on wildlife.	Possible	Minor	Low
	Illegal collection of flora and/or fauna species by construction crew and/or members of the public	Possible	Moderate	Medium
Biosecurity (weeds, pests and pathogens)	Introduction or spread of weeds/ pests/pathogens from construction activities or materials	Possible	Moderate	Medium
	As the trail is mostly situated within a national park, domestic animals will be prohibited. Interference of local wildlife by domestic animals is related to unintended introduction of domestic animals on the trail.	Possible	Minor	Low
Water resources	Potential for flooding to occur upstream or downstream as a result of the sizing and treatment of waterway crossings	Possible	Unlikely	Low
	Reduction in water quality through ineffective treatment of pollutant (nitrogen, phosphorous, total suspended solids and gross pollutants) load in stormwater runoff	Possible	Moderate	Medium
	Major storms and resulting flooding may cause undue erosion and impact the trail impact. Trail impact due to erosion may potentially impacts surrounding MNES habitat.	Possible	Moderate	Medium
	Potential for contamination and/or pollutant load in local drainage lines	Unlikely	Moderate	Low
	Use of construction machinery in and around waterways resulting in the degradation of aquatic habitats, bed and	Possible	Moderate	Medium

Environmental value	Impact	Probability	Consequence	Risk
	banks of waterways and adverse impacts to the opal cling goby habitat.			
Soil and land management	Movement of soils can adversely impact on dispersive soils which have a high erosion risk and tunnel and gully erosion can occur.	Possible	Moderate	Medium
	Erosion of soils may occur during construction. Trafficability could also prove difficult within upper layers (such as sand or clay) in wet conditions	Possible	Moderate	Medium
	Soil compaction as a result of construction and operation equipment and vehicles moving in the area and could prove difficult within the upper loose sandy layers and the silty clay layers if exposed and trafficked under wet conditions. The upper sandy layer often overlies the less permeable silty clay layer. This ground profile can often result in wet or saturated upper layers for some time following periods of high rainfall as the sand layer is typically limited to horizontal drainage.	Possible	Moderate	Medium
Soil and land management	Chemicals and fuels used on-site during construction phase not appropriately managed resulting in contaminating the natural environment.	Possible	Moderate	Medium
Public amenity and health	Production of greenhouse gases as a result of machinery use*	Possible	Minor	Low
	Decline of air quality related to construction machinery and dust particles* Production of greenhouse gases as a result of vehicles using the access tracks to service the trail and nodes.	Unlikely	Minor	Low
	Noise and vibration generated by construction plant, vehicles and equipment impacting on sensitive receptors including wildlife.	Possible	Moderate	Medium
	Noise generated by members of the public using vehicles illegally within the project area.	Possible	Minor	Low
	During construction, construction activities have the potential to increase bushfire	Possible	High	Medium

Environmental value	Impact	Probability	Consequence	Risk
	hazard. The use of construction machinery within the project area have the potential to ignite fires and include, but not limited to mini excavators; chainsaws, compactors, general construction tools and equipment such as drills, saws, sanders, etc			
	Interference with wildlife by construction vehicles	Possible	Moderate	Medium
	Impacts to sensitive environmental areas because of vehicles not using designated service tracks and/or members of the public using vehicles illegally within the project area.	Possible	Moderate	Medium
	Increased traffic because of construction activities and potential adverse impacts to existing communities surrounding the project area	Possible	Minor	Low
	Construction activities within the road reserve and potential adverse impacts to existing road users	Likely	Minor	Low
Public amenity and health	Steep terrain, remote location, the presence of dangerous animals and plants and potential of extreme weather events are associated with Wangetti South Section and could adversely impact on construction personnel in the following ways: • Bites from snakes, spiders, and insects. • Allergic reactions to plant species along the trail. • Heat/cold exposure, falls and sprains, etc. • Another hazard is the operation of a helicopter to transport construction material to the project area. • Potential hostile intersection with fauna species	Possible	Minor	Low
	Natural hazard events (including bushfire, landslides and storm events) occurring within the project area threatening people and structures and requiring evacuation	Possible	High	Medium

Environmental value	Impact	Probability	Consequence	Risk
Waste Management	Waste generation/ pollution of local area during construction because of inappropriate waste management by construction personnel.	Possible	Minor	Low
Cultural heritage	Potential to find unrecorded cultural heritage*and to disturb identified cultural heritage	Possible	Moderate	Medium
	Additional access to sensitive and restricts sites that may impact on Traditional Owner cultural values	Possible	Moderate	Medium
	Damage to sensitive environmental areas within Wet Tropics World Heritage Area because of vehicles not using designated service tracks and/or members of the public using vehicles illegally within the project area.	Possible	Moderate	Medium

3.3 Rationale and approach

This CEMP has been prepared with consideration of the following site-specific environmental investigations:

- Wangetti South Section Baseline Ecology and Impact Assessment Report 2020 prepared by GHD
- Four ecological field survey events were undertaken on the following dates:
  - 11 March to 15 March 2019 and this field survey focused on areas between south of Mowbray River to Campsite 5, area near Campsite 3, near Hartleys Creek and along Ellis Beach
  - 8 April to 12 April 2019: this field survey focused on areas between Hartleys Creek and Buchan Point
  - 26 August to 30 August 2019 by a team of four ecologists. This survey focused on the coastal, mountainous sections from Hartley's Creek to Turtle Cove. It also covered Simpson Point and Ellis Beach
  - 2 September to 6 September 2019: this field trip focused on the western part of the alignment (from Tresize Road to Turtle Cove) and any remaining areas surveyed from Slip Cliff Point to Redcliff Point.
- According to the 2018 Wangetti Trail Cultural Heritage Survey Report, cultural heritage ground-truthing was conducted in the following areas and dates:
  - Ellis Beach and Mount Buchan - Tuesday 24th July 2018;
  - Hartleys Creek - Wednesday 25th July 2018;

– Ellis Beach overtaking lane to Red Cliff Point - Tuesday 31st July to Thursday 2nd August 2018.

The location fauna and flora surveys undertaken in Wangetti South Section are shown in the maps in Appendix C.

The key findings are summarised in Table 3-1.

3.3.1 Key assumptions

Key assumptions associated with the development of this CEMP include the following:

- The construction period to be undertaken from April 2021 to April 2022
- A soil investigation has not been undertaken for the project and will need to be undertaken to confirm soil conditions (refer to ESCP)
- Construction teams are to be accommodated off site where practical
- Working areas will be clearly defined and demarcated and construction operations must not occur outside of the marked area
- During construction phase the Contractor is to consider having a trailer mounted portable toilet or something similar to be able to service the construction crew. The setup of temporary amenities to be located in disturbed areas and outside of areas of high ecological significance
- Designated eating areas and smoko areas are to be provided. The setup of the area to be located in disturbed areas and outside of areas of high ecological significance
- Material laydown areas are to be allocated and demarcated prior to storage of materials
- All fuels, chemicals, paints, wastes and other potentially environmentally hazardous substances must be stored in a weatherproof container with adequate bunding
- Construction crew will be required to carry their waste off site.

3.3.2 Management approach

This CEMP adopts a risk-based approach to identify and prioritise actions, which addresses the key environmental values, uses and sensitive components summarised in Table 3-5.

This CEMP adopts provisions based on industry standard practices for minimisation and rehabilitation of environmental impacts during construction. The provisions reflect the potential for indirect and direct impacts posed by construction activities, such as unauthorised clearing, dust emissions during high winds and collisions with wildlife.

3.3.3 Roles and responsibilities

This section outlines parties associated with the Wangetti South Section and the responsibilities during the construction phase. All personnel are responsible for ensuring they comply with the EMP, their General Environmental Duty (GED) and Duty to Notify in accordance with the EP Act, as detailed in Table 3-6.

Table 3-6 Environmental roles and responsibilities

Responsible parties	Responsibilities
TDPD (as proponent)	The Project Manager shall support all project personnel in the implementation of the CEMP. The Project Manager may delegate responsibilities to appropriately qualified personnel where appropriate.

Responsible parties	Responsibilities
	• The Project Manager's responsibilities are to: • Ensure that all personnel are familiar with the CEMP and are aware of their environmental responsibilities. • Ensure that all personnel operate in accordance with the CEMP, statutory approvals and legislative requirements. • Ensure necessary guidance and advice is provided to all personnel with regard to environmental management requirements. • Ensure that all relevant licenses/permits/approvals are in place prior to any works being undertaken (if required). • An audit program be developed by the contractor in consultation with TDPD and DES and following the review of the environment approval conditions and it be undertaken at the end of the construction phase. • Where necessary, coordinate and/or assist in the response to environmental incidents through implementation of corrective actions. • Report environmental incidents to relevant Administering Authority.
Contractor's Project Manager Contractor's Trail Designer/Builder	Implementation of the provisions relating to construction phase of this CEMP during the construction phase including: • Complying with the EMP, statutory approvals, legislative requirements, Australian Standards and any relevant Code of Practice and/or Industry Standard. • Provide the resources and training systems and appropriate SME trainers to develop, schedule and deliver induction to all staff and contractors including site induction and any relevant site-specific training. • Record training events and maintain personnel records. • Provide portable toilets onsite if required and ensure that maintenance and disposal of waste is conducted by a licensed contractor as required. • Ensure all vehicles arriving onsite utilise the designated entry/exit points and parking area. Ensure that all equipment is fuelled, maintained and 'fit for purpose' for the required task prior to arriving at the site. • Notify the Project Manager of environmental incidents and corrective actions taken (if any). • Record and maintain a database detailing environmental incidents and non-conformances including corrective actions taken.

3.5 Training, awareness and competence

All personnel involved in the construction process shall be required to attend a compulsory induction before commencing any work on site. The environmental component of the induction shall include (but not be limited to) the following items:

- Guidance on the significance and sensitivity of environmental features along the Wangetti Trail
- Individual's and organisation's environmental obligations under relevant environmental legislation
- The potential environmental impacts of construction (where relevant)
- Controls and procedures to prevent impacts
- All staff shall be made aware of their General Environmental Duty (GED) and Duty to Notify responsibilities as per the EP Act and the implications of failing to fulfil these duties
- All staff shall be made aware of their environmental responsibilities under the CEMP in relation to implementing mitigation measures, reporting environmental incidents and complaints and implementing corrective actions
- All staff shall be made aware of their environmental responsibilities under the CEMP in relation to contaminated land, including identification of potentially contaminated land and procedures for working with potentially contaminated land
- All staff shall be given instructions on environmental emergency response procedures (i.e. fire fighting, snake bite, spill kit locations and usage).

The environmental induction training should be developed prior to construction commencing.

Site inductions and toolbox talks

All Contractor personnel including sub-contractors will either be briefed on environmental requirements for specific construction activities or on a site-specific basis, concentrating on reinforcing practical measures. It is typical for these briefings to become a part of the Toolbox agenda. Typical topics for toolbox talks include:

- Permit conditions
- Vegetation clearing demarcations
- Refuelling plant and machinery
- Precautions to prevent sediment-laden run-off entering watercourses
- Waste management (including re-use, recycling, segregation, storage and disposal)
- Noise management measures
- Precautions for protected flora and fauna
- Wildlife care.

3.5.1 Training register

A register of all environmental training delivered during the course of the construction of the Project, (including inductions and toolbox talks), will be maintained for the duration specified by any environmental approvals. The register will be maintained to record training attendance and currency of training for each staff, contractor and visitor.

4. CEMP provisions

This section of the CEMP presents the environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control. It discusses the residual impact once controls measures are implemented, nominates performance indicators used for measuring the controls, a list of corrective actions and how the controls will be monitored.

The CEMP provisions represent the TDPD commitments for environmental management and demonstrate that construction activities will be appropriately managed to reduce impacts to MNES, MSES and other significant environmental values associated with the project area.

4.1 Biodiversity

Wangetti South Section supports an array of unique and threatened flora and fauna species and ecosystems, given that the majority of works are located within a sensitive environmental area being Macalister Range National Park and the Wet Tropics World Heritage Area. Minimising impacts to threatened species and ecosystems during the construction phase will be a key aspect of environmental management for Wangetti South.

This section outlines proposed environmental controls in response to protecting threatened flora and fauna species during the construction phase. Refer to Section 4.1.1 and 4.1.2. It also outlines proposed environmental controls in response to managing weeds, pests and pathogens during the construction phase. Refer to Section 4.1.3 below.

4.1.1 Fauna

The construction phase has the potential to impact on the threatened fauna species. Habitat for MNES and MSES fauna species that are known, likely or may occur in the Wangetti South Section could be potentially affected by proposed works are outlined in Table 4-1,

Appendix D describes and shows the potential fauna habitat types have been recorded within the Wangetti South survey area, Potential habitat for the southern cassowary is captured in the Cassowary Management Plan. Appendix B shows potential modelled habitat for opal cling goby (*Stiphodon semoni*) in vicinity of Wangetti Trail - South Section.

The biodiversity (flora) environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-1.

Table 4-1 Biodiversity (fauna) environmental factors

Factor – Biodiversity (fauna)			
Construction activities resulting in adverse impacts to the project area			
Construction activities resulting in the removal of vegetation, including MNES and MSES Construction activities may impact flora and fauna biodiversity in the area Illegal collection of wildlife Development within Ecologically Significant Areas Injury or loss of native flora and fauna Additional disturbance to aquatic environments associated with increased foot traffic and potential deviation from designated trail areas Additional disturbance and disruption of flora and fauna due to increased access of area Additional noise and vibration associated with construction/ may negatively impact flora and fauna Light sources generated from the construction adversely impacting on wildlife.			
Initial Risk with no control			
Medium to low risk			
Mitigation measures/controls	**Timing**	**Applicable MNES & MSES**	**Responsibility**
Signs will be erected along the project area to remind people that the collection of wildlife within National parks is prohibited.	During pre-start At all times	MNES and MSES bird species that are known, likely or may occur: • *Casuarius casuarius* (Southern cassowary) • Migratory birds (e.g. eastern curlew, great sand plover)	Contractor's Project Manager Site Supervisor
Site inductions and toolbox talks with the construction crew will occur prior construction to educate them about fauna species in the project area.	During pre-start		Contractor's Project Manager Site Supervisor

Factor – Biodiversity (fauna)			
Clearing of trees that provide habitat to fauna species is carried out in a way that ensures animals in the area being cleared (the clearing site) have enough time to move out of the clearing site without human intervention; The clearing must be carried out in stages.	At all times	• Non-migratory species (e.g. masked owl) MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section • *Litoria dayi (*Australian lace lid*)* • *Litoria nannotis (*Waterfall frog*)* • *Litoria nyakalensis (*Mountain mistfrog) • *Litoria rheocola (*Common mistfrog) • *Litoria serrata (*Tapping green eyed frog) MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section • *Dasyurus maculatus gracilis* (Spotted-tailed quoll) • *Dasyurus hallucatus* (Northern quoll) • *Dendrolagus lumholtzi* (Lumholtz's tree-kangaroo) • *Hipposideros semoni* (Semon's leaf-nosed bat) • *Phascolarctos cinereus* (Koala) • *Pteropus conspicillatus* (Spectacled flying-fox) • *Rhinolophus robertsi* (Large-eared horseshoe bat) • *Saccolaimus saccolaimus nudicluniatus* (Bare-rumped sheath-tailed bat)	Contractor's Project Manager Site Supervisor
Suitability qualified fauna spotter/ecologist to be available during the construction phase to provide advice. An experienced fauna spotter-catcher is to conduct an inspection of the trail alignment and public campsites ahead of vegetation disturbance and track construction clearing. The spotter must be present through all stages of clearing. Standard fauna spotter-catcher vegetation clearing protocols are to be followed, including inspection of potential habitat features prior to disturbance	During pre-start At all times		Contractor's Project Manager Site Supervisor
Speed limits are to be restricted on access roads to avoid the incidence of vehicle strike with fauna to be nominated in the Traffic Management Plan.	At all times		All personnel
A response procedure to be developed and implemented with regards to wildlife injury or mortality during construction	At all times		Contractor's Project Manager Site Supervisor
No fires are to be permitted within the project area.	At all times		All personnel
Works impacting fauna to comply with the conditions in the environmental permits issued for Wangetti South Section.	At all times		All personnel
Records of pest animals observed on site to be recorded and addressed in accordance with the provision in the weed, pest and disease management plan.	At all times		All personnel

Factor – Biodiversity (fauna)			
Sequential clearing of vegetation to allow resident fauna the opportunity to disperse away from the immediate construction area	During vegetation clearing	• *Xeromys myoides* (Water mouse) MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section • *Stiphodon semoni* (Opal cling goby) • *Stiphodon rutilarueus* (Orange cling goby) • *Stiphodon pelewensis* (Emerald cling goby) • *Stiphodon surrufus* (Birdsong cling goby)	All personnel
Opal cling goby to be managed during the construction phase in accordance with the following: • Provisions are made to minimise the risk of fish kills arising from the works e.g. through entrapment of fish upstream or between works. In the event that fish that have been trapped by the works, fish salvage activities in accordance with the Fisheries Queensland Guidelines for Fish Salvage (available at www.daf.qld.gov.au) are implemented immediately • All clearing is to comply with requirements of relevant permits and approval conditions, with specific reference to erosion and sediment control plans that clearly identify mechanisms to avoid the discharge of sediment during construction off site into local habitat. • Transit to construction sites will be via approved and designated services tracks only and speed limits of maximum 40 km/hr on formed roads. Construction vehicles will be of the smallest practical size to access the required areas.	At all times	*Stiphodon semoni* (Opal cling goby)	All personnel

Factor – Biodiversity (fauna)			
• Signs will be erected along the project area to remind people that the collection of wildlife within National parks is prohibited. • Within opal cling goby habitat, bridges will be designed to completely span suitable habitat and limit public access to waterways. No in-stream crossings will be included. • Adherence to daytime construction times only and all machinery to be silenced to manufacturers specifications. No blasting of rock is permitted. • Limiting construction equipment operating adjacent to waterways and undertaking hand construction where possible. • Undertake a pre-clearing weed survey and pre-clearing pest survey and treatment and management and report areas of existing weed infestation. • During construction phase, all machinery and vehicle hygiene protocols to be followed at all times to prevent the introduction of weeds and pathogens. Vehicles, plant and equipment to be used for the project would be required to be clean with Weed and Seed Hygiene Declaration certificates. Vehicles, plant and equipment to be inspected prior to being used to ensure they are clean. • Weed identification to be included in the site induction training. • Trail construction will minimise disruption of forest canopy wherever possible to avoid additional sunlight that can promote weed growth on forest floor. • Techniques for installing the bridges has been outlined in the Wangetti Trail Construction Methodology Manual and include spanning the full width of the waterway so that no works occurs			

Factor – Biodiversity (fauna)			
within the waterway and existing nature features are left in place within the waterway. • Construction of waterway crossings only to occur in the approved areas as documented on a map in a register. • Pre-works and post works reporting to be undertaken in accordance with the Accepted development requirements for operational work that is constructing or raising waterway barrier works, Department of Agriculture and Fisheries, 2018 and information reported in the contractor's environment system. • For any part of the waterway bed or banks adjacent to the works that has been altered by construction activities, the site is restored and/or rehabilitated so that as a minimum: • Stability and profiles of the bed and banks are re-instated to natural stream profiles and stability within five (5) business days of the completion of the works • The waterway bed is retained with natural substrate or reconstructed with substrate comparable to the natural substrate size and consistency • Site conditions allow the rapid re-establishment of native vegetation and cover or native species are replanted to re-establish the natural plant community • All vegetation that is removed is cut into small pieces and dispersed throughout the surrounding area (where possible) with no large windrows or stockpiles being present within the project area. The temporary (construction) footprint will be left in such a manner that natural regeneration of the local vegetation community will be encouraged, including soil, and weed			

Factor – Biodiversity (fauna)			
management as appropriate to the disturbance and existing environment. • Storage of fuels, chemicals, wastes and other potentially environmentally hazardous substances will be bunded or otherwise contained areas away from waterways. • No refuelling activities should take place within 50 m of a watercourse. • Degradation will be mitigated through minimising the size of the disturbance area, implementing an Erosion Sediment and Control Plan (ESCP), constructing bridges that span the width of the waterway, constructing during dry conditions, and minimising disturbance by noise, vibration and/or artificial lighting.			
Southern cassowaries to be managed during the construction phase in accordance with the provisions in the Wangetti Trail Cassowary Management Plan in the EMP. Site clearance survey of camp areas by experienced ecologist to be undertaken prior to any construction with the following requirements: • Location of potentially important cassowary foodplant trees within and immediately adjacent development footprint. • Location and orientation of permanent water in relation to development footprint. Assessment of likely cassowary access routes to any of the above resources identified (tracks, pads etc) Use of any recreational radios, playing of music, or general broadcasting will be strictly confined to in-vehicle operation whilst transiting to and from site only and not played within any highest, high or moderate priority areas during construction.	At all times	MNES and MSES bird species that are known likely or may occur: • Southern cassowary	Contractor's Project Manager Site Supervisor

Factor – Biodiversity (fauna)			
The induction program for all construction personnel will include a component on cassowary management measures and will include methodologies for de-escalating confrontational interactions. On any construction work site, should a cassowary approach the works area then works in that particular location will cease until the cassowary has left of its own accord. All construction work should have a plan for alternate work sites and tasks in this contingency. On-site standard construction hours will apply as per EP (noise) policy 2019, local government statutes and permit conditions. Adherence to daytime construction times only and all machinery to be silenced to manufacturers specifications. No blasting of rock is permitted. All machinery used in construction and operation should be silenced to manufacturers specifications and maintained to that condition. Lighting and electrical supply to the eco-accommodation and emergency lighting should be reliant on alternatives to fuel generators. Helicopters can be used for the transport of materials to sites in low and lowest priority areas where: • They are able to operate outside of the ground effect zone when hovering. • Drop zones are in low or lowest priority areas where likely cassowary occurrence is nil or extremely unlikely. • Preclearance of any drop zones for materials near watercourses or rainforest (essential habitat areas) identifies no evidence of cassowary presence. • Helicopter overfly of WTWHA is in accordance with regulatory provisions of the Wet Tropics Plan			

Factor – Biodiversity (fauna)			
• All machinery used in construction and operation should be silenced to manufacturers specifications and maintained to that condition Helicopters will not be used for the transport of construction personnel. Works adjacent permanent or significant ephemeral watercourses (e.g. bridge works) will have full erosion and sediment control measures implemented and maintained for the duration of the works as per the ESCP to be developed for the project. Where possible, all constructed watercourse crossings will be at level that will not obstruct potential cassowary movement. Preference is given to a bed level crossing that will not obstruct waterflow, and to be comprised primarily of natural material, e.g. laid stone pavements. Where there are practical limitations to the construction of bed level crossings, crossings should be designed such that their height will not obstruct cassowary movement, i.e., are capable of being stepped up onto, and over (or under). Heights are to comply with the Building Code of Australia AS 2156.2 (Walking Tracks Part 2: Infrastructure) and AS 5100 (Bridge Design) with respect to requirements for handrails. Hand rails/balustrades on bridges/crossings will pose an impediment to cassowary movement and hence crossings should be of a 'low fall' design, less than the 1300 – 1400mm specified in AS 5100 for bicycles. Permanent barrier fencing, of any sort, is not be employed in any situation. Any secured areas e.g. around waste disposal locations, should use wooden palisade fencing. Temporary fencing for construction purposes (e.g. around open pits, newly laid concrete areas) will not be made of wire, nor obstruct movement across the general site area.			

Factor – Biodiversity (fauna)			
Undertake a pre-clearing weed survey treatment and management and report areas of existing weed infestation. Pre-clearance on-ground weed, and pest surveys will be undertaken by an appropriately skilled person to confirm biosecurity matters within the project area and this will assist with determining the appropriate treatments to be used to treat weeds and pests. All machinery and vehicle hygiene protocols to be followed at all times to prevent the introduction of weeds and pathogens. Vehicles, plant and equipment to be used for the project would be required to be clean. Vehicles, plant and equipment to be inspected prior to being used to ensure they are clean. Disinfecting vehicles and machinery. This will be undertaken during the construction phase of the project and maintained throughout. Plant/machinery to be washed down at a commercial washdown facility or washdown facility at QPWS works depot prior to construction and if they used again for the different areas of the project area. Any weed infestation shall be treated at earliest stage while small and manageable. Treatment methods to be approved by WTMA, DES, TDPD and QPW, as applicable. Weed material that is cleared within the project area must be disposed of appropriately. Any weed removal as part of the construction phase will be cleared and disposed of at an approved waste disposal facility. Any infestations that subsequently establish during the construction period will be treated, and post-construction weed management of rehabilitated areas will be undertaken. The contractor will be required to complete a pre-clearing pest survey and report documenting areas of existing electric ant infestation and identifying treatment and management			

Factor – Biodiversity (fauna)			
requirements. Pre-clearance on-ground pest surveys will be undertaken by an appropriately skilled person. Before starting construction, discussions with WTMA, Douglas Shire Council and Cairns Regional Council to be undertaken during the pre-start trail review to discuss and agree on specific treatments regarding pest species including but not limited to yellow crazy ants, electric ants, pigs and dogs Feeding of cassowaries is banned in all parts of the project area and is to be a prominent message at trailhead hub locations, at camp areas. Signage will be placed in all these locations and be part of any information package given to hikers, campers, mountain bike riders. Food scraps to be disposed of into bins with closed/secured lids and removed from site daily to minimise vermin infestations.			
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise impacts to fauna within the project area.			
Performance indicator			
No injury or death to native fauna species.			
Corrective actions			
Incident	Corrective action		
Pre-clearing inspection find	If during clearing an active breeding place is identified, works should cease immediately, and a fauna spotter/catcher be contacted.		
Fauna within clearing area	Relocation of fauna captured during clearing works to an appropriate nearby habitat area to be undertaken by a fauna spotter/catcher.		

Factor – Biodiversity (fauna)	
Injured animals	To be taken immediately to a licensed wildlife carer.
Monitoring	
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.	
Any non-conformances are to be documented and reported to TDPD and rectified immediately	

4.1.2 Flora

The biodiversity (flora) environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-2.

In addition, to the environmental controls outlined in Table 4-2 below, the Wangetti Trail South Section (Wangetti to Palm Cove) Matters of national environmental significance flora pre-clearance survey methodology has been prepared for Wangetti South Section. The purpose of the Matters of national environmental significance flora pre-clearance survey methodology was to outline the pre-clearance survey methodology to be adopted before starting construction works to demonstrate how protected flora species will be identified and managed as part of the project. Protected flora considered by the document are those that are listed as MNES under the EPBC Act. The document outlines the timing of the MNES flora pre-clearance survey, the personnel required to undertake the MNES flora pre-clearance survey and the methods to be adopted. Refer to Appendix F in the EMP for a copy of the document.

Table 4-2 Biodiversity (flora) environmental factors

Factor – Biodiversity (flora)			
Construction activities resulting in adverse impacts to the project area			
Clearing of vegetation will be required to allow for the construction of the trail, camp sites and service tracks. Construction activities may impact flora biodiversity in the area Development within Ecologically Significant Areas Additional disturbance to aquatic environments associated with increased foot traffic and potential deviation from designated trail areas Additional disturbance and disruption of flora due to increased access of area Additional noise and vibration associated with construction/ may negatively impact flora and fauna			
Initial risk with no control			
Low risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
During vegetation clearing preference is given to trimming vegetation rather than clearing to retain overhead canopy.	During vegetation clearing	MNES and MSES flora species that are known, likely or may occur in the Wangetti South Section: • *Archontophoenix myolensis (*Myola palm*)* • *Anoectochilus yatesiae (*Marbled jewel orchid • *Canarium acutifolium* • *Dendrobium fellowsii* • *Dendrobium mirbelianum* (Dark-stemmed antler orchid) • *Diplazium cordifolium* • *Diplazium pallidum* • *Myrmecodia beccarii* (Ant plant)	All personnel
During the MNES flora pre-clearance survey, the botanist/ecologist will comprehensively traverse the project footprint on foot in search of MNES plants. Where an MNES flora species is encountered, the tree protection zone of the individual tree (or the host tree / adjacent tree, as relevant to the particular flora species) is to be determined and an exclusion zone established. In accordance with Australian Standard Protection of Trees on Development Sites (AS 4970-2009), the formula to use is: Tree Protection Zone radius = DBH (trunk	During vegetation clearing		Contractor's Project Manager Site Supervisor

Factor – Biodiversity (flora)			
diameter measured at 1.4 m above ground) x 12. For trees with a diameter at breast height larger than 1.5 m, a maximum tree protection zone radius of 18 m is to be established. As per AS 4970-2009, encroachment of up to 10 percent of the tree protection zone is allowable when the suitably qualified and experienced the botanist/ecologist assesses that this will not adversely affect plant health. Where an MNES plant species is detected, the botanist/ecologist will notify the trail builders, and an exclusion zone will be clearly demarcated using coloured flagging tape or bunting. The precise location of all observed MNES flora species will be recorded with a hand-held global positioning system (GPS) for future reference and for notification to relevant parties (e.g. Queensland Herbarium) and inclusion on site plans. Upon completion of works in the vicinity of an exclusion zone, all marking will be removed. Vegetation clearing must only take place in those areas where pre-clearance surveys have been completed. During the PSTR, the scope of the environmental issue is visually identified and marked as an exclusion zone (using different coloured flagging tape or bunting). The exact alignment of the trail is flagged, ensuring an adequate buffer from the exclusion zone. Detailed documentation is gathered, including photographs showing the pre-existing conditions on site before any works are undertaken. This allows for post-construction photos to be taken, which will enable before/after comparison.		• *Phaius pictus* • *Phalaenopsis amabilis subsp. rosenstromii (*Native moth orchid*)* • *Polyscias bellendenkerensis* • *Randia audasii* • *Rhomboda polygonoides* • *Toechima pterocarpum (*Orange tamarind*)* • *Vappodes lithocola (*Dwarf butterfly orchid) (also known as *Dendrobium lithocola,* and the Queensland Flora Census 2019 groups this species into *Dendrobium biggibum)* • *Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium bigibbum)* • *Zeuxine polygonoides* (Velvet jewel orchid) (also known as *Rhomboda polygonoides))*	

Factor – Biodiversity (flora)			
Toolbox talks with the construction crew will occur prior construction to educate them about flora species in the project area.	During pre-start		Contractor's Project Manager Site Supervisor
Plant operators are to exercise due care when operating to ensure any parts of trees are not damaged from blades or booms.	At all times		All personnel
Clearing for trail, public campsite and associated structure construction is to avoid, where practical, trees greater than 10 cm diameter at breast height (dbh).	At all times		All personnel
Suitability qualified botanist/ecologist to be onsite during the construction phase to provide advice.	During vegetation clearing		Contractor's Project Manager Site Supervisor
Where unavoidable, restrict vegetation clearing to the smallest practical work area with retention of vegetation associated with riparian areas.	During vegetation clearing		Contractor's Project Manager Site Supervisor
Clearing for public campsite facilities and associated structures is to be restricted to the footprint of individual features such as camping platforms, amenities blocks, rainwater tanks and tracks or raised walkways. Clearing is only to occur where it is unavoidable.	At all times		All personnel
Manual construction methods are encouraged in preference to mechanical methods	During vegetation clearing		All personnel
No unapproved clearing to occur beyond the required limits for construction	During vegetation clearing		All personnel

Factor – Biodiversity (flora)			
Identified sensitive areas are demarcated and managed appropriately with minimal impacts	During pre-start During vegetation clearing		All personnel
No burning of vegetation is to occur on site	At all times		All personnel
No collection of firewood is to take place	At all times		All personnel
All vegetation that is cleared should not be stockpiled and should be dispersed of within the 40 m corridor to resemble the natural surrounds and to allow natural decomposition processes to take place.	At all times		Contractor's Project Manager Site Supervisor
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise impacts to vegetation to the approved footprint.			
Performance indicator			
No vegetation clearing outside of the approved clearing footprint.			
Corrective actions			
Incident	Corrective action		
Clearing extends outside of the approved area	Immediately stop works and report to TDPD and Project Manager. Let areas naturally regenerate and implement weed control to manage any outbreaks. Areas to be monitored to check health and condition of regenerating areas.		
Damage to high visibility flagging and exclusion fencing	Replacement of flagging and fencing as soon as possible to reduce the potential of accidental clearing.		

Factor – Biodiversity (flora)
Monitoring
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.
Any non-conformances are to be documented and reported to TDPD and rectified immediately

4.1.3 Biosecurity

A Preliminary Weed, Pests and Disease Management Plan (WPDMP) have been developed for the construction and operational phases of Wangetti South Section. The WPDMP provides an overview of the strategy, methods and controls implemented as part of the Wangetti South Section to manage the issue of weeds, pests and diseases. Specifically, this WPDMP identifies weeds, pests and potential diseases within the Wangetti South Section and describes management strategy, to identify, avoid and, prevent/minimise and control the introduction of and spread of weeds, pests and diseases within the Wangetti South Section and to neighbouring areas.

The objectives of the WPDMP is to:

- Protect the biodiversity of the surrounding landscape of the adverse impacts from weeds
- Reduce weed infestations by integrating control methods and cost-effective management
- Manage weeds in disturbed areas and to protect rehabilitated areas
- Manage the weed species that are currently present on the site as well as off-site work areas
- Prevent introduction of new weed infestations to the Project area and adjoining areas
- Increase on-site awareness about the major weed species and manage pest species though strategic management, where possible.
- Avoid and effectively manage impacts associated with weeds, pests and diseases.

Weed and pest species and pathogens identified onsite are to be managed in accordance with the WPDMP which can be found in Appendix C of the Wangetti South EMP.

4.1 Soil and land management

Soil and land management measures will be a key aspect of environmental management for Wangetti South given the terrain, climate and that the majority of works are located within a sensitive environmental area being Macalister Range National Park and the Wet Tropics World Heritage Area.

This section outlines proposed environmental controls in response to managing soils and erosion during the construction phase. It also outlines proposed environmental controls in response to managing chemicals and fuels related to plant, vehicle and equipment used to complete works during the construction phase. Refer to Section 4.1.1 and Section 4.1.2 below.

4.1.1 Erosion and sediment control

The Department of State Development, Tourism and Innovation - Tourism Development Project Division - Wangetti Trail South Section (Wangetti to Palm Cove) Concept Erosion and Sediment Control Plan (CESCP) has been prepared for Wangetti South Section and outlines the control measures to be adopted and considered the Contractor. Refer to Appendix A in the EMP for a copy of the CESCP.

4.1.2 Chemical and fuel management

Chemicals and fuel used on site will largely be related to the equipment used to complete works and the chemicals used in the construction.

Equipment used for on-site works during the construction phase include:

- Mini Excavators
- Bobcats
- Power carriers
- Chainsaws
- Compactors
- Generators
- General construction tools and equipment (drills, saws, sanders, etc.).

Some of this equipment will require petrol to be stored on site. Equipment will be refuelled using petrol storage containers on site.

All chemicals will be stored in a designated bunded chemical storage compound located at the project site office. Chemicals will be stored according to the storage and handling requirements listed in the relevant safety data sheet and comply with AS 1940 and AS 3833, including minor storages in accordance with Section 2 of the Standards, with incompatible chemicals not stored together.

Spill kits and chemical containment measures will be maintained at the project site compound, as well as in the site vehicles when required.

The chemical and fuel management environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-3 and Table 4-5.

The fuels and oils environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-5.

Table 4-3 Chemical and fuel management environmental factors

Factor – Chemical and fuel management			
Construction activities resulting in adverse impacts to the project area			
Chemicals and fuel used on-site for project works will largely be related to the equipment used to complete works and the chemicals used in the construction. Equipment used for on-site works during the construction phase include: • Mini Excavators • Bobcats • Power carriers • Chainsaws • Compactors • Generators • General construction tools and equipment (drills, saws, sanders, etc.).			
Initial risk with no control			
Medium			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
All chemicals will be stored in a designated bunded chemical storage compound located at the project site office.	At all times	MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section • *Litoria dayi* (Australian lace lid) • *Litoria nannotis* (Waterfall frog) • *Litoria nyakalensis* (Mountain mistfrog)	All personnel
Chemicals will be stored according to the storage and handling requirements listed in the relevant safety data sheet and comply with AS 1940 and AS 3833, including minor storages in accordance with Section 2 of the Standards, with incompatible chemicals not stored together.	At all times		All personnel

Factor – Chemical and fuel management			
Refuelling and transfer operations must be done in areas with adequate containment systems, away from watercourses. Safe handling techniques will be employed during refuelling, such as using pumps to prevent spillage.	At all times	• *Litoria rheocola* (Common mistfrog) • *Litoria serrata* (Tapping green eyed frog MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section • *Stiphodon semoni* (Opal cling goby) • *Stiphodon rutilarueus* (Orange cling goby) • *Stiphodon pelewensis* (Emerald cling goby) • *Stiphodon surrufus* (Birdsong cling goby) Wet Tropics World Heritage Area National Heritage Site Waterways protected under the *Fisheries Act 1994* and *Water Act 2000* Protected Areas - estates protected under the NC Act Coastal Management District	All personnel
All plant and equipment must be maintained and operated in their proper and effective condition and no routine maintenance and servicing to be undertaken on site.	At all times		All personnel
Contaminants must not be directly or indirectly released to any waters or land.	At all times		All personnel
Spill kits and chemical containment measures will be maintained at the project site compound, as well as in the site vehicles when required.	At all times		All personnel
Spills are to be isolated, stopped and contained and will be cleaned up utilising onsite spill kits. Waste to be placed in a sealed container, suitable to hold such materials and waste to be consigned to a contractor licensed to receive such wastes for disposal.	At all times		All personnel
In an instance of a spill, irrespective of the quantity, a report detailing the incident, investigations, corrective actions and monitoring requirements will be prepared.	At all times		Contractor's Project Manager Site Supervisor
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for accidental spills, with any spills appropriately captured and managed.			

Factor – Chemical and fuel management	
Performance indicator	
No contamination of water quality, soil, and vegetation as a result of the storage and handling of chemicals and fuels	
Appropriate storage of fuels and chemicals	
Adequately maintained spill response kits and procedures	
Corrective actions	
Incident	Corrective action
If a spill is identified	Undertake corrective actions outlined in the spill containment procedure.
Containers damaged or bunded areas in poor condition	Fix bunded areas to be in working order.
Appropriate equipment in spill kits	If spill kits are lacking equipment, equipment is to be replaced as soon as possible.
Monitoring	
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.	
Any non-conformances are to be documented and reported to TDPD and rectified immediately	

Table 4-4 Hazardous materials environmental factors

Factor – Hazardous materials			
Construction activities resulting in adverse impacts to the project area			
Hazardous materials used on-site for project works will largely be related to the equipment and materials used to complete works.			
Initial risk with no control			
Medium risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
Material Safety Data Sheets (MSDS) are to be available to all personnel for all chemicals that are stored on site.	At all times	MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section • *Litoria dayi* (Australian lace lid) • *Litoria nannotis* (Waterfall frog) • *Litoria nyakalensis* (Mountain mistfrog) • *Litoria rheocola* (Common mistfrog) • *Litoria serrata* (Tapping green eyed frog MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section • *Stiphodon semoni* (Opal cling goby) • *Stiphodon rutilarueus* (Orange cling goby) • *Stiphodon pelewensis* (Emerald cling goby) • *Stiphodon surrufus* (Birdsong cling goby)	Contractor's Project Manager Site Supervisor
Hazardous waste (i.e. paint, thinners, cleaning materials, petrochemicals and other toxic chemicals) must be stored at a dedicated hazardous waste container/containment area. The hazardous waste must be disposed of as a registered waste handling facility for toxic/hazardous materials/chemicals	At all times		Contractor's Project Manager Site Supervisor
Hazardous materials should be stored in a contained, stable and safe environment with relevant labels placed on storage containers and lids firmly applied to prevent spillage	At all times		All personnel
Special care must be taken to avoid the spillage of hazardous materials/chemicals onto the ground or into water resources	At all times		All personnel
A mixing of concrete to take place on an impermeable surface	At all times		All personnel
No wastewater from concrete mixing is to be discharged to the receiving environment.	At all times		All personnel

Factor – Hazardous materials			
		Wet Tropics World Heritage Area National Heritage Site Waterways protected under the *Fisheries Act 1994* and *Water Act 2000* Protected Areas - estates protected under the NC Act Coastal Management District	
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for accidental spills, with any spills appropriately captured and managed.			
Performance indicator			
No contamination of water quality, soil, and vegetation, as a result of the storage and handling of hazardous materials.			
Appropriate storage of hazardous materials.			
Adequately maintained spill response kits and procedures			
Corrective actions			
Incident	Corrective action		
If a spill is identified	Undertake corrective actions outlined in the spill containment procedure.		
Containers damaged or bunded areas in poor condition	Fix bunded areas to be in working order.		
Appropriate equipment in spill kits	If spill kits are lacking equipment, equipment is to be replaced as soon as possible.		

Factor – Hazardous materials
Monitoring
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.
Any non-conformances are to be documented and reported to TDPD and rectified immediately

Table 4-5 Fuels and oils environmental factors

Factor – Fuels and oils			
Construction activities resulting in adverse impacts to the project area			
Fuels and oils used on-site for project works will largely be related to the equipment and materials used to complete works.			
Initial risk with no control			
Medium risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
Fuel shall be stored in appropriate storage containers or bunded areas away from waterways.	At all times	MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section • *Litoria dayi* (Australian lace lid) • *Litoria nannotis* (Waterfall frog) • *Litoria nyakalensis* (Mountain mistfrog) • *Litoria rheocola* (Common mistfrog) • *Litoria serrata* (Tapping green eyed frog MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section	All personnel
Refuelling of machinery shall conform with the following: i. Occur away from waterways unless for tracked machinery and contingency plan management measures are available in the immediate area; ii. Fuelling activity to be supervised at all times; and iii. Hoses to be fitted with a stop valve at the nozzle end. For smaller equipment that may require more regular re-fuelling (e.g. chainsaws, a limit of 5 litres of extra fuel in an appropriate container can be kept along the trail). Spill kits will also be available	At all times		All personnel

Factor – Fuels and oils			
on site for all personnel to use. All personnel will be trained in spill response procedures and in the use of spill kits.		• *Stiphodon semoni* (Opal cling goby) • *Stiphodon rutilarueus* (Orange cling goby) • *Stiphodon pelewensis* (Emerald cling goby) • *Stiphodon surrufus* (Birdsong cling goby) MNES and MSES flora species that are known, likely or may occur in the Wangetti South Section: • *Archontophoenix myolensis (*Myola palm*)* • *Anoectochilus yatesiae (*Marbled jewel orchid • *Canarium acutifolium* • *Dendrobium fellowsii* • *Dendrobium mirbelianum* (Dark-stemmed antler orchid) • *Diplazium cordifolium* • *Diplazium pallidum* • *Myrmecodia beccarii* (Ant plant) • *Phaius pictus* • *Phalaenopsis amabilis subsp. rosenstromii (*Native moth orchid*)* • *Polyscias bellendenkerensis* • *Randia audasii* • *Rhomboda polygonoides* • *Toechima pterocarpum (*Orange tamarind*)* • *Vappodes lithocola (*Dwarf butterfly orchid) (also known as *Dendrobium lithocola,* and the Queensland Flora Census 2019	
No refuelling activities to occur within 50 m of a watercourse.	At all times		All personnel
Site supervisor should be supplied with the contact number for the local fire department unit.	At all times		All personnel
All chemical storage and handling will be in accordance with material SDS, with appropriate firefighting equipment (e.g. specific fire extinguisher types) identified in the SDS to be maintained on-site.	At all times		Contractor's Project Manager Site Supervisor
Adequate fire suppression equipment should be on site.	At all times		Contractor's Project Manager Site Supervisor
Machinery will be used and serviced as per manufacturer's instructions.	At all times		All personnel
No burning of any substances, including wooden debris or products, will be undertaken as part of this project.	At all times		All personnel

Factor – Fuels and oils			
		groups this species into *Dendrobium biggibum)* • *Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium bigibbum)* • *Zeuxine polygonoides* (Velvet jewel orchid) (also known as *Rhomboda polygonoides))* Wet Tropics World Heritage Area National Heritage Site Waterways protected under the *Fisheries Act 1994* and *Water Act 2000* Protected Areas - estates protected under the NC Act Coastal Management District	
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for accidental spills, with any spills appropriately captured and managed.			
Performance indicator			
No contamination of water quality, soil, and vegetation as a result of the storage and handling of hazardous materials.			
Appropriate storage of hazardous materials.			
Adequately maintained spill response kits and procedures			

Factor – Fuels and oils	
Corrective actions	
Incident	Corrective action
If a spill is identified	Undertake corrective actions outlined in the spill containment procedure. Where spills occur compromised soil/vegetation should be treated as hazardous waste and disposed of accordingly.
Containers damaged or bunded areas in poor condition	Fix bunded areas to be in working order.
Appropriate equipment in spill kits	If spill kits are lacking equipment, equipment is to be replaced as soon as possible.
Monitoring	
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.	
Any non-conformances are to be documented and reported to TDPD and rectified immediately	

4.2 Cultural heritage

Sections of the Wangetti South Section are considered to have high cultural heritage values. Environmental management for the project should adhere to the measures in the Aboriginal Cultural Heritage Act 2003 Duty of Care Guidelines. The project would constitute a Category 5 development and should not proceed without cultural heritage assessment.

The Wangetti South Section is also located within the Wet Tropics World Heritage Area, which is recognised as a national heritage place for both natural and Indigenous values.

The cultural heritage environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-6.

Table 4-6 Cultural heritage environmental factors

Factor – Cultural heritage			
Construction activities resulting in adverse impacts to the project area			
Clearing of vegetation will be required to allow for the construction of the trail, camp sites and access tracks which may impact on cultural heritage sites. Damage to sensitive environmental areas within Wet Tropics World Heritage Area as a result of vehicles not using designated service tracks and/or members of the public using vehicles illegally within the project area.			
Initial risk with no control			
Medium risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
All works are to be undertaken in accordance with the *Queensland Heritage Act 1992*, ACH Act and the Duty of Care Guidelines unless otherwise agreed in a CHMP.	At all times	Wet Tropics World Heritage Area National Heritage Site Waterways protected under the *Fisheries Act 1994* and *Water Act 2000* Protected Areas - estates protected under the NC Act Coastal Management District	All personnel
All site personnel shall attend environmental training as part of the site induction process prior to entering the work site. As part of this training, a cultural heritage induction should be delivered by the nominated cultural heritage officer to all site personnel before entering the site, with the notification procedure in the event of an unexpected find to be clearly indicated during the induction	At all times		All personnel
In the event of a find the following actions are to be undertaken: 1. FIND: A potential Cultural Heritage item or object is found. 2. STOP: STOP WORK IMMEDIATELY and install an exclusion zone around the area. 3. NOTIFY: Notify a responsible person (e.g. Site Supervisor, Project Manager).	At all times		All personnel

Factor – Cultural heritage			
4. MANAGE: Report the discovery to the project manager for advice on management. Cease operations and follow cultural heritage reporting procedure. Report to TDPD and Project Manager. Protocols to follow as outlined in the Cultural Heritage Agreement. Let areas naturally regenerate and implement weed control to manage any outbreaks. Areas to be monitored to check health and condition of regenerating areas. Construction Manager should be notified immediately who will then notify the Archaeologist appointed to the project Archaeologist is to provide management recommendations to the Construction Manager and will liaise (if necessary) with the Department of Environment and Science to ensure compliance with the Queensland Heritage Act 1992 and the ACH Act.			
Within the WTWHA minimise clearing to designed and demarcated areas; weed and pest management to avoid disturbance and degradation of flora and fauna environmental values.	Prior to construction		Contractor's Project Manager Site Supervisor
Prior to conducting construction works within the WTWHA the contractor conducting the works has been informed of the requirements of the Wet Tropics Permit No: WTMA20001a The works supervisor has obtained a briefing describing the natural values of the subject site from the relevant QPWS Ranger or a Wet Tropics Management Authority officer. The works supervisor must also be given direction by the relevant QPWS Ranger or a Wet Tropics Management Authority officer as to the nature and extent of the clearing or earthworks to be undertaken.	Prior to construction		Contractor's Project Manager Site Supervisor

Factor – Cultural heritage	
Residual risk within control in place	
Low risk - Implementation of recommended mitigation measures will minimise the potential for accidental spills, with any spills appropriately captured and managed.	
Performance indicator	
No damage to known or unknown to cultural heritage sites.	
Corrective actions	
Incident	Corrective action
Construction works extend outside of approved disturbance footprint and uncover of cultural heritage artefact.	Cease operations and follow cultural heritage reporting procedure. Report to TDPD and Project Manager. Protocols to follow as outlined in the Cultural Heritage Agreement. Let areas naturally regenerate and implement weed control to manage any outbreaks. Areas to be monitored to check health and condition of regenerating areas.
Monitoring	
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.	
Any non-conformances are to be documented and reported to TDPD and rectified immediately	

4.3 Water management

Wangetti South Section traverses several watercourses protected under the *Water Act 2000* and *Fisheries Act 1994*. The shared use trail will require a number of waterway crossings to be installed over waterways to allow hikers and mountain bikers to safely cross the waterways.

The exact and type of structure proposed as the waterway crossings will be determined by the trail builder and will comprise of the following options: rock armouring, boulder crossings and low-level bridge (minor water crossing).

Habitat for the following MNES and MSES fauna species that are known, likely or may occur in the Wangetti South Section could be potentially affected by proposed works within and adjoining waterways and they include:

- *Casuarius casuarius* (Southern cassowary)
- *Litoria dayi* (Australian lace lid)
- *Litoria nannotis* (Waterfall frog)
- *Litoria nyakalensis* (Mountain mistfrog)
- *Litoria rheocola* (Common mistfrog)
- *Litoria serrata* (Tapping green eyed frog)
- *Xeromys myoides* (Water mouse)
- *Stiphodon semoni* (Opal cling goby)
- *Stiphodon rutilarueus* (Orange cling goby)
- *Stiphodon pelewensis* (Emerald cling goby)
- *Stiphodon surrufus* (Birdsong cling goby).

Appendix D describes and shows the potential fauna habitat types have been recorded within the Wangetti South survey area, including potential breeding and calling habitat for amphibians, potential feeding and breeding habitat for aquatic species and foraging and breeding habitat for fish species.

Potential habitat for the southern cassowary is captured in the Cassowary Management Plan.

Appendix B shows potential modelled habitat for opal cling goby (*Stiphodon semoni*) in vicinity of Wangetti Trail - South Section.

The water resources potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-7.

Table 4-7 Water management environmental factors

Factor – Water management			
Construction activities resulting in adverse impacts to the project area			
A number of low-level bridges and crossings and gully crossing style bridges for minor waterway crossings will be used to minimise the loss of aquatic habitats. Instream crossings, including boulder rock crossings will be designed during the detailed design to maintain natural characteristics of the waterway and not impact flows or fish passage			
Initial risk with no control			
Medium risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
All construction phase related aspects of the ESCP (refer to the EMP) are to be implemented	At all times	MNES and MSES species that are known, likely or may occur in the Wangetti South Section and could be potentially affected by proposed works within and adjoining waterways and they include: • *Casuarius casuarius* (Southern cassowary) • *Litoria dayi* (Australian lace lid) • *Litoria nannotis* (Waterfall frog) • *Litoria nyakalensis* (Mountain mistfrog) • *Litoria rheocola* (Common mistfrog) • Litoria serrata (Tapping green eyed frog) • Xeromys myoides (Water mouse)	All personnel
Construction of waterway crossings only to occur in the approved areas as documented on a map in a register.	At all times		All personnel
No refuelling activities should take place within 50 m of a watercourse.	At all times		All personnel
Degradation will be mitigated through minimising the size of the disturbance area, implementing an Erosion Sediment and Control Plan (ESCP), constructing bridges that span the width of the waterway, constructing during dry conditions, and minimising disturbance by noise, vibration and/or artificial lighting.	At all times		All personnel
Provisions are made to minimise the risk of fish kills arising from the works e.g. through entrapment of fish upstream or between works. In the event that fish that have been trapped by the works, fish salvage activities in accordance with the Fisheries Queensland	During works within waterways.		All personnel

Factor – Water management			
Guidelines for Fish Salvage (available at www.daf.qld.gov.au) are implemented immediately		• *Stiphodon semoni* (Opal cling goby) • *Stiphodon rutilarueus* (Orange cling goby) • *Stiphodon pelewensis* (Emerald cling goby) • *Stiphodon surrufus* (Birdsong cling goby). Wet Tropics World Heritage Area National Heritage Site Waterways protected under the *Fisheries Act 1994* and *Water Act 2000* Protected Areas - estates protected under the NC Act Coastal Management District	
Fish kills must be reported in accordance with the emergency procedure.	During works within waterways.		All personnel
Where possible, all constructed watercourse crossings will be at level that will not obstruct potential cassowary movement. Preference is given to a bed level crossing that will not obstruct waterflow, and to be comprised primarily of natural material, e.g. laid stone pavements. Where there are practical limitations to the construction of bed level crossings, crossings should be designed such that their height will not obstruct cassowary movement, i.e., are capable of being stepped up onto, and over (or under). Heights are to comply with the Building Code of Australia AS 2156.2 (Walking Tracks Part 2: Infrastructure) and AS 5100 (Bridge Design) with respect to requirements for handrails. Handrails/balustrades on bridges/crossings will pose an impediment to cassowary movement and hence crossings should be of a 'low fall' design, less than the 1300 – 1400 mm specified in AS 5100 for bicycles.	During works within waterways.		All personnel
Limit the use of machinery within waterways. Use machinery no greater than the capacity required for the purpose.	During works within waterways.		All personnel
Excess spoil, if generated, shall be disposed of in a suitable disposal area outside of the WTWHA, unless prior approval has been sought from WTMA.	At all times		All personnel
Pre-works and post works reporting to be undertaken in accordance with the Accepted development requirements for operational work	At all times		Contractor's Project Manager

Factor – Water management			
that is constructing or raising waterway barrier works, Department of Agriculture and Fisheries, 2018 and information reported in the contractor's environment system.			Site Supervisor
No major alterations to waterway bed/banks. For any part of the waterway bed or banks adjacent to the works that has been altered by construction activities. The site is restored and/or rehabilitated so that as a minimum: • Stability and profiles of the bed and banks are re-instated to natural stream profiles and stability within five (5) business days of the completion of the works • The waterway bed is retained with natural substrate or reconstructed with substrate comparable to the natural substrate size and consistency • Site conditions allow the rapid re-establishment of native vegetation and cover or native species are replanted to re-establish the natural plant community	During works within waterways.		All personnel
Works within/adjacent to waterways to comply with the conditions in the environmental permits issued for Wangetti South Section.	At all times		All personnel
Within opal cling goby habitat, bridges will be designed to completely span suitable habitat and limit public access to waterways. No in-stream crossings will be included.	At all times	*Stiphodon semoni* (Opal cling goby)	Contractor's Project Manager Site Supervisor
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for impacts to waterways.			
Performance indicator			
No residual impacts to waterways.			

Factor – Water management	
Corrective actions	
Incident	Corrective action
Impacts to waterways outside of approved areas.	Reinstate any changes to the waterway.
Monitoring	
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.	
Weather conditions to be monitored and temporary controls established during extreme weather events.	
Any non-conformances are to be documented and reported to TDPD and rectified immediately.	

4.4 Waste management

TDPD is committed to undertaking the project sustainability, and to minimise waste production during the project.

While the production of waste during construction is expected to be minimal, waste will be disposed of according to the waste and resource management hierarchy:

2. AVOID unnecessary resource consumption
3. REDUCE waste generation and disposal
4. RE-USE waste resources without further manufacturing
5. RECYCLE waste resources to make the same or different products
6. RECOVER waste resources, including the recovery of energy
7. TREAT waste before disposal, including reducing the hazardous nature of waste
8. DISPOSE of waste only if there is no viable alternative.

An indication of the types and an estimate of the volume of waste produced during the project is provided below:

- Waste soil material – no soil to be removed from site unless contaminated
- Miscellaneous waste – worker's personal waste, to be removed and disposed daily.

The following waste management controls detailed in Table 4-8 are proposed to meet the requirements of the *Waste Reduction and Recycling Act 2011* (Qld) and associated regulations.

Table 4-8 Waste management environmental factors

Factor – Waste management			
Construction activities resulting in adverse impacts to the project area			
Clearing of vegetation and cut and fill activities will be required to allow for the construction of the trail, camp sites and access tracks resulting in vegetation waste and excess spoil. Construction camps will produce general waste. Inappropriate waste management by construction personnel.			
Initial risk with no control			
Low risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
All project personnel will be instructed in applicable waste management practices as a part of the environmental induction process.	At all times	MNES and MSES bird species that are known, likely or may occur: • *Casuarius casuarius* (Southern cassowary) • Migratory birds (e.g. eastern curlew, great sand plover) • Non-migratory species (e.g. masked owl) MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section • *Litoria dayi* (Australian lace lid) • *Litoria nannotis* (Waterfall frog) • *Litoria nyakalensis* (Mountain mistfrog) • *Litoria rheocola* (Common mistfrog)	Contractor's Project Manager Site Supervisor
All vegetation waste to be cut into practical sizes and placed at edge of clearings to naturally decompose. Material from any restricted invasive plant species will be cleared and disposed of at an approved waste disposal facility.	At all times		Contractor's Project Manager Site Supervisor
All general refuse and food wastes to be collected and transported to a local government approved disposal site and suitable bins will be provided for waste streams (general and recyclable) to reduce proclivity of waste to attract fauna and pest species.	At all times		All personnel
Adopt the waste management hierarchy (i.e. avoid, re-use, recycle, energy recover and disposal), before materials are considered	At all times		Contractor's Project Manager Site Supervisor

Factor – Waste management			
waste for disposal in landfill, determine if they can first be recycled, reused or recovered.		• *Litoria serrata (*Tapping green eyed frog)	
General housekeeping shall be undertaken on an ongoing basis to keep the site clean, and housekeeping duties monitored to ensure that waste is contained appropriately and site is clean at all times	At all times	MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section • *Dasyurus maculatus gracilis* (Spotted-tailed quoll) • *Dasyurus hallucatus* (Northern quoll) • *Dendrolagus lumholtzi* (Lumholtz's tree-kangaroo) • *Hipposideros semoni* (Semon's leaf-nosed bat) • *Phascolarctos cinereus* (Koala) • *Pteropus conspicillatus* (Spectacled flying-fox) • *Rhinolophus robertsi* (Large-eared horseshoe bat) • *Saccolaimus saccolaimus nudicluniatus* (Bare-rumped sheath-tailed bat) • *Xeromys myoides* (Water mouse) MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section • *Stiphodon semoni* (Opal cling goby) • *Stiphodon rutilarueus* (Orange cling goby) • *Stiphodon pelewensis* (Emerald cling goby)	All personnel
No on-site burial or burning of waste material.	At all times		All personnel
Excavated soils will be reused on site where possible.	At all times		All personnel
Any wastewater shall be collected and appropriately disposed of offsite. Disposal of water onsite is only to be undertaken if analysis has proven the water suitable.	At all times		All personnel
Provide portable toilets onsite if required during the construction phase and ensure that maintenance and disposal of waste is conducted by a licensed contractor as required. The setup of temporary amenities to be located in disturbed areas and outside of areas of high ecological significance. Where trail builders are required to camp overnight along the trail due to the remoteness of the area, they will be required to carry all rubbish out; bury human waste at least 100 m from streams and at least 15 cm deep, or carry it out.	At all times		Contractor's Project Manager Site Supervisor

Factor – Waste management			
		• *Stiphodon surrufus (Birdsong cling goby)* MNES and MSES flora species that are known, likely or may occur in the Wangetti South Section: • *Archontophoenix myolensis (*Myola palm*)* • *Anoectochilus yatesiae (*Marbled jewel orchid • *Canarium acutifolium* • *Dendrobium fellowsii* • *Dendrobium mirbelianum* (Dark-stemmed antler orchid) • *Diplazium cordifolium* • *Diplazium pallidum* • *Myrmecodia beccarii* (Ant plant) • *Phaius pictus* • *Phalaenopsis amabilis subsp. rosenstromii (*Native moth orchid*)* • *Polyscias bellendenkerensis* • *Randia audasii* • *Rhomboda polygonoides* • *Toechima pterocarpum (*Orange tamarind*)* • *Vappodes lithocola (*Dwarf butterfly orchid) (also known as *Dendrobium lithocola,* and the Queensland Flora Census 2019 groups this species into *Dendrobium biggibum)* • *Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis* and the Queensland Flora Census	

Factor – Waste management			
		2019 groups this species into *Dendrobium bigibbum)* • *Zeuxine polygonoides* (Velvet jewel orchid) (also known as *Rhomboda polygonoides))* Protected Areas - estates protected under the NC Act Wet Tropics World Heritage Area National Heritage Site Waterways protected under the *Fisheries Act 1994* and *Water Act 2000*	
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for incorrect waste management.			
Performance indicator			
No land or water contamination as a result of inappropriate waste management.			
Wastes minimised and opportunities for reuse and recycling identified and implemented			
All waste disposal to be removed from site.			
Corrective actions			
Incident	Corrective action		
Improper waste management	Inspect waste storage areas. If area is untidy or unkempt, undertake measures to rectify.		

Factor – Waste management
Monitoring
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.
Any non-conformances are to be documented and reported to TDPD and rectified immediately

4.5 Public amenity and health

Sensitive receptors (e.g. existing residences, places of work, schools, agricultural or ecologically significant areas/species that could be impacted) within and surrounding the Project that may be potentially affected by the proposed construction works associated with Wangetti South Section include:

- Wet Tropics World Heritage Area and National Heritage area including wildlife
- National Parks
- Residential communities within Palm Cove and Wangetti.

Wangetti South Section is predominantly within an area which has been subjected to very limited disturbance and is set back from urbanises areas. Construction related activities have the potential to adversely impact on the amenity of the area.

Wangetti South Section is also characterised by steep terrain, is home to dangerous animals and plants and there is the potential for extreme weather events to occur in the area. All of these matters could have adverse impacts on construction personnel working within Wangetti South Section during the construction phase.

This section outlines proposed environmental controls in response to protecting the amenity of the area, managing bushfire and extreme weather events, managing dangerous animals and plants and managing traffic during the construction phase. Refer to Table 4-9, Section 4.5.1 to Section 4.5.5.

Table 4-9 Public amenity environmental factors

Factor – Public amenity			
Construction activities resulting in adverse impacts to the project area			
Construction activities may be visible to varying degrees by people living, working, and travelling through the surrounding areas.			
Initial risk with no control			
Low risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
Construction equipment, stockpiles and other visible elements to be located away from views to or from sensitive visual receptors.	At all times	Wet Tropics World and National Heritage Area Waterways protected under the *Fisheries Act 1994* and *Water Act 2000* Coastal management districts protected under the C*oastal Protection and Management Act 1995*. Protected Areas - estates protected under the NC Act	All personnel
Construction work area to be marked out and fenced to restrict construction crew to the works area.	At all times		All personnel
Should equipment or stockpiles be located in visually prominent locations for any reasonable period of time, incorporate screening measures and practices to keep areas tidy.	At all times		All personnel
Provide notification to surrounding properties of upcoming works.	At all times		All personnel
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for incorrect waste management.			
Performance indicator			
No complaints from the public.			

Factor – Public amenity	
Corrective actions	
Incident	Corrective action
Visual amenity complaint	Inspect the area for where the complaint was made to ensure all equipment and stockpiling is adequately stored. If area is untidy or unkempt, undertake measures to rectify.
Monitoring	
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.	
Any non-conformances are to be documented and reported to TDPD and rectified immediately	

4.5.1 Bushfire

Bushfires pose a significant risk to human safety, for both the construction personnel working on the trails but also other local residents and workers. Bushfires also pose a significant threat to threatened flora and fauna. The main hazards related to bushfire are the risk of works on-site being an ignition source for a bushfire and the risk of a bushfire in the region impacting on site works.

With this in mind, the following practices detailed in Table 4-10 have been identified to reduce the likelihood of site works contributing to a bushfire, as well as measures to control a fire should site works result in a fire being ignited.

Table 4-10 Bushfire environmental factors

Factor – Bushfire			
Construction activities resulting in adverse impacts to the project area			
The site is located within the very high potential intensity and bushfire hazard buffer of the bushfire hazard overlay. During construction, construction activities have the potential to increase bushfire hazard. The use of construction machinery within the project area have the potential to ignite fires and include, but not limited to mini excavators; chainsaws, compactors, general construction tools and equipment such as drills, saws, sanders, etc. Bushfires occurring within the project area impacting threatened flora and fauna species			
Initial risk with no control			
Medium risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
Fire extinguishers to be kept in all vehicles, as well as the project site office and/or work areas.	At all times	MNES and MSES flora species that are known, likely or may occur in the Wangetti South Section: • *Archontophoenix myolensis (*Myola palm*)* • *Anoectochilus yatesiae (*Marbled jewel orchid • *Canarium acutifolium* • *Dendrobium fellowsii* • *Dendrobium mirbelianum* (Dark-stemmed antler orchid) • *Diplazium cordifolium* • *Diplazium pallidum* • *Myrmecodia beccarii* (Ant plant) • *Phaius pictus* • *Phalaenopsis amabilis subsp. rosenstromii (*Native moth orchid*)* • *Polyscias bellendenkerensis* • *Randia audasii* • *Rhomboda polygonoides*	All personnel
Fuel shall be stored in appropriate storage containers.	At all times		All personnel
Fire management plan is to be developed for the construction phase of the project, in conjunction with WTMA. The nominated construction contractor of the trail and public campsites will be required to develop a bushfire management plan as part of their contract.	Prior to construction		Contractor's Project Manager Site Supervisor
All chemical storage and handling will be in accordance with material SDS, with appropriate firefighting equipment (e.g. specific fire extinguisher types) identified in the SDS to be maintained on-site.	At all times		Contractor's Project Manager Site Supervisor
Adequate fire suppression equipment should be on site.	At all times		All personnel
No burning of any substances, including wooden debris or products, will be undertaken as part of this project.	At all times		All personnel

Factor – Bushfire			
Toolbox talks with the construction crew will occur prior construction to educate them about bushfire management, bushfire hazards and evacuation routes.	At all times	• *Toechima pterocarpum (*Orange tamarind*)* • *Vappodes lithocola (*Dwarf butterfly orchid) (also known as *Dendrobium lithocola,* and the Queensland Flora Census 2019 groups this species into *Dendrobium biggibum)* • *Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium bigibbum)* • *Zeuxine polygonoides* (Velvet jewel orchid) (also known as *Rhomboda polygonoides))* MNES and MSES bird species that are known, likely or may occur: • *Casuarius casuarius* (Southern cassowary) • Migratory birds (e.g. eastern curlew, great sand plover) • Non-migratory species (e.g. masked owl) MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section • *Litoria dayi* (Australian lace lid) • *Litoria nannotis* (Waterfall frog) • *Litoria nyakalensis* (Mountain mistfrog)	Contractor's Project Manager Site Supervisor
Working during the fire season, ensure that each team has at least one team member who has been trained in basic bushfire awareness	During pre-start		Contractor's Project Manager Site Supervisor
During the fire season, each team must always have the following equipment on hand: • Viable, functioning, two-way communications – e.g. mobile phone, UHF radio or satellite phone. Each team needs to be able to contact each other team and external contacts and each team needs to be contactable; • One filled and operational knapsack pump or charged airwater extinguisher (not less than 9L capacity); • Two rake hoes; • Weather instruments capable of measuring temperature, wind speed and humidity; • Fire Weather Log Book.	At all times		All personnel
During the fire season, chainsaw work to be scheduled to take place early in the morning, when fire danger risk is lowest.	At all times		All personnel
During the fire season, prior to starting chainsaw work: • Ensure that the immediate area has been manually cleared of twigs, leaves, scrub and other flammable material; • Have another staff member act as spotter. Spotter to standby at all times while chainsaw is being used; • Ensure that the knapsack is on hand, filled and ready for use.	At all times		All personnel

Factor – Bushfire			
Working on Total Fire Ban Days – If TDPD approves work to go ahead, then the following rules must be applied: • Only work in areas with good communication including mobile phone reception • Only work in areas with quick/easy access where vehicles can be parked close by • No operating excavators, chainsaws, brush cutters, or any other machinery/equipment that could conceivably emit sparks during operation • Generally, all work should be conducted with hand tools only • Ensure all workers have adequate sun protection • Ensure all workers work to the conditions and drink plenty of water	At all times	• *Litoria rheocola* (Common mistfrog) • *Litoria serrata* (Tapping green eyed frog) MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section • *Dasyurus maculatus gracilis* (Spotted-tailed quoll) • *Dasyurus hallucatus* (Northern quoll) • *Dendrolagus lumholtzi* (Lumholtz's tree-kangaroo) • *Hipposideros semoni* (Semon's leaf-nosed bat) • *Phascolarctos cinereus* (Koala) • *Pteropus conspicillatus* (Spectacled flying-fox) • *Rhinolophus robertsi* (Large-eared horseshoe bat) • *Saccolaimus saccolaimus nudicluniatus* (Bare-rumped sheath-tailed bat) • *Xeromys myoides* (Water mouse) MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section • *Stiphodon semoni* (Opal cling goby) • *Stiphodon rutilarueus* (Orange cling goby) • *Stiphodon pelewensis* (Emerald cling goby)	All personnel
On TFB days, the following weather monitoring protocols apply: • At arrival to site in the morning, check weather observations and record in Fire weather logbook • Before returning to work, check weather observations and record in Fire weather logbook • Before returning to work after lunch, check weather observations and record in Fire weather logbook • Before returning to work after afternoon smoko, check weather observations and record in Fire weather logbook • If there is a fire danger, consider suspending operations and leaving site.	At all times		All personnel

Factor – Bushfire			
		• *Stiphodon surrufus* (Birdsong cling goby) Wet Tropics World Heritage Area National Heritage Site Waterways protected under the *Fisheries Act 1994* and *Water Act 2000* Protected Areas - estates protected under the NC Act Coastal Management District	
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise impacts to fauna within the project area.			
Performance indicator			
No injury or death to humans or native fauna species, loss of vegetation and/or damage to property or buildings.			
Corrective actions			
Incident	Corrective action		
Fire starts during the construction phase Replacement of firefighting equipment.	Staff re- trained in the use of firefighting equipment. Staff re- trained to minimise exposure to hazardous materials.		
Monitoring			
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.			
At the start of each working week (or some other agreed schedule) provide reports to TDPD depending on work locations) stating the trails being worked on, their location and the number of personnel working on each. Report to provide contact details for key personnel in construction crew.			

Factor – Bushfire
At the start of each working week, check the weather forecast and note any potential high-risk days (i.e. high-risk days are those with high temperatures and high winds. They generally only occur during the hot summer months or during periods of drought)
On the day before any anticipated high-risk days, check to see if a Total Fire Ban (TFB) has been called for the area. Local fire bans will be checked to see if they are in place, with any project works that pose a high fire risk not performed during this time. If a TFB day has been called, contact DES via the Shadow Ranger immediately to discuss whether it is safe/appropriate to work.
During the fire season, the following weather monitoring protocols apply: • At arrival to site in the morning, check weather observations and record in Fire Weather Log Book • Before returning to work after lunch, check weather observations and record in Fire Weather Log Book
Any non-conformances are to be documented and reported to TDPD and rectified immediately

4.5.2 Hazards, health and safety

Wangetti South Section traverses an area which is susceptible to a number of hazards, health and safety matters. This section provides a summary of the existing hazard, health and safety matters within the project area and immediate surrounds. It also assesses the potential impacts as a result the construction activities.

The majority of Wangetti South Section will be located within national park offering a remote trail experience to hikers and mountain bikers and as a result carries an inherent risk for the users detailed in Table 4-11.

Another hazard is the operation of a helicopter to transport construction material to the project area.

The hazards, health and safety environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-11.

Table 4-11 Hazards, health and safety environmental factors

Factor – Hazards, health, and safety			
Construction activities resulting in adverse impacts to the project area			
Steep terrain, remote location, the presence of dangerous animals and plants and potential of extreme weather events are associated with Wangetti South Section and could adversely impact on construction personnel in the following ways: • Bites from snakes, spiders, and insects. • Allergic reactions to plant species along the trail. • Heat/cold exposure, falls and sprains, etc. • Another hazard is the operation of a helicopter to transport construction material to the project area. • Potential hostile intersection with fauna species • Extreme weather events requiring evacuation			
Initial risk with no control			
Low risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
All health and safety related aspects of the Traffic Management Plan (in the EMP)) as it relates to the construction phase are to be adhered to.	At all times	MNES and MSES bird species that are known likely or may occur; Southern cassowary Protected Areas - estates protected under the NC Act Wet Tropics World Heritage Area National Heritage Site	All personnel
Appropriate Personal Protective Equipment (PPE) must be worn by all personnel on site (i.e. steel-cap boots, high-vis shirt/vest as appropriate, etc.)	At all times		All personnel
Helicopter operations to be carefully controlled, and clustered into half or full day blocks. Helicopter operations to be scheduled to	At all times		Contractor's Project Manager Site Supervisor

Factor – Hazards, health, and safety			
occur on a recurring fortnightly/monthly basis (as required), with operations organised in advance. The Contractor to liaise with TDPD Project Manager to coordinate the use of helicopters and ensure all permits and approvals are obtained prior to operations commencing. Contractor to map out helicopter staging area locations for the project. All aircraft used for construction material delivery or waste removal shall be flown not less than 1000ft above ground level when operating over the World Heritage Area unless: a) Taking off or landing; or b) Flying at a level that is reasonably necessary for safety purposes; or c) Flying over infrastructure footprints.			
Workplace health and safety plans need to be developed and implemented by the contractor on site.	At all times		All personnel
All signage installed with the project area must have a unique 'location identification number' on it, to be quoted in case of emergency. Emergency responders would be provided with GPS coordinates corresponding to each 'location identification number' and instructions about the most direct and reliable routes of access to that point.	At all times		All personnel
Identify any locations where mobile phone coverage is poor or unavailable.	At all times		All personnel

Factor – Hazards, health, and safety			
Toolbox talk with construction crew about working within difficult terrain and procedure to follow.	At all times		All personnel
First aid kits to be available on site.	At all times		All personnel
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for incorrect waste management.			
Performance indicator			
No injuries to construction personnel.			
Corrective actions			
Incident	Corrective action		
Injury as a result of improper use of construction material or from flora and fauna.	Identify action and prepare corrective action to manage any future impacts. Administer first aid treatment (as required).		
Monitoring			
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.			
Any non-conformances are to be documented and reported to TDPD and rectified immediately			

4.5.3 Noise and vibration

Due to the proximity of the trails to population centres, the number of noise-sensitive receptors that may be impacted by site works is limited as identified by the following:

- Residents in close proximity to site works (at the trail head/entry and exit points)
- Wildlife inhabiting the park.

Site works that may contribute to noise that impacts on these receptors include:

- The use of chainsaws
- The use of excavation equipment
- The use of compacting equipment
- The use of power carriers
- Helicopters
- Vehicular use (4WD, ATV).

Vehicle use will involve the carting of materials and equipment to and from the works sites. The nature of the site and the location of works in bushland means that the main noise-sensitive receptors that will be impacted by site works are park visitors and wildlife inhabiting the park. As such, management actions have been designed to reduce the impact of noise on these receptors.

Hazards related to vibration works will be associated with track compaction works. However, the risk from vibration work should be minimal and localised.

The main noise-sensitive receptors that will likely be impacted by site works are users of the national park and the local fauna. As such, management actions have been designed to reduce the impact of noise on these receptors.

The noise and vibration environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-12.

Table 4-12 Noise and vibration environmental factors

Factor – Noise and vibration			
Construction activities resulting in adverse impacts to the project area			
Due to the proximity of the trails to population centres, the number of noise-sensitive receptors that may be impacted by site works is limited as identified by the following: • Residents in close proximity to site works (noting this is limited); • Wildlife inhabiting the park. Site works that may contribute to noise that impacts on these receptors include: • The use of chainsaws • The use of excavation equipment • The use of compacting equipment • The use of power carriers • Helicopters • Vehicular use (4WD, ATV). Noise generated by members of the public using vehicles illegally within the project area.			
Initial risk with no control			
Low risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
Notifying adjoining residences of the timing of construction works prior to undertaking construction works and providing them with a contact in case they have questions.	Prior to construction commencing	MNES and MSES bird species that are known, likely or may occur: • *Casuarius casuarius* (Southern cassowary) • Migratory birds (e.g. eastern curlew, great sand plover) • Non-migratory species (e.g. masked owl)	TDPD
All construction vehicles to comply with maintenance schedules and has up to date service records and operational restrictions designed to limit noise impacts during construction.	At all times		Contractor's Project Manager Site Supervisor
Vehicles and machinery to be switched off when not in use.	At all times		All personnel

Factor – Noise and vibration			
Equipment is to be fitted with noise control devices.	At all times	MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section • *Litoria dayi (*Australian lace lid*)* • *Litoria nannotis (*Waterfall frog*)* • *Litoria nyakalensis (*Mountain mistfrog) • *Litoria rheocola (*Common mistfrog) • *Litoria serrata (*Tapping green eyed frog) MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section • *Dasyurus maculatus gracilis* (Spotted-tailed quoll) • *Dasyurus hallucatus* (Northern quoll) • *Dendrolagus lumholtzi* (Lumholtz's tree-kangaroo) • *Hipposideros semoni* (Semon's leaf-nosed bat) • *Phascolarctos cinereus* (Koala) • *Pteropus conspicillatus* (Spectacled flying-fox) • *Rhinolophus robertsi* (Large-eared horseshoe bat) • *Saccolaimus saccolaimus nudicluniatus* (Bare-rumped sheath-tailed bat) • *Xeromys myoides* (Water mouse)	All personnel
Helicopters can only be used for the transport of materials to construction sites in low and lowest priority areas where: They are able to operate outside of the ground effect zone when hovering. • Drop zones are in low or lowest priority areas where likely cassowary occurrence is nil or extremely unlikely. • Preclearance of any drop zones for materials near watercourses or rainforest (essential habitat areas) identifies no evidence of cassowary presence. • Helicopter overfly of WTWHA is in accordance with regulatory provisions of the Wet Tropics Plan • Helicopters can be used in any area where emergency evacuation is required. Helicopters will not be used for the transportation of construction personnel.	At all times		Contractor's Project Manager Site Supervisor

Factor – Noise and vibration			
		MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section • *Stiphodon semoni* (Opal cling goby) • *Stiphodon rutilarueus* (Orange cling goby) • *Stiphodon pelewensis* (Emerald cling goby) • *Stiphodon surrufus (Birdsong cling goby)* Protected Areas - estates protected under the NC Act Wet Tropics World Heritage Area National Heritage Site	
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for noise and vibration impacts to listed threatened species, residents, and other wildlife within the Wet Tropics.			
Performance indicator			
Negligible noise and vibration impacts to sensitive receptors. No noise complaints			
Corrective actions			
Incident		Corrective action	
Construction equipment requiring a service resulting in additional noise produced.		Vehicles and equipment to be serviced as soon as possible	

Factor – Noise and vibration	
Receiving complaints about excess noise and vibration impacting sensitive receivers	Reporting incidents relating to noise and/or vibration are the responsibility of all personnel onsite at all times and are to be recorded and managed in a complaints register with the corrective actions undertaken. The contractor in the construction phase will be required to develop a complaints management system and register and seek approval from TDPD, DES and QPWS.
Monitoring	
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.	
Any non-conformances are to be documented and reported to TDPD and rectified immediately	

4.5.4 Air quality

The Project is predominantly within an area which is previously undisturbed. As such, air quality is largely influenced by the coastal location and surrounding related to the natural environment including bird calls and vegetation movements from wind. There are also a number of sensitive receivers located along Wangetti South Section including national parks and residential areas in the southern extent.

It is anticipated that limited air quality nuisances will be generated as a result of the Project, with the construction phase representing the highest potential for air quality changes. During construction, the use of machinery will have the most significant impact on air quality. However, these impacts are anticipated to be minor and short term and intermittent as works progress along the trail alignment.

The air quality environmental factors potentially impacted by the construction activities, the proposed environmental controls in response to the impact, when the control will be implemented and who is responsible for implementing the control are detailed in Table 4-13.

Table 4-13 Air quality environmental factors

Factor – Air quality			
Construction activities resulting in adverse impacts to the project area			
Potential air and dust impacts to sensitive receptors as a result of construction activities, attributable to exhaust emissions and fugitive dust.			
Initial risk with no control			
Low risk			
Mitigation measures/controls	**Timing**	**Applicable MNES and MSES**	**Responsibility**
Consider weather conditions and prevailing winds when conducting construction activities that may result in air emissions. Reduce clearing during periods of high wind.	At all times	MNES and MSES flora species that are known, likely or may occur in the Wangetti South Section: • *Archontophoenix myolensis (*Myola palm*)* • *Anoectochilus yatesiae (*Marbled jewel orchid • *Canarium acutifolium* • *Dendrobium fellowsii* • *Dendrobium mirbelianum* (Dark-stemmed antler orchid) • *Diplazium cordifolium* • *Diplazium pallidum* • *Myrmecodia beccarii* (Ant plant) • *Phaius pictus* • *Phalaenopsis amabilis subsp. rosenstromii (*Native moth orchid*)* • *Polyscias bellendenkerensis* • *Randia audasii* • *Rhomboda polygonoides* • *Toechima pterocarpum (*Orange tamarind*)*	All personnel
Wetting the road/work area during dry periods to reduce dust being generated.	At all times		All personnel
Construction vehicles to be cleaned of soils before driving on sealed roads to reduce dust being generated.	At all times		All personnel
A maximum speed limit of 40 km/hr shall apply to access roads and tracks to minimise the potential for dust generation.	At all times		All personnel
All temporary soil stockpiles will be covered, stabilised and/or moistened as required to prevent generation of dust particles.	At all times		All personnel
Soil stockpiles will be kept minimal to prevent any wind erosion.	At all times		All personnel
Stockpiles that are anticipated to be present in the medium (1-3 months) and long term (>3 months) are to be covered to minimise dust emissions.	At all times		All personnel

Factor – Air quality			
All vehicles carrying loads with the potential to create dust shall cover their loads.	At all times	• *Vappodes lithocola (*Dwarf butterfly orchid) (also known as *Dendrobium lithocola,* and the Queensland Flora Census 2019 groups this species into *Dendrobium biggibum)* • *Vappodes phalaenopsis (Cooktown orchid) (Also known as Dendrobium phalaenopsis and the Queensland Flora Census 2019 groups this species into Dendrobium bigibbum)* • *Zeuxine polygonoides* (Velvet jewel orchid) (also known as *Rhomboda polygonoides))* MNES and MSES bird species that are known, likely or may occur: • *Casuarius casuarius* (Southern cassowary) • Migratory birds (e.g. eastern curlew, great sand plover) • Non-migratory species (e.g. masked owl) MNES and MSES amphibian species that are known, likely or may occur in the Wangetti South Section • *Litoria dayi* (Australian lace lid) • *Litoria nannotis* (Waterfall frog) • *Litoria nyakalensis* (Mountain mistfrog) • *Litoria rheocola* (Common mistfrog)	All personnel
Minimal ground disturbance during construction to reduce dust emissions.	At all times		All personnel
At the commencement of the construction, the entire trail will be broken into Construction Segments. The Construction Segments assist in reducing the amount of area to be exposed during the construction phase, which in turns reduces impacts to the natural environment and reduces the impact to the movement of wildlife in the area.	Prior to construction		Contractor's Project Manager Site Supervisor
Vehicles, plant and equipment will be regularly serviced and comply with Australian Design Standards.	At all times		All personnel
All machinery and equipment are to have proprietary emission control equipment fitted and in working order.	At all times		All personnel
When not in use, vehicles and machinery shall be turned off.	At all times		All personnel

Factor – Air quality			
		• *Litoria serrata* (Tapping green eyed frog) MNES and MSES mammal species that are known, likely or may occur in the Wangetti South Section • *Dasyurus maculatus gracilis* (Spotted-tailed quoll) • *Dasyurus hallucatus* (Northern quoll) • *Dendrolagus lumholtzi* (Lumholtz's tree-kangaroo) • *Hipposideros semoni* (Semon's leaf-nosed bat) • *Phascolarctos cinereus* (Koala) • *Pteropus conspicillatus* (Spectacled flying-fox) • *Rhinolophus robertsi* (Large-eared horseshoe bat) • *Saccolaimus saccolaimus nudicluniatus* (Bare-rumped sheath-tailed bat) • *Xeromys myoides* (Water mouse) MNES and MSES aquatic species that are known, likely or may occur in the Wangetti South Section • *Stiphodon semoni* (Opal cling goby) • *Stiphodon rutilarueus* (Orange cling goby) • *Stiphodon pelewensis* (Emerald cling goby)	

Factor – Air quality			
		• *Stiphodon surrufus* (Birdsong cling goby) Wet Tropics World Heritage Area National Heritage Site Protected Areas - estates protected under the NC Act	
Residual risk within control in place			
Low risk - Implementation of recommended mitigation measures will minimise the potential for impacts to air quality.			
Performance indicator			
Negligible air and dust impacts to sensitive receptors.			
Corrective actions			
Incident	Corrective action		
Vehicles and equipment servicing not up to date	Vehicles and equipment to be serviced as soon as possible.		
Monitoring			
Weekly inspections to assess the implementation of the above mitigation measures with records kept in a weekly environmental checklist.			
Any non-conformances are to be documented and reported to TDPD and rectified immediately			

4.5.5 Roads and traffic

A Preliminary Traffic Management Plan (TMP) have been developed for the construction and operational phases of Wangetti South Section. The TMP provides preliminary guidance to help establish appropriate traffic control and traffic management procedures manage potential hazards associated with the traffic environment during the Project and to reduce potential adverse impacts to people and wildlife during the construction and operational phases of the Project.

It is expected that prior to any construction activity and operational activity for the Project, a detailed work specific TMP will be developed by the contractor as part of the EMP. The contractor should review the preliminary guidance provided in this TMP and provide greater detail based on construction methodology, operational activities, and timing of works. The TMP will also need to be in general accordance with the MUTCD, Austroads Guide to Traffic Management and Transport and Main Roads Specifications MRTS02 Provision for Traffic.

Refer to Appendix D in the EMP for a copy of the TMP.

5. Work completion

At the completion of each construction trail segment and the Dark Jungle campground, the Contractor will undertake rehabilitation of all temporary disturbed areas that are not associated with long standing fixtures of the Wangetti trail and Dark Jungle. This will involve:

- Remove all flagging tape that may still be visible;
- Removal any rubbish or construction debris;
- Remove all construction equipment and machinery;
- Leave in place any sediment control measures for a duration as agreed and determined by the DES Shadow Ranger. As a minimum, sediment control measures should be retained until the Trail Curing Period has finished dependent on weather conditions and the trail or Construction Segment is deemed ready to be opened to the public;
- Trim any tree branches that may protrude into the riding or walking corridor;
- Trim or remove any sharp tree stumps within the fall zone adjacent to the trail;
- Check that any imported surfacing materials or raised embankments have been compacted to a suitable level;
- Check that all rock work is stable and secure;
- Check that the trail is draining as intended – i.e. no puddling of water anywhere on the trail, all grade reversals have a clear outlet and are draining effectively with no blockages, that any outsloped sections of trail have the appropriate gradients and there are no blockages along the lower edge;
- If excavators and other plant/machinery are being relocated to another project or a different area, they are to be washed down at a commercial washdown facility or washdown facility at QPWS works depot.
- Scattering cut vegetation (excluding weeds) into the surrounding environment, without smothering existing vegetation

Should at any time, any aspect of the activity be closed or decommissioned, all construction equipment and material must be removed off site and the disturbed site must be rehabilitated to a condition with a suitable vegetation cover that is the same or better than the surrounding environment

On completion of the construction works, the Contractor shall decommission their facilities and related works and ensure that the site is clean and left in a state which is safe, stable and non-polluting. Further details are in the rehabilitation plan has been developed for Wangetti South Section and is in the EMP.

6. Monitoring and environmental inspections

The contractor will be required to develop an environment monitoring plan and schedule to be approved by TDPD for the construction phase of Wangetti South Section and to include the following requirements in Table 6-1.

Table 6-1 Construction phase monitoring requirements

Environmental Aspect	Monitoring requirements
Biodiversity (fauna)	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Biodiversity (flora)	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Bushfire, heavy rainfall and other extreme weather events.	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	At the start of each working week (or some other agreed schedule) provide reports to TDPD depending on work locations) stating the trails being worked on, their location and the number of personnel working on each. Report to provide contact details for key personnel in construction crew.
	At the start of each working week, check the weather forecast and note any potential high-risk days (i.e. high-risk days are those with high temperatures and high winds. They generally only occur during the hot summer months or during periods of drought).
	On the day before any anticipated high-risk days, check to see if a Total Fire Ban (TFB) has been called for the area. Local fire bans will be checked to see if they are in place, with any project works that pose a high fire risk not performed during this time. If a TFB day has been called, contact DES via the Shadow Ranger immediately to discuss whether it is safe/appropriate to work.
	During the fire season, the following weather monitoring protocols apply: At arrival to site in the morning, check weather observations and record in Fire Weather Log Book.
	Before returning to work after lunch, check weather observations and record in Fire Weather Log Book.
	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.

Environmental Aspect	Monitoring requirements
	At the start of each working week (or some other agreed schedule) provide reports to TDPD depending on work locations) stating the trails being worked on, their location and the number of personnel working on each. Report to provide contact details for key personnel in construction crew.
	At the start of each working week, check the weather forecast and note any potential high-risk days (i.e. high-risk days are those with high rainfall and high winds). They generally only occur during the hot summer months.
	Check with local area news for any heavy rainfall events or forecast cyclones for the region.
Chemical and fuel management	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Cultural heritage	Monitoring in accordance with the project's Cultural Heritage Management Plan (CHMP).
Erosion and sediment control	A formal monitoring and maintenance program prior to site establishment. The monitoring and maintenance program shall make allowance for required site inspections.
Water management	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Weather conditions to be monitored and temporary controls established during extreme weather events.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Noise and vibration	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Waste management	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Hazards, health, safety	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Air quality	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.

Environmental Aspect	Monitoring requirements
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.
Roads and traffic	The following parameters will be included in a monitoring program to be developed by the construction contractor: • The speed limits throughout the project area (regular basis). • Vehicle routes within project area and on existing road network (regular basis). • Drive behaviour within project area (Ongoing on a case by case basis). • Traffic flow to manage congestion (as required) • Interactions with wildlife (Ongoing on a case by case basis) Interactions with other road users (Ongoing on a case by case basis).
	Traffic Management Inspection to be undertaken for the project.
	Regular performance/compliance audits of the Contractor's traffic control measures to be undertake and feedback provided.
	The following parameters will be included in a monitoring program to be developed by the operator: • The speed limits throughout the project area (regular basis) • Vehicle routes within project area and on existing road network (regular basis) • Traffic flow to manage congestion (as required) • Interactions with wildlife (Ongoing on a case by case basis) • Interactions with other road users (Ongoing on a case by case basis)
	Traffic Management Inspection to be undertaken for the project.
	Regular performance/compliance audits of the Contractor's traffic control measures to be undertake and feedback provided.
Public amenity	Weekly inspections to assess the implementation of the mitigation measures identified within the environmental management sub plans with records kept in a weekly environmental checklist.
	Any non-conformances are to be documented and reported to TDPD and rectified immediately.

7. Audit

During construction activities, compliance audits will be conducted in accordance with the requirements of CEMP as well as construction procedures, relevant legislation, licence and permit conditions and industry standards.

An audit program be developed by the contractor in consultation with TDPD and DES and following the review of the environment approval conditions and it be undertaken at the end of the construction phase.

All inspection and audit reports of environmental performance will be stored in an electronic database that is used to enable corrective actions identified during the inspection/auditing process to be recorded, tracked and closed out. The information will be made available to the relevant regulatory authorities as required.

8. Review

During the construction phase TDPD will regularly review and (if necessary) update the CEMP. The review will take into account the following:

- Changes in legislative requirements (including conditions of approvals)
- Environmental performance, findings of environmental audits and inspections
- Outcomes of agency consultation
- Outcomes of consultation with communities and resolution of complaints
- Changes in external and internal policies, standards and guidelines.

The review will ensure the continuing suitability, adequacy, and effectiveness of the EMP. The review will include assessing opportunities for improvement.

9. Emergency incident planning and response

Emergency and incident responses will vary depending on the nature of the incident.

TDPD will be verbally notified of an incident on the day it occurs and as soon as practicable of the responsible person becoming aware of the incident, and in writing within 24 hours.

All notifications to authorities including but not limited to Wet Tropics Management Authority (WTMA), Department of Environment and Science (DES), Queensland Parks and Wildlife Service (QPWS)), State emergency services (police/fire/ambulance) and Department of Transport and Main Roads will be undertaken by TDPD.

The Contractor will be required to provide an Emergency Response Plan and for this plan to be thoroughly communicated to all staff members in the Construction Induction. The Emergency Response Plan should identify evacuation routes, mustering points, communication protocols and provide key contact details for local authorities and services. It should be compatible with the internal emergency response protocols of the various land managers.

When reporting environmental incidents to TDPD, the following information is to be provided:

- The name and contact details of the reporting person
- The date and time the environmental incident occurred
- The activity that was being undertaken when the incident occurred
- How the incident occurred
- Any containment measures put in place to reduce or contain environmental harm
- An assessment of the amount of environmental harm that occurred
- If any other stakeholders are aware of the incident.

Environmental incidents and emergencies have been identified within Section 4. However, pro-active environmental risk management measures should be undertaken wherever possible, if events such as extreme rainfall or flooding are forecast.

Some examples of environmental risk responses are provided in Table 9-1 below.

Table 9-1 Example environmental incidents and mitigation and reporting requirements

Incident	Mitigation Measures	Report
Failure of erosion and sediment control devices following rainfall event or flooding	Re-instatement of ESC devices	Report to TDPD
Identification of cultural heritage aspects during excavation	Cease operations and follow cultural heritage reporting procedure	Report to TDPD
Injury to fauna during site works	Following notification procedure.	Report to TDPD
Damage to vegetation	Cease operations in the vicinity of impacted vegetation. Attempt to stabilise area and engage project botanist.	Report to TDPD

10. References

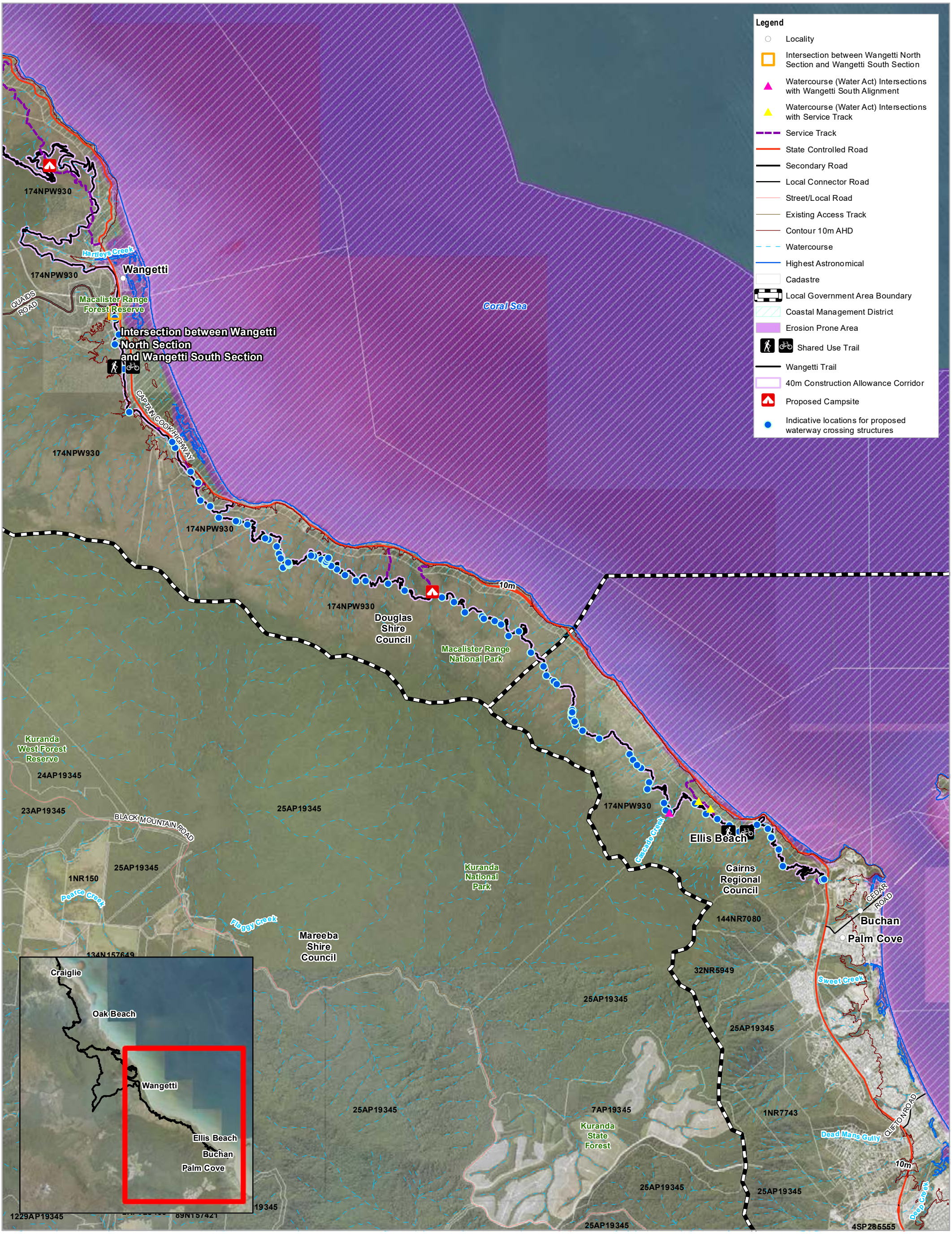
Australian Government Department of the Environment 2014. Environmental Management Plan Guidelines 2014. Available from: https://www.environment.gov.au/epbc/publications/environmental-management-plan-guidelines

GHD Pty Ltd 2020. Department of State Development, Tourism and Innovation - Wangetti Trail South Section (Wangetti to Palm Cove) Matters of National Environmental Significance Baseline Ecology and Impact Assessment Report, Final Version, July 2020

World Trail Pty Ltd 2020. *Wangetti Trail Construction Methodology Manual April* 2020.

Appendices

Appendix A – Waterways within Wangetti South Section



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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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DITID
Environment Assessment Stage 2 Wangetti Trail

Waterways,Coastal Management District and Erosion Prone Area Wangetti South Section

Project No. 41-32458
Revision No. 0
Date 16/12/2020

Appendix A-1

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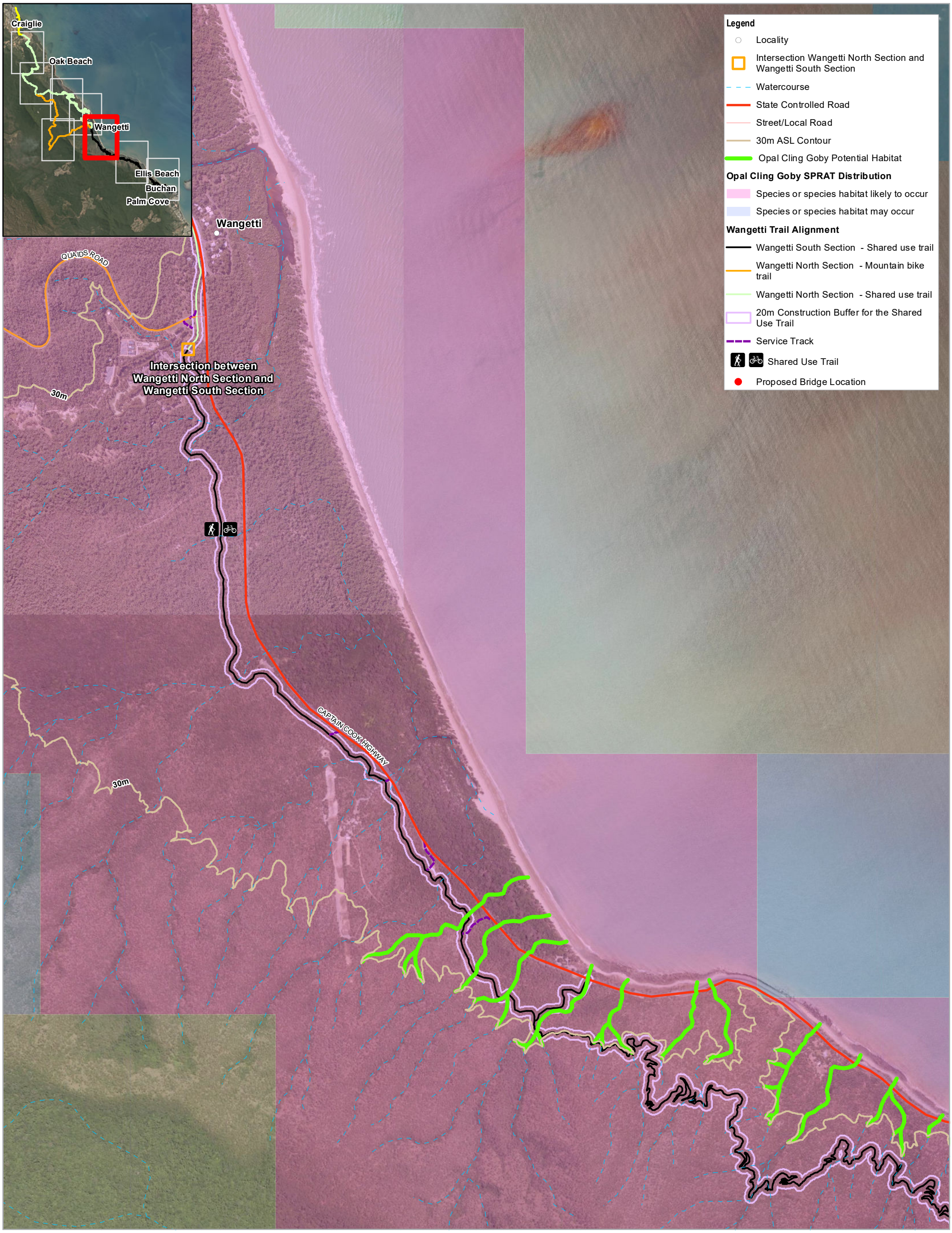
Print date: 16 Dec 2020 - 15:14

Data source: DITID/GHD: Wangetti Trail Alignment (11/2020); DNRME: Roads (2019), Cadastre (2019), Watercourse (2014), Place Names (2016), Rail (2016), Imagery (2016), Local Government Area Boundary (2018), Contours (2016), Erosion Prone Areas (2013); DEHP: Coastal Management District (2016); DES: Protected Area (2018); WTMA: Proposed Campsite (2020), Zoning Boundary (2019); GHD: Section Intersections - Wangetti North, Wangetti South (2020), Service Tracks (2020), 40m Construction Allowance Corridor (2020), Indicative Waterway Crossing Locations (2020), Watercourse (WIM) Intercetions with Wangetti South Alignment and Service Tracks (2020). Created by: xlee

Appendix B - Potential and marginal habitat for the opal cling goby (*Stiphodon semoni)* in the vicinity of the Wangetti South Section and proposed location of single span bridges



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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

DITID
Environment Assessment Stage 2 Wangetti Trail

Potential Modelled Habitat for opal cling goby *(Stiphodon semoni)* in vicinity of Wangetti Trail - South Section

Project No. **41-32458**
Revision No. **B**
Date **1/12/2020**

APPENDIX E
(Sheet 1 of 3)

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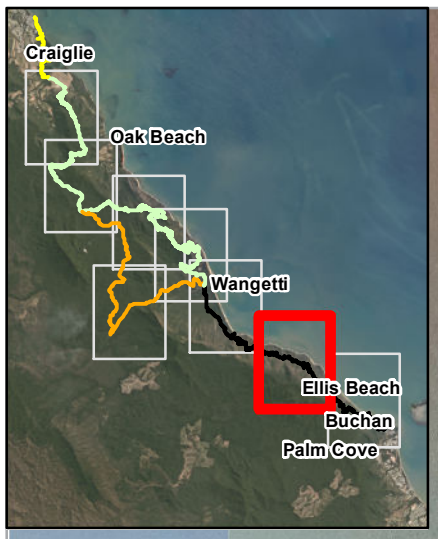
Print date: 01 Dec 2020 - 14:31

Data source: DITID/GHD: Proposed Infrastructure (2019), Wangetti Trail Alignment (04/2020); DNRME: Roads (2016), Watercourse (2014), Imagery (2015), 30m ASL Contour (2016); GHD: Opal Cling Goby Potential and Marginal Habitat (2020), Section Intersections - Mowbray North, Wangetti North, Wangetti South (2020); WTMA: Proposed Camp and Amenities Block (2020); DAWE and GHD: SPRAT Distribution created by and digitised by GHD (2020) . Created by: xlee



Legend

- Watercourse
- State Controlled Road
- 30m ASL Contour
- Opal Cling Goby Potential Habitat

Opal Cling Goby SPRAT Distribution

- Species or species habitat likely to occur
- Species or species habitat may occur

Wangetti Trail Alignment

- Wangetti South Section - Shared use trail
- 20m Construction Buffer for the Shared Use Trail
- Service Track
- Proposed Bridge Location
- Dark Jungle Amenities Block Footprint

CAPTAIN COOK HIGHWAY

30m

Paper Size ISO A3

0 100 200 300 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

DITID
Environment Assessment Stage 2 Wangetti Trail

Potential Modelled Habitat for opal cling goby *(Stiphodon semoni)* in vicinity of Wangetti Trail - South Section

Project No. **41-32458**
Revision No. **B**
Date **1/12/2020**

APPENDIX E
(Sheet 2 of 3)

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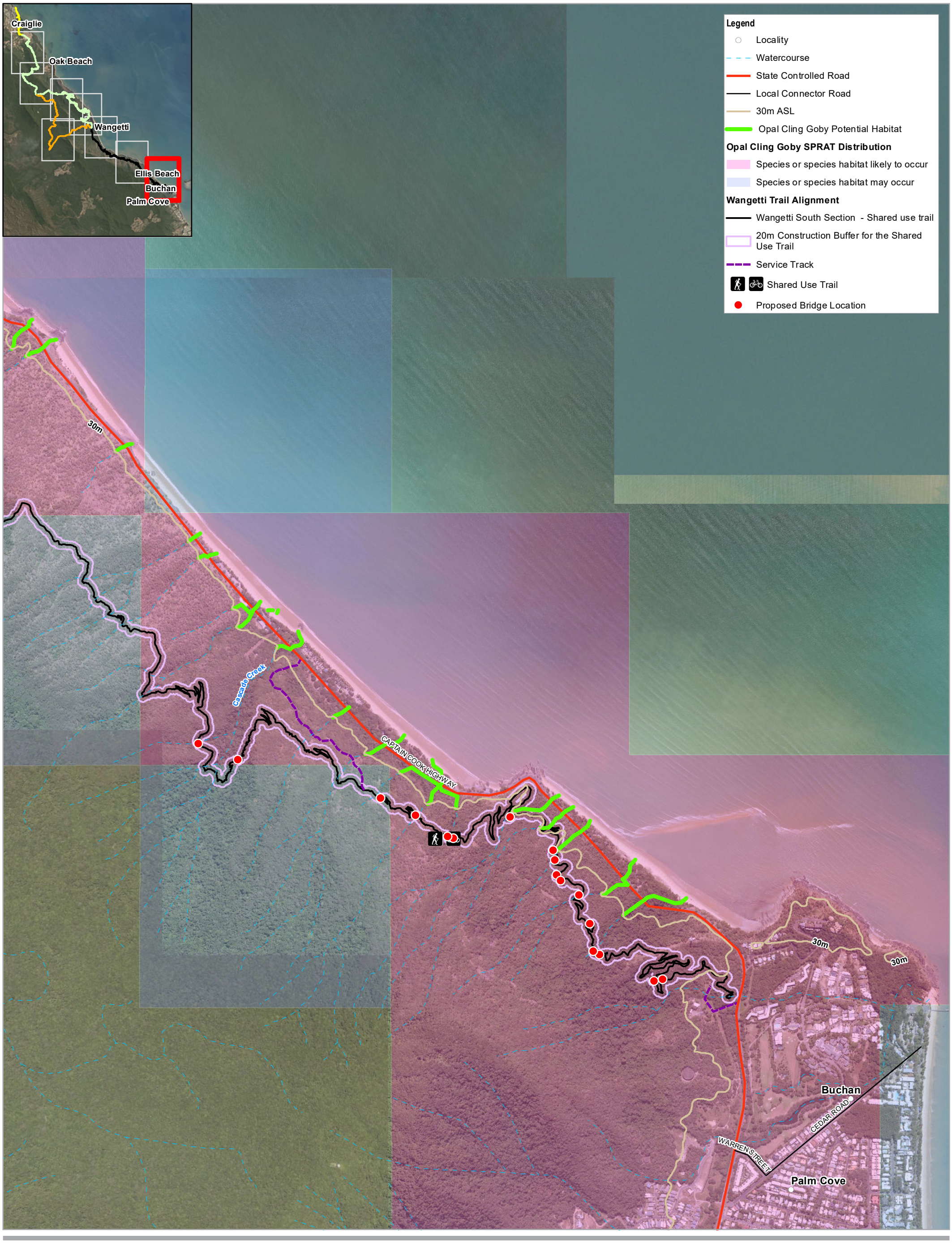

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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DITID
Environment Assessment Stage 2 Wangetti Trail

Potential Modelled Habitat for opal cling goby *(Stiphodon semoni)* in vicinity of Wangetti Trail - South Section

Project No. **41-32458**
Revision No. **B**
Date **1/12/2020**

APPENDIX E
(Sheet 3 of 3)

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Appendix C – Wangetti South Section Ecological Field Survey Assessment Sites

Paper Size ISO A3

0 100 200 300 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

DITID
Environment Assessment Stage 2 Wangetti Trail

Wangetti South Section
Ecological Field Survey
Assessment Sites

Project No. 41-32458
Revision No. 2
Date 30/06/2020

APPENDIX C
(Sheet 1 of 3)

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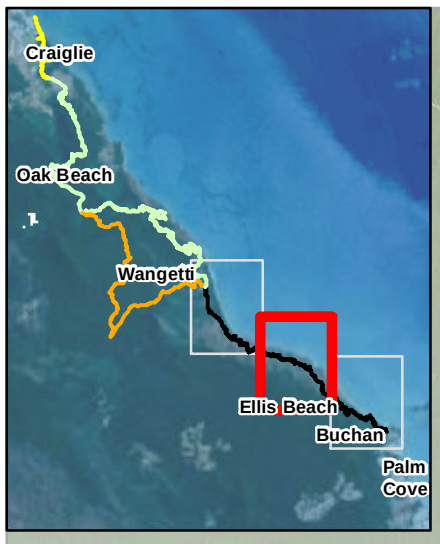
Print date: 30 Jun 2020 - 13:11

Data source: DITID/GHD: Proposed Infrastructure (2019), Wangetti Trail Alignment (04/2020); DNRME: Cadastre (2020), Roads (2016), Watercourse (2014), Imagery (2015); GHD: Survey Sites (2019), Section Intersections - Mowbray North, Wangetti North, Wangetti South (2020); WTMA: Proposed Camp and Amenities Block (2020), . Created by: xlee



Legend

- Watercourse
- State Controlled Road
- Cadastre
- Fauna Survey Site April 2019
- Fauna Survey Site August 2019
- Flora Survey Site April 2019
- Flora Survey Site August 2019

Wangetti Trail Alignment

- Wangetti South Section - Shared use trail
- Service Track
- 40m Construction allowance corridor for the Shared Use Trail
- Dark Jungle

Paper Size ISO A3

0 100 200 300 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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DITID
Environment Assessment Stage 2 Wangetti Trail

Wangetti South Section
Ecological Field Survey
Assessment Sites

Project No. 41-32458
Revision No. 2
Date 30/06/2020

APPENDIX C
(Sheet 2 of 3)

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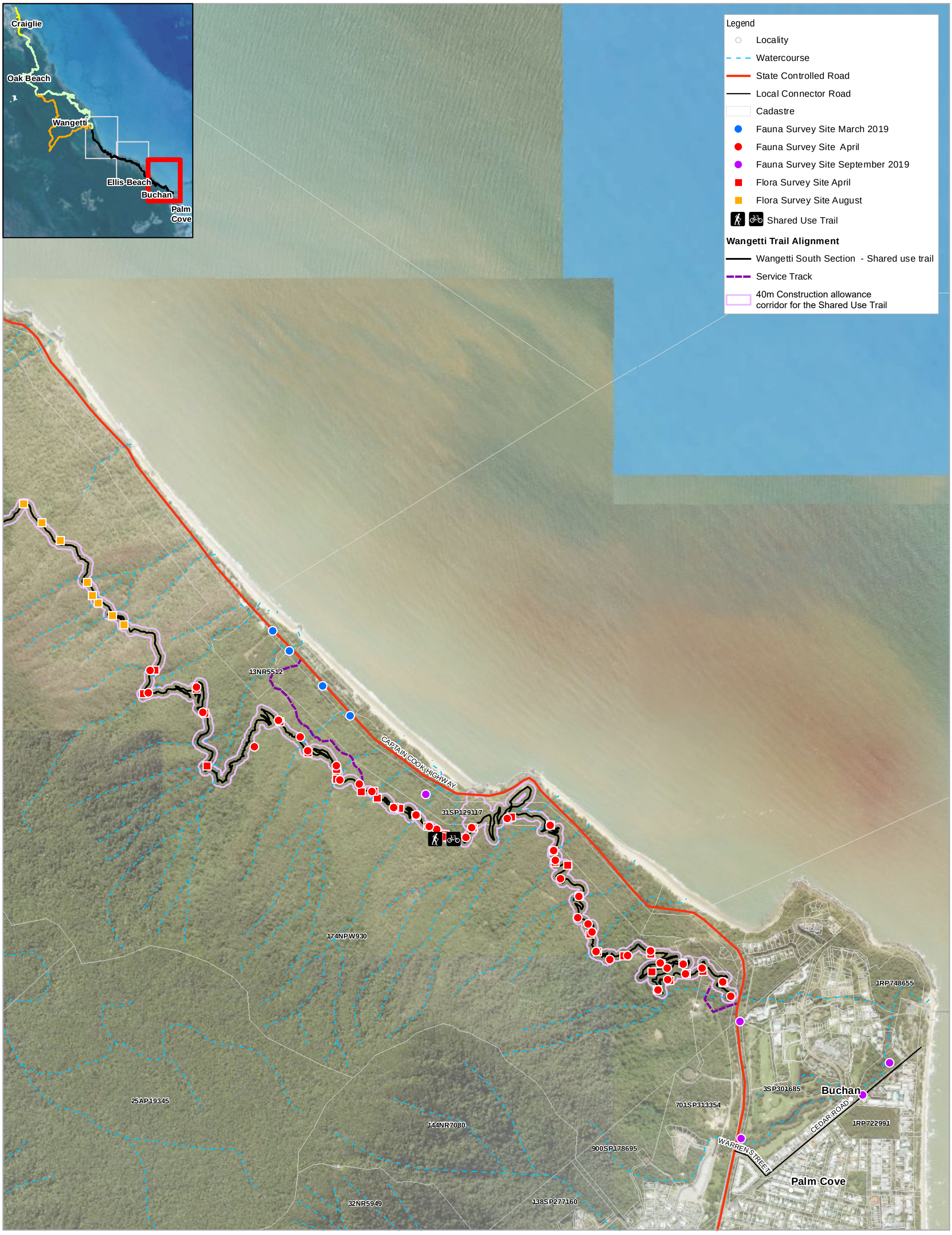
Print date: 30 Jun 2020 - 13:11

Data source: DITID/GHD: Proposed Infrastructure (2019), Wangetti Trail Alignment (04/2020); DNRME: Cadastre (2020), Roads (2016), Watercourse (2014), Imagery (2015); GHD: Survey Sites (2019), Section Intersections - Mowbray North, Wangetti North, Wangetti South (2020); WTMA: Proposed Camp and Amenities Block (2020), . Created by: xlee



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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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DITID
Environment Assessment Stage 2 Wangetti Trail

Wangetti South Section
Ecological Field Survey
Assessment Sites

Project No. 41-32458
Revision No. 2
Date 30/06/2020

APPENDIX C
(Sheet 3 of 3)

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Appendix D - Wangetti South Section Potential Habitat Types

Fauna habitat types within Wangetti South Section

Nine distinct fauna habitat types have been recorded within the Wangetti South survey area during the field surveys. These include the following:

- *Acacia* woodland
- Disturbed rainforest
- Ephemeral waterways
- Eucalypt woodland on steep rocky slopes
- *Melaleuca* swamp
- Mixed *Melaleuca viridiflora* woodlands on inundated plains
- Open woodland over grasses on undulating plains
- Permanent streams
- Vine forest
- Modified landscapes.

A representative photograph and description of each of these habitat types is provided in Table D-1, together with identification of which habitat types provide potential habitat for MNES fauna species.

The distribution of fauna habitat types within the Wangetti South Section is presented in Appendix D-1 to D-3.

Table D-1 Fauna habitat recorded during the field survey within the Wangetti South Section

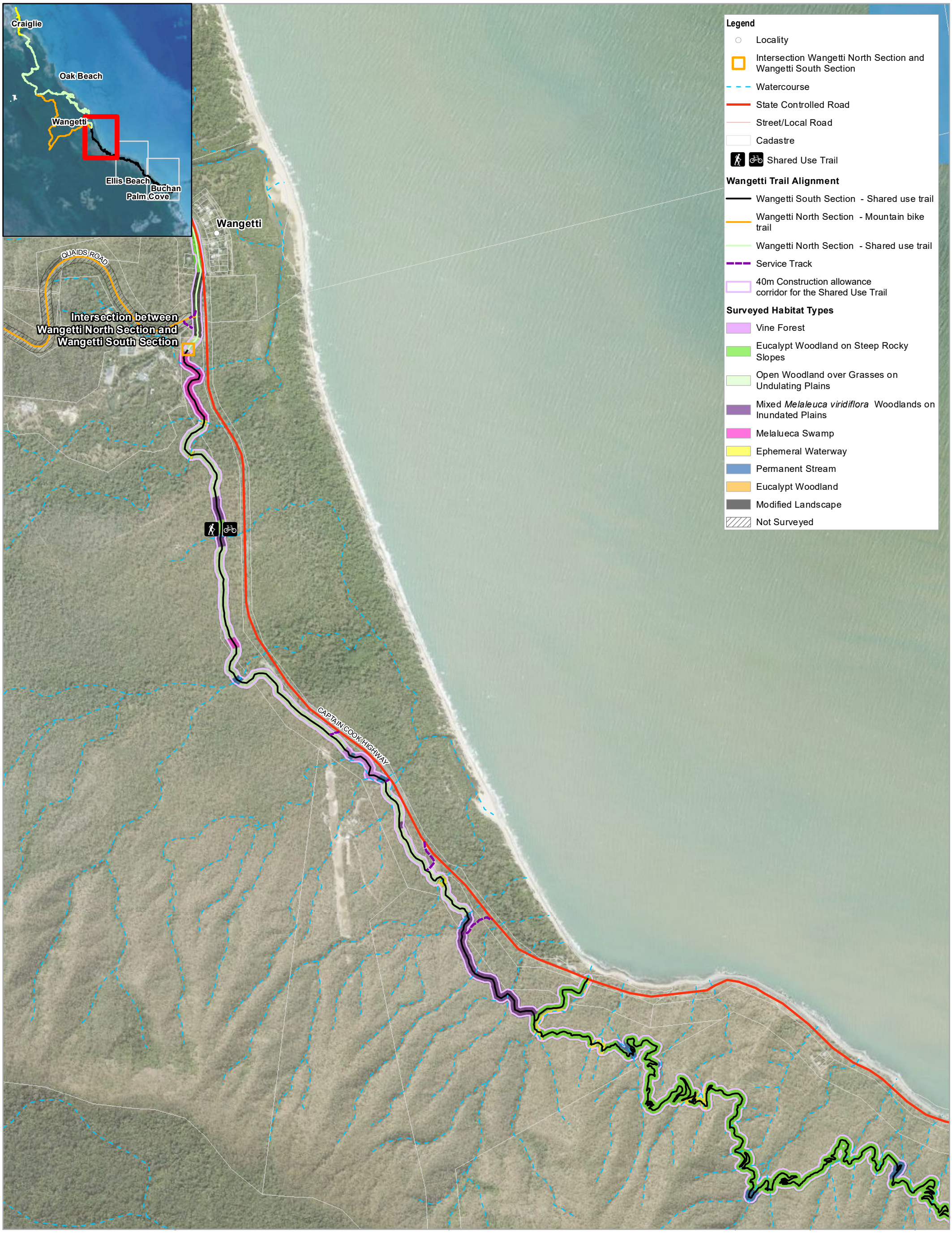
Habitat type	Characteristics	Ecological values
Disturbed rainforest 	• Canopy dominated by *Acacia celsa*, and retains a variety of mature rainforest tree species • Dense vines including *Calamus australis* (wait-a-while) and ground palms, dominate the shrub and understorey layer • Occasional large, hollow-bearing trees • Dense leaf litter, rotting woody debris logs, and scattered rocks • Soft friable soils suitable for burrowing.	• Canopy vegetation provides foraging and nesting opportunities for a range of rainforest specialists, including doves, honeyeaters, monarchs, flycatchers, gerygones and figbirds, and foraging habitat for flying foxes • Abundance of fruits provide foraging habitat for frugivorous birds and ground mammals • Microhabitats for snakes, geckos and skinks • Potential conservation significant species – southern cassowary.
Vine forest 	• Closed canopy dominated by mature rainforest tree species • Dense shrub layer dominated by palms, ferns and vines • Dense vine understorey • Occasional large, hollow-bearing trees • Abundance of fruit and berries • Understorey relatively open with dense leaf litter, rotting woody debris logs, and scattered rocks • Soft friable soils suitable for burrowing.	• Canopy vegetation provides foraging and nesting opportunities for a range of rainforest specialists, including doves, honeyeaters, monarchs, flycatchers, gerygones and figbirds, and foraging habitat for flying foxes • Microhabitats for snakes, geckos and skinks • Refuge for microbats • Refuge and foraging habitat for rodents and other ground-dwelling mammals • Potential conservation significant species – southern cassowary and migratory birds.

Habitat type	Characteristics	Ecological values
Eucalypt woodland on steep rocky slopes 	• Canopy dominated by *Eucalyptus portuensis* or retains a variety of mature canopy sclerophyll tree species, including *E. tessellaris*, *E. tereticornis*, *Lophostemon suaveolens*, *Corymbia intermedia* and *C. clarksoniana* • Hollow-bearing trees are moderately prevalent • Sparse shrub layer • Dense ground cover, including *Imperata cylindrical* (blady grass) and native ferns • Presence of logs, woody debris and leaf litter • Presence of rocky outcrops and boulders.	• Canopy vegetation provides foraging and nesting opportunities for honeyeaters and parrots, and foraging habitat for flying foxes and arboreal mammals • Hollow-bearing trees provide den sites for arboreal mammals, such as possums, microbats, and nesting habitat for hollow-nesting birds, such as lorikeets, cockatoos and owls • Rocky outcrops and boulders provide basking and sheltering habitat for snakes, monitors and skinks • Potential conservation significant species – migratory birds.
Open woodland over grasses on undulating plains 	• Tall, sparse canopy vegetation • Hollow-bearing trees are moderately prevalent • Very sparse shrub layer present • Open understorey • Presence of logs, woody debris and leaf litter.	• Canopy vegetation provides blossoms and nesting opportunities for honeyeaters and parrots, and foraging habitat for flying foxes • Refuge and foraging habitat for arboreal mammals and nocturnal birds • Microhabitats for snakes, geckos, skinks and other reptile species • Grasses provide food resources for granivorous birds and herbivorous mammals • Potential conservation significant species – none.

Habitat type	Characteristics	Ecological values
Acacia woodland 	• Dense regrowth canopy cover of *Acacia melanoxylon* • Dense leaf litter and woody debris • Scattered rock and decorticating bark present.	• Canopy vegetation provides blossoms for honeyeaters and parrots • Microhabitats for snakes, geckos, skinks and other reptile species • Potential conservation significant species – none.
Mixed *Melaleuca viridiflora* woodlands on inundated plains 	• Dense canopy cover of Melaleuca viridiflora • Shrub layer absent • Diverse ground layer of grasses, sedges and forbs • Presence of woody debris and leaf litter • Soft friable soils suitable for burrowing.	• Canopy vegetation provides blossoms and nesting opportunities for honeyeaters and parrots, and foraging habitat for flying foxes and arboreal mammals • Grasses provide food resources for granivorous birds and herbivorous mammals • Burrowing habitat for reptiles and amphibians • Potential conservation significant species – migratory birds.

Habitat type	Characteristics	Ecological values
Melaleuca swamp 	• Dense canopy cover of *Melaleuca viridiflora* • Dense sedges and grasses fringing swamp.	• Canopy vegetation provides blossoms for honeyeaters and parrots • Drinking sites for birds and mammals • Breeding and calling habitat for amphibians • Foraging habitat for frog-eating snakes • Foraging habitat for flying foxes and microbats • Potential conservation significant species – migratory birds.
Ephemeral waterways 	• Tall closed canopy vegetation • Presence of complex riparian habitat • In stream complexity with undercut banks, roots balls, trailing vegetation, and large rocks to boulders.	• Canopy vegetation provides blossoms and fruits for doves, honeyeaters, friarbirds, figbirds and parrots • Temporary feeding and breeding habitat for aquatic species, and important for facilitating movement during flow events between permanent streams • Drinking site for birds and mammals • Breeding and calling habitat for amphibians • Foraging habitat for frog-eating snakes • Foraging habitat for flying foxes and microbats • Potential conservation significant species – southern cassowary and migratory birds.

Habitat type	Characteristics	Ecological values
Permanent streams 	• Tall closed canopy vegetation • Slow and fast flowing permanent streams with splash zones • Large boulders and rocks • Rock crevices.	• Foraging and breeding habitat for fish species and crustaceans • Foraging habitat for kingfishers and other fishing birds • Drinking site for birds and mammals • Breeding and foraging habitat for amphibians • Foraging habitat for frog-eating snakes • Foraging habitat for flying foxes and microbats • Potential conservation significant species – southern cassowary. Suitable habitat for the waterfall frog, common mistfrog and Australian lace-lid.
Modified landscapes 	• Canopy and shrub layer absent • Ground layer heavily altered.	• Foraging habitat for raptors and birds adapted to open landscapes • Foraging habitat for macropods • Potential conservation significant species – none.



Paper Size ISO A3

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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DITID
Environment Assessment Stage 2 Wangetti Trail

Wangetti South Section Potential Habitat Types within the Project Area

Project No. **41-32458**
Revision No. **3**
Date **30/06/2020**

APPENDIX D -1
(Sheet 1 of 3)

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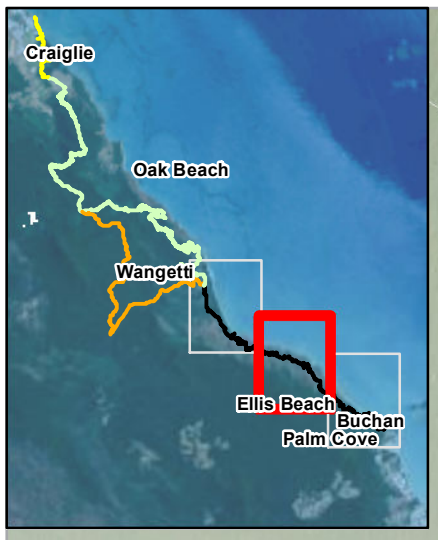
Data source: DITID/GHD: Proposed Infrastructure (2019), Wangetti Trail Alignment (04/2020); DNRME: Cadastre (2019), Roads (2016), Watercourse (2014), Imagery (2015); GHD: Surveyed Habitat Types (2019), Section Intersections - Mowbray North, Wangetti North, Wangetti South (2020); WTMA: Proposed Camp and Amenities Block (2020), . Created by: xlee



Legend

- Watercourse
- State Controlled Road
- Cadastre

Wangetti Trail Alignment

- Wangetti South Section - Shared use trail
- Service Track
- 40m Construction allowance corridor for the Shared Use Trail
- Dark Jungle

Surveyed Habitat Types

- Disturbed Rainforest
- Vine Forest
- Eucalypt Woodland on Steep Rocky Slopes
- Ephemeral Waterway
- Permanent Stream

CAPTAIN COOK HIGHWAY

Paper Size ISO A3

0 100 200 300 400

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

GHD

DITID
Environment Assessment Stage 2 Wangetti Trail

Wangetti South Section
Potential Habitat Types within the Project Area

Project No. **41-32458**
Revision No. **3**
Date **30/06/2020**

APPENDIX D-2
(Sheet 2 of 3)

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Print date: 30 Jun 2020 - 13:17

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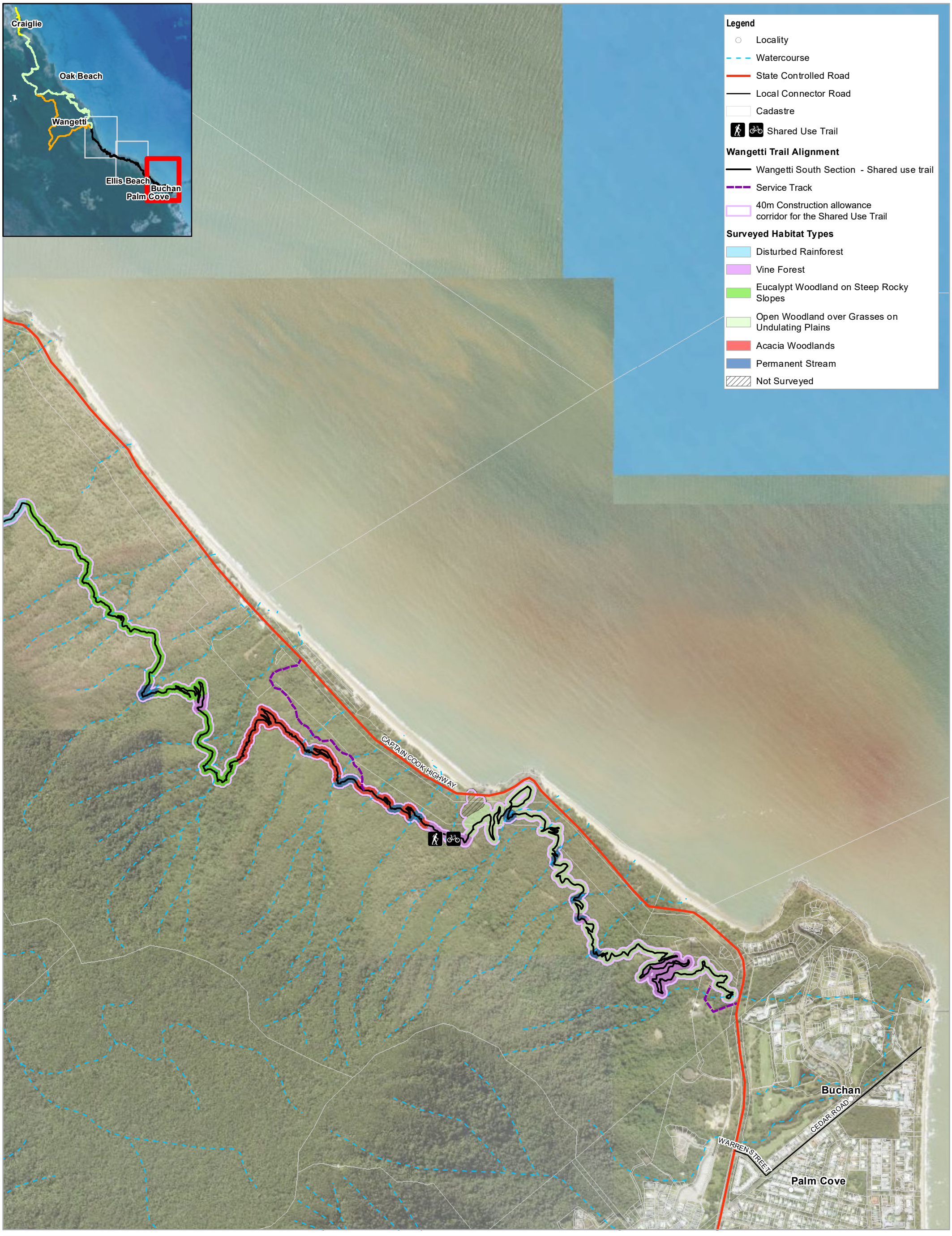

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Environment Assessment Stage 2 Wangetti Trail

Wangetti South Section Potential Habitat Types within the Project Area

Project No. 41-32458
Revision No. 3
Date 30/06/2020

APPENDIX D-3
(Sheet 3 of 3)

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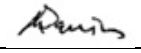
8th floor Cairns Corporate Tower 15 Lake Street
PO Box 819
T: 61 7 4044 2222 F: 61 7 4044 2288 E: cnsmail@ghd.com

4132458-11006-139/https://projects.ghd.com/oc/sqoc2/wangettitrackapprova/Delivery/Documents/4132458-REP_Wangetti South CEMP.docx

Document Status

Revision	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
1	N. Schulz	B. Steytler	*On file*	G Squires		26.7.21

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