

September 2021

North One Hotel Development and Apartments

Northern Territory Environmental Protection Authority
Referral Report

CONTROL AND REVISION HISTORY

Revisions

Version	Document	Author	Reviewer/Approver	Date Reviewed
Version 1.0	Draft	Sharon Arena – BPL	John Hamilton - Urbanscope	6/09/2021
Version 1.1	Final	Sharon Arena - BPL	John Hamilton - Urbanscope	16/09/2021



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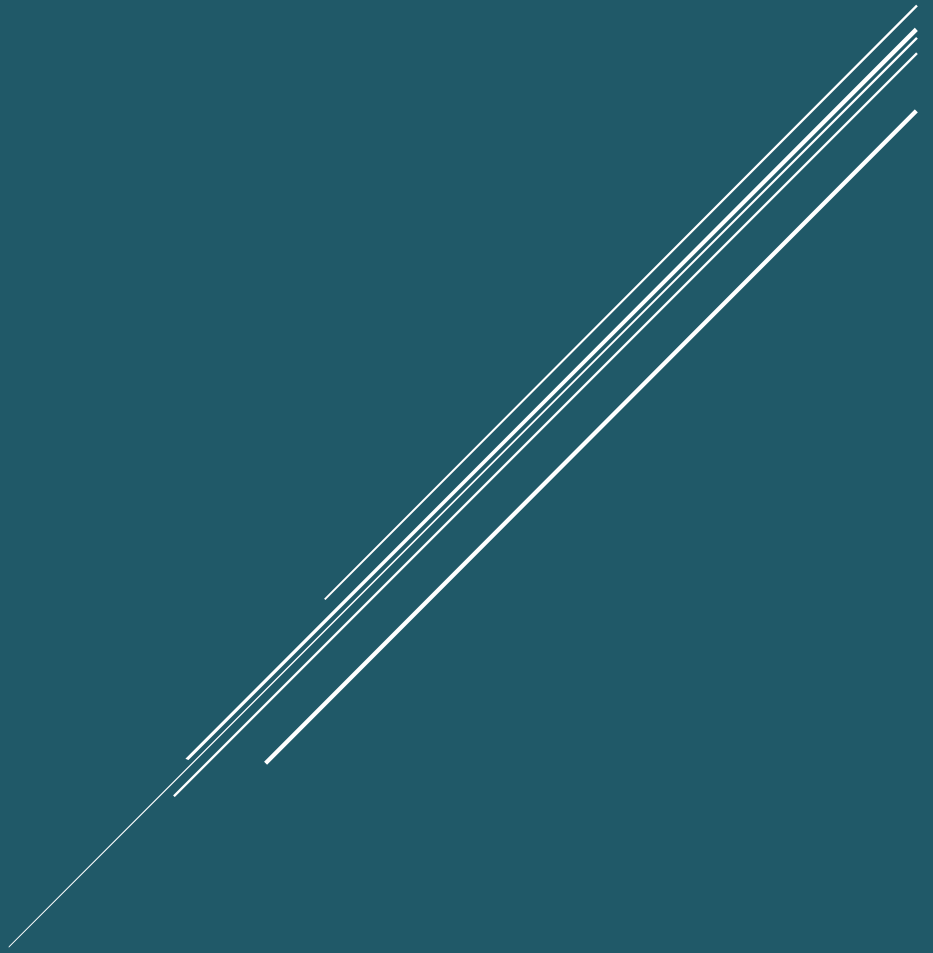
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EXECUTIVE SUMMARY

NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

EXECUTIVE SUMMARY

INTRODUCTION

KTT Investments Pty Ltd (**KTT Investments; the Proponent**) proposes to develop the North One Hotel and Apartments (the **North One Development; the Project**) - a high-quality multi-story hotel/villa, apartment complex with public bar and markets, situated at Little Mindil Beach, Northern Territory (**NT**), approximately 2.5 km from the Darwin Central Business District (**Figure ES-1**).

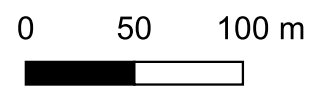
A referral under the *Environmental Protection Act 2019 (EP Act)* (this document) has been prepared by BPL Environmental in accordance with the requirements described in the Northern Territory Environmental Protection Authority (**NT EPA**) *Guideline Referring a Proposed Action to the NT EPA, Environmental impact assessment guideline for proponents* (NT EPA, 2020). The referral has been prepared to enable the NT EPA to assess whether the project is consistent with the NT EPA objectives and whether approval under the EP Act is required.

PROJECT OVERVIEW

The North One Hotel and Apartment Development aims to create a prestigious waterside facility consisting of a hotel, commercial premises, and residential offerings. The Development will consist of five buildings comprising the following:

- 150 Hotel rooms (including 16 lagoon villas and 3 garden villas);
- 53 serviced apartments;
- Six retail spaces;
- 151 semi-basement and 126 ground level car parking spaces; and
- Beachfront food and beverage venue.

Intrinsic to the development is the biophilic design concept and provision of open space, with a fundamental feature being the incorporation of green roofs on each building. In addition, the North One Complex will provide for new and existing public walkways to maintain access to the site itself, Mindil Beach, and the creek. Public open spaces will be created for public events and activities including a space for communal markets. **Figure ES-2** provides an artist impression of the North One Hotel and Apartment Complex; an overview of the proposed layout is presented in **Figure ES-3**. Further detail, including Development drawings, have been prepared by HACHEM and are provided as **Appendix 1** of the main report.



Project Location

Parcel 7651 boundary

Date: 26/02/2021
 CRS: GDA 1994 MGA Zone 52
 Author: eleanor@animalplantmineral.com.au



Figure ES-2: Illustrative Impression of the North One Complex



1
TP3.01

EXISTING VEHICLE ACCESS ROAD VIA ADJACENT MINDIL BEACH CASINO CAR PARK ENTRANCE ON CASINO DRIVE TO REMAIN & BE CONNECTED TO PROPOSED INTERNAL ROAD NETWORK.

PROPOSED RELOCATION OF EXISTING PEDESTRIAN PATH & PROPOSED PRAM CROSSING. REFER TO DRIVEWAY CROSSOVER DRAWINGS BY ADJ FOR DESIGN AND DETAILS.

PROPOSED SINGLE VEHICULAR ACCESS POINT / CROSSOVER. REFER TO DRIVEWAY CROSSOVER DRAWINGS BY ADJ FOR DESIGN AND DETAILS.

REFER TO TRAFFIC IMPACT ASSESSMENT PREPARED BY SJ TRAFFIC FOR FURTHER INFORMATION IN REGARD TO THE TRAFFIC GENERATION & ASSOCIATED IMPLICATIONS RELEVANT TO THIS PROPOSAL.

REFER TO VISUAL IMPACT STUDY BY CLOUSTON ASSOCIATES
CAMERA VIEWS SHOWN IN RED
- VIEWS 1, 3, 5, 7 ARE FROM 1.7m ABOVE NGL
- VIEWS 2, 4, 6, 8 ARE FROM 4.5m ABOVE NGL

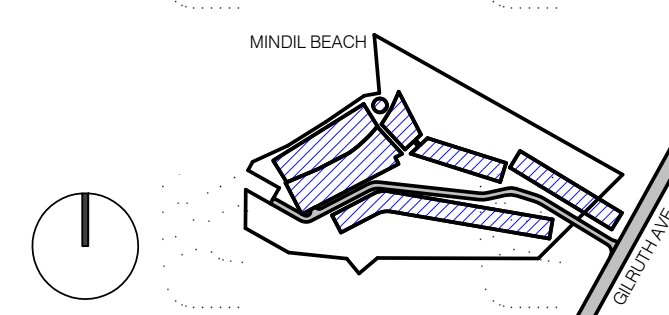
1 SITE PLAN - PROPOSED 1:750

ES-3: Proposed Layout of North One Complex

HACHEM ARCHITECTURE INTERIOR MARKETING
HACHEM.COM.AU LEVEL 3, 2 DREWERY PLACE 183 WESTON STREET
INFO@HACHEM.COM.AU MELBOURNE 3000 BRUNSWICK EAST 3067
STUDIO +61 1300 734 560 VICTORIA, AUSTRALIA VICTORIA, AUSTRALIA

The information contained within this and accompanying this document is confidential and commercially sensitive. They are permitted only to be opened, read and used by the addressee. Verify all dimensions and levels on site prior to shop drawing or construction. Do not scale drawings. Figure dimensions must be used in preference to scaled dimensions. Notify Architect of any discrepancies.

REV.	DESCRIPTION	DATE
A	TOWN PLANNING SUBMISSION	19/02/21



PROJECT LOCATION
25 GILRUTH AVENUE,
THE GARDENS, DARWIN

CLIENT
DAVID DO AWI

DRAWING SCALE
1 : 750

DRAWING DATE
19/02/21

SHEET SIZE
A1

CHECK
EP

PROJECT NO
257

DRAWN
KS



DRAWING TITLE
PROPOSED SITE PLAN

REVISION
A

BUILDING / ATTRIBUTE
12°26'59" S
130°49'45" E

PROJECT NAME
LITTLE MINDIL

DRAWING NO.
TP0.13

PROJECT DESCRIPTION

SITE SETTING

The proposed North One complex is situated at 25 Gilruth Avenue, The Gardens and falls within the locality of the Town of Darwin. At present the site comprises a grassed area, a 230-car capacity open-air bitumen carpark and associated landscaping; all totalling an area of 5.13 hectares. The site is approximately 2.5 km from the Darwin Central Business District and is bordered by the following:

- North-western boundary: Little Mindil Beach;
- Northern boundary: Mindil Beach Casino Resort which features restaurants, bars, pools, and business amenities;
- North-east boundary: Little Mindil Creek, sewer pump station, and an open-air carpark and road reserve for Mindil Beach Casino Resort;
- Eastern boundary: Gilruth Avenue and Garden Park Golf Links; and
- South-west: An escarpment rising sharply along the site boundary; National Trust listed Myilly Point Heritage Precinct.
- Registered Sacred Site 5073-89: Casino Burial Island, located in the Little Mindil Creek reserve.

A Planning Scheme Amendment (PSA) has been approved by the Department of Infrastructure, Planning and Logistics (DIPL) for the North One Proposal to excise the Little Mindil Creek area from the site and rezone it from Zone Tourist Commercial (Zone TC) to Zone Public Open Space (Zone PS). This will ensure ongoing protection of the creek, public access to the foreshore and protection of Registered Sacred Site 5073-89.

Figure ES-4 shows the North One Complex site within the context of the surrounding land uses and **Figure ES-5** indicates the approved zoning plan for the site.



Figure ES-4: Surrounding Land Uses

KEY COMPONENTS OF PROJECT DESIGN

The proposed Development is detailed within **Section 2** of the main report. A summary of the key components is provided in **Table ES-1**.

Table ES-1: Key Components of the Proposal

	Component	Size/capacity
Proposal Infrastructure	Hotel Facilities	<ul style="list-style-type: none"> Seven (7) x three (3) Bedroom Foreshore Villas (serviced apartments); 22 x two (2) Bedroom Apartments (serviced apartments); 22 x three (3) Bedroom Apartments (serviced apartments); Two (2) x four (4) Bedroom Apartments (serviced apartments); 149 x single Hotel Rooms (hotel/motel); 16 x two (2) Bedroom Lagoon Villas (hotel/motel); Three (3) x two (2) Bedroom Garden Villas (hotel/motel); A Feature Beachfront Bar (ancillary bar-public); An area within the landscaped grounds for a Market (ancillary Market); Hotel facilities; and Loading facilities, including two (2) loading bays.
	Buildings	<ul style="list-style-type: none"> A six (6) storey + basement serviced apartment building; A six (6) storey + basement hotel building with semi-basement parking; A single storey garden villa building; A single storey lagoon villa building; and A single storey feature food and beverage building.
	Design Features	<ul style="list-style-type: none"> A variety of accommodation options - Hotel rooms, lagoon villas, garden villas and serviced apartments; Biophilic design with green rooftops; Grassed public lawn designed for events; Public activity and market area on the ground floor of the hotel building (ancillary market); Feature food and beverage venue, with public access; Retention of the existing public footpath through the site; Retention of public access to the foreshore; and Comprehensive landscaping for the site.
Site Preparation	Earthworks	<ul style="list-style-type: none"> The site will be raised to 5.80 m Australian Height Datum, which is above the storm surge level. Clean fill will be imported for site preparation works, as required. Most excavation required for the site will be undertaken within the fill layer. A small portion of the semi-basement carpark may require excavation into the existing soil profile.
Service Requirements	Water	<ul style="list-style-type: none"> Connection to existing water supply network Average daily water load 0.389 L/s Adequate supply available to meet Hotel demand
	Sewerage	<ul style="list-style-type: none"> Average dry weather flow - 0.444 L/s Peak dry weather flow – 2.018 L/s Peak wet weather flow – 6.054 L/s An existing sewerage pump station with sufficient capacity to facilitate the Development is available for connection

		<ul style="list-style-type: none"> • A rising main will require upgrade to facilitate the sewerage connection
	Electricity	<ul style="list-style-type: none"> • Electrical infrastructure exists on site. • Existing overhead powerlines will be relocated underground.
	Communication	<ul style="list-style-type: none"> • Communication infrastructure is available for connection. • Existing infrastructure within the site will be relocated outside of the Development footprint
Stormwater	Point of Discharge	<ul style="list-style-type: none"> • The existing Point of Discharge for the site within Little Mindil Creek will remain for the Development • Stormwater control measures will be incorporated into the Development to address the slight increase in impervious surfaces resulting from the proposal.
Traffic	Road Network	<ul style="list-style-type: none"> • Existing road network will accommodate traffic volumes generated by the Development, with negligible impact on existing users
	Site Access	<ul style="list-style-type: none"> • An access point will be constructed from Gilruth Avenue directly to the Development
Timing	Construction timeline	<ul style="list-style-type: none"> • 3 years
	Life of project	<ul style="list-style-type: none"> • Permanent
Workforce	Construction workforce (full time equivalents)	<ul style="list-style-type: none"> • 350 people
	Operation workforce (full time equivalents)	<ul style="list-style-type: none"> • 120 people

TECHNICAL STUDIES

Technical studies undertaken to inform assessment of potential impacts of the proposed Development on the NT's environmental factors are listed in **Table ES-2**.

Table ES-5: Technical Studies and Management Plans Commissioned to Inform the Referral.

Author	Study Title	Referral Appendix
ADG (2020a)	Little Mindil Beach. 25 Gilruth Avenue, The Gardens, Northern Territory. Engineering Services Report No 23085 C R002 REV00	Appendix 9
ADG (2020b)	Little Mindil Beach. 25 Gilruth Avenue, The Gardens, Northern Territory. Stormwater Management Plan No 23085 C R001 REV00	Appendix 10
ADG (2021a)	Little Mindil Beach. 25 Gilruth Avenue, The Gardens, Northern Territory. Hydraulic Assessment No 23085 C R003 REV01	Appendix 11
ADG (2021b)	Erosion and Sediment Control Plan No 23085 Rev A	Appendix 12
Animal Plant Mineral (APM) (2021)	Little Mindil Desktop Biological Study.	Appendix 6
BPL Environmental (2021)	Acid Sulphate Soils Management Plan , North One Hotel and Apartment Development, V1.2.	Appendix 8
BPL Environmental (2021)	Biting Insects Management Plan , North One Hotel and Apartment Development, V1.2.	Appendix 21
BPL Environmental (2021)	Construction Environmental Management Plan , North One Hotel and Apartment Development, V1.1.	Appendix 7
BPL Environmental (2021)	Waste Management Plan , North One Hotel and Apartment Development, V1.2.	Appendix 13

Author	Study Title	Referral Appendix
Clouston Associates (2021a)	Little Mindil – 25 Gilruth Ave, The Gardens; Visual Impact Study , D20-0018-R01, Issue B.	Appendix 15
Clouston Associates (2021b)	Little Mindil Darwin Landscape Concept Presentation , D20-0018, Issue D.	Appendix 2
Ellengowan Enterprises (2020)	Little Mindil Beach – Proposed Hotel Site – Small Scale Archaeological Assessment Report	Appendix 19
Ellengowan Enterprises (2021)	Heritage Impact Assessment: Myilly Point	Appendix 20
Hachem Architects (2021)	Design Response Package , Little Mindil, Darwin.	Appendix 1
SJ Traffic Consulting (2020)	Proposed Little Mindil Beach Hotel Traffic Impact Assessment , Ref 20T366A, Rev A.	Appendix 14
SLR Consulting (2020)	Preliminary Site Investigation.	Appendix 5
SLR Consulting (2021)	Little Mindil Development Noise Impact Assessment ; Version No. v1.0	Appendix 17
SLR Consulting (2021)	North One Hotel and Apartments Desktop Environmental Wind Study , v1.0.	Appendix 18
Urbanscope (2021)	Economic Benefits Snapshot.	Appendix 16
Urbanscope (2021)	Stakeholder Engagement Plan , North One Development.	Appendix 3
WSP (2021)	North One Hotel and Apartments GHG Emissions Assessment	Appendix 22

KEY ENVIRONMENTAL FACTORS

Environmental Factors are elements of the environment that may be impacted by any aspect of a proposal. *NT EPA Environmental Factors and Objectives* (NT EPA 2020) classifies 14 Factors to guide the structure of formal Environmental Impact Assessment (EIA) processes in the NT. The potential impacts of a proposal are assessed against the NT EPA’s (2020) Objectives for each Factor to determine whether the impacts of a proposal are likely to be significant.

A preliminary assessment has identified the following key Environmental Factors for the North One Development:

- Terrestrial Environmental Quality;
- Hydrological Processes;
- Inland Water Environmental Quality;
- Community and Economy;
- Culture and Heritage; and
- Human Health.

Table ES-3 lists all of the NT EPA’s Environmental Factors and provides comments on the inclusion or lack of inclusion in the referral. **Section 7** of the main document describes in detail each Key Environmental Factor potentially impacted by the proposal and is structured to reflect the risk and EIA process. The remaining Environmental Factors, deemed non-significant to the Proposal, are discussed in detail in **Section 8** of the referral.

Table ES-3: Environmental Factors and details of inclusion or lack of inclusion in this Referral

Environmental Factor	NT EPA Objective	Key Env't. Factor	Referral	Comment
Theme: Land				
Terrestrial Environmental Quality	Protect the quality and integrity of land and soils so that environmental values are supported and maintained.	✓	✓	Details of potential impacts discussed in Table ES-4 and Section 7.1 of the main report.
Landforms	Conserve the variety and integrity of distinctive physical landforms.	✗	✗	Within the Development boundary there are no significant landforms. The escarpment on the south-eastern edge of the Lot 7651 is situated outside of the building envelope and will be discussed in Section 7.4 (Community and Economy) which addresses visual impact and community use; and Section 8.1 (Terrestrial Ecosystems).
Terrestrial Ecosystems	Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	✗	✓	The Site is predominately cleared, and the Proposal does not have a significant impact on terrestrial ecosystems; no clearing of escarpment or tidal creek vegetation is proposed. There are ecosystems of interest surrounding the Site which will be discussed in further detail within Section 8.1 (Terrestrial Ecosystems).
Theme: Water				
Hydrological Processes	Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses, and the welfare and amenity of people are maintained.	✓	✓	Details of potential impacts discussed in Table ES-4 and Section 7.2 of the main report.
Inland Water Environmental Quality	Protect the quality of groundwater and surface water so that environmental values including health, land uses, and the welfare and the amenity of the people are maintained.	✓	✓	Details of potential impacts discussed in Table ES-4 and Section 7.3 of the main report.
Aquatic Ecosystems	Protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	✗	✗	A recently approved PSA has excised Little Mindil Creek from the development envelope and as such, there are no aquatic ecosystems within the Development area and no direct impacts proposed. Any impacts on water quality of the creek have been addressed in Section 7.3 (Inland Water Environmental Quality).
Theme: People				

Environmental Factor	NT EPA Objective	Key Env't. Factor	Referral	Comment
Community and Economy	Enhance communities and the economy for the welfare, amenity, and benefit of current and future generations of Territorians.	✓	✓	Details of potential impacts discussed in Table ES-4 and Section 7.4 of the main report.
Culture and Heritage	Protect sacred sites, culture, and heritage.	✓	✓	Details of potential impacts discussed in Table ES-4 and Section 7.5 of the main report.
Human Health	Protect the health of the Northern Territory population.	✓	✓	Details of potential impacts discussed in Table ES-4 and Section 7.6 of the main report.
Theme: Sea				
Coastal Processes	Protect the geophysical and hydrological processes that shape the coastal morphology so that the environmental values of the coast are maintained.	✗	✗	The Proposal is a terrestrial based Development that is not anticipated to impact on the geophysical or hydrological processes that shape coastal morphology of the local area. An existing retaining wall has been constructed by the NT Government along the foreshore and no development or site discharge is proposed directly within the coastal environment. Section 7.2 (Hydrological Processes) addresses impacts on Little Mindil Creek, which ultimately directs to the coastal environment.
Marine Environmental Quality	Protect the quality and productivity of water, sediment and biota so that environmental values are maintained.	✗	✗	Since the Proposal is terrestrial based and will be set back from the foreshore it is not anticipated to impact Marine Environmental Quality. Any increased runoff will be directed to Little Mindil Creek, with potential sedimentation issues addressed in Section 7.3 (Inland Water Environmental Quality). No adverse impacts are anticipated on Marine Environmental Quality.
Marine Ecosystems	Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	✗	✗	None of the environmental values and sensitivities relevant to this factor are triggered by this Proposal.
Theme: Air				
Air Quality	Protect air quality and minimise emissions and their impact so that environmental values are maintained.	✗	✗	Not applicable to this Proposal as no significant air quality sources exist.
Atmospheric Processes	Minimise greenhouse gas emissions so as to contribute to the NT government's goal of achieving net zero greenhouse gas emissions by 2050.	✗	✓	Greenhouse gas contribution from the proposed development is not considered significant. Further details are provided in Section 8.2 (Atmospheric Processes).

SUMMARY OF POTENTIAL IMPACTS AND PROPOSED MITIGATION

Consideration of outcomes from the technical studies by environmental professionals identified the potential impacts requiring management. A summary of the key potential impacts, mitigating environmental management measures (using the mitigation hierarchy of avoidance, minimisation, management), and how the proposal meets the requirements of the factor objectives (including statements about any residual significant environmental impact and offsets proposed), is summarised in **Table ES-4**.

Table ES-4: Summary of Potential Impacts, Proposed Mitigations and Outcomes for Key Environmental Factors

Terrestrial Environmental Quality	
Potential Impacts	<ul style="list-style-type: none"> • Disturbance of Acid Sulphate Soils (ASS) during clearing and earthworks • Incorrect handling of ASS/Potential ASS (PASS) • Retained water becomes acidified • Soil erosion resulting in disturbance of ASS or sediment of the adjacent environment • Incorrect storage of lime and hydrated lime leading to death of vegetation • Integrity of infrastructure compromised due to exposure to acidic environment • Contamination during project construction phase • Exposure of humans and the environment to Contaminants of Particular Concern (COPC) from fly-tipped waste • Exposure of historical site contaminants
Mitigation	<p><u>Disturbance of ASS during clearing and earthworks</u></p> <ul style="list-style-type: none"> • Undertake a geotechnical assessment prior to construction, to identify areas of occurrence of ASS. • Disturbance of ASS to be avoided where possible, including constructing infrastructure above natural ground level wherever possible. • Excavated ASS to be treated during construction in accordance with requirements of the ASS Management Plan (Appendix 8) to prevent acidic fluids leaching into surface water or groundwater. <p><u>Incorrect handling of ASS/PASS</u></p> <ul style="list-style-type: none"> • Material free of ASS will be used to construct any bunds or infrastructure pads that may be required. • Preparation of compliant ASS treatment pads. The area will be fully contained/constructed such that drainage /runoff water from the pad is directed to an appropriate receptacle for testing and treatment (if required). • Any spilled ASS material is to be transferred to the treatment pad immediately. • Awareness training of ASS handling requirements will be provided to personnel involved with the movement of soils, particularly during the construction phase <p><u>Retained water becomes acidified</u></p> <ul style="list-style-type: none"> • All stormwater or ASS leachate from stockpiles or other exposed areas shall be diverted to a retention pond for monitoring and treatment (if required). • pH, water level, electrical conductivity, total iron and aluminium concentrations to be monitored within any pond of retained water suspected of being contaminated by ASS. • Hydrated lime to be available for pH adjustment of water if required. • Monitoring of wastewater conducted prior to discharge must indicate parameters comply with the performance indicators. <p><u>Soil erosion resulting in disturbance of ASS or sediment of the adjacent environment</u></p> <ul style="list-style-type: none"> • Implementation of the Erosion and Sediment Control Plan (ESCP) and management procedures in the CEMP to avoid erosion. <p><u>Incorrect storage of lime and hydrated lime leading to death of vegetation</u></p> <ul style="list-style-type: none"> • Lime will be stored in a containment area adjoining the treatment pad (so that any discharge from the area is directed into the treatment pad). • Appropriate weatherproof storage of hydrated lime. <p><u>Integrity of infrastructure compromised due to exposure to acidic environment</u></p> <ul style="list-style-type: none"> • Disturbance to be avoided where possible including constructed infrastructure above natural ground level where possible. • Project design to incorporate corrosion resistant materials where required. <p><u>Contamination during project construction phase</u></p> <p>Implement the hazardous materials management procedures in the CEMP including the following:</p> <ul style="list-style-type: none"> • Storage of hazardous materials in accordance with Australian Standard <i>AS1940:2017 - The Storage and Handling of Flammable and Combustible Liquids</i>. • Train personnel in implementing safe work practices to minimise risks and impacts of spillage of fuels, chemicals, and other contaminants.

	<ul style="list-style-type: none"> • Train personnel in incident reporting and emergency management procedures and encourage the reporting of issues and near misses. • Record and report all POL, chemical and hazardous substance spills. • Ensure personnel have access to spill kits that contain an absorbent material, clearly marked oily/chemical waste disposal drum and a shovel. • In the event of a chemical or hazardous substance spill, containment measures should be enacted, and Material Safety Data Sheet (MSDS) requirements complied with. • MSDSs are to be located with storage areas, as well as centrally located and readily available to staff for use in case of an emergency. • MSDSs must be current. • All contaminated soil and absorbent in the oily/chemical waste disposal drum should be disposed of by a licenced waste contractor. • Keep site free from build-up of waste materials by directing regular clean ups. • Avoid storing large volumes of materials on site. • Ensure herbicides used for weed control are registered and are only applied by appropriately trained personnel <p><u>Exposure of humans and the environment to COPC's from fly-tipped waste</u></p> <ul style="list-style-type: none"> • Removal of fly-tipped waste from the site using accredited waste specialists. • Inspection of disturbed area and fly-tipped waste for the presence of asbestos. Removal, transport and disposal of asbestos using licensed specialists, as required. <p><u>Exposure of historical site contaminants</u></p> <ul style="list-style-type: none"> • Complete a Land Suitability Assessment prior to commencement of construction. • Undertake appropriate remediation of the site, in consultation with the appropriate Regulatory Authority, to a suitable level for the intended land use. • Develop a Contaminated Site Management Plan prior to commencement of construction, including specific measures for Asbestos management, to facilitate clean-up of the site and ensure further contamination of the adjacent environment is avoided during the remedial works.
Outcomes	<p>Due to the suspected existence of asbestos in situ, a risk to Terrestrial Environmental Quality may result if mitigation measures are not implemented. The level of contamination across the site is yet to be quantified and impacts would be restricted to the construction phase.</p> <p>As a result of the presence of ASS there are potential risks to the terrestrial environment associated with the proposed Development. After implementation of management controls, impacts from ASS are considered to present a low risk, with any potential effects on the surrounding environment being localised and minor.</p> <p>Risks to Terrestrial Environmental Quality are considered local in scale and short term. Implementation of identified control measure will reduce risks associated with the North One Development and ensure the NT EPA's Factor objective can be met.</p>
Hydrological Processes	
Potential Impacts	<ul style="list-style-type: none"> • Alteration of surface hydrology • Site flooding or inundation from storm surge
Mitigation	<p><u>Alteration of surface hydrology</u></p> <ul style="list-style-type: none"> • Implement the ESCP during both the construction and operational phases of the Development • Install measures, as appropriate, to mitigate velocity impacts at the Point of Discharge from the site • Incorporate impervious areas into the Hotel design to reduce stormwater flow • Design landscaping to facilitate on-site infiltration of stormwater runoff • Design private open space for dwellings within the Complex to have at least half of the area permeable, allowing stormwater infiltration and minimising stormwater runoff from the site • Incorporation of biophilic architecture into the design to reduce stormwater runoff from roof-spaces • Incorporate operational stormwater management into an Environmental Management Plan (EMP), to be developed prior to commencement of operations <p><u>Site flooding or inundation from storm surge</u></p> <ul style="list-style-type: none"> • Fill the site to RL 5.80 m AHD to ensure key infrastructure is situated outside of the storm surge inundation level.
Outcomes	<p>The residual impact to Hydrological Processes from the North One Hotel and Apartment Development is considered negligible as the surface water hydrological regime can be maintained given appropriate consideration of modelling and studies being integrated into the design of the proposed infrastructure.</p> <p>The groundwater hydrological regime will not be impacted, due to the Project not interacting with groundwater and no beneficial users identified immediately surrounding the Development site.</p>

Inland Water Environmental Quality	
Potential Impacts	<ul style="list-style-type: none"> • Disturbance of ASS during earth works and clearing • Contamination of surface and groundwater systems through leaks and spills during construction • Contamination of surface and groundwater systems through leaks and spills during operations • Erosion and sedimentation impacting on water quality during construction • Erosion and sedimentation impacting on water quality during operations • Litter impacts within Mindil Creek impacting water quality and environmental values
Mitigation	<p><u>Disturbance of ASS during earth works and clearing</u></p> <ul style="list-style-type: none"> • Refer to mitigation measures for Terrestrial Environmental Quality above <p><u>Contamination of surface and groundwater systems through leaks and spills during construction</u></p> <p>Implement mitigation measures identified in the CEMP, including:</p> <ul style="list-style-type: none"> • Record and report all chemical and hazardous substance spills. • Ensure personnel have access to spill kits that contain an absorbent material, clearly marked oily waste disposal drum and shovel. • All contaminated soil and absorbent in the oil/chemical waste disposal drum should be disposed of at a designated oil waste disposal site approved by Darwin authorities. • In the event of a chemical or hazardous substance spill ensure all requirements of the MSDS's are complied with. • MSDSs are to be located within storage areas as well as centrally located and readily available to staff for use in case of emergency. MSDSs are to remain current. • Any spillage of wastes, contaminants or other materials shall be cleaned up as quickly as practicable using procedures that prevent contaminants or material being transferred to the stormwater drainage system. • The stormwater system for the site shall be inspected regularly to identify any failures and, if necessary, repairs shall be undertaken. • Chemical storage and handling areas shall be bunded and have drainage lines separate from the stormwater drainage, to reduce the likelihood of chemical contamination of stormwater. <p><u>Contamination of surface and groundwater systems through leaks and spills during operations</u></p> <ul style="list-style-type: none"> • Development of an EMP prior to operations commencing, which includes storage, handling and spill management for chemicals and hazardous substances used for the Hotel Complex. • Ensure pesticides are handled by a licensed operator, in accordance with the <i>Northern Territory Code of Practice for Handling Pesticides</i> <p><u>Erosion and sedimentation impacting on water quality during construction</u></p> <ul style="list-style-type: none"> • Implementation of the ESCP and CEMP. • Ensure stockpiles of bulk material are located well clear of any waterway or drainage system. • The stormwater system for the site shall be inspected regularly to identify any failures and, if necessary, repairs shall be undertaken <p><u>Erosion and sedimentation impacting on water quality during operations</u></p> <ul style="list-style-type: none"> • Install erosion and sediment controls in accordance with the ESCP. • Incorporate erosion and sediment control into the EMP, prior to commencement of operations. An inspection schedule should be included in the EMP for stormwater control infrastructure <p><u>Litter impacts within Mindil Creek impacting water quality and environmental values</u></p> <ul style="list-style-type: none"> • Implement the Waste Management Plan (Appendix 13), including consideration of the waste management hierarchy to minimise waste generation from the Development. • Undertake regular inspections of Little Mindil Creek for excessive litter and remove rubbish from the creek, as required
Outcomes	By implementing the management measures detailed above, the residual impact to Inland Water Environmental Quality is not considered significant and cumulative impacts are expected to be negligible. The NT EPA objective is expected to be met for Inland Water Environmental Quality.
Community and Economy	
Potential Impacts	<ul style="list-style-type: none"> • Restrictions on public access to the Mindil Beach foreshore • Loss of the site as community public open space • Reduced amenity due to noise generation • Visual amenity impacts • Traffic delays, congestion, and increased road safety risk • Sea breeze impacts on heritage buildings within the Myilly Point Heritage Precinct
Mitigation	<p><u>Restrictions on public access to the Mindil Beach foreshore</u></p> <ul style="list-style-type: none"> • Ensure the Development does not encroach on publicly- accessible open space. • Maintain pedestrian pathways to ensure access to the Little Mindil Beach foreshore. • Explore partnership options to upgrade and enhance the adjacent Nurses Walk. • Incorporation of public areas, including the Market area, within the design of the Development.

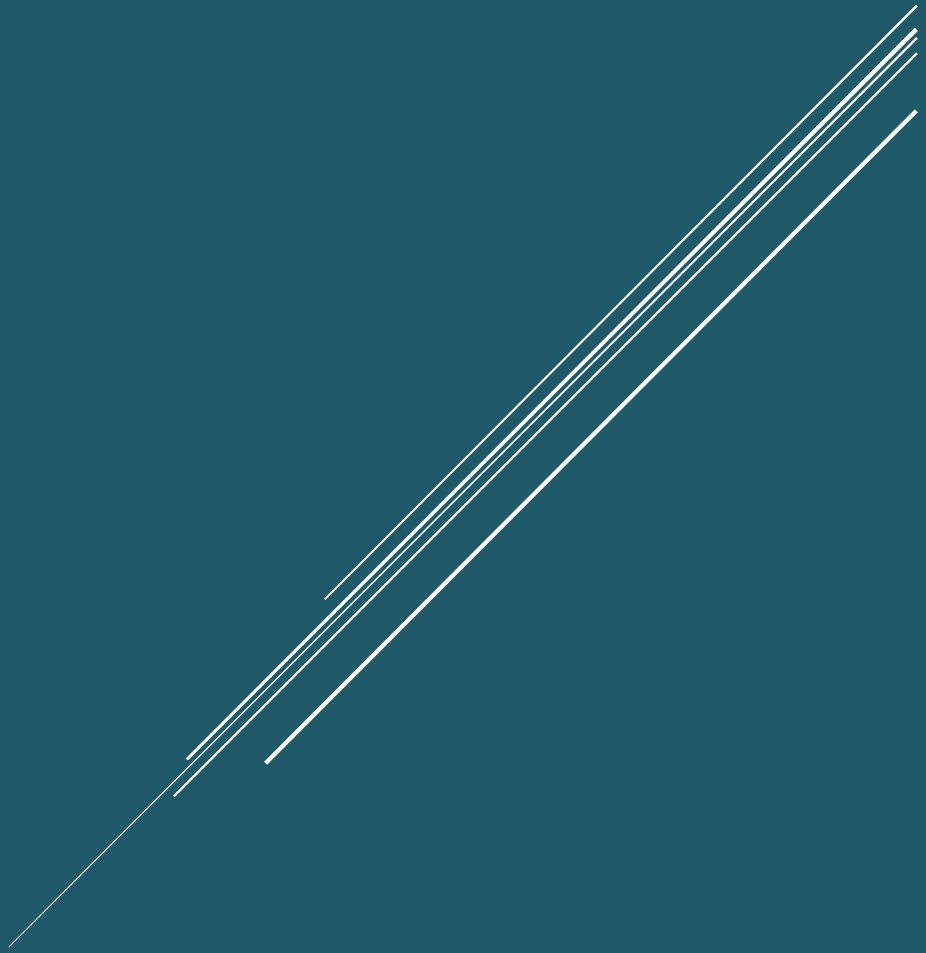
	<p><u>Loss of the site as community public open space</u></p> <ul style="list-style-type: none"> As above <p><u>Reduced amenity due to noise generation</u></p> <ul style="list-style-type: none"> No direct line of site between major plant items and the nearest sensitive receptors Implement acoustic treatments if the overall sound power level of mechanical plant exceeds 80 dBA for each building Ensure acoustic testing is undertaken to confirm compliance for mechanical plant prior to completion of construction. Establish speed limits within the site to reduce traffic noise impacts. Construct trafficable surface with a low-squeal compound. Investigate acoustic upgrades for Ground Level Food and Beverage Bar to reduce break-out noise from amplified music. Investigate options for acoustic upgrades to the facades of the Hotel Building and patron limits to reduce Level 1 Poolside Bar noise emissions. Adhere to Responsible Serving of Alcohol principles to reduce likelihood of patrons causing noise and participating in anti-social behaviour. Establish protocols for live music events, including notification procedures, noise monitoring (if appropriate) and complaint processes. Incorporate noise impacts into the EMP, to be completed prior to the commencement of operations. <p><u>Visual amenity impacts</u></p> <ul style="list-style-type: none"> Maintain the maximum limit on building height to 6 levels. Siting of the taller buildings away from the sensitive receptors to the south of the Development site. Preserve and enhance the vegetation within Little Mindil Creek and the southern escarpment. Inclusion of biophilic rooftop design into the Development to enhance the visual amenity of the Development. Ensure building and landscape designs incorporate sympathetic vegetation and design choices to integrate with the surrounding environmental values and provide adequate screening of non-aesthetic infrastructure. <p><u>Traffic delays, congestion, and increased road safety risk</u></p> <ul style="list-style-type: none"> The Traffic Impact Assessment concluded that additional traffic generated by the Development is not likely to result in adverse impacts in the surrounding road network. <p><u>Sea breeze impacts on heritage buildings within the Myilly Point Heritage Precinct</u></p> <ul style="list-style-type: none"> Due to the recessed design of the Complex, the large setback from the surrounding areas and the landscaping plan, it is expected that the Complex will have a negligible impact on the north to westerly sector winds or sea breezes that will impact the southerly buildings on top of the cliff. <p><u>Stakeholder Engagement</u></p> <ul style="list-style-type: none"> Implement the Stakeholder Engagement Plan to ensure open and appropriate consultation with stakeholders, including the community, throughout all stages of the proposed Development.
Outcomes	<p>KTT Investment considers that with the implementation of the described design criteria and mitigation strategies that the Development will achieve the NT EPA's objective for Community and Economy. It is recognised, however, that the following residual impacts will occur:</p> <ul style="list-style-type: none"> Moderate visual impact from some vantage points within the Myilly Point Heritage Precinct; Loss of large grassed area, currently informally used as public open space. <p>Overall, it is expected that the Development will have a net positive impact on the local, regional and national community and economy.</p>
Culture and Heritage	
Potential Impacts	<ul style="list-style-type: none"> Disturbance or destruction of culturally significant sites Restricted access to Sacred Site and Little Mindil Beach for cultural purposes Degradation of scenic values of Myilly Point Heritage Precinct
Mitigation	<p><u>Disturbance or destruction of culturally significant sites</u></p> <ul style="list-style-type: none"> Obtain an AAPA Certificate prior to ground disturbance. Develop procedures for discovery of an unknown potential archaeological site during excavation activities. Instigate an archaeological monitoring program for any ground disturbance work in recognition of the possibility that historic burials may still exist at the site. A Larrakia representative to be present on site to monitor excavation work. <p><u>Restricted access to Sacred Site and Little Mindil Beach for cultural purposes</u></p> <ul style="list-style-type: none"> Establish a process of stakeholder engagement and participatory planning with the Larrakia people. Engage with the relevant indigenous stakeholders to ensure traditional activities in nearby areas are understood and not impacted.

	<ul style="list-style-type: none"> Ensure the Development does not encroach on publicly- accessible open space. Maintain pedestrian pathways to ensure access to the Little Mindil Beach foreshore. <p><u>Degradation of scenic values of Myilly Point Heritage Precinct</u></p> <ul style="list-style-type: none"> Refer to mitigation strategies detailed in the Community and Economy section above
Outcomes	<p>The construction phase of the proposed Development has the potential to have significant cultural impacts if an unknown site of cultural significance is disturbed. Implementation of the mitigation measures significantly reduces the likelihood of disturbance to a culturally significant site.</p> <p>Maintaining access to the Registered Sacred Site and Little Mindil/Mindil Beach foreshore for use for cultural purposes will minimise impacts from the Development.</p> <p>The proposed development will not have a direct impact on the historic values of the Myilly Point Heritage Precinct.</p>
Human Health	
Potential Impacts	<ul style="list-style-type: none"> Exposure to environmental elements Animal Interactions Biting Insects
Mitigation	<p><u>Exposure to environmental elements</u></p> <ul style="list-style-type: none"> Hotel personnel will be trained in the risks associated with climate exposure, the signs and symptoms of over-exposure to heat and its effects (e.g. dehydration) and what to do in case of an emergency. Hotel guests will be informed of the risks and mitigation strategies to avoid or minimise effects to human health. First-aid facilities will be equipped to provide at least an initial response to incidents of this type. Develop and implement a Cyclone Response Plan. Ensure buildings are designed and constructed in accordance with relevant building codes, with particular emphasis on cyclone ratings. <p><u>Animal Interactions</u></p> <ul style="list-style-type: none"> Awareness for Hotel guests on risks of animal interaction and avoidance measures to be implemented. First-aid facilities will be equipped to provide at least an initial response to incidents of this type, with Hotel personnel trained in first response procedures <p><u>Biting Insects</u></p> <ul style="list-style-type: none"> Implement the Biting Insects Management Plan (BIMP) (Appendix 21)
Outcomes	<p>The risks to human health from exposure to environmental elements and animal interaction will not alter as a result of the proposed Development. As such, no residual impact is expected.</p> <p>Implementation of control measures to reduce human health impacts as a result of biting insects (such as implementation of the BIMP, as well as consideration of biting insect occurrences in the landscape design of the Development) will result in the risk being low.</p>

CONCLUSION

The North One Hotel and Apartment Development will provide a prestigious waterfront accommodation and entertainment experience for tourists and the local Darwin community and will provide economic benefits to the Darwin and NT economies.

The risk assessment process has determined that the Development will not have any significant impacts on the environmental factors as described by the NT EPA (2020). Assessment of the environmental impacts and risks potentially associated with the Development, and the identification of mitigating strategies to reduce impacts, has resulted in the North One Development being compliant with the NT EPA Objectives for all applicable environmental factors.



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PROJECT TERMS

Term	Meaning
Development/Complex/Proposal	North One Hotel and Apartment Development
KTT Investment Pty Ltd	Proponent for the North One Hotel and Apartment Development
Proponent	Person or company proposing the North One Hotel and Apartment Development
Regulator	Governing body discerning environmental approvals
Site	Lot 7651, 25 Gilruth Avenue, The Gardens, Darwin
Referral	Northern Territory Environmental Assessment Referral Report

LIST OF ABBREVIATIONS

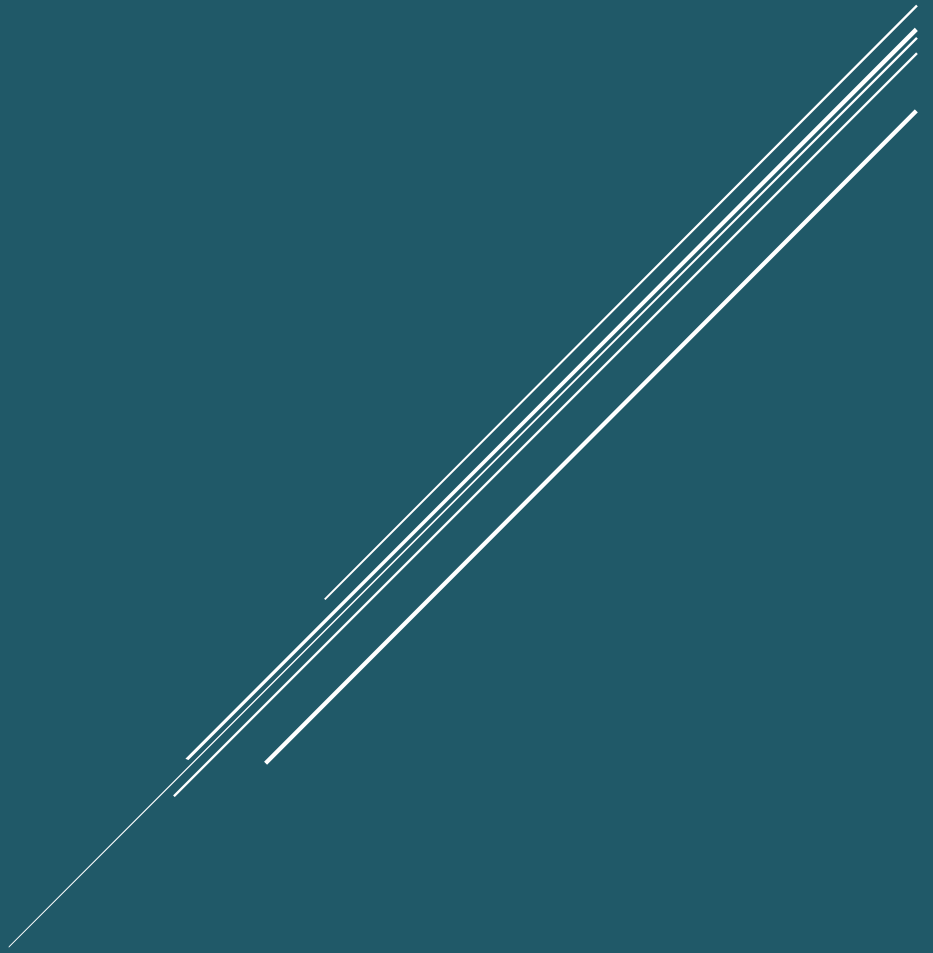
Abbreviation	Measure
AAPA	Aboriginal Areas Protection Authority
ABS	Australian Bureau of Statistics
AEP	Annual Exceedance Probability
API	Assessment of Proponent Information
APM	Animal Plant Mineral
AD	Average Daily
AHD	Australian Height Datum
APM	Animal Plant Mineral Pty Ltd
ASS	Acid Sulphate Soils
ASX	Australian Securities Exchange
BIMP	Biting Insects Management Plan
BoM	Bureau of Meteorology
BPL	BPL Environmental Consultants
CBD	Central Business District
CEMP	Construction Environmental Management Plan
COPC's	Contaminants of Potential Concern
Cth	Commonwealth
DA	Development Application
DAWE	Department of Agriculture, Water, and the Environment (Cth)
DD	Data Deficient
DEPWS	Department of Environment, Parks and Water Security
DHW	Domestic Hot water
DIPL	Department of Infrastructure, Planning and Logistics
DoE	Department of the Environment (Cth)
DoEE	Department of Environment and Energy
DPLH	Department of Planning Lands and Heritage
DMA	Decision Making Authority
EMS	Environmental Management System
EP	Equivalent Person
EP Act	<i>Environmental Protection Act 2020 (NT)</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act 1999</i>
EPA	Environmental Protection Authority

Abbreviation	Measure
EIA	Environmental Impact Assessment
ERD	Environmental Review Document
ESD	Environmentally Sustainable Development
ESCP	Erosion and Sediment Control Plan
EMP	Environmental Management Plan
FTE	Full-time Equivalent
GDP	Gross Domestic Product
GHG	Greenhouse gases
GSP	Gross State Production
GVA	Gross value add
IAP2	International Association for Public Participation
IBRA	Interim Biogeographic Regionalisation for Australia
IECA	International Erosion Control Association
HAZMAT	Hazardous Materials
HVAC	Heating Ventilation and Air Conditioning
KTT Investments	KTT Investments Pty Ltd
LGA	Local Government Area
LSSS	Land Subject to Storm Surge
MNES	Matter of National Environmental Significance
MSDS	Material Safety Data Sheet
MS	Ministerial Statement
NATA	National Association of Testing Authorities
NGER	National Greenhouse and Energy Reporting
North One Complex	North One Hotel and Apartment Complex
NR Maps	Natural Resource Maps
NT	Northern Territory
NT EPA	Northern Territory Environmental Protection Authority
NTPS	<i>Northern Territory Planning Scheme 2020</i>
PASS	Potential Acid Sulphate Soils
PD	Peak Daily
PEC	Priority Ecological Community
PH	Peak Hourly
PMP	Project Management Plan
PMST	Protected Matters Search Tool
POL	Petrol, oils and lubricants
POW	Programme of Work
PSA	Planning Scheme Amendment
PSS	Primary Storm Surge
PWC	Power and Water Corporation
QUDM	Queensland Urban Drainage Manual
RBL	Rated background noise level
RNE	Register of the National Estate
RTA	Road Transport Association
RUSLE	Revised Universal Soil Loss Equation

Abbreviation	Measure
SOCS	Site of Conservation Significance
SQIDs	Stormwater quality improvement devices
SSS	Secondary Storm Surge
tCO ₂ e	Tonnes of carbon dioxide equivalent
TDS	Total dissolved solids
TEC	Threatened Ecological Community
The Development	North One Hotel and Apartment Complex
The Project	North One Hotel and Apartment Complex
The Proponent	KTT Investments
TPWC Act	<i>Territory Parks and Wildlife Conservation Act 1976</i>
TSS	Total suspended solids
VIS	Visual Impact Study
WoNS	Weed of National Significance
Zone PS	Zone Public Open Space
Zone TC	Zone Tourist Commercial

UNITS OF MEASURE

Unit	Meaning
%	Percent
°C	Degrees Celsius
ha	hectare
Km	Kilometre
K	Thousand
L/s	Litres per second
m	Metre
M	Million
m ²	Square metres
m ³ /s	Cubic metres per second
Mm/hr	Millimetre per hour
mg/L	Milligrams per litre
Mtpa	Million tonnes per annum
mm	Millimetre
t	Tonnes



INTRODUCTION

NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

1 INTRODUCTION

KTT Investments Pty Ltd (**KTT Investments**) (the **Proponent**) intends to develop the North One Hotel and Apartments (the **Development**) - a high-quality multi-story hotel/villa, apartment complex with public bar and markets, situated at 25 Gilruth Avenue, The Gardens, Northern Territory (the **site**). Consistent with the *Environmental Protection Act 2019 (EP Act)* and *Environmental Protection Regulations 2020*, the Proponent is referring this Project for assessment by the Northern Territory Environmental Protection Authority (**NT EPA**).

1.1 PURPOSE

BPL Environmental was commissioned by KTT Investments to develop an environmental assessment referral report for the North One Hotel and Apartment Development. The purpose of this document is to provide:

- A high-level overview of the environmental context for the site;
- Detail the key components of the proposed hotel development;
- Summarise the stakeholder engagement and community consultation undertaken for the Proposal; and
- Identify the environmental factors and objectives in terms of environmental protection, management, and cumulative impacts.

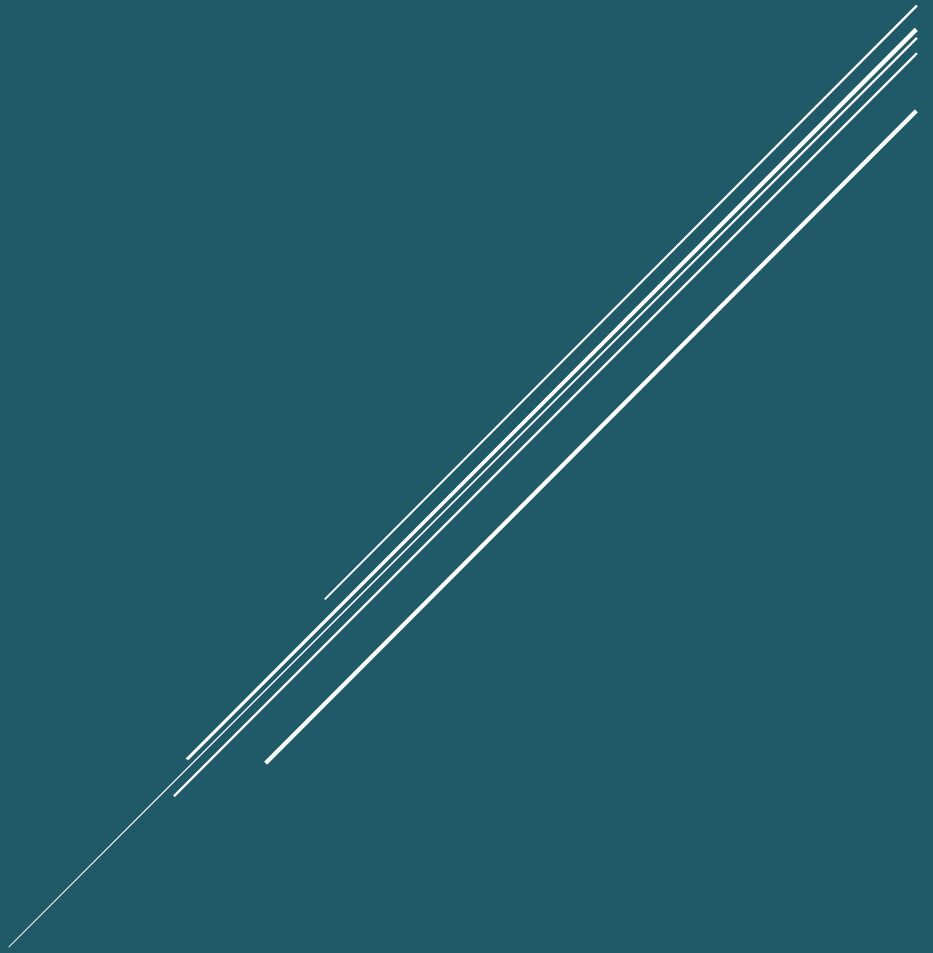
1.2 PROPONENT

The Proponent, KTT Investment Pty Ltd, is an investment company comprised of the following shareholders: Anh Tuan Do, David Do Awi, Duy Kien Nguyen, and Thi Thuy Trang Dang. An agreement between the Proponent and the current landowner, SKYCITY Australia Pty Ltd (CAN 090 828 612), has been entered into outlining the proponent as beneficiaries.

Contact details for the Proponent are summarised in **Table 1-1**.

Table 1-1: Proponent Details

Proponent	KTT Investment Pty Ltd
Contact	John Hamilton – Urbanscope (Australia) Pty Ltd
Postal address	c/- 459 Harris Street Ultimo NSW 2007
Phone	+61 2 9042 0600
Fax	+61 2 9660 7681
Email	johnha@urbanscope.com.au
Proponent ABN	70 634 253 197
Media Contact	Bruce Cutler – Red Splash (bruce@redsplash.com.au)



PROPOSAL OVERVIEW

NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

2 PROPOSAL OVERVIEW

The North One Hotel and Apartment Development is designed to “authentically connect with the Australian coastal spirit, create a strong narrative to capture the imagination of the public, create an immersive experience for guests and homeowners, use the asset of the site and its position to advantage, and create a true branded residence to drive premium prices” (Hachem, 2020).

2.1 LOCALITY

The site, situated at 25 Gilruth Avenue, The Gardens, falls within the locality of the Town of Darwin (Lot reference number 7651 of Town of Darwin Plan S2009/255A-B) and is approximately 2.5 km from the Darwin Central Business District. It comprises a grassed area, a 230-car capacity open-air bitumen carpark and associated landscaping; all totalling an area of 5.13 hectares (ha) (Figure 2-1, Plate 2-1 and Plate 2-2). A location plan is included as Figure 2-2.



Figure 2-1: North One Development Site



Plate 2-1: North One Development Site from Gilruth Avenue



Plate 2-2: North One Development Site Grassed Area

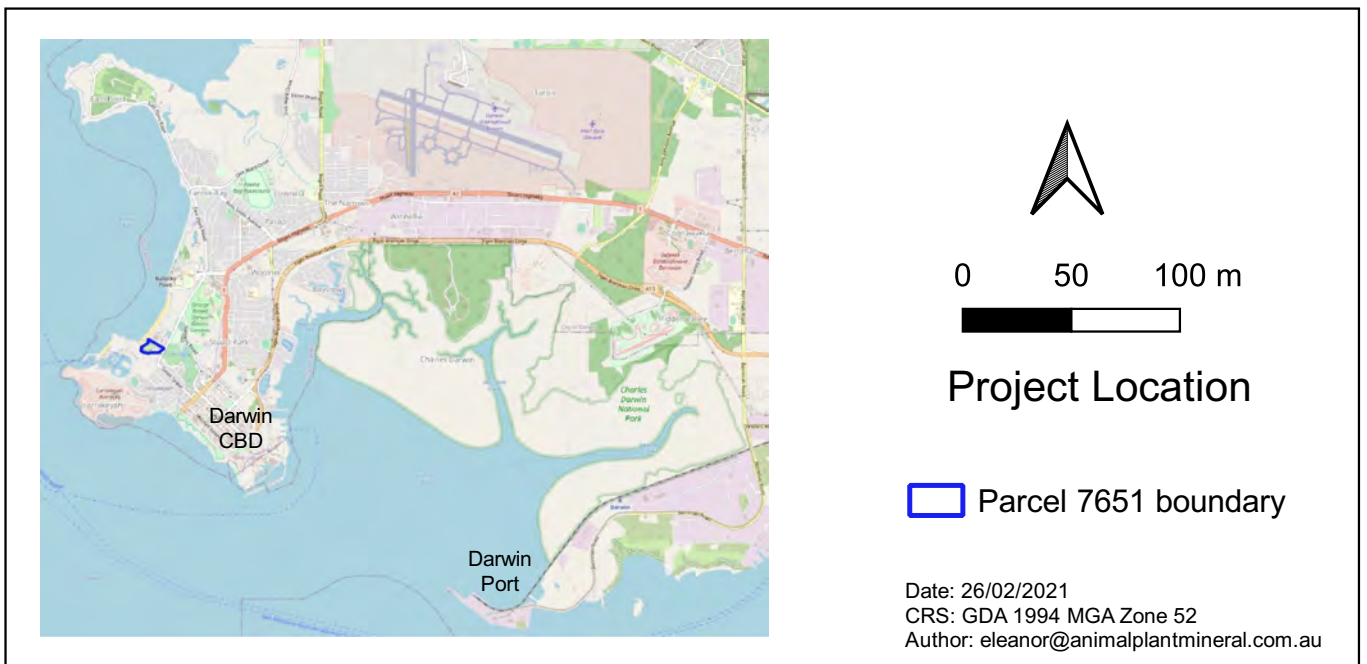


Figure 2 2: Project Location

Natural features and land uses bounding the site include:

- North-western boundary: Little Mindil Beach;
- Northern boundary: Mindil Beach Casino Resort which features restaurants, bars, pools, and business amenities;
- North-east boundary: Little Mindil Creek, sewer pump station, and an open-air carpark and road reserve for Mindil Beach Casino Resort;
- Eastern boundary: Gilruth Avenue and Garden Park Golf Links; and
- South-west: An escarpment rising sharply along the site boundary; National Trust listed Myilly Point Heritage Precinct (which includes Burnett House, Mines House, Audit House and Magistrates House).
- Registered Sacred Site 5073-89: Casino Burial Island, located in the Little Mindil Creek reserve.

Figure 2-3 shows the Development site within the context of the surrounding land uses. **Figure 2-4** indicates the location of the Registered Sacred Site.



Figure 2-3: Surrounding Land Uses

MAP 1

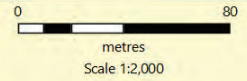


Lot 7651 Town of Darwin. (25 Gilruth Avenue, The Gardens, NT) - 201901805
 NOT FOR WORKS

MAP SHOWING SACRED SITES RECORDED AS AT 13/03/2019

ISSUED TO:
 Colliers International NT Pty Ltd

J2019-0077



KEY

- Subject Land
- Restricted Works Area
- Extent of Registered Site
- Registered Sacred Site

** The Sacred Site point is not indicative of the specific site location and does not represent the location of any features of the site.*

**Figure 2 4:
 Registered Sacred Site
 5073-99 Location**



Prepared and produced by Aboriginal Area Protection Authority (AAPA), Darwin, Northern Territory of Australia
 1/ Northern Territory of Australia

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2.2 ZONING

Lot 7651 Town of Darwin is zoned under the *Northern Territory Planning Scheme 2020 (NTPS)* as Zone Tourist Commercial (**Zone TC**), as indicated in **Figure 2-5**.

Previously, the Little Mindil Creek area was also included within Lot 7651; however, KTT completed a Planning Scheme Amendment (**PSA**) to excise the creek reserve from the site and rezone it from Zone TC to Zone Public Space (**Zone PS**). The PSA was granted approval by the Department of Infrastructure, Planning and Logistics (**DIPL**) on 27th May 2021. This will ensure ongoing protection of the creek, public access to the foreshore and protection of Registered Sacred Site 5073-89.

The site incorporates the following easements and covenants:

- Electronic communications easement to Telstra Corporation Limited
- Electricity supply easement to the Power and Water Corporation (**PWC**)
- Sewage easement to PWC
- Right of way easement to PWC
- Covenant Dealing No. 731712 – Requires the owner to provide continuing care of vegetation on the Escarpment (including the top and base) as well as the tidal creek (**Plate 2-3**).

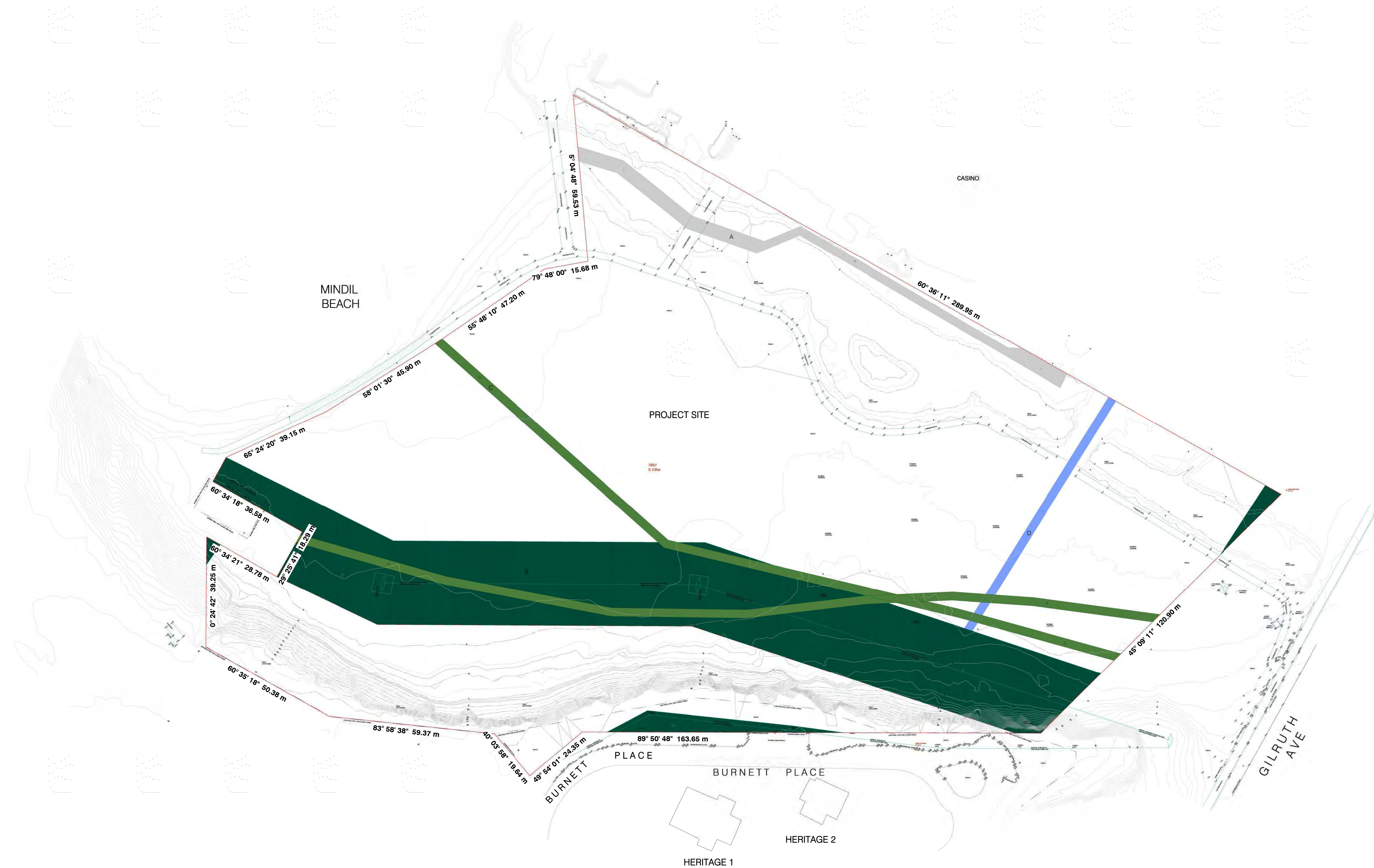
Figure 2-6 indicates the current easement plan for the site.



Plate 2-3: Escarpment Vegetation

EASEMENT LEGEND

- (A) = EASEMENT (SEWERAGE) BENEFIT TO THE POWER & WATER CORPORATION.
- (B) = EASEMENT (ELECTRICITY SUPPLY) BENEFIT TO THE POWER & WATER CORPORATION.
- (C) = EASEMENT (ELECTRONIC COMMUNICATIONS SUPPLY) BENEFIT TO THE POWER & WATER CORPORATION.
- (D) = EASEMENT (RIGHT OF WAY) BENEFIT TO THE POWER & WATER CORPORATION.



1 SITE PLAN - EXISTING
1 : 750

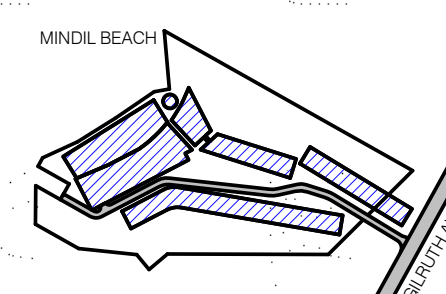
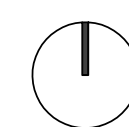
Figure 2 6: Easement and Covenant Plan

HACHEM ARCHITECTURE INTERIOR MARKETING

HACHEM.COM.AU LEVEL 3, 2 DREWERY PLACE 183 WESTON STREET
INFO@HACHEM.COM.AU MELBOURNE 3000 BRUNSWICK EAST 3057
STUDIO +61 1300 734 560 VICTORIA, AUSTRALIA VICTORIA, AUSTRALIA

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REV.	DESCRIPTION	DATE
A	TOWN PLANNING SUBMISSION	19/02/21



PROJECT LOCATION
25 GILRUTH AVENUE,
THE GARDENS, DARWIN

CLIENT
DAVID DO AWI

DRAWING SCALE
As indicated

DRAWING DATE
19/02/21

SHEET SIZE
A1

CHECK
EP

PROJECT NO
257

DRAWN
KS



DRAWING TITLE
EXISTING SITE CONDITIONS

PROJECT NAME
LITTLE MINDIL

REVISION
A

DRAWING NO.
TP0.11

BUILDING / ATTRIBUTE
12°26'59" S
130°49'45" E

TP0.11

TOWN PLANNING

2.3 PROJECT DESIGN

2.3.1 Development Overview

The North One Hotel and Apartment Development aims to create a prestigious waterside facility consisting of a hotel, commercial premises, and residential offerings. The Development will consist of five buildings comprising the following:

- 150 hotel rooms, including 16 lagoon villas and 3 garden villas;
- 53 serviced apartments;
- Six retail spaces;
- 151 semi-basement and 126 ground level car parking spaces; and
- Beachfront food and beverage venue.

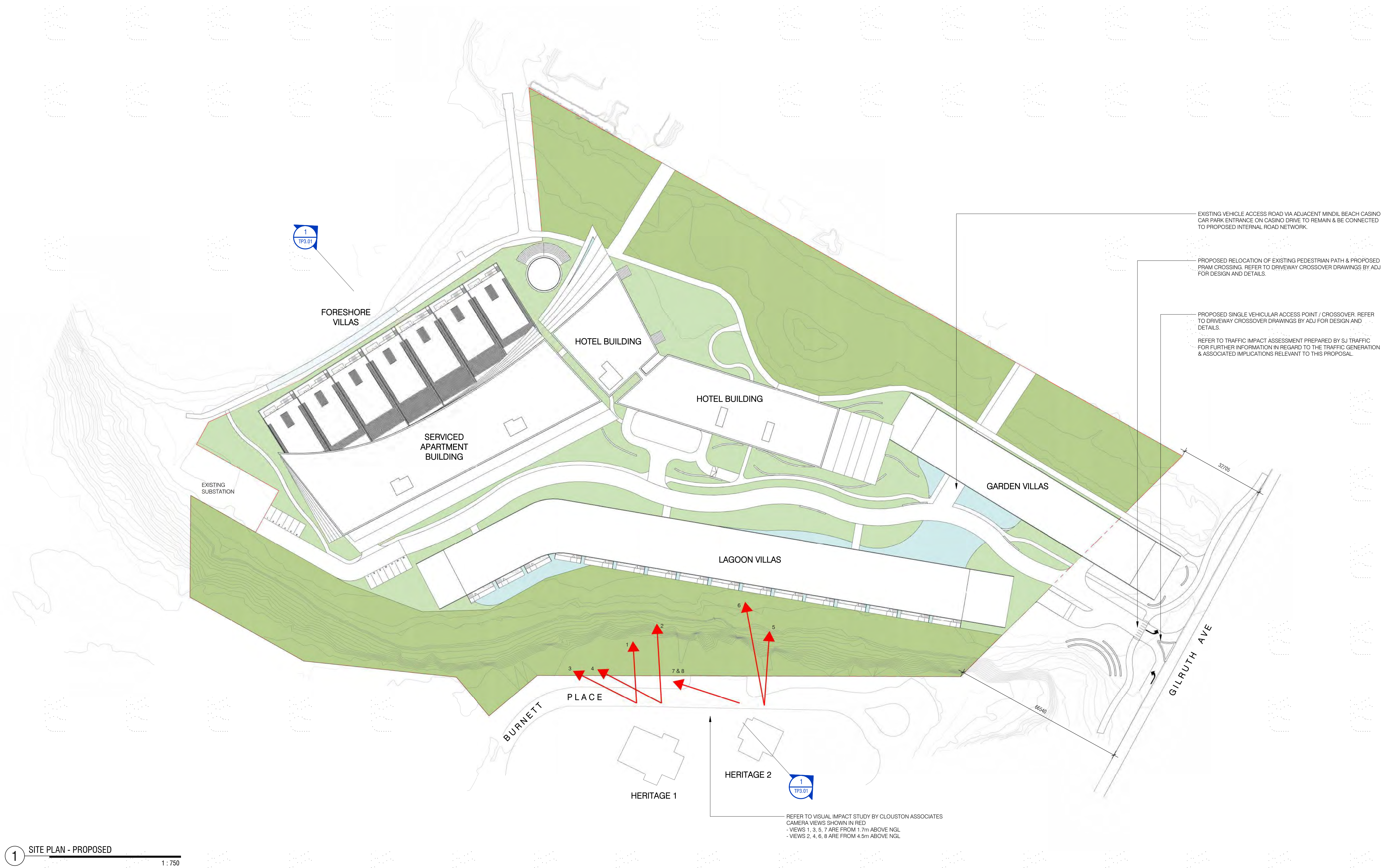
More specifically, the Proposal will include:

- Seven (7) x three (3) Bedroom Foreshore Villas (serviced apartments);
- 22 x two (2) Bedroom Apartments (serviced apartments);
- 22 x three (3) Bedroom Apartments (serviced apartments);
- Two (2) x four (4) Bedroom Apartments (serviced apartments);
- 149 x single Hotel Rooms (hotel/motel);
- 16 x two (2) Bedroom Lagoon Villas (hotel/motel);
- Three (3) x two (2) Bedroom Garden Villas (hotel/motel);
- A Feature Beachfront Bar (ancillary bar-public);
- An area within the landscaped grounds for a Market (ancillary Market);
- Hotel facilities; and
- Loading facilities, including two (2) loading bays.

The five main buildings on site are:

- A six (6) storey + basement serviced apartment building;
- A six (6) storey + basement hotel building with semi-basement parking;
- A single storey garden villa building;
- A single storey lagoon villa building; and
- A single storey feature food and beverage building.

Figure 2-7 provides an overview of the proposed layout for the North One Hotel and Apartment Complex; an artist impression is illustrated in **Figure 2-8**. Further detail, including Development drawings, have been prepared by HACHEM and are provided as **Appendix 1**.



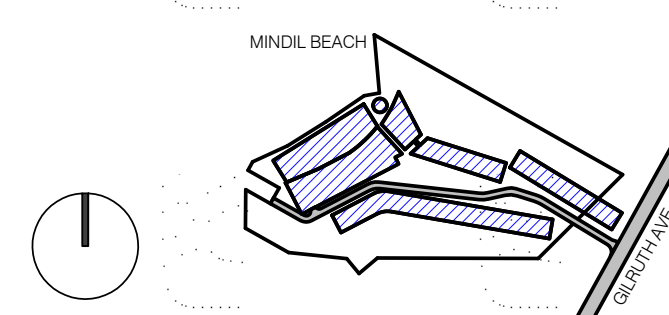
1 SITE PLAN - PROPOSED 1 : 750

Figure 2 7: Proposed Layout of North One Development

HACHEM ARCHITECTURE INTERIOR MARKETING
 HACHEM.COM.AU LEVEL 3, 2 DREWERY PLACE 183 WESTON STREET
 INFO@HACHEM.COM.AU MELBOURNE 3000 BRUNSWICK EAST 3067
 STUDIO +61 1300 734 560 VICTORIA, AUSTRALIA VICTORIA, AUSTRALIA

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REV.	DESCRIPTION	DATE
A	TOWN PLANNING SUBMISSION	19/02/21



PROJECT LOCATION
 25 GILRUTH AVENUE,
 THE GARDENS, DARWIN

CLIENT
 DAVID DO AWI

DRAWING SCALE
 1 : 750

DRAWING DATE
 19/02/21

SHEET SIZE
 A1

CHECK
 EP

PROJECT NO
 257

DRAWN
 KS



DRAWING TITLE
 PROPOSED SITE PLAN

PROJECT NAME
 LITTLE MINDIL

REVISION
A

BUILDING / ATTRIBUTE
 12°26'59" S
 130°49'45" E

DRAWING NO.
TP0.13



Figure 2 8: Illustrative Impression of the North One Development

2.3.2 Landscaping and Public Open Space

Intrinsic in the Development is a biophilic landscape design concept and provision of open space. The public open space and landscaping features of the site include:

- Biophilic design with green rooftops;
- Grassed public lawn designed for events;
- Public activity and market area on the ground floor of the hotel building (ancillary market);
- Convenient public access to the feature food and beverage venue;
- Retention of the existing public footpath through the site;
- Retention of public access to the foreshore; and
- Comprehensive landscaping for the site.

Clouston Associates were engaged to develop a landscape design concept for the North One Development, which is presented as **Appendix 2**. A bird's eye view of the Hotel and Apartment Complex illustrating the biophilic rooftop design is presented as **Figure 2-9**.



Figure 2-9: North One Hotel and Apartment Development – Bird's Eye View

2.3.3 Site Preparation

Bulk earthworks will be required to level the site and raise the infrastructure pad above the storm surge level. Through the importation of clean fill, the final surface height is expected to be raised to 5.80 m Australian Height Datum (AHD). **Figure 2-10** provides a comparison of the existing and final surface levels.

Prior to commencement of bulk earthworks and site preparation, a Land Suitability Assessment will be undertaken, and remediation conducted where required, to ensure any potential contamination is addressed and the site is suitable for the intended land use. Further detail on potential contamination is provided in **Section 7.1** (Terrestrial Environmental Quality).

2.3.4 Services and Infrastructure

The Development site is adequately serviced by public utilities including reticulated water, sewerage, stormwater drainage, national broadband network, electrical reticulation and an established road network.

2.3.4.1 Water

The Water Supply Code of Australia specifies the following water demand criteria for residential and commercial developments for an equivalent person (EP) per day as shown in **Table 2-1** below.

Table 2-1: Water Loading Criteria

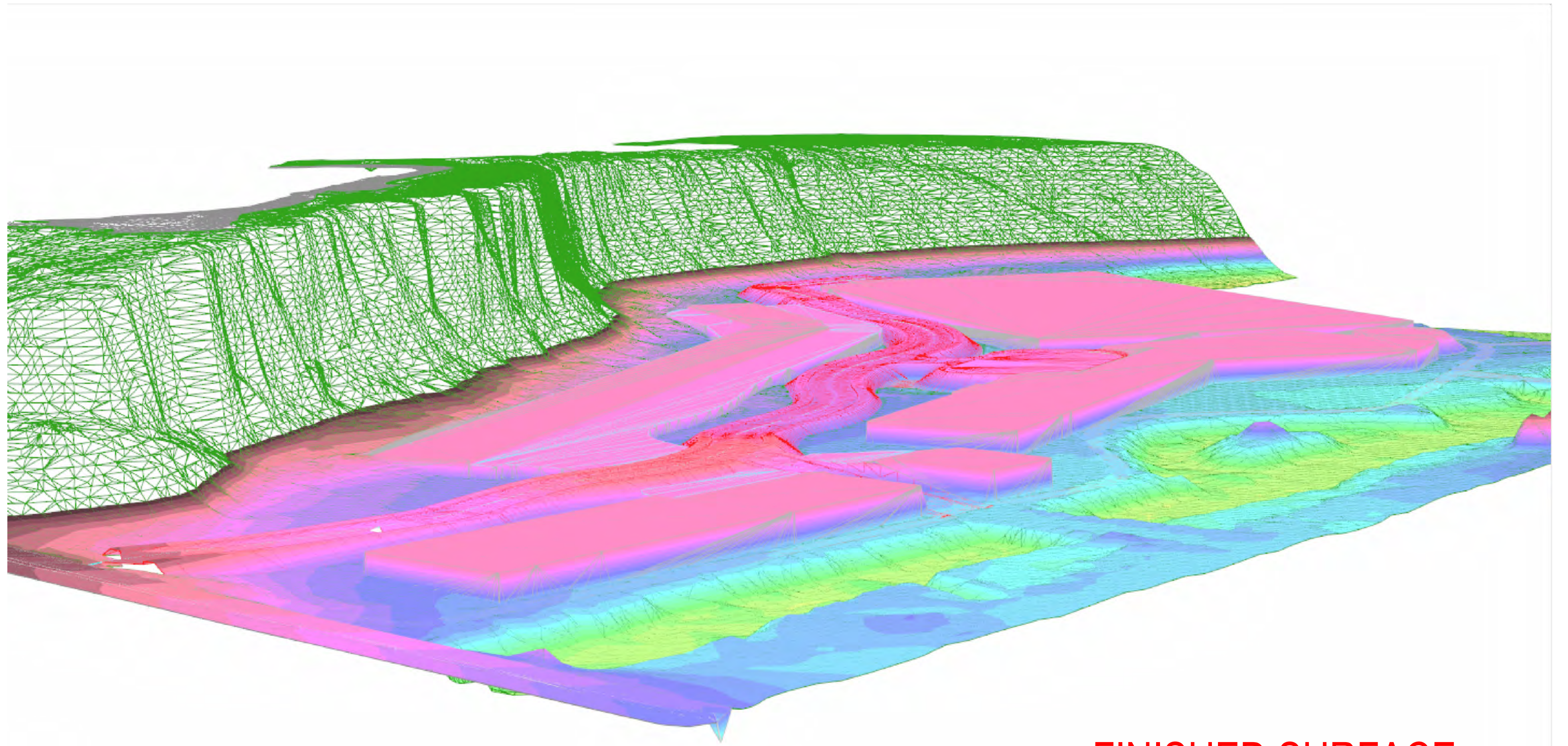
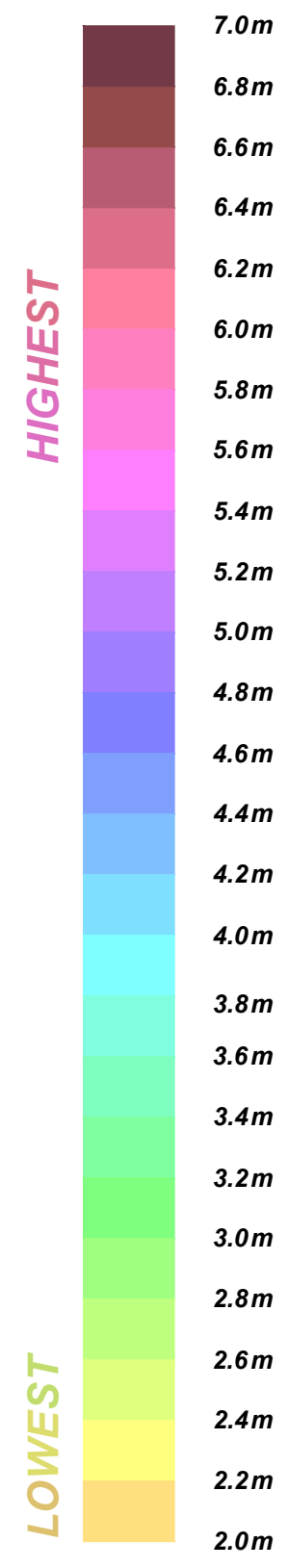
Demand	Potable Water Supply
Average Daily (AD)	300 L/EP/Day
Peak Day (PD)	1100 L/EP/Day
Peak Hour (PH)	1.9 x AD (Darwin Area)

The EP for the Development has been calculated by applying a demand rate per bedroom and for commercial areas, as outlined in the *PWC Supplement to the Water Supply Code of Australia*. The existing water connection is expected to adequately facilitate the estimated demands of the Project, based on the calculated water loading, as represented in **Table 2-2** below.

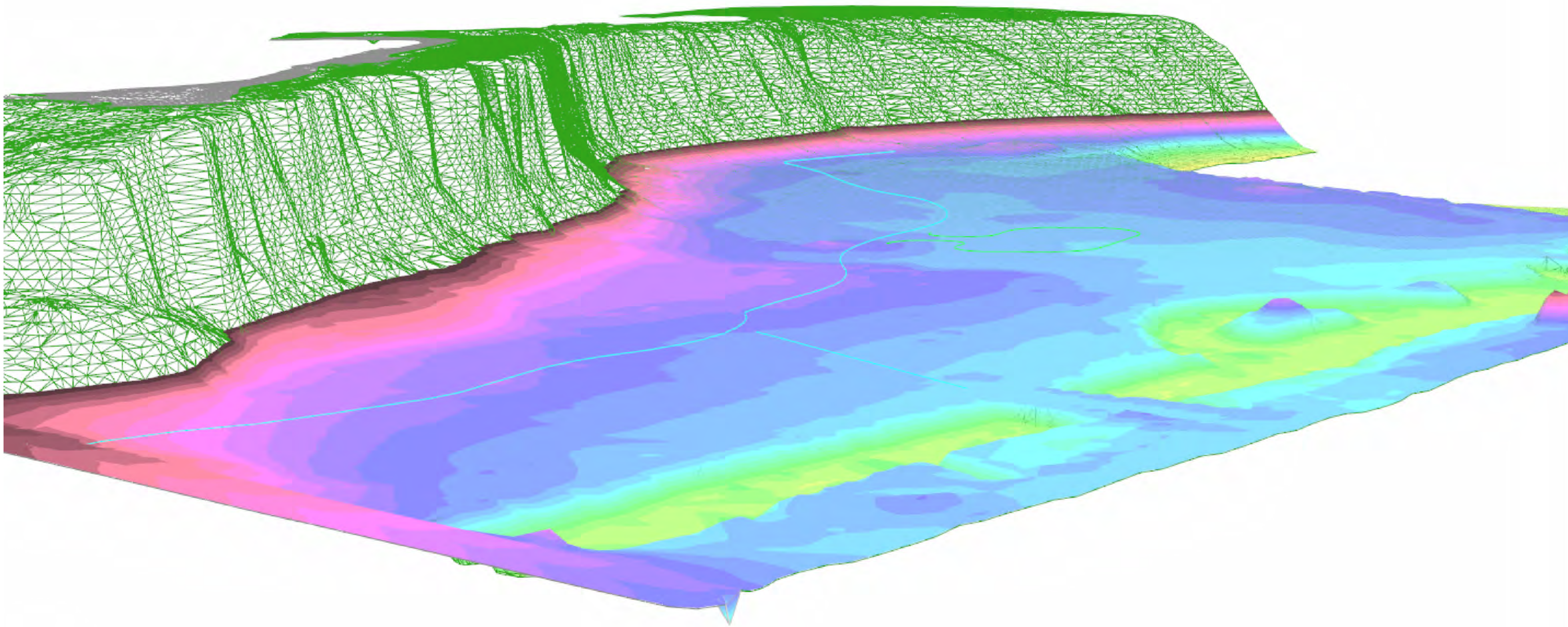
Table 2-2: Expected Water Loading

Development Type	EP	AD (L/s)	PD (L/s)	PH (L/s)
Hotel	59.90	0.208	0.763	0.395
Villas (2 and 3 Bedroom)	52.00	0.181	0.662	0.343
Residential Apartments	92.00	0.319	1.171	0.607
Function/ Commercial	8.75	0.030	0.111	0.058
Retail/Stalls	0.60	0.002	0.008	0.004
Total	213.25	0.389	1.425	0.738

Additional sluice valves may be required either side of the connection tee to ensure security of service. Details of the proposed connection will be provided during the detailed design stage, subject to approval by the PWC.



FINISHED SURFACE



EXISTING SURFACE

ISSUED FOR
INFORMATION ONLY

Rev	Date	Description	By	Chk
A	28.05.21	ISSUED FOR INFORMATION	HD	HD

Figure 2 10: Surface Level Comparison



Client: Arthur Winston Investments Pty Ltd
Project Name: LITTLE MINDIL BEACH
THE GARDENS, NORTHERN TERRITORY

Discipline: CIVIL
Designed By: HD
Checked By: HD
Project No.: 23085
Drawn By: DG

Status: INFORMATION
Approved By: BL
Scale at A1: AS SHOWN
Title: SURFACE COMPARISON

Drawing No: DA_C103
Revision: A

2.3.4.2 Sewerage

The expected sewage loading from the North One Development is presented in **Table 2-3**.

Table 2-3: Expected Sewage Loading

Development Type	<i>r</i>	EP	Average Dry Weather Flow (L/s)	Peak Dry Weather Flow (L/s)	Peak Wet Weather Flow (L/s)
Hotel	4.538	59.90	0.125	0.567	1.701
Villas (2 and 3 Bedroom)	4.538	52.00	0.108	0.492	1.476
Residential Apartments	4.538	92.00	0.192	0.871	2.612
Function/ Commercial	4.538	8.75	0.018	0.083	0.248
Retail/Stalls	4.538	0.60	0.001	0.006	0.017
Total	4.538	213.25	0.444	2.018	6.054

The existing sewerage pump station, with an allocated capacity of 330 EP, is expected to adequately facilitate the Project. To enable this connection, however, a rising main in Lot 5772 Gilruth Ave, which only contains 150 EP of spare capacity, will require upgrade to accommodate for the proposed demand. The proposed connection and extent of upgrade to the sewer rising main will be subject to approval and further negotiation with PWC.

2.3.4.3 Electricity

A significant amount of existing electrical infrastructure exists within the site. To facilitate the proposed development, a large portion of the overhead infrastructure will require relocation underground. **Figure 2-11** shows current placement of electrical infrastructure within the site; **Figure 2-12** indicates the proposed electrical services layout plan. The works detailed on these drawings are preliminary and will be subject to further design and approvals from relevant authorities.

2.3.4.4 Communication

The following communication infrastructure within connectible proximity to the subject site includes:

- Underground conduit owned by Nextgen on the eastern side of Gilruth Avenue;
- Underground NBN cabling on the eastern side of Gilruth Avenue;
- Underground Telstra cabling from Gilruth Avenue to Mandora beneath the Timor Sea;
- Underground Telstra cabling running along the southern site boundary.

Connection to the site will be facilitated through a specialist telecommunications consultant and negotiation with the relevant carriers regarding the requirements of the proposed development telecommunications connection.

Figure 2-11 and **Figure 2-12** also indicate the existing and proposed communication infrastructure layout plan within the site.

2.3.4.5 Stormwater Drainage

The majority of the site currently discharges via sheet flows towards the north-eastern boundary; with runoff conveyed toward Little Mindil Creek. Little Mindil Creek, which is identified as the Lawful Point of Discharge, ultimately discharges to Fannie Bay at Little Mindil Beach.

The proposed Development intends to implement best management practice for stormwater treatment, as detailed in **Section 7.2** and **Section 7.3**. The Lawful Point of Discharge will remain as Little Mindil Creek following completion of the North One Hotel and Apartment Complex.

The retaining wall along the Little Mindil Beach foreshore, which is currently undergoing restoration by the City of Darwin, will remain in place.

2.3.4.6 Traffic

The North One site is fronted by Gilruth Avenue along the south-eastern boundary and Burnett Place on the site's southern boundary. There are no existing vehicle crossovers to the site from Gilruth Avenue or Burnett Place. The site is currently accessed through a vehicle access road from the adjacent Mindil Beach Casino Resort carpark entrance on Casino Drive.

A single vehicular access point located along Gilruth Avenue is proposed as part of the Development. The access point location will have sufficient sightlines; with left-in, left-out restrictions at the site access point being adopted (**Figure 2-13**).

Whilst this access point is within the road reserve, in-principle support for the application to be lodged, noting the road reserve encroachment, has been provided by the City of Darwin through the initial consultation process.

Additional traffic generated by the Development is not likely to result in adverse impacts in the surrounding road network, as described in **Section 7-4**.

2.4 PROJECT TIMING

The North One Hotel and Apartment Development is intended as a permanent high-quality feature within the Darwin landscape.

Construction of the Development is anticipated to occur over a 3 year period.














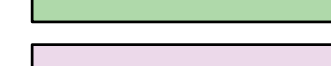

2.5 WORKFORCE

The construction phase of the Development is expected to generate approximately 350 direct or indirect jobs within the Darwin region.

Once operational, the North One Complex will require 120 direct or indirect employees on an ongoing basis.

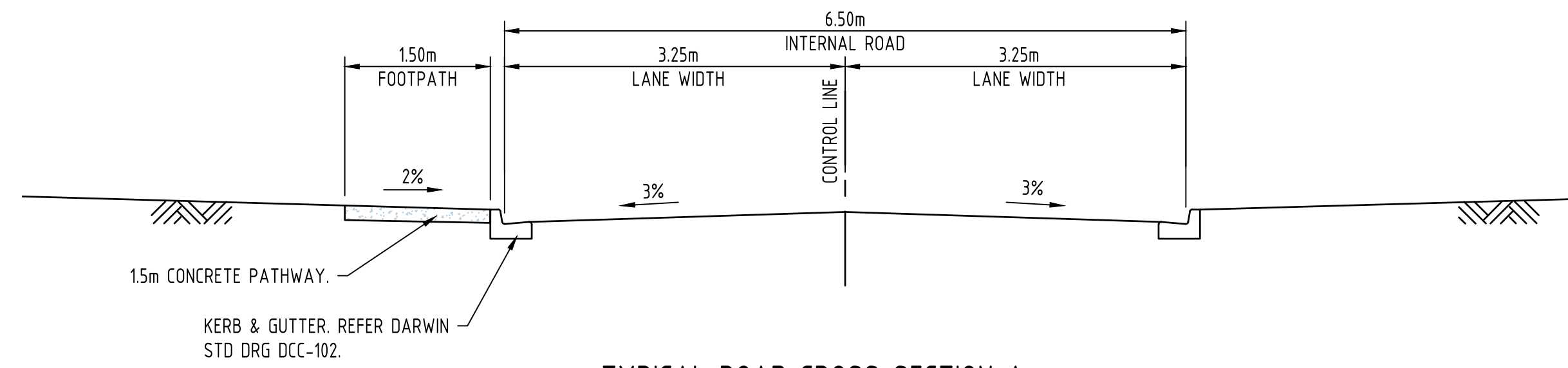
It is also anticipated that a number of local businesses will benefit, and potentially expand, as a result of attraction of tourists to the region from the North One Development.

LEGEND

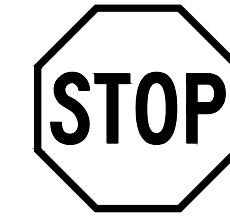
-  SITE BOUNDARY
-  PROJECTION OF SITE BOUNDARY
-  EXISTING PROPERTY BOUNDARY
-  EXISTING SURFACE CONTOURS
-  EXISTING OVERHEAD ELECTRICAL
-  EXISTING WATER MAIN (RECORDS)
-  EXISTING SEWER GRAVITY MAIN (RECORDS)
-  EXISTING ROAD
-  PROPOSED ROAD LINEMARKING
-  EXISTING FOOTPATH TO BE PROTECTED AND MAINTAINED
-  EXISTING FOOTPATH TO BE DEMOLISHED AND REMOVED FROM SITE
-  PROPOSED FOOTPATH
-  PROPOSED ROAD PAVEMENT
-  PROPOSED LANDSCAPE MEDIAN/ISLAND
-  PROPOSED ROOFED AREA

NOTES

1. CROSSOVER TO BE PEDESTRIAN AND BICYCLE PRIORITY.
2. ALL LINEMARKING TO BE AS PER NTG STD DRG NO. CS3400
3. REALIGNMENT OF ROAD AND FOOTPATH TO OCCUR IN CITY OF DARWIN ROAD RESERVE AND TO BE COORDINATED/NEGOTIATED WITH CITY OF DARWIN.



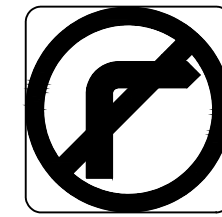
TYPICAL ROAD CROSS SECTION A
N.T.S.



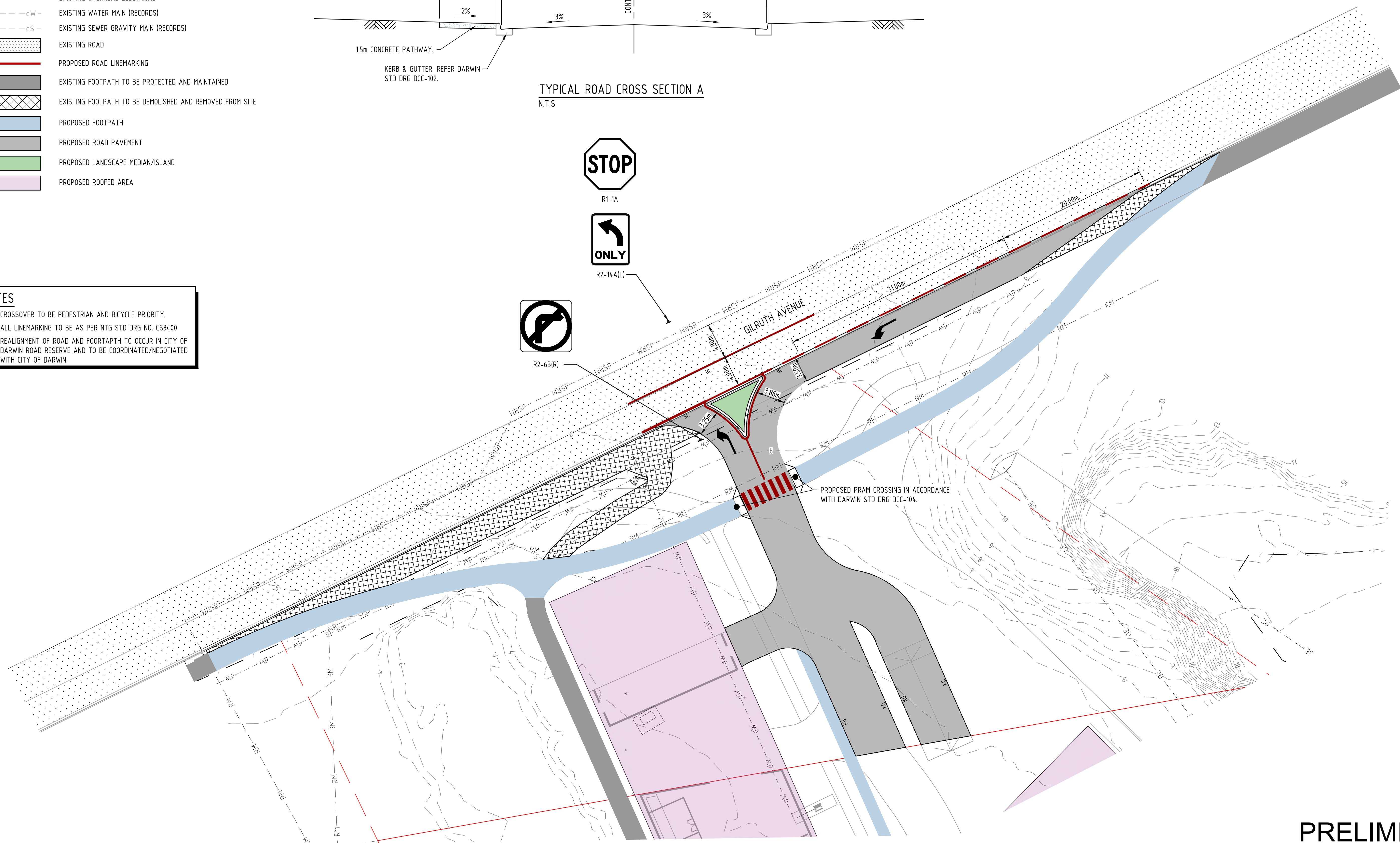
R1-1A



R2-14A(L)



R2-6B(R)



PRELIMINARY
NOT FOR CONSTRUCTION

Rev	Date	Description	By	Chk
C	01.02.21	ISSUED FOR DISCUSSION	JMB	HD
B	05.06.20	ISSUED FOR DISCUSSION	JMB	HD
A	03.06.20	ISSUED FOR DISCUSSION	JMB	HD

Figure 2 13: Left-In, Left-Out Crossover Configuration



SCALE 1:200
AT ORIGINAL SIZE (A1)



Darwin Office
Suite G01, Manunda Place, 38 Cavenagh Street,
Darwin, Northern Territory 0800, Australia
GPO Box 2422, Darwin, Northern Territory 0801
T 1300 657 402 F +617 3871 2266
E info@adg.com W www.adg.com
BRISBANE / DARWIN / GOLD COAST / MELBOURNE / PERTH /
SUNSHINE COAST / SYDNEY / TOOWOOMBA

Client
KTT Investments Pty Ltd
Project Name
**LITTLE MINDIL BEACH
THE GARDENS, NORTHERN TERRITORY**

Discipline CIVIL		Status DISCUSSION
Designed By HD	Checked By HD	Approved By BL
Project No. 23085	Drawn By JMB	Scale at A1 1:500

Title
**DRIVEWAY CROSSOVER
OPTION A**

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Drawing No. DA_C022	Revision C
-------------------------------	----------------------

2.6 JUSTIFICATION AND ALTERNATIVES

2.6.1 Justification

The rationale behind the North One Hotel and Apartments Development arose from an understanding that Darwin currently lacks a premium level, international standard destination resort hotel. The \$200 million luxury 5-star North One Hotel and Apartments Development will be the single largest private investment in Darwin for the past five years, creating jobs and business opportunities during construction and ongoing; signifying confidence in Darwin's economic future in the rebound from Covid-19.

The downstream benefits of North One will see increased visitation to local restaurants, tourism attractions and the airport. The Little Mindil site has been earmarked for hotel resort development since 2008 when it was sold by the NT Government for private development.

2.6.2 Alternatives

2.6.2.1 Location

The concept of the North One Hotel and Apartment Development was realised as a result of the unique setting and natural values of the Gilruth Avenue site. Being situated on the foreshore of Little Mindil Beach, the site provides an opportunity to offer a prestigious waterside development that will benefit from sunsets over Fannie Bay and the natural features abutting the site, such as Little Mindil Creek and the southern escarpment.

The Development will also complement the existing facilities in the area, such as the Mindil Beach Casino Resort and Mindil Beach Sunset Markets, the Garden Park Golf Links and provide guests with a world-class vacation experience.

Suitable alternative sites, such as the Westin Hotel-Apartment site, were not available at the time of determining the North One Development location and do not provide the unique setting presented by the Gilruth Avenue site.

2.6.2.2 Alternative Design

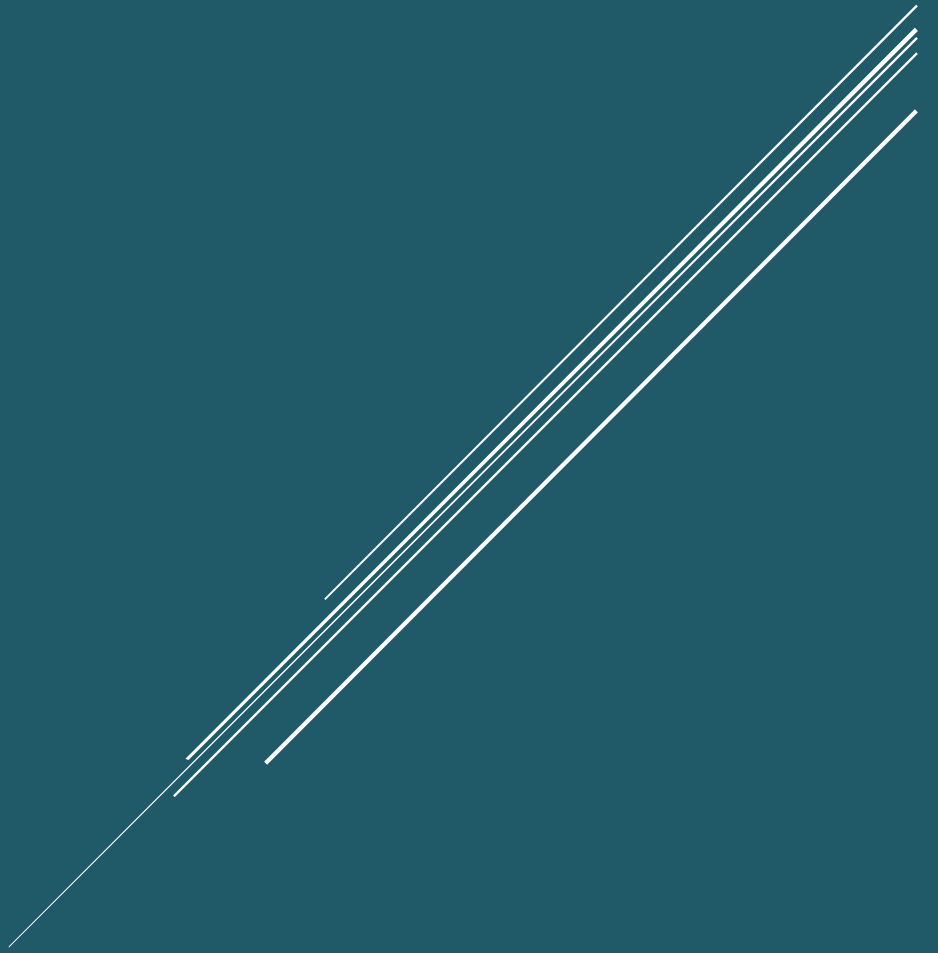
Numerous design options have been considered for the North One Hotel and Apartment Development. Early designs included placement of luxury villas on the top of the escarpment, roof top bar facilities and a maximum building height of 10 levels. The chosen design does not incorporate any development on the top of the escarpment, has positioned bar and dining facilities to limit noise impacts and has restricted building height to a maximum of six levels, despite the NTPS 2020 prescribing no height limitation for the site.

Table 2-4 provides a comparison of design concepts between the design presented by HACHEM Architects (the preferred option) and an earlier design by another architectural company.

Table 2-4: Comparison of Concept Designs for the North One Hotel and Apartment Development

Description	HACHEM Design	Initial Design	Comment
Site planning	<ul style="list-style-type: none"> Bulk of Development sited near the foreshore Hotel and apartments integrated in one building Luxury villas sited with views to escarpment and to Little Mindil Creek and are provided with a lagoon setting 	<ul style="list-style-type: none"> Bulk of Development sited near the escarpment. Scheme did not maximise beach-ocean views and capturing sea breezes. Hotel and apartments proposed as discrete buildings 	<p>Preference was to locate the bulk of the Development at a maximum distance from the Myilly Point Heritage Precinct and residences to reduce impacts such as noise and sea-breeze.</p> <p>The proposed design also maximises views and sea breezes for the hotel, apartments and villas.</p>
Biophilic design	<ul style="list-style-type: none"> Emphasises biophilic design through green roofs, natural ventilation, cascading landscaping and maximising soft landscaping and water features at ground level. 	Not incorporated	A view of green roofs and dense landscaping from residence on the top of the escarpment was viewed as preferable to hard roofscapes.
Height of development	<ul style="list-style-type: none"> 1 and 6 levels 	<ul style="list-style-type: none"> 1, 4 and 10 levels 	Selecting a concept design that was commercially viable and kept the overall height of the Development to a minimum was a significant consideration.
Location of hotel pool, bar and restaurant areas	<ul style="list-style-type: none"> Located on level 1 taking advantage of beach and ocean views, which frees up ground level for public use and soft landscaping. 	<ul style="list-style-type: none"> Located on rooftop near the escarpment. 	HACHEM design was a preferable location for noise control and management compared to a rooftop pool and bar area.
Public access to site	<ul style="list-style-type: none"> Existing pedestrian pathway adjacent to Little Mindil Creek linking Gilruth Avenue to the foreshore is maintained Existing pedestrian pathway along the foreshore is maintained 	<ul style="list-style-type: none"> Existing pedestrian pathway adjacent to Little Mindil Creek linking Gilruth Avenue to the foreshore is maintained Existing pedestrian pathway along the foreshore is truncated in front of the luxury villas 	Appreciative of the significance of the Sacred Site in the tidal creek area and the site's historic use, whereby it provides a link from Gilruth Avenue to the beach as well as being used for occasional public events, an important design consideration was to avoid alienating people from the site.

Description	HACHEM Design	Initial Design	Comment
	<ul style="list-style-type: none"> • New pedestrian pathway linking foreshore at northwest corner of site to Gilruth Avenue through the centre of the proposed site • At ground level at the northern side of the site public access is encouraged through the provision of an open lawn area (a proposed site for cultural performances, e.g. fire dance); open market stalls; and an indoor-outdoor bar • The Sacred Site/Little Mindil Creek area is proposed to be rezoned to public open space. 	<ul style="list-style-type: none"> • Ground level outdoor areas are unresolved and do not provide access for the general public 	<p>HACHEM’s scheme was seen as superior in this regard with its network of public pathways and provision of public areas at ground level.</p>
Development at top of escarpment	<ul style="list-style-type: none"> • No development proposed on top of escarpment 	Four luxury villas sited on the escarpment face.	Development on the escarpment was viewed as impractical and not consistent with covenant and would impact negatively on the Myilly Point Heritage Precinct and residences.
Architectural design quality	<ul style="list-style-type: none"> • An innovative design concept which integrates well with the site and has a strong environmental focus through a biophilic approach. 	Site planning lacked cohesion and provided ill-defined outdoor spaces at ground level.	HACHEM’s scheme was seen as a stand-out design with potential to be an iconic development.



ENVIRONMENTAL CONTEXT

NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

3 ENVIRONMENTAL CONTEXT

3.1 REGIONAL CONTEXT

3.1.1 Land Use History

Originally occupied by Larrakia tribes, the proposed development area has experienced several historic land uses since colonisation. Chinese market gardens and wells were established in the early 20th century and aerial photography indicates that until the 1940s the site was used as a habitation area for local Aboriginal people. During World War II the site was occupied by the military and throughout history the Little Mindil Beach area has been a popular site for recreational purposes.

Historic aerial and satellite imagery reviewed by SRL (2020) provides the basis for evidence of past and present land use and activities undertaken on the site or surrounding the site from the 1940s to present. A summary of the historical information identified through these searches is provided in **Table 3-1** below.

Table 3-1: Summary of Historical and Aerial Satellite Imagery Review

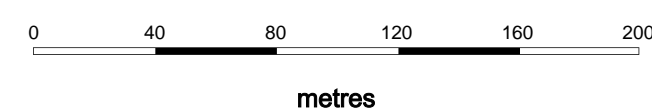
Date	Description
1941	Undeveloped land with apparent woody vegetation. The Casino Lot is also undeveloped. The heritage houses at Myilly Point are observable.
1975	Post Cyclone Tracy, debris from buildings to the west atop the escarpment has been spread across the site. The electrical substation on to the west of the site is now in place. Woody vegetation has been cleared and dirt roads transect the site. Some development including land clearing has occurred across the neighbouring Casino Lot.
1999	Earthworks have been undertaken along the north-western foreshore portion of the site and with new access tracks installed. Apparent imported fill material of unknown origin is observable. The flow of Creek appears to have been altered through these works. The casino and carpark are observable.
2008	The site appears largely unchanged from previous image. Multi-storey residential buildings have been constructed to the south-west.
2009	The site appears largely unchanged.
2010	Installation of footbridges across Creek, the bitumen carpark area and access road from the casino carpark are underway. Significant clearing of vegetation along the southern site boundary has occurred and grass installed on the northern area.
2012-2016	The site appears largely as it does today, with temporary infrastructure relating to events on the Gala Lawns observable.

3.1.1.1 Topography and Geomorphology

Topography from the NT Department of Infrastructure, Planning and Logistics (DIPL) Orthographic Series depicts the site as relatively flat with no significant change in ground level elevation (**Figure 3-1**). An escarpment to the south and south-west of the site rises sharply along the boundary. The creek is situated to the north and north-east of the site. The Registered Sacred Site (5073-89) within the creek boundary (discussed further in **Section 7.5** and shown in **Figure 2-4**) appears to be slightly lower in elevation than the grassed area and carpark on the site.



1:2 500



CONTOUR INTERVAL: 1 metre
HORIZONTAL DATUM: GDA94
VERTICAL DATUM: AHD
PROJECTION: Transverse Mercator

CURRENCY OF TOPOGRAPHY: 1 Jul 2016
CURRENCY OF CADASTRE: 12/09/2017
SOURCE MAP SCALE: 1:2500
ZONE UTM: 52

This map was produced on the Geocentric Datum of Australia (GDA 94).

For most practical purposes GDA94 coordinates and satellite derived (GPS) coordinates based on the World Geocentric System 1984 (WGS84) are the same.

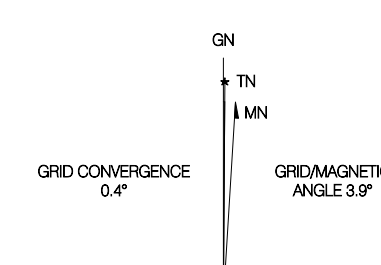
This map has been compiled without field verification. The representation of a road or track on this map is not necessarily evidence of a Public Right of Way.

Horizontal Accuracy: Expected accuracy of well defined detail is within 0.5mm at source map scale.

Vertical Accuracy: 90% of elevations are correct to within one half the contour interval at source map scale.

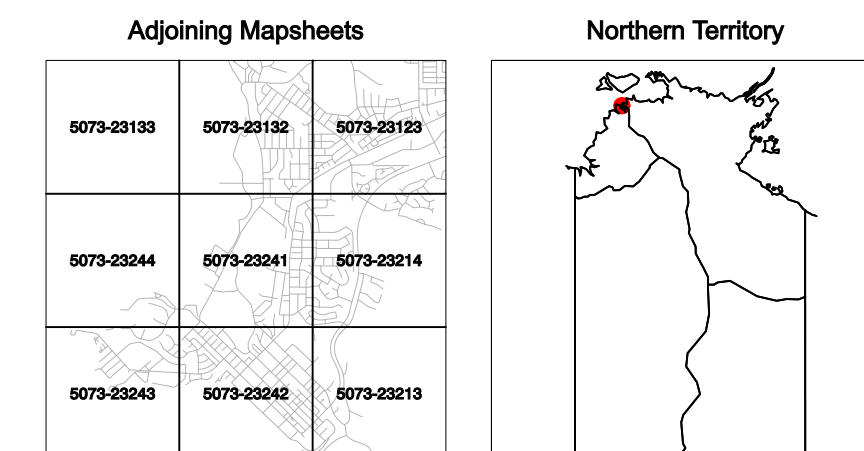
Compilation: By digital photogrammetric methods without field verification.

This map has been automatically generated and may contain errors.



True north, grid north and magnetic north are shown diagrammatically for the centre of this map. Magnetic north is correct for 2009 and moves easterly about 0.1° every ten years.

LOCALITY DIAGRAM



ORTHOGRAPHIC MAP

GARDENS
1:2 500
5073-23241

Figure 3 1: Orthographic Map overlain with Topography and Satellite Imagery

3.1.1.2 Geological Setting

SLR conducted a review of the 1988 Darwin Northern Territory Australian 1:250,000 Geological Series map as part of a Preliminary Site Investigation. This review indicated the strata which underlay the site consisted of kaolinitic claystone, commonly radiolaria-rich, silty in places, montmorillonitic, glauconitic and calcareous when fresh; basal conglomerate; minor bioturbated siltstone, carbonate, sandy claystone and clayey sandstone (SLR, 2020).

The Darwin Geological Series Extract, incorporating the Development area is provided as **Figure 3-2**.



Figure 3-2: Darwin Northern Territory Australian 1:250,000 Geological Series (Extract)

3.1.2 Biogeographic Regionalisation

The Interim Biogeographic Regionalisation for Australia (**IBRA**; version 7) classifies the Australian continent into regions (bioregions) of similar geology, landform, vegetation, fauna, and climate characteristics. The North One Development site is within the Darwin Coastal Bioregion (Thackway and Cresswell, 1995 – updated by DoEE).

Land within the Darwin Coastal Bioregion is predominately flat with minimal elevation above sea level. It is intersected by several major rivers. Vegetation is comprised of eucalypt forest and woodlands with tussock and hummock grass understorey.

The Darwin Coastal Bioregion has mixed land uses, with urban development concentrated around Darwin. Aboriginal land, pastoral leases and conservation reserves occupy other areas of the bioregion. The major population centres are Palmerston and Darwin (Department of Environment 2008).

3.1.3 Land Systems

The *Land Systems of the Darwin Region* report (Wood *et al.*, 1985) documents a broadscale land resource inventory of the Darwin region and an evaluation of the capability of the land to support numerous forms of land use. The study serves as a basis for regional planning decisions and aims to promote land uses that accord with the continuing ability of the land to support them.

The foundation of the report is classification of the survey area into Land Systems. A Land System is defined as an area of land which has a distinctive and recurring pattern of landform, soils, and vegetation. A Land System is composed of a sequence of land units, the latter being relatively homogeneous in land attributes.

The Wood *et al.* (1985) study has been adapted to a 1:250,000 spatial layer by the NT Government, as described by Lynch *et al.* (2012). The NT Government Natural Resource Maps (**NR Maps**) identify two Land Systems as occurring within Lot 7651. Land Systems within and surrounding Lot 7651 are in the Darwin Coastal Geo Zone and are listed in **Table 3-2** and shown in **Figure 3-3**.

Table 3-2: Land Systems of the Darwin Coastal Geo Zone

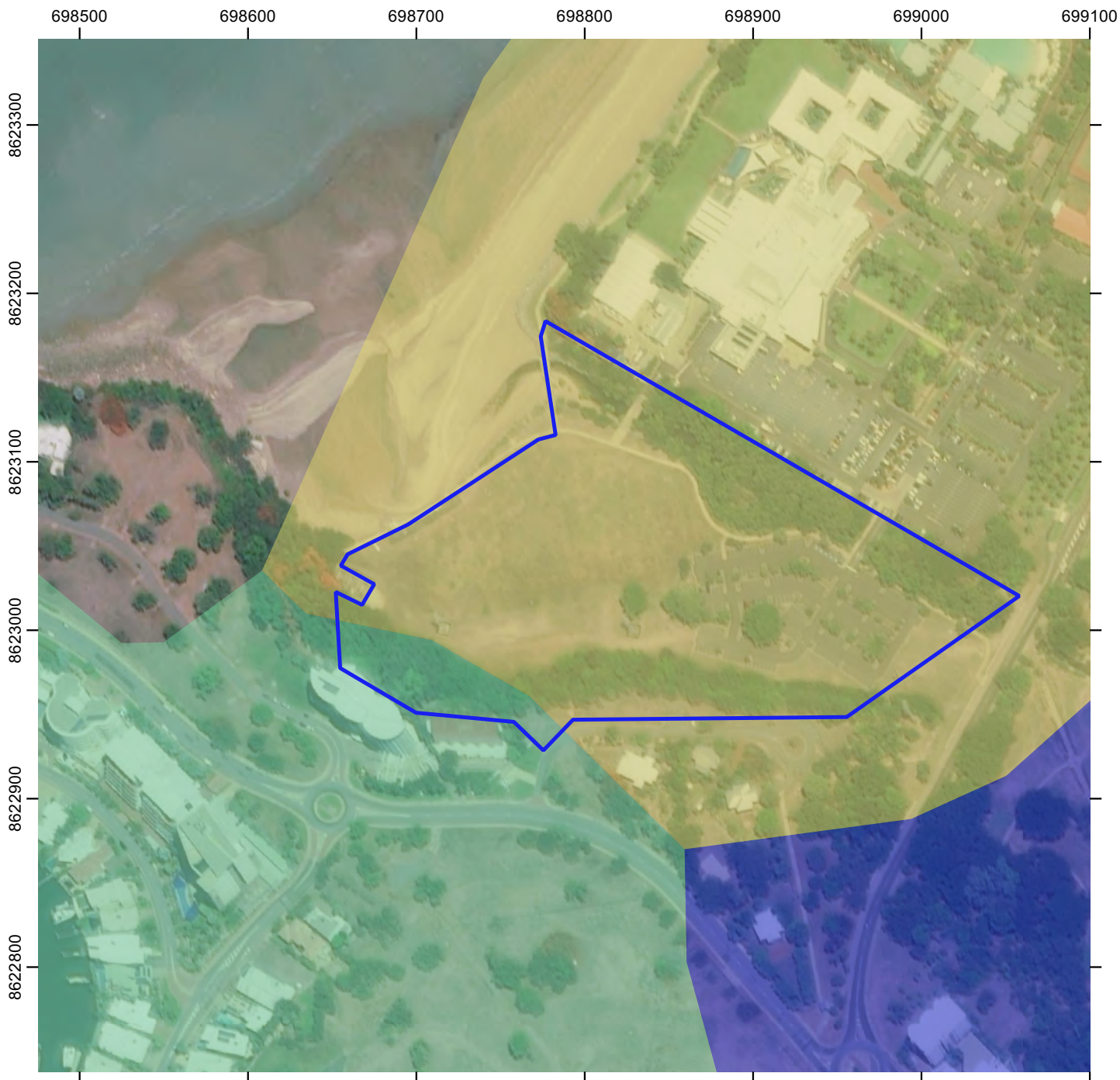
Land System	Class	Landform	Soil	Typical Vegetation of the Land System
Kay	Lateritic plains and rises: plains and rises associated with deeply weathered profiles (laterite) including sand sheets and other depositional products; sandy and earth soils	Level to gently undulating plains on deeply weathered rocks	Lateritic red and yellow earths; Ferric Red, Brown and Yellow Kandosols	Tall open woodland of <i>C. bleeseri</i> , <i>Erythrophleum chlorostachys</i> , <i>E. tetrodonta</i> , <i>E. miniata</i> , <i>E. tectifera</i> over <i>Sorghum</i> spp, <i>Chrysopogon fallax</i> , <i>Eriachne</i> spp
Krans		Steep, dissected terrain forming the edge of the deeply weathered plateau	Shallow lithosols and gravelly yellow earths; Leptic Rudosols and gravelly Yellow Kandosols	Mid-high woodland of <i>E. tetrodonta</i> , <i>E. miniata</i> , <i>C. bleeseri</i> , <i>Erythrophleum chlorostachys</i> , <i>E. tectifera</i> over tropical tall grass (<i>Heteropogon triticeus</i> , <i>Chrysopogon fallax</i> , <i>Sorghum</i> spp)
Littoral 1	Tidal flats: tidal mudflats and coastal floodplains with channels and estuaries; subject to tidal inundation; poorly drained clays and muds	Level tidal flats with channels and estuaries and minor dunes	Saline muds and grey cracking clays; Supratidal and Intertidal Hydrosols	Samphire, sedgeland, or mangrove low closed forest

3.1.4 Land Units


The Land Resources of the Elizabeth, Darwin, and Blackmore Rivers – Greater Darwin Area, NT dataset (DENR, 2000) is a compilation of eight land resource surveys. The dataset identifies most of the Development site as estuarine fringe (refer to **Figure 3-4**), which contains saline muds and clays, ranging from silty loam to silty clays. Generally, these are poorly drained soils that are subjected to peak tidal inundation.

The site is predominantly void of vegetation, although vegetative assemblages are associated with Little Mindil Creek and the escarpment. All Land Units are well represented in the region.




Refer to **Table 3-3** for further detail regarding applicable Land Units.



Legend

 Parcel 7651 boundary

Land Systems

-  Kay
-  Krans
-  Littoral 1

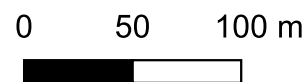


Figure 3 3: Land Systems of the Darwin Coastal Geo Zone – Lot 7651

Land Systems



Animal Plant Mineral Pty Ltd

Date: 26/02/2021
 CRS: GDA 1994 MGA Zone 52
 Author: eleanor@animalplantmineral.com.au

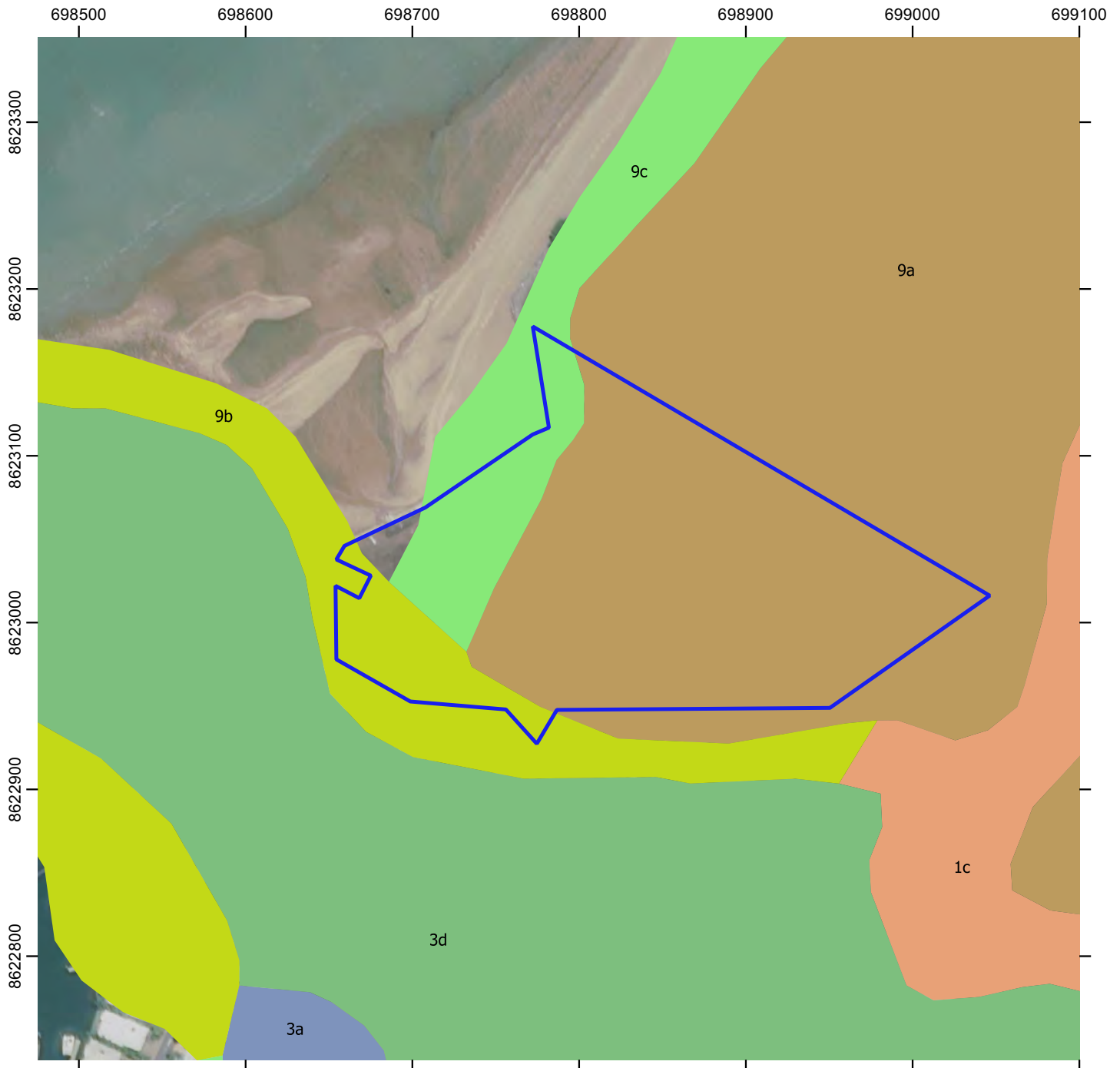








Figure 3 4: Land Units of the Darwin Coastal Geo Zone

Legend

 Parcel 7651 boundary

Land Units

-  1c - Rises and short steep slopes
-  3d - Gently undulating upland surface
-  9a - Esturine fringes
-  9b - Esturine fringes
-  9c - Dunes and beach ridges



0 50 100 m



Land Units



Animal Plant Mineral Pty Ltd

Date: 26/02/2021
 CRS: GDA 1994 MGA Zone 52
 Author: eleanor@animalplantmineral.com.au

Table 3-3: Applicable Land Units of the Darwin Coastal Geo Zone

Map Unit	Landform	Soil Description	Vegetation Description	Drainage Description	Area in Lot (ha)	Area in region (ha)
1c	Low scarps and short steep slopes, mostly on lateritic material 5 – 20 % relief 5-20 m Extensive outcrop and surface stone (30-60% cover)	Parent material of lateritised siltstones and sandstones Leptic Rudosols Shallow gravelly lithosols. Coarse textured. 50-70% stone and gravel throughout. Rapidly drained.	Woodland; dominant species are generally thin <i>Eucalyptus miniata</i> , <i>E. bleeseri</i> with <i>E. tetradonta</i> , <i>E. tectifera</i> , <i>E. foelscheana</i> as associated species; open shrub understory of <i>Xanthostemon paradoxus</i> , <i>Terminalia ferdinandiana</i> , <i>Buchanania obovata</i> , <i>Cycas armstrongii</i> , <i>Livistona humilis</i> ; open grass cover with <i>Sorghum plumosum</i> , <i>Eriachne avenacea</i> , <i>Chrysopogon latifolius</i> , <i>Heteropogon contortus</i> as major species.	Nil to low level of seasonal soil waterlogging.	0*	7543
3d	Gently undulating upland surface. Gradient 1-3%. Ferruginous and quartz gravel pavement, minor laterite outcrop.	Parent material of ferricrete and quartz. Leptic Rudosols Shallow gravelly lithosols. Loamy sand to sandy loam. 40-60% ferruginous gravel throughout.	Open Woodland, minor Woodland; thin <i>Eucalyptus miniata</i> as dominant with <i>Eucalyptus tetradonta</i> , <i>E. bleeseri</i> ; usually open shrub layer with <i>Acacia spp.</i> , <i>Cochlospermum fraseri</i> , <i>Calytrix exstipulata</i> , <i>Buchanania obovata</i> , with patches of dense <i>Xanthostemon paradoxus</i> and <i>Petalostigma quadriloculare</i> ; medium dense grasses including Annual sorghum, <i>Sorghum plumosum</i> , <i>Plectrachne pungens</i> , <i>Schizachyrium fragile</i> , <i>Heteropogon triticeus</i> ..	Rapidly drained	0*	9262
9a	Estuarine fringe. Gradient negligible, <0.5%. Firm surfaced with saline crusting.	Parent material of Quaternary sediments. Supratidal Hydrosol. Saline muds and clays, variable morphology. Silty loam to silty clays.	Usually bare with small areas of <i>Arthrocnemum sp.</i> (samphire) and <i>Sporobolus virginicus</i> .	Very poorly drained, subject to peak tidal inundation.	3.8	8824
9b	Estuarine fringe. Gradient negligible, <0.5%. Muddy and soft surfaced	Parent material of Quaternary sediments. Intertidal Hydrosol. Saline muds and clays. Silty clays, unconsolidated marine muds.	Low Closed Forest of mangrove species; <i>Avicennia marina</i> on seaward fringe with dense <i>Ceriops tagal</i> dominating much of community to landwards.	Very poorly drained, subject to intertidal inundation.	0.5	39415

Map Unit	Landform	Soil Description	Vegetation Description	Drainage Description	Area in Lot (ha)	Area in region (ha)
9c	Dunes and Beach Ridges. Seaward gradient to 8%, landward gradient 2-4%. Generally loose with occasional outcrop of calcareous beach rock.	Parent material of Quaternary sediments. Orthic Tenosol. Calcareous sands. Siliceous and calcareous sands.	Grassland; with <i>Sporobolus virginicus</i> , <i>Ipomea pescaprea</i> ; with minor pockets of Low Closed Forest, variable tree and vine species.	Rapidly drained, subject to periodic wave action.	0.7	1992

* Vegetation type occurs outside of Lot 7651.

3.2 CLIMATE

The climate of the site is described by the Köppen classification system as Tropical Savanna (Figure 3-5). This is typified by monthly mean temperatures above 18 degrees Celsius for every month of the year and the driest month having less than 60 mm of rain.

Of the four types of tropical savanna climates, the site is typified by a pronounced wet and dry season of relatively equal duration, with summer dominant rainfall.

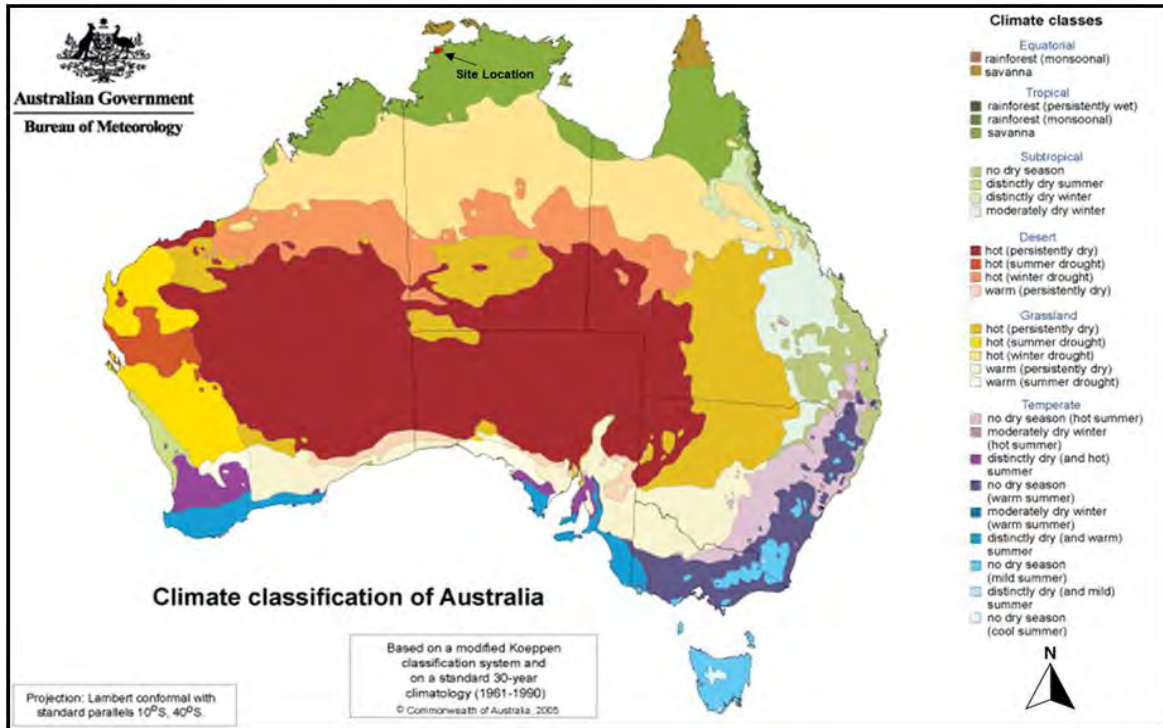


Figure 3-5: Köppen climate classification (Source: Bureau of Meteorology (BoM))

3.2.1 Temperature

Darwin Airport (Site No. 014015), being the closest weather station to the North One Development location, has a recorded mean maximum temperature of 32.4 degrees Celsius and a mean minimum temperature of 23.3 degrees Celsius. Mean monthly maximum temperatures only vary by approximately three degrees Celsius between the summer and winter extremes, however mean monthly minimum temperature extremes vary by up to six degrees Celsius. Figure 3-6 represents the monthly maximum and minimum mean temperatures. This data has been compiled from 29 years of data collection between 1991 - 2020, as shown in Table 3-4 below.

Table 3-4: Temperature Means for Darwin Airport (Site No. 014015) (BoM, 2021)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Mean Max TEMP (°C)	32.0	31.7	32.3	33.0	32.3	31.1	31.1	31.9	33.1	33.8	33.7	33.0	32.4
Mean Min TEMP (°C)	25.1	25.1	24.9	24.2	22.3	20.0	19.3	19.8	22.9	24.8	25.4	25.5	23.3

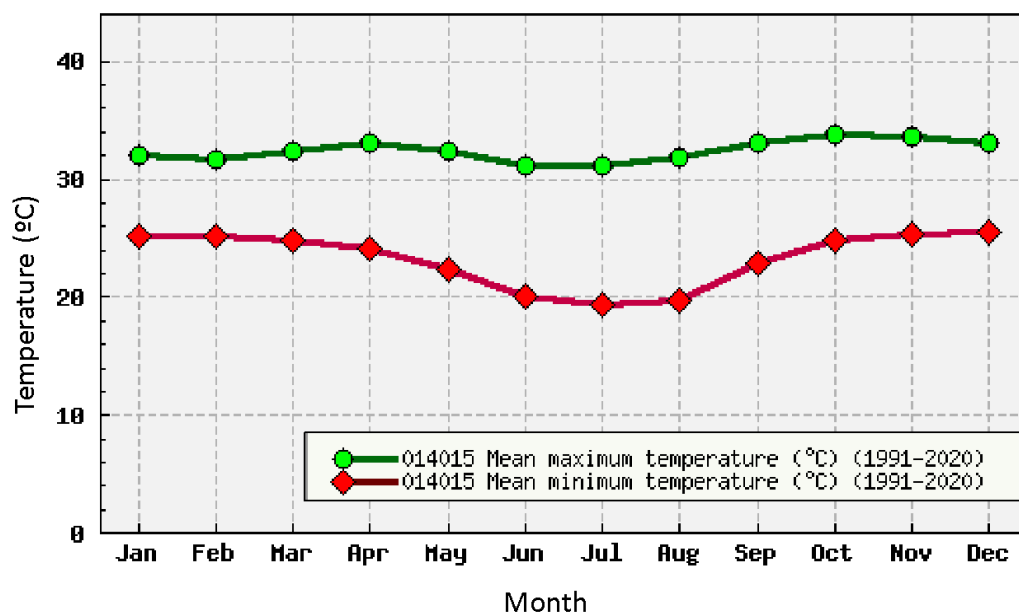


Figure 3-6: Temperature Means for Darwin Airport (Site No. 014015) (BoM, 2021)

3.2.2 Rainfall

Darwin Airport (Site No. 014015) has a recorded mean annual rainfall of 1832.4 millimetres (mm). Approximately 94 % of the annual total falls in the months between November and April. The distinct wet and dry seasons are typically of equal duration (six months each) being May to October (dry season) and November to April (wet season). Mean monthly rainfall and 29-year mean rainfall statistics for the period 1991 – 2020 are presented in Table 3-5 and Figure 3-7.

Table 3-5: Rainfall Means for Darwin Airport (Site No. 014015) (BoM, 2021)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Mean Rainfall (mm)	470.7	412.4	313.7	105.1	20.7	2.1	0.9	0.8	14.3	68.9	143.5	279.3	1832.4

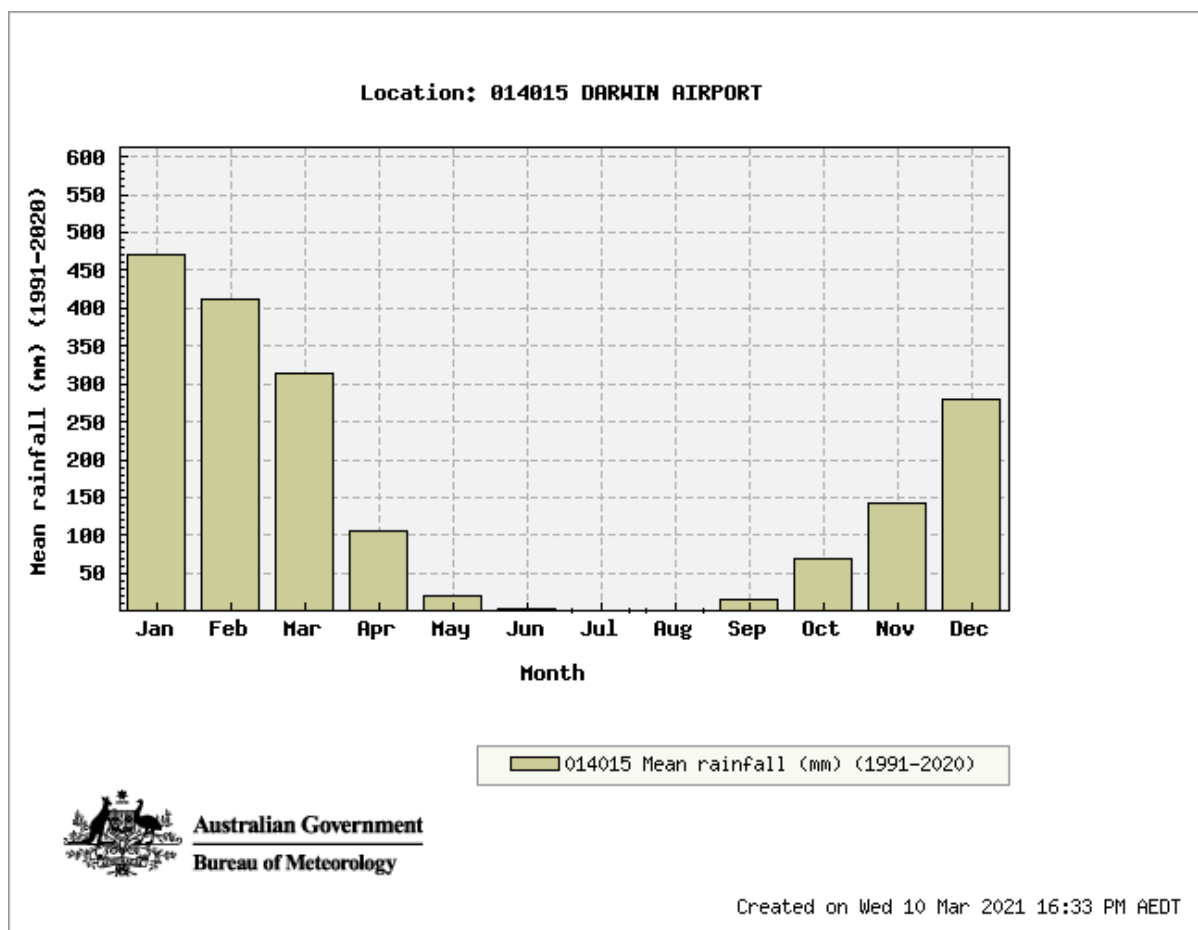


Figure 3-7: Rainfall Means for Darwin Airport (Site No. 014015) (BoM, 2021)

3.2.3 Humidity

Darwin Airport (Site No. 014015) has a recorded mean 9 am relative humidity of 70% and a mean 3pm relative humidity of 53%. During the wet season months of January to March the humidity levels are higher, with a mean 9am and 3pm relative humidity of approximately 80% and 70% respectively. The mean 9am and 3pm relative humidity monthly statistics are presented in **Table 3-6** and **Figure 3-8**.

Table 3-6: Humidity Means for Darwin Airport (Site No. 014015) (BoM, 2021)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
Mean 9am Humidity (%)	81	83	81	73	63	57	59	62	68	67	71	76	70
Mean 3pm Humidity (%)	71	74	67	52	41	36	36	38	47	51	58	66	53

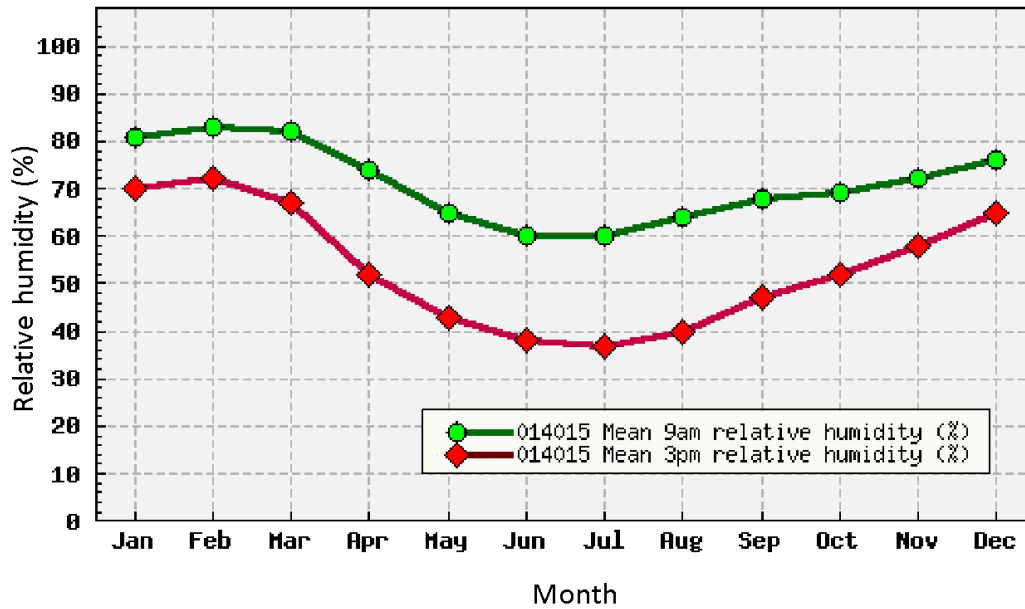


Figure 3-8: Humidity Means for Darwin Airport (Site No. 014015) (BoM, 2021)

3.2.4 Evaporation

The BoM gridded mean annual pan evaporation dataset indicates the mean annual pan evaporation for the site is 2345 mm. Mean daily evaporation rate is 6.7 mm, based on the 29-year average from 1991 - 2020 (BoM, 2021) as shown in Figure 3-9.

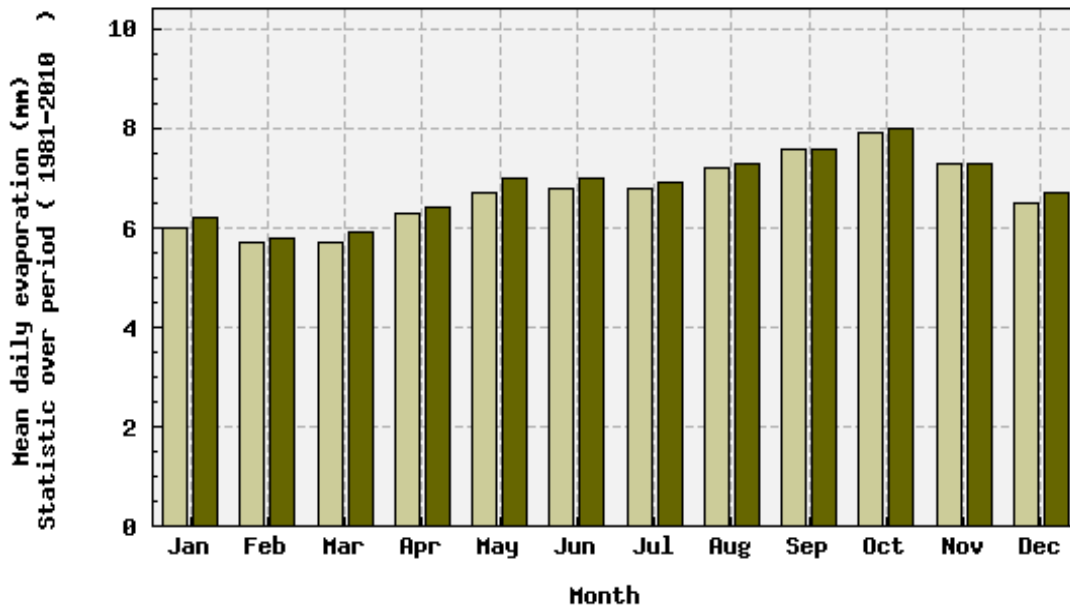


Figure 3-9: Mean Daily Evaporation and 29-year Mean (1981-2010) for Darwin airport (BoM, 2021)

3.2.5 Wind

Table 3-7, Figure 3-10 and Figure 3-11 below represent the mean wind speed for Darwin airport, at 9am and 3pm.

Table 3-7: Wind Speed for Darwin Airport (Site No. 014015) (BoM, 2021)

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	ANNUAL
9am Wind Speed (km/h)	14.0	13.8	10.6	12.7	15.7	16.6	15.0	13.4	11.1	11.1	10.6	12.4	13.1
3pm Wind Speed (km/h)	19.5	20.1	16.9	17.3	17.2	16.7	17.9	20.0	22.0	21.4	18.8	18.7	20

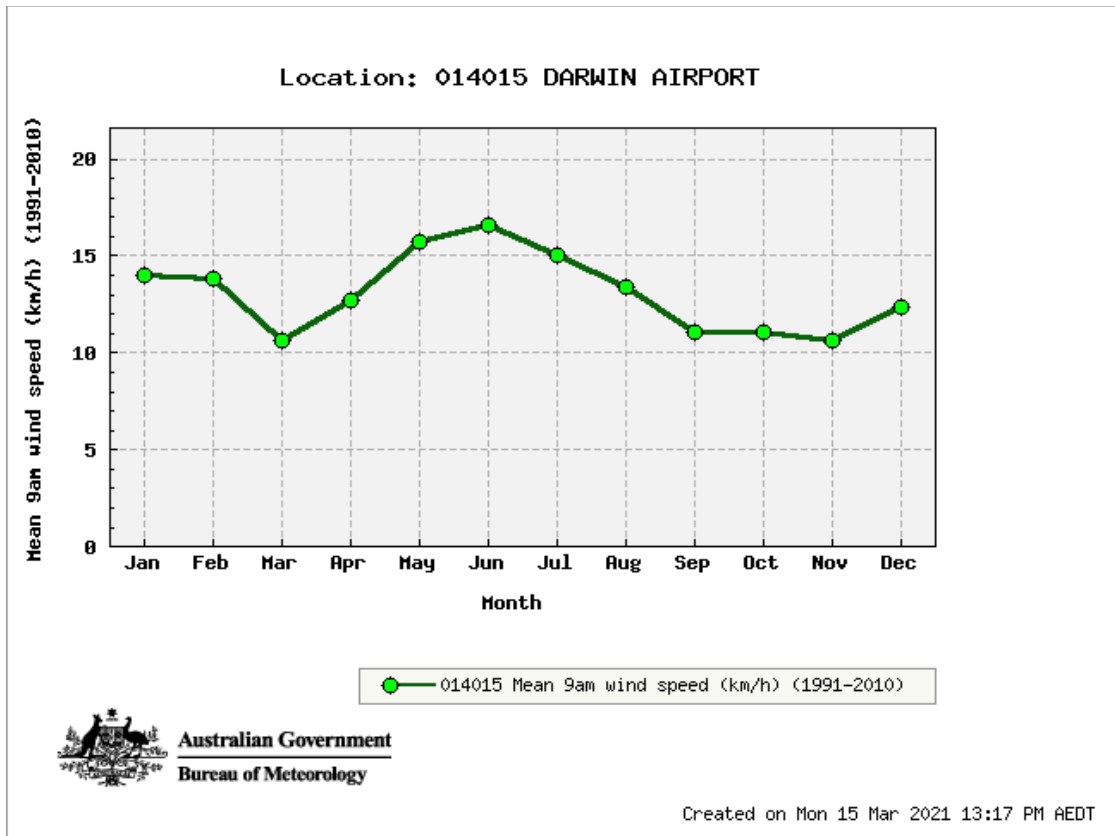


Figure 3-10: Darwin Airport Mean 9am Wind Speed

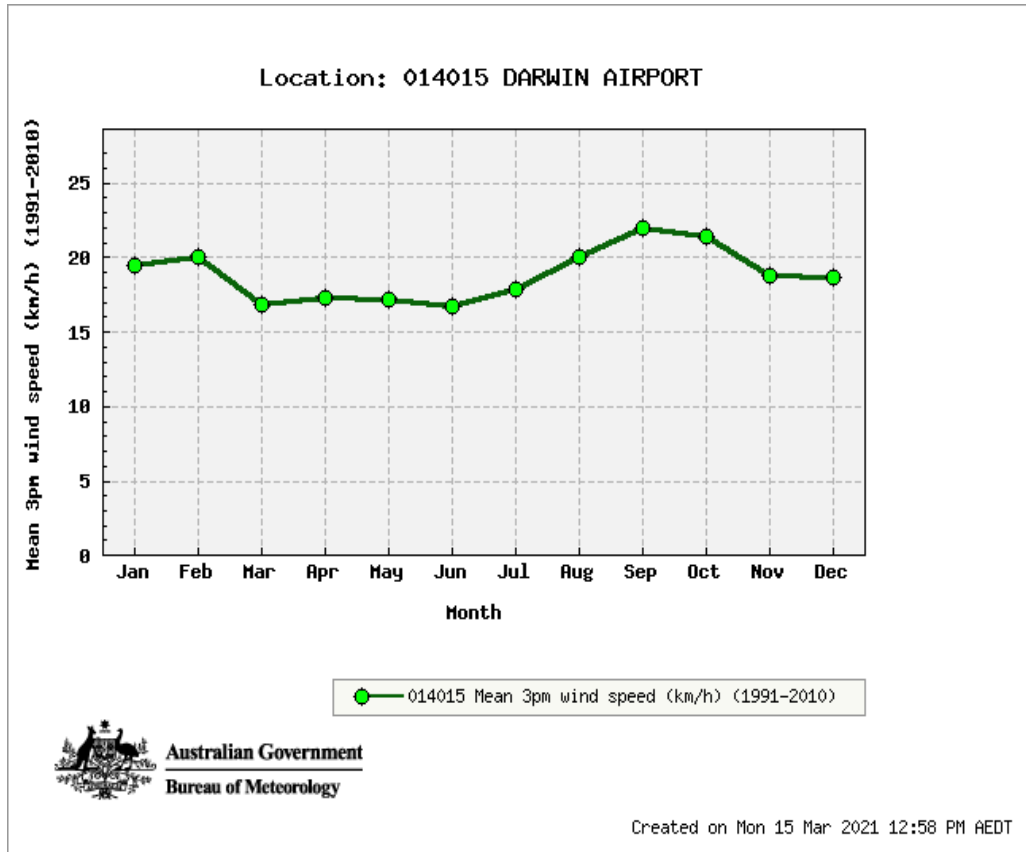


Figure 3-11: Darwin Airport Mean 3pm Wind Speed

Wind roses derived from three-dimensional meteorological modelling of the long-term wind records obtained from the weather stations at Darwin Airport, are presented in **Figure 3-12**. The key prevailing wind directions of interest are the north to west quadrant for summer months (wet season) and east to south-east quadrant winds for winter months (dry season).

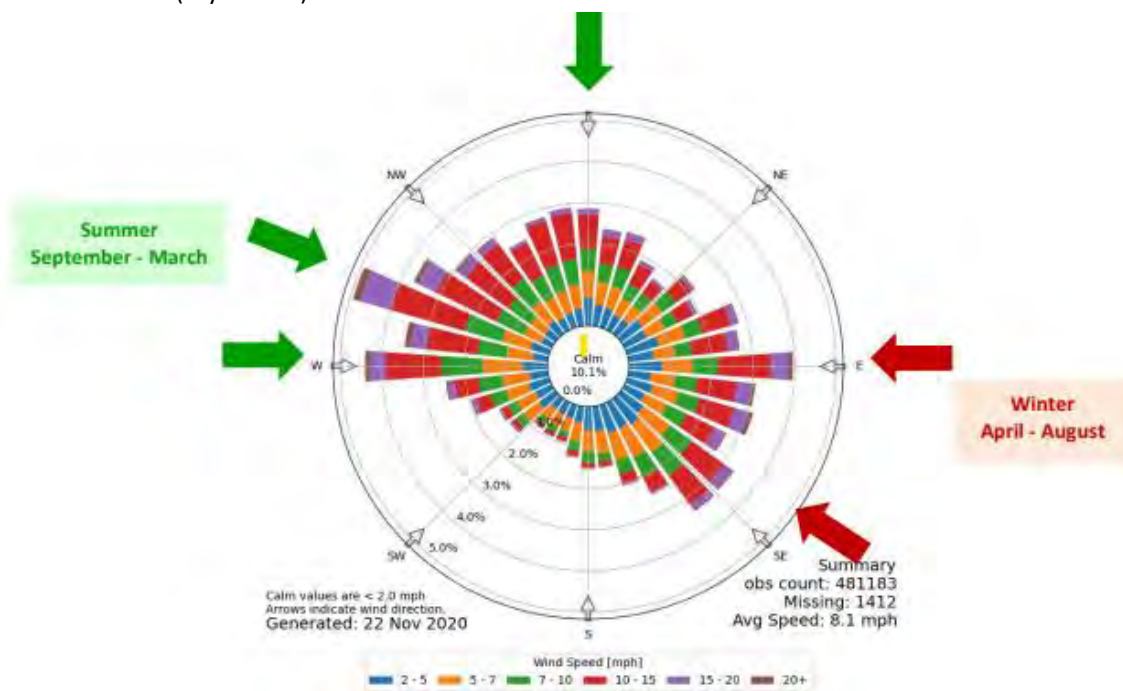
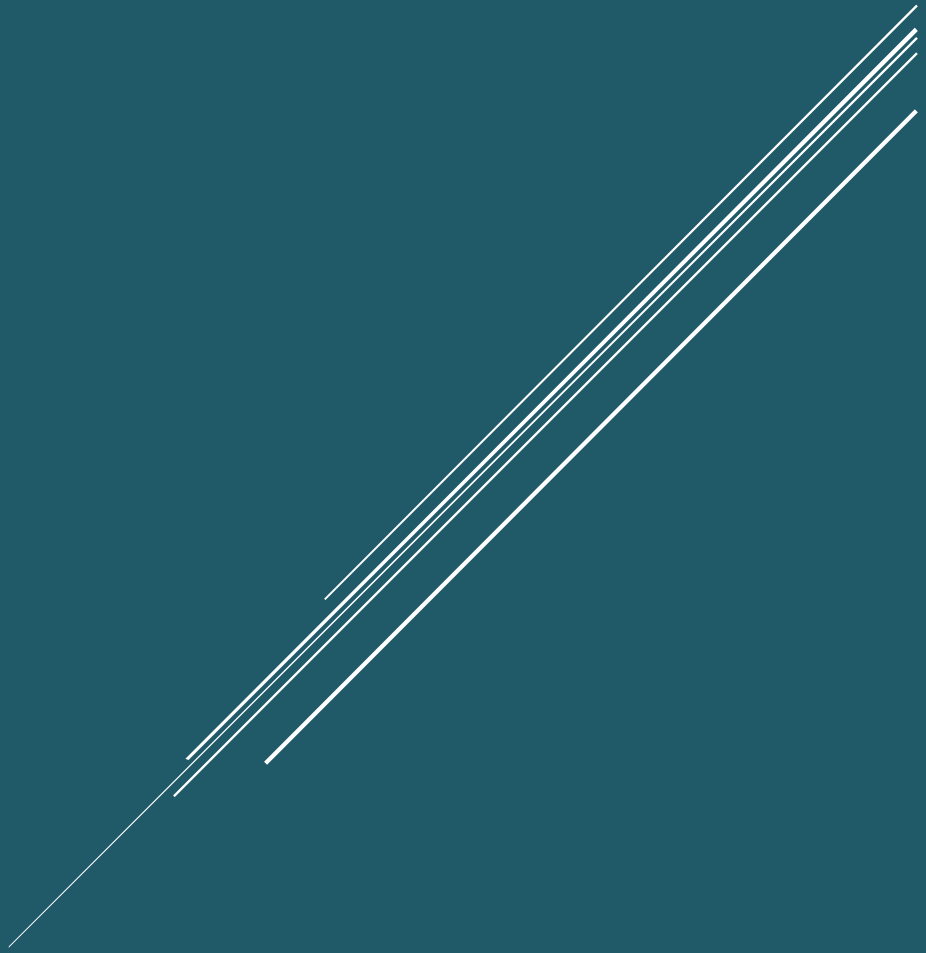


Figure 3-12: Darwin Airport Wind Roses (1970-2020) (SLR, 2021)



EXISTING APPROVALS

NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

4 EXISTING APPROVALS

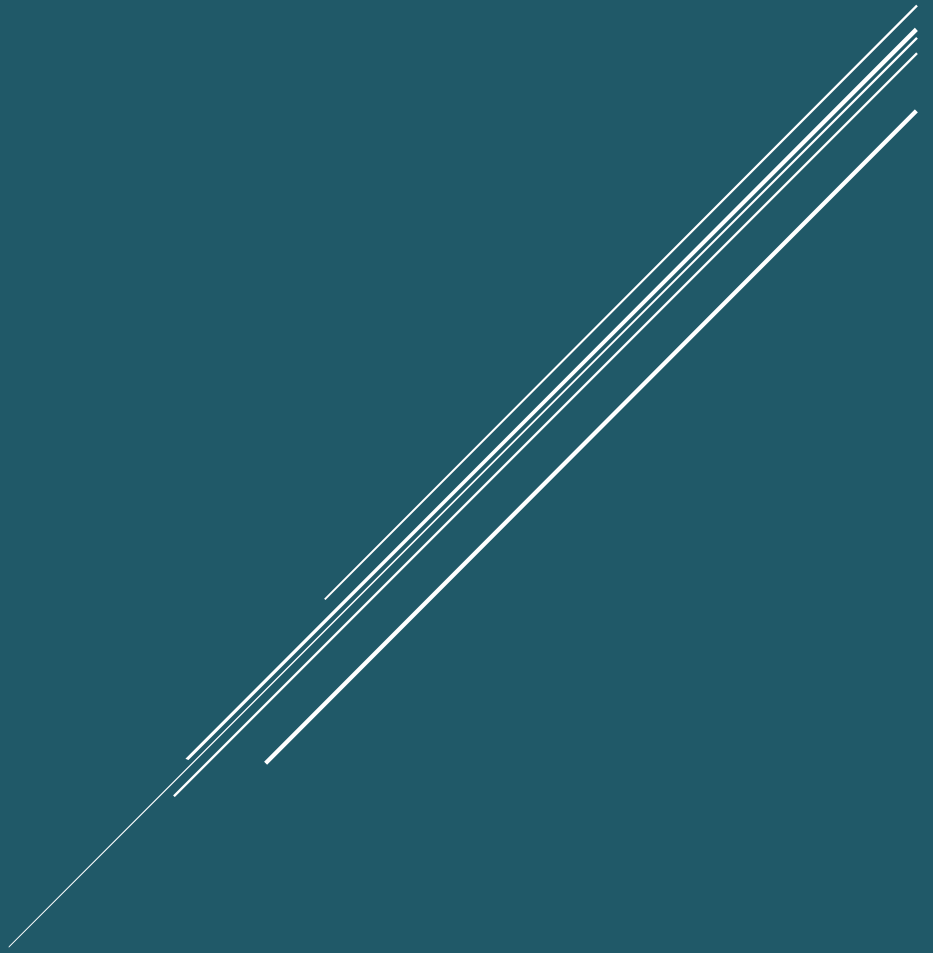
The following existing development approvals for Lot 7651 are detailed in **Table 4-1** below:

Table 4-1: Relevant Development Approvals for Lot 7651

Permit	Date Issued	Application Purpose	Relevance
DP09/1004	December 2009	Leisure and recreation (including area of outdoor entertainment, landscaping and carparking).	Current development of the site.
DP09/1004A	February 2010	Minor design changes to the vehicle access bridge.	Variations to the current development of the site.
DP09/1004B	July 2010	Reducing the carparking approved under DP09/1004 by two (2) spaces in order to keep existing vegetation and to provide extra disabled car parking.	N/A
PSA Amendment No. 16	May 2021	Excise Little Mindil Creek from Lot 7651 and revert the area to Zone PS. Amending a small portion of Zone PS to Zone TC to consolidate the Lot and correct an administrative misalignment of the western Lot boundary.	Recognition of the protection of the existing covenant for this Little Mindil Creek area and maintenance of public access to the foreshore.

The pending approvals include:

- This referral under the NT EPA;
- Aboriginal Areas Protection Authority (**AAPA**) Certificate;
- Development Application.



STAKEHOLDER ENGAGEMENT

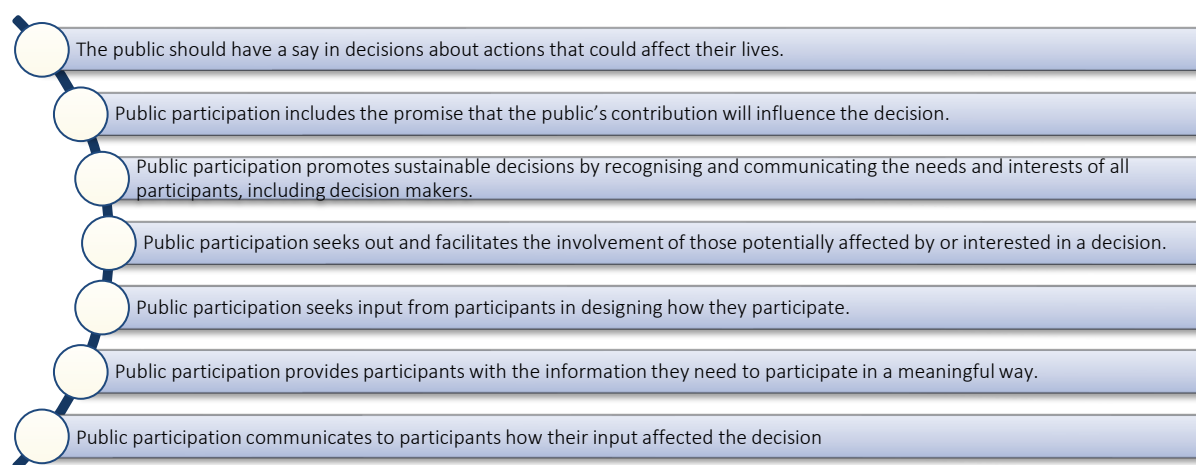
NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

5 STAKEHOLDER ENGAGEMENT

5.1.1 Stakeholder Engagement Plan

Engagement with the community and key stakeholders is an essential process for the North One Development, providing a mechanism to demonstrate to stakeholders that environmental, social and Development risks have been identified and appropriate mitigating measures implemented to reduce risks to an acceptable level. Inadequate consultation can result in the Company not achieving established targets and goals for community and stakeholder engagement.

To recognise the importance of building long term relationships with stakeholders and the community, KTT Investment has developed a Stakeholder Engagement Strategy (**Appendix 3**) to provide a foundation for implementation of stakeholder engagement. The Strategy is consistent with the International Association for Public Participation (**IAP2**) Core Values, illustrated in **Figure 5-1**.



Source: International Association for Public Participation – www.iap2.org

Figure 5-1: International Association for Public Participation (IAP2) Core Values

Implementation of the Strategy will ensure that enduring consultation throughout the life of the Project will be appropriate and inclusive, whilst also maintaining conformance with KTT Investment and NT EPA objectives for stakeholder engagement. The Strategy will be a dynamic document that is revised at each project phase to ensure it remains current with Development aspects and cognisant of stakeholder expectations at the time of implementation.

5.1.2 Key Stakeholders

The range of stakeholders associated with the North One Development includes Indigenous groups, local community, Government departments, interest groups, industry groups and commercial businesses. A list of the key stakeholders identified for the Development is provided in **Table 5-1**.

Table 5-1: Key Stakeholders

Stakeholder	Application Purpose
Indigenous Groups	Larrakia Development Corporation
	Larrakia Nation Aboriginal Corporation
Local Community	Residents surrounding the North One Development site, including those within the Myilly Point Peninsula
	Greater Darwin Community
Government Departments	NT EPA
	City of Darwin
	Chief Minister
	Office of the Chief Minister
	Department of Chief Minister and Cabinet
	Department of Industry, Trade and Tourism
	Minister for Hospitality and Tourism
	Minister for Industry and Trade
	Department of Infrastructure, Planning and Logistics
	Minister for Planning
	Aboriginal Areas Protection Authority
	Investment Territory
Industry Groups	Hospitality NT
	Property Council of the NT
	Tourism Top End
	Master Builders Association of the NT
	Chamber of Commerce NT
	Tourism NT
Interest Groups	National Trust
	Environment Centre Northern Territory
Commercial Businesses	Mindil Beach Casino Resort
	Cullen Bay Marina Corporation
	Paspaley Group

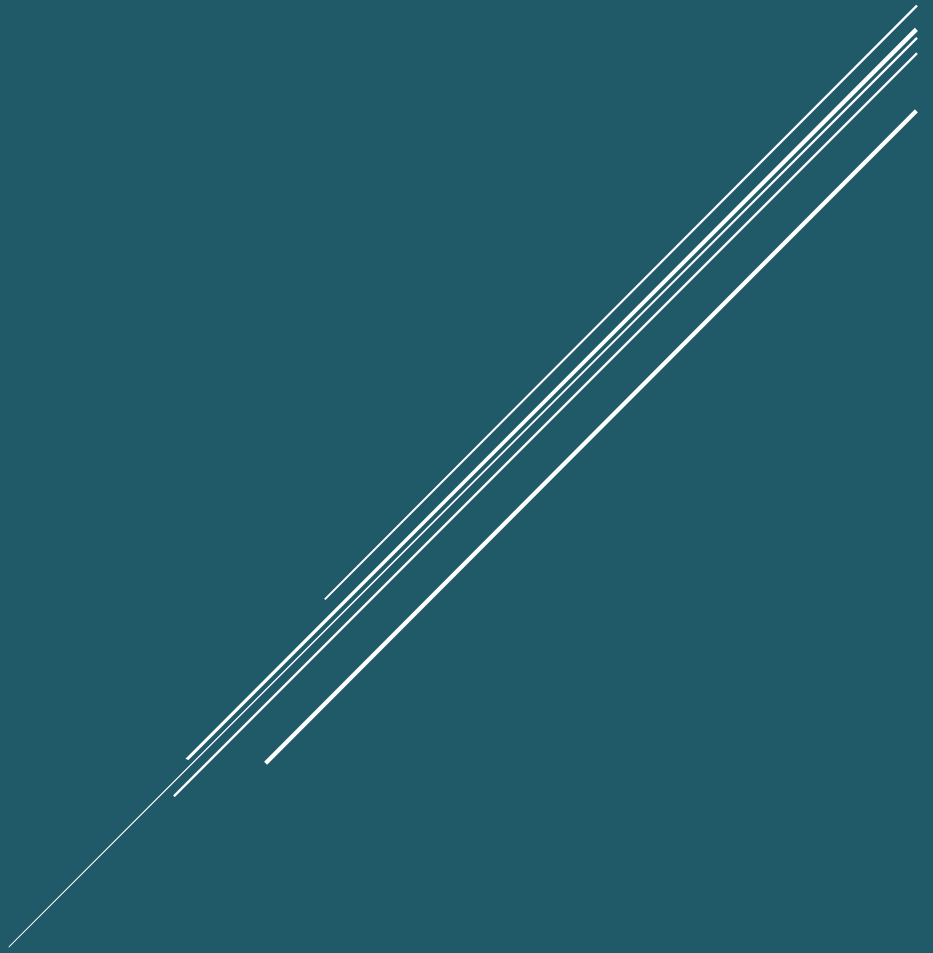
5.1.3 Engagement Outcomes

An initial consultation program was undertaken, including briefings with a range of stakeholders. Positive feedback on the Development included:

- Support for a new tourism product in Darwin;
- Improved activation of the surrounding area;
- The indication of growing investment confidence for Darwin;
- Support for the biophilic design;
- Retention of community access; and
- The choice of location.

The key areas of concern arising from consultation included indigenous heritage, impacts from building height on views and sea breezes, loss of the area by the community and actioning meaningful consultation. These issues have been considered by KTT in the design of the Development and are explored as part of the Community and Economy Factor (**Section 7.4**).

Details of the consultation undertaken to date is included within **Appendix 3**.



KEY ENVIRONMENTAL FACTORS

NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

6 KEY ENVIRONMENTAL FACTORS

6.1 ENVIRONMENTAL FACTORS AND OBJECTIVES

Environmental Factors are elements of the environment that may be impacted by any aspect of a proposal. *NT EPA Environmental Factors and Objectives* (NT EPA 2020) classifies 14 Factors to guide the structure of formal Environmental Impact Assessment (EIA) processes in the NT. The potential impacts of a proposal are assessed against the NT EPA's (2020) Objectives for each Factor to determine whether the impacts of a proposal are likely to be significant.

A preliminary assessment has identified the key Environmental Factors for the North One Development, as listed in **Table 6-1**. **Section 7** describes each Environmental Factor potentially impacted by the proposal and is structured to reflect the risk and EIA process. The remaining Environmental Factors, deemed non-significant to the Proposal, are summarised in **Table 6-2**. **Section 8** discusses applicable environmental factors that are considered unlikely to cause significant impact, for both construction and operation, residually or cumulatively.

Table 6-1: Key Environmental Factors

Theme	Environmental Factor	NT EPA Objective	Section
Land	Terrestrial Environmental Quality	Protect the quality and integrity of land and soils so that environmental values are supported and maintained.	7.1
Water	Hydrological Processes	Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses, and the welfare and amenity of people are maintained.	7.2
	Inland Water Environmental Quality	Protect the quality of groundwater and surface water so that environmental values including health, land uses, and the welfare and the amenity of the people are maintained.	7.3
People	Community and Economy	Enhance communities and the economy for the welfare, amenity, and benefit of current and future generations of Territorians.	7.4
	Culture and Heritage	Protect sacred sites, culture, and heritage.	7.5
	Human Health	Protect the health of the Northern Territory population.	7.6

Table 6-2: Non-significant Environmental Factors

Theme	Environmental Factor	Objective	Section
Land	Landforms	Conserve the variety and integrity of distinctive physical landforms.	Within the Development boundary there are no significant landforms. The escarpment on the south-eastern edge of the Lot 7651 is situated outside of the building envelope and will be discussed in Section 7.4 (Community and Economy) which addresses visual impact and community use; and Section 8.1 (Terrestrial Ecosystems).
	Terrestrial Ecosystems	Protect terrestrial habitats to maintain environmental values	The Site is predominately cleared, and the Proposal does not have a significant impact on terrestrial ecosystems; no

Theme	Environmental Factor	Objective	Section
		including biodiversity, ecological integrity and ecological functioning.	clearing of escarpment or tidal creek vegetation is proposed. There are ecosystems of interest surrounding the Site which will be discussed in further detail within Section 8.1 (Terrestrial Ecosystems).
Water	Aquatic Ecosystems	Protect aquatic habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	A recently approved PSA has excised Little Mindil Creek from the development envelope and as such, there are no aquatic ecosystems within the Development area and no direct impacts proposed. Any impacts on water quality of the creek have been addressed in Section 7.3 (Inland Water Environmental Quality).
Sea	Coastal Processes	Protect the geophysical and hydrological processes that shape the coastal morphology so that the environmental values of the coast are maintained.	The Proposal is a terrestrial based Development that is not anticipated to impact on the geophysical or hydrological processes that shape coastal morphology of the local area. An existing retaining wall has been constructed by the NT Government along the foreshore and no development or site discharge is proposed directly within the coastal environment. Section 7.2 (Hydrological Processes) addresses impacts on Little Mindil Creek, which ultimately directs to the coastal environment.
	Marine Environmental Quality	Protect the quality and productivity of water, sediment and biota so that environmental values are maintained.	Since the Proposal is terrestrial based and will be set back from the foreshore it is not anticipated to impact Marine Environmental Quality. Any increased runoff will be directed to Little Mindil Creek, with potential sedimentation issues addressed in Section 7.3 (Inland Water Environmental Quality). No adverse impacts are anticipated on Marine Environmental Quality.
	Marine Ecosystems	Protect marine habitats to maintain environmental values including biodiversity, ecological integrity and ecological functioning.	None of the environmental values and sensitivities relevant to this factor are triggered by this Proposal.
Air	Air Quality	Protect air quality and minimise emissions and their impact so that environmental values are maintained.	Not applicable to this Proposal as no significant air quality sources exist.
	Atmospheric Processes	Minimise greenhouse gas emissions so as to contribute to the NT government's goal of achieving net zero greenhouse gas emissions by 2050.	Greenhouse gas contribution from the proposed development is not considered significant. Further details are provided in Section 8.2 (Atmospheric Processes).

6.1.1 Risk Assessment

The NT EPA (2020) requires identification, analysis, and mitigation of potential environmental impacts of the proposal through a whole-of-project risk assessment. The risk and environmental impact assessment process informing this referral document is as described in **Appendix 4**, which includes assessment of construction, operation, and cumulative impacts.

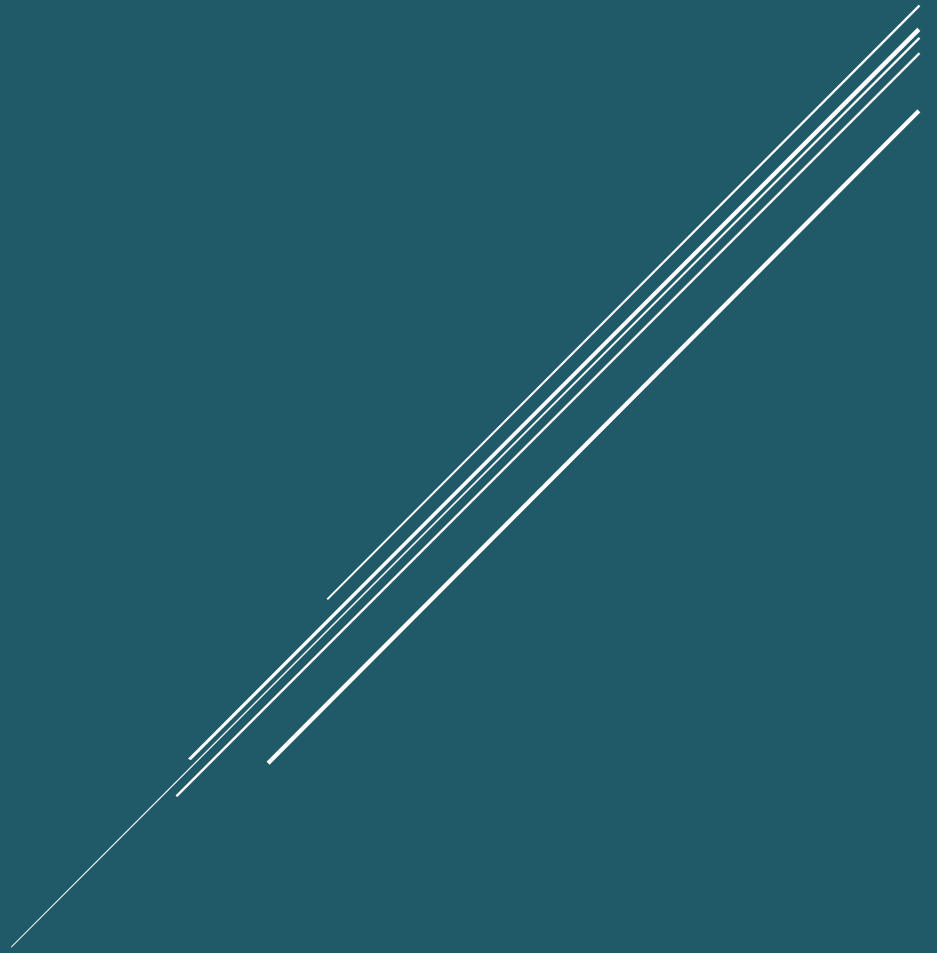
The risk assessment broadly determines that the majority of residual impacts resulting from the Development pose a low risk to the NT EPA's environmental objectives and no residual impacts rate higher than a medium risk rating. In this sense the development of the North One Hotel and Apartment Complex does not pose any unacceptable risks to the environmental factors outlined by the NT EPA. The four residual impacts that are rated as medium risk are associated with the following:

- Contamination of surface water (including Little Mindil Creek) and degradation of associated ecological receptors due to liberation of Acid Sulphate Soils (**ASS**);
- Disturbance or destruction of culturally significant sites due the possibility that burial sites (additional to the Registered Sacred Site) may still exist within the Development envelope;
- Reduction of scenic values of Myilly Point Heritage Precinct due to loss of views due to construction of North One Development; and
- Loss of the site as community public open space due to a reduction in recreational value of the grassed area by some current recreational users.

The risk assessment broadly determines that all the residual impacts resulting from the Development pose either a low or medium risk to the NT EPA's environmental objectives. A suite of management plans appended to the referral and the Construction Environmental Management Plan (**CEMP**) seek to further mitigate and manage the risks presented in this assessment.

The risk assessment process has determined that the Development will not have any significant impacts on the environmental factors as described by the NT EPA (2020).

Specific detail on each applicable factor is provided in **Section 7** and **Section 8** below.



ENVIRONMENTAL FACTORS WITH POTENTIAL FOR SIGNIFICANT IMPACT

NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

7 ENVIRONMENTAL FACTORS WITH POTENTIAL FOR SIGNIFICANT IMPACT

7.1 ENVIRONMENTAL FACTOR: TERRESTRIAL ENVIRONMENTAL QUALITY

7.1.1 NT EPA Objective

Terrestrial Environmental Quality refers to the chemical, physical, biological, and aesthetics characteristics of land and soils. The NT EPA's objective for the environmental factor Terrestrial Environmental Quality is to:

Protect the quality and integrity of land and soils so that environmental values are supported and maintained.

The Terrestrial Environmental Quality objective recognises the essential link between soil quality and the protection of ecological and social values that good soil quality supports.

7.1.2 Technical Studies

Technical studies undertaken to inform assessment of potential impacts on Terrestrial Environmental Quality are listed in **Table 7-1**.

Table 7-1: Technical Studies Informing Terrestrial Environmental Quality

Date	Study Title	Consultant	Description	Report
May 2020	Preliminary Site Investigation. Reference number 680.30010-R01. Version No: v3.0	SLR	Preliminary site investigation at 25 Gilruth Avenue, The Gardens, Northern Territory (Little Mindil), based on publicly available historical data, master plan documentation, and observations during an initial site inspection.	Appendix 5
February 2021	Little Mindil Desktop Biological Study.	Animal Plant Mineral (APM)	A desktop assessment of terrestrial fauna, vegetation and flora for Lot 7651.	Appendix 6

7.1.3 Key Policies and Guidelines

Relevant Policies and Guidelines include:

- *Environment Protection Act 2019*
- *National Acid Sulfate Soils Sampling and Identification Methods Manual* (Sullivan et al., 2018)
- *NT EPA Environmental Guidelines for Reclamation in Coastal Areas 2006*
- *Australian Standard AS1940:2017 – Storage and Handling of Flammable and Combustible Liquids*
- *Waste Management and Pollution Control Act 1998*
- *National Environment Protection (Assessment of Site Contamination) Measure 2013*
- *NT EPA Northern Territory Contaminated Land Guideline 2017*
- *Guidelines for the Assessment, Remediation and Management of Asbestos Contaminated Sites in Western Australia 2021*
- *NT EPA Asbestos Disposal in the Northern Territory*

7.1.4 Existing Environment

7.1.4.1 Existing Land Uses

The North One Development site is currently used as an overflow car park facility for the adjacent Mindil Beach Casino Resort and incorporates a large grassed area utilised informally by the general public for recreational purposes such as exercising, picnicking and occasionally for public events. An existing footpath network provides access to the Little Mindil Beach foreshore through the site, along Little Mindil Creek (**Plate 7-1**).

The site was previously utilised as a dumping ground after the 1942 bombing of Darwin and 1974 Cyclone Tracy impact. More recent fly tipping activities are also evident with the area (**Plate 7-2**). The varied history of the site, particularly with relation to potentially contaminating events, may result in constraints that require management to facilitate the Development. Further details of historic use were described in **Section 3.1.1**.



Plate 7-1: Existing Public Footpath Through Site



Plate 7-2: Fly Tipping in Little Mindil Creek within the Development Site

7.1.4.2 Acid Sulphate Soils

Acid Sulphate Soils are a characteristic natural feature of lowland coastal environments in Darwin, particularly where landform elevations are below 5m AHD. They contain highly reactive iron sulphides, generally in the form of framboidal pyrite. When in a waterlogged state ASS is benign; however, when drained or excavated oxygen from the atmosphere reacts with the iron sulphides in the soil, resulting in the production of sulphuric acid and the potential release of metal compounds from disturbed soils (SLR, 2020). ASS which has not been oxidised by exposure to air is known as Potential Acid Sulphate Soils (**PASS**).

A review of the *Land Systems of the Northern Part of the NT (1:250,000)*, conducted by SLR (2020), indicated the North One Development site exists within the Darwin Coastal geomorphic zone and is classified as level tidal flats with channels and estuaries and minor dunes. It is a common occurrence for ASS to exist on tidal flats, coastal floodplains, and some coastal sand plains. **Figure 7-1** provides an extract of the NT NR Maps *Acid Sulphate Soils Risk Map* overlay for the site, which confirms the probability of ASS.



Figure 7-1: Acid Sulphate Soils Risk Map (as accessed from NR Maps on 23.04.2020)

7.1.4.3 Existing Soil Quality

Based on the known historical use of the site, the following potential contamination sources may exist, as identified by SLR during the preliminary site inspection (shown in **Table 7-2**). There are, however, no previous or current investigations of the soil, surface water or groundwater within the site; therefore, no definitive assessment can be made regarding the presence or absence of contamination associated with these sources.

It is possible that land quality assessment, and potentially remediation, have been carried out prior to the most recent development works (230 space bitumen carpark, installation of underground services, landscaping of the Gala Lawns area and installation of surrounding pedestrian walkways and foot bridges) (SLR,2020).

Table 7-2: Potential Contamination and Sources (SLR, 2020)

Contaminants of Potential Concern (COPCs)	Potential Sources	Potential transport mechanisms	Potential exposure pathways
Asbestos Containing Material	<ul style="list-style-type: none"> • Dispersal of debris from Cyclone Tracy impact. • Remnant impact of historic dumping following 1942 bombing of Darwin and 1974 Cyclone Tracy impact. • Fill of unknown origin imported during historic earth works projects. 	<ul style="list-style-type: none"> • Aerial dispersion and distribution of contaminants. 	<ul style="list-style-type: none"> • Inhalation of contaminated material, such as vapour or dust.
ASS/PASS	<ul style="list-style-type: none"> • Proximity to coastal/tidal areas. 	<ul style="list-style-type: none"> • Disturbance and mismanagement of ASS/PASS material during earthworks. 	<ul style="list-style-type: none"> • Ingestion of contaminated material. • Dermal contact. • Plant uptake.
Heavy Metals	<ul style="list-style-type: none"> • Fill of unknown origin imported during historic earth works projects. • Remnant impact of historic dumping following 1942 bombing of Darwin and 1974 Cyclone Tracy impact. • Mobilisation following disturbance and mismanagement of ASS/PASS material. 	<ul style="list-style-type: none"> • Migration of surface contaminants, impacted soil, or leachable contaminants, via hydraulic surface flow during periods of inclement weather. • Bioaccumulation of contaminants in aquatic fauna. 	<ul style="list-style-type: none"> • Inhalation of contaminated material, such as vapour or dust. • Bioaccumulation of contaminants in aquatic fauna. • Ingestion of contaminated material.
Hydrocarbons	<ul style="list-style-type: none"> • Fill of unknown origin imported during historic earth works projects. • Spills relating to historic development projects. • Remnant impact of anecdotal historic dumping following 1942 bombing of Darwin and 1974 Cyclone Tracy impact. 	<ul style="list-style-type: none"> • Migration of surface contaminants, impacted soil, or leachable contaminants, via hydraulic surface flow during periods of inclement weather. • Bioaccumulation of contaminants in aquatic fauna. 	<ul style="list-style-type: none"> • Inhalation of contaminated material, such as vapour or dust. • Ingestion of contaminated material.
Polychlorinated Biphenyls	<ul style="list-style-type: none"> • Remnant impact of historic dumping following 1942 bombing of Darwin and 1974 Cyclone Tracy impact. • Electrical substation to the west of the site. 	<ul style="list-style-type: none"> • Migration of surface contaminants, impacted soil, or leachable contaminants, via hydraulic surface flow during periods of inclement weather. • Bioaccumulation of contaminants in aquatic fauna. 	<ul style="list-style-type: none"> • Inhalation of contaminated material, such as vapour or dust. • Ingestion of contaminated material.

7.1.5 Potential Impacts and Risks

A Preliminary Conceptual Site Model was developed to assess the potential sources, transport pathways, and potential receptors of risks to human health, the environment or environmental values of the Development area and surrounds. This information is presented in **Table 7-3** below, with further detail included in the Preliminary Site Investigation report (**Appendix 5**).

Table 7-3: Preliminary Conceptual Site Model.

Sources	COPCs	Pathways	Receptors	Likelihood/Risks
Historical landfill, fly-tipping or use of contaminated fill material during construction	Metals	<p>Dermal contact between site users and areas of gross contamination.</p> <p>Lateral migration of surface water/runoff.</p> <p>Vertical infiltration of COPC's from the surface water to the groundwater.</p> <p>Lateral migration of COPC's via groundwater.</p>	<p>Site users (including workers engaged in construction works).</p> <p>Ecological receptors of creek and beach area (flora/fauna).</p> <p>Human receptors (recreational users and consumers of fish/shellfish).</p>	Low (based on the findings of the Preliminary Site Investigation).
	Petroleum hydrocarbons	<p>Inhalation of COPC derived vapours.</p> <p>Dermal contact between site users and gross contamination.</p> <p>Lateral migration of surface water/runoff.</p> <p>Vertical infiltration of COPC's from the surface water to the groundwater.</p> <p>Lateral migration of COPC's via groundwater.</p>	<p>Site users (including workers engaged in construction works).</p> <p>Ecological receptors of creek and beach area (flora/fauna).</p> <p>Human receptors (recreational users and consumers of fish/shellfish).</p>	
	Asbestos	<p>Inhalation of fibrous asbestos (through presence of friable asbestos, fibrous asbestos, or asbestos fines).</p>	<p>Site workers (including workers engaged in construction works).</p>	
Site excavation during construction	ASS/PASS	<p>Acid drainage.</p>	<p>Ecological receptors (soil/flora/fauna) of the Little Mindil Beach area.</p>	Moderate to Low (subject to implementation of an ASS Management Plan).
	Toxic Metals	<p>Leaching due to acid drainage.</p>	<p>Ecological receptors (soil/flora/fauna) of the creek and beach Area.</p>	
Hazardous substances used in construction phase	Petrol, oils and lubricants (POL)	<p>Dermal contact between site users and areas of gross contamination.</p> <p>Lateral migration of surface water/runoff.</p> <p>Vertical infiltration of COPC's from the surface water to the groundwater.</p> <p>Lateral migration of COPC's via groundwater.</p>	<p>Site users (including workers engaged in construction works).</p> <p>Ecological receptors of the creek and beach area (flora/fauna).</p> <p>Human receptors (recreational users and consumers of fish/shellfish).</p>	Moderate to Low (subject to implementation of the Hazardous Substances Procedure).

7.1.5.1 Acid Sulphate Soils

The site will be predominantly filled to raise the building level above the storm surge level. Excavation and disturbance of existing soils will occur as a result of the following, although the majority of excavation will occur within the fill zone:

- Initial site leveling and removal of topsoil layers;
- Excavation required for installation of erosion and sediment control infrastructure;
- Construction of the semi-basement carparking facilities (note – this will predominantly be built within the fill zone, however, may also involve partial excavation of existing soils);
- Excavation for some underground utility services (most excavation expected within the fill zone); and
- Localised excavation for piling.

Unmanaged disturbance of ASS and consequent acid drainage from these activity can lead to adverse impacts to the terrestrial environment (impacts associated with inland water quality are addressed in **Section 7.3**); including adverse changes to the quality of soils, reduction in soil stability and fertility, loss of visual amenity due to rust coloured stains from iron precipitation at the soil surface and long term infrastructure damage through acidic water corroding metallic and concrete structures.

Given the lack of whole-scale deep excavation, the restriction of excavation to minor components of the Development and the response of ASS to mitigation, it is anticipated that the risk to terrestrial environmental quality will be moderate to low impact. It should also be noted that impacts are expected to be limited to the construction phase of the Development.

7.1.5.2 Hazardous Substances Used in the Construction Phase

KTT are proposing to construct a high-quality development incorporating best practice management from the construction phase through to operations. Hazardous substance usage and storage is anticipated mainly during the construction phase and will be consistent with Australian Standards.

Pollution can, however, occur as a result of accidental spills and unintentional release of polluting substances into the ground or waterways. Polluting substances used on site may include POL, paints, thinners, cement, asphalt and other hazardous materials.

Where minor spills occur, impacts would be localised and easily managed. In the event of an unforeseen, significant spill, the terrestrial environment would provide a pathway to Little Mindil Creek and potentially into Fannie Bay, which are sensitive receptors. The impact would depend on a series of factors including the type and volume of material released, extent of contamination and climatic conditions at the time of the incident.

Given the scale of the Development and the relatively short construction period comparative to the project life, impacts on the terrestrial environment are expected to be moderate to low. KTT is cognisant of the potential significance of an uncontrolled discharge of hazardous substances and will implement appropriate mitigation strategies to address the risk, as details in **Section 7.1.6** below.

7.1.5.3 Disturbance of Contaminated Soils

Contaminated land is land (inclusive of soils and water) that has chemical substances in levels that potentially pose a hazardous risk to human health and/or the environment. The North One Development site has a history of material dumping, particularly asbestos associated with World War II and Cyclone Tracey, and therefore has the potential to be identified as contaminated.

KTT recognise this potential risk and will instigate a Land Suitability Assessment prior to commencement of construction. Remedial actions will be undertaken as necessary to ensure the site is suitable for the intended land use.

7.1.6 Mitigation and Management

Mitigation measures for the potential risks to Terrestrial Environmental Quality are listed in **Table 7-4** and described in the North One Hotel and Apartment Development CEMP (**Appendix 7**).

Table 7-4: Mitigation Measures for Terrestrial Environmental Quality

Issues	Mitigation Measure
Disturbance of ASS during clearing and earthworks.	<ul style="list-style-type: none"> Undertake a geotechnical assessment prior to construction, to identify areas of occurrence of ASS. Disturbance of ASS to be avoided where possible, including constructing infrastructure above natural ground level wherever possible. Excavated ASS to be treated during construction in accordance with requirements of the ASS Management Plan (Appendix 8) to prevent acidic fluids leaching into surface water or groundwater.
Incorrect handling of ASS/PASS.	<ul style="list-style-type: none"> Material free of ASS will be used to construct any bunds or infrastructure pads that may be required. Preparation of compliant ASS treatment pads. The area will be fully contained/constructed such that drainage /runoff water from the pad is directed to an appropriate receptacle for testing and treatment (if required). Any spilled ASS material is to be transferred to the treatment pad immediately. Awareness training of ASS handling requirements will be provided to personnel involved with the movement of soils, particularly during the construction phase.
Retained water becomes acidified.	<ul style="list-style-type: none"> All stormwater or ASS leachate from stockpiles or other exposed areas shall be diverted to a retention pond for monitoring and treatment (if required). pH, water level, electrical conductivity, total iron and aluminium concentrations to be monitored within any pond of retained water suspected of being contaminated by ASS. Hydrated lime to be available for pH adjustment of water if required. Monitoring of wastewater conducted prior to discharge must indicate parameters comply with the performance indicators.
Soil erosion resulting in disturbance of ASS or sediment of the adjacent environment.	<ul style="list-style-type: none"> Implementation of the Erosion and Sediment Control Plan (ESCP) and management procedures in the CEMP to avoid erosion. Erosion protection measures are further described in Section 7.3 (Inland Water Environmental Quality).
Incorrect storage of lime and hydrated lime leading to death of vegetation.	<ul style="list-style-type: none"> Lime will be stored in a containment area adjoining the treatment pad (so that any discharge from the area is directed into the treatment pad). Appropriate weatherproof storage of hydrated lime.
Integrity of infrastructure compromised due to exposure to acidic environment.	<ul style="list-style-type: none"> Disturbance to be avoided where possible including constructed infrastructure above natural ground level where possible. Project design to incorporate corrosion resistant materials where required.
Contamination during project construction phase.	<p>Implement the hazardous materials management procedures in the CEMP including the following:</p> <ul style="list-style-type: none"> Storage of hazardous materials in accordance with Australian Standard <i>AS1940:2017 - The Storage and Handling of Flammable and Combustible Liquids</i>.

Issues	Mitigation Measure
	<ul style="list-style-type: none"> ● Train personnel in implementing safe work practices to minimise risks and impacts of spillage of fuels, chemicals, and other contaminants. ● Train personnel in incident reporting and emergency management procedures and encourage the reporting of issues and near misses. ● Record and report all POL, chemical and hazardous substance spills. ● Ensure personnel have access to spill kits that contain an absorbent material, clearly marked oily/chemical waste disposal drum and a shovel. ● In the event of a chemical or hazardous substance spill, containment measures should be enacted, and Material Safety Data Sheet (MSDS) requirements complied with. ● MSDSs are to be located with storage areas, as well as centrally located and readily available to staff for use in case of an emergency. ● MSDSs must be current. ● All contaminated soil and absorbent in the oily/chemical waste disposal drum should be disposed of by a licenced waste contractor. ● Keep site free from build-up of waste materials by directing regular clean ups. ● Avoid storing large volumes of materials on site. ● Ensure herbicides used for weed control are registered and are only applied by appropriately trained personnel.
Exposure of humans and the environment to COPC's from fly-tipped waste.	<ul style="list-style-type: none"> ● Removal of fly-tipped waste from the site using accredited waste specialists. ● Inspection of disturbed area and fly-tipped waste for the presence of asbestos. Removal, transport and disposal of asbestos using licensed specialists, as required.
Exposure of historical site contaminants	<ul style="list-style-type: none"> ● Complete a Land Suitability Assessment prior to commencement of construction. ● Undertake appropriate remediation of the site, in consultation with the appropriate Regulatory Authority, to a suitable level for the intended land use. ● Develop a Contaminated Site Management Plan prior to commencement of construction, including specific measures for Asbestos management, to facilitate clean-up of the site and ensure further contamination of the adjacent environment is avoided during the remedial works.

7.1.7 Monitoring and Inspection

Details of monitoring activities will be determined once infrastructure design and associated construction methodologies have been finalised and following completion of geotechnical investigations, the Land Suitability Assessment and relevant project approvals. Monitoring activities will be reported through the CEMP reporting schedule and as per the specialist management plans, outlined below in **Table 7-5**. Inspection and reporting expectations are outlined in **Table 7-6**.

Table 7-5: Monitoring Actions for Terrestrial Environmental Quality

Issue	Monitoring	Timing
ASS monitoring	<ul style="list-style-type: none"> ● pH, water level, electrical conductivity, total iron, and aluminium concentrations to be monitored against ANZECC guidelines or baseline levels for any ponds or retained water potentially exposed to discharge from ASS. ● Chromium Reducible Sulphur analysis to potentially indicate the presence of PASS. ● Titratable Actual Acidity analysis to potentially indicate the presence of ASS. 	<ul style="list-style-type: none"> ● As needs basis, where exposure of ASS is suspected.

Issue	Monitoring	Timing
	<ul style="list-style-type: none"> Monitoring of lime-treated soil for successful neutralisation before being moved or covered. National Association of Testing Authorities (NATA) accredited laboratories will be used for analysis. 	
Soil contamination and validation monitoring	<ul style="list-style-type: none"> Analytes sampled will depend on constituents of material released to terrestrial environment. NATA accredited laboratories will be used for analysis. Sampling methods will be consistent with the <i>National Environment Protection Assessment of Site Contamination) Measure</i>. Acceptable criteria will be established in consultation with the NT Department of Environment, Parks and Water Security (DEPWS). 	<ul style="list-style-type: none"> As required where residual soil contamination is suspected.

Table 7-6: Inspection and Reporting for Terrestrial Environmental Quality

Issue	Inspection	Reporting
Soil contamination	<ul style="list-style-type: none"> Daily inspection during construction to ensure site is cleared of waste, all chemicals/POLs have been stored and disposed of correctly, and all spills have been identified and dealt with. Weekly inspection of any bunds to check integrity and detect leaks and spills. 	<ul style="list-style-type: none"> Incidents are to be reported and records maintained/retained. Investigate incidents and implement any preventative actions. Report any contamination issues to the Site Supervisor.
ASS	<ul style="list-style-type: none"> Inspection of work areas during excavation to ensure all potential ASS has been removed to the treatment area. 	<ul style="list-style-type: none"> Record volumes of ASS treated. Record ASS monitoring results. Statutory incident reporting in the case of a significant incident resulting from ASS liberation.

7.1.8 Statement of Residual Impact

Due to the suspected existence of asbestos and other contaminating materials in situ, and the potential risk to human and environmental health by disturbing these materials, a risk to Terrestrial Environmental Quality may result if mitigation measures are not implemented. It is noted, however, that the level of contamination across the site is yet to be quantified and impacts would be restricted to the construction phase.

Regardless of the contamination status of the Development area, implementing the management controls outlined in **Table 7-4**, will reduce the risk to Terrestrial Environmental Quality. Hence, any potential effects on the surrounding environment will be minimal.

As a result of the presence of ASS there are potential risks to the terrestrial environment associated with the proposed Development. Management controls for ASS are also presented in **Table 7-4**. After implementation of these controls, impacts from ASS are considered to present a low risk, with any potential effects on the surrounding environment being localised and minor. A monitoring and reporting schedule will be implemented to ensure risks are identified and managed rapidly and effectively.

Use of hazardous materials comes with a risk of seepages, leaks, and spills. Implementation of the appropriate transport, storage, and handling procedures is expected to reduce these risks to an acceptable level.

Risks to Terrestrial Environmental Quality are considered local in scale and short term. Implementation of identified control measure will reduce risks associated with the North One Development and ensure the NT EPA's Factor objective can be met.

The North One Hotel and Apartment Development is not expected to impact Terrestrial Environmental Quality beyond the boundary of the site. Given this, the nature of the operation being an accommodation facility and the lack of other significant polluting industries in the local area, the cumulative impacts on the terrestrial environment from the Development are considered to be negligible.

7.2 ENVIRONMENTAL FACTOR: HYDROLOGICAL PROCESSES

7.2.1 NT EPA Objective

Hydrological Processes refer to the occurrence, distribution, connectivity, movement and quantity of surface water and groundwater. The NT EPA's objective for the environmental factor Hydrological Processes is to:

Protect the hydrological regimes of groundwater and surface water so that environmental values including ecological health, land uses, and the welfare and amenity of people are maintained.

The Hydrological Processes objective recognises the fundamental link between hydrological regimes and the environmental values they support such as water-dependent ecosystems, amenity, cultural values, recreational, public drinking water, agricultural and industrial uses of water.

7.2.2 Technical Studies

Technical studies undertaken to inform assessment of potential impacts of the Development on Hydrological Processes are listed in **Table 7-7**.

Table 7-7: Technical studies informing Hydrological Processes

Date	Study Title	Consultant	Description	Report
June 2021	Little Mindil Beach. 25 Gilruth Avenue, The Gardens, Northern Territory. Engineering Services Report No 23085 C R002 REV00	ADG	Provides advice to the development proposal at Little Mindil, covering works required to service the proposed development with regards to earthworks, roadworks, stormwater drainage, sewerage and water supply, electricity, communication, and gas.	Appendix 9
June 2021	Little Mindil Beach. 25 Gilruth Avenue, The Gardens, Northern Territory. Stormwater Management Plan No 23085 C R001 REV00	ADG	Comprises a stormwater quantity assessment for Little Mindil based on the development proposal and recommends best management practice measures for stormwater quality.	Appendix 10
June 2021	Little Mindil Beach. 25 Gilruth Avenue, The Gardens, Northern Territory. Hydraulic Assessment No 23085 C R003 REV01	ADG	Summarises the hydraulic characteristics of the site, defines the flooding extent associated with local catchment flows and assesses the peak levels associated with storm surge inundation.	Appendix 11
June 2021	Erosion and Sediment Control Plan No 23085 Rev A	ADG	Comprises plans and notes to describe the proposed erosion and sediment control measures to be implemented for the construction and operational phases of the Proposal.	Appendix 12

7.2.3 Key Policies and Guidelines

Relevant Policies and Guidelines include:

- *Environment Protection Act 2019*
- *Best Practice Erosion and Sediment Control Guidelines* (International Erosion Control Association – **IECA**)
- *Australian Guideline for Urban Stormwater Management* (ANZECC, 2000)
- *City of Darwin Subdivision and Development Guideline* (2005)
- *NT EPA Stormwater Strategy for the Darwin Harbour Region* (2010)

7.2.4 Existing Environment

The North One Development site generally falls from south to north at a grade of 1%; a contour plan of the Project area is provided as **Figure 7-2**. The southern boundary of the site comprises a steep rock embankment, with the northern portion containing an existing creek that discharges into Fannie Bay at Little Mindil Beach. The site includes approximately 30% coverage with impervious carpark areas, with the remainder of the site incorporating medium permeability grass cover.



Figure 7-2: North One Development Site Contours

7.2.4.1 Surface Water Characteristics

The following hydrological features have been identified at or around the site and are identified in **Figure 7-3**:

- Little Mindil Creek, an open channel natural creek running parallel to the northern boundary of the site;
- Fannie Bay and Little Mindil Beach Foreshore to the north-west of the Development area.

No other forms of surface water are present in proximity to the North One Development.

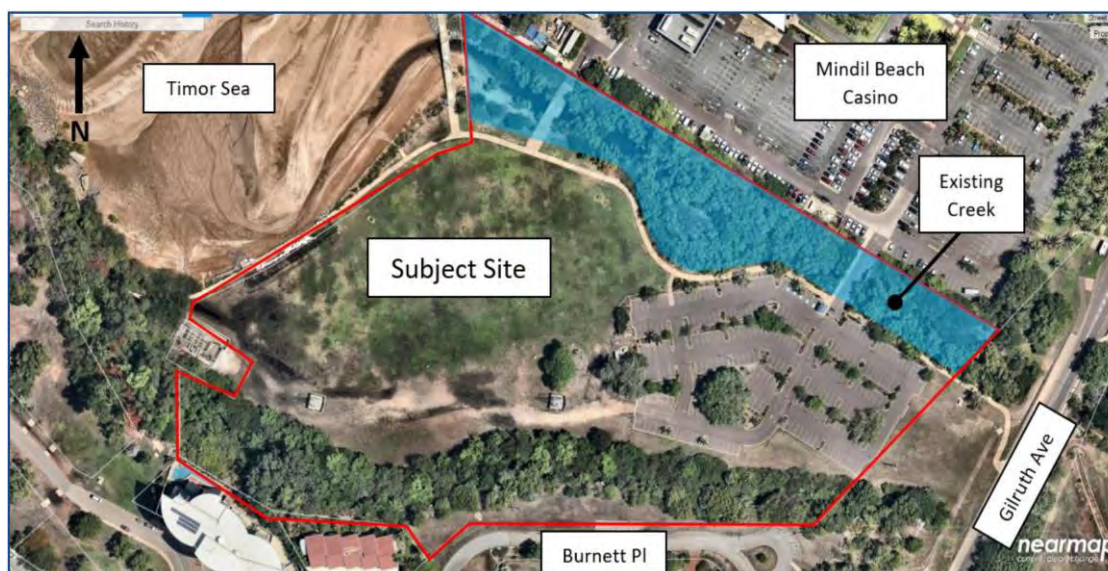


Figure 7-3: Surface Water Features of the North One Development Site

A large external catchment has been identified to discharge via the Development area through Little Mindil Creek. Runoff from this catchment is captured and channelized prior to entering the North One site and is conveyed within the existing open-channel creek. This external catchment does not negatively burden the Development area.

Within the site, the pre-development catchment hydrology has been assessed in accordance with the following Queensland Urban Drainage Manual (**QUDM**) Section 4.0 using the Rational Method for peak flow rate:

$$Q = (2.78 \times 10^{-3}) C_y I_y A$$

where:

Q = Peak flow rate (m³/s) for Average Recurrence Interval (**ARI**)

C_y = Co-efficient of runoff for ARI of y years (dimensionless)

A = Catchment area (ha)

I_y = Average rainfall intensity (mm/hr) for a design duration of t hours and an ARI of y years

Pre-development peak flow rates are summarised in **Table 7-8**.

Table 7-8: Pre-Development Peak Flow Rates

Catchment	Area (ha)	Time of Concentration (min)	Coefficient of Discharge			Peak Flow Rate (m ³ /s)		
			C ₁	C ₁₀	C ₁₀₀	Q ₁	Q ₁₀	Q ₁₀₀
A	5.19	18.8	0.61	0.76	0.91	0.79	1.64	2.86

7.2.4.2 Flood Assessment

Hydraulic analysis of the existing conditions for the Development area was undertaken to establish and quantify current flooding patterns and behaviour. Pre-development flooding behaviours were assessed using a 1D/2D TUFLOW model. This model simulates the dynamic flooding behaviour along natural watercourses, constructed channels and the floodplain. Modelling results are as follows:

- Runoff in the study area predominantly sheets across the impervious areas of the upper catchment and through defined flowpaths down the escarpment. The lower part of the catchment is generally flat and ponding occurs on both sides of Gilruth Avenue;
- The creek within the site conveys a peak flow of $11.7 \text{ m}^3/\text{s}$ in a 1% Annual Exceedance Probability (AEP) storm event; Peak velocity within the creek is generally low due to the adopted Medium High Water Springs tailwater being applied in the modelling.
- Depth of flow within the creek is up to 2.30 m in the 1% AEP storm event.

Figure 7-4 indicates the 1% AEP pre-development flood depth plot across the catchment; **Figure 7-5** presents the results for the Development area. As indicated in these figures, storm events up to 1% AEP are contained within the defined Little Mindil Creek channel.

Further detail on the hydraulic assessment is contained within **Appendix 11**.



Figure 7-4: Pre-Development Catchment Flood Extent



Figure 7-5: Pre-Development Area Flood Extent

7.2.4.3 Storm Surge

The Development site is subject to storm surge flood inundation, as identified in the *NT Storm Surge Mapping for the Darwin Area*. Storm surge information, both primary storm surge (PSS) (1 in 100-year storm event) and secondary storm surge (SSS) (1 in 1000 year storm event), is presented in **Table 7-9** for a series of marker locations within the North One Development site (refer to **Figure 7-6** for marker locations). The PSS level for the site is confirmed as 5.47 m AHD (ADG, 2021b)

The Storm Surge Plan for the site is included as **Figure 7-7**.

Table 7-9: Primary and Secondary Storm Surge Levels for Lot 7651.

Locations	Primary Storm Surge Level (mAHD)	Secondary Storm Surge Level (mAHD)
P1	5.46	-
P2	5.46	-
P3	5.47	-
P4	5.47	-
P5	5.47	-
P6	5.46	-
S1	-	5.75
S2	-	5.86
S3	-	5.85
S4	-	5.79
S5	-	5.75
S6	-	5.76

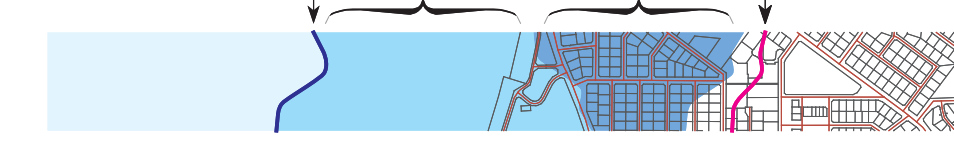
Source: Darwin Area Storm Surge Inundation for 2100, November 2014 (DENR)



Figure 7-6: Primary and Secondary Storm Surge Overlay and Location Markers

DARWIN AREA STORM SURGE INUNDATION for 2100

Estimated HAT (Highest Astronomical Tide) Primary Storm Surge Zone (100 Year ARI) Secondary Storm Surge Zone (1,000 Year ARI) Extreme Storm Surge Extent (10,000 Year ARI)



The technical information forming the basis of this storm surge inundation mapping is contained in the following reports prepared for the NT Government by Systems Engineering Australia Pty Ltd (SEA) or GHD:

1. Darwin Storm Tide Mapping Study - 2006
2. High Resolution Storm Tide and Climate Change Impacts Study - 2010
3. Rapid Creek Storm Surge Tide Mapping, Mapping update - 2018

Using the storm surge levels and estimates of Highest Astronomical Tide (HAT) from the above studies, the inundation and HAT extents for the projected mean sea level in 2100 were developed by GHD Pty Ltd in 2014 and 2016 based on the latest topographic information (2009, 2011 and 2015). This map is produced by the NT Government for the Darwin area based on the storm surge inundation and HAT extents.

The map shows the total storm surge (technical terminology is storm tide) hazard risk due to tropical cyclones in terms of the ocean water level comprising the combined effects of astronomical tide plus storm surge plus wave setup for two statistical Average Recurrence Intervals (ARI). It also shows the estimated HAT extent. The 'Primary Storm Surge Zone' shown on the map refers to the extent of inundation for a storm tide event of 100 year ARI (with approximately a 40% chance of exceedance within any 50 year period). The 'Secondary Storm Surge Zone' shown on the map refers to the further extent of inundation for a storm tide event of 1000 year ARI (with approximately a 5% chance of exceedance within any 50 year period). The extents do not include the possible effects of very localised wave runup.

Average Recurrence Interval (ARI) is also called Return Period of the Risk and is defined as the 'average' number of years between successive events of the same or greater magnitude. The ARI of a storm tide event gives no indication of when a storm tide of that magnitude may occur.

Highest Astronomical Tide (HAT) is the highest ocean level expected due to any combination of astronomical conditions alone and has an equivalent ARI of approximately 18.6 years. The HAT extent is used in this map as the reference for storm surge inundation. It is based on estimates of HAT levels derived from numerical hydrodynamic modelling that has not been verified by long term in situ measurements.

The Storm Surge information shown on the map is considered as indicative only.

For detailed interpretation of this map and further information contact:
 Department of Environment, Parks and Water Security, Water Resources Division
 4th Floor Goyder Centre, 25 Chung Wah Terrace,
 Palmerston, Northern Territory.
 T: (08) 8999 4455 Email: waterresources@nt.gov.au
 PO Box 496, Palmerston, NT, 0831

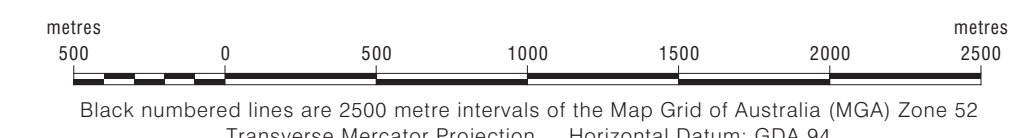
Storm surge reports and maps are available on <https://nt.gov.au/floods>
 This map has been updated in **September 2020** and supersedes all previous versions.

GENERAL FEATURES

Local Government Area		LITCHFIELD
Property / Road Boundaries (July 2020)		STUART PARK
Suburbs / Localities		
Major Road		
Minor Road		
Park / Reserve		
Railway		
Gas pipeline		
Watercourse, Lake or Lagoon		
Mangroves		

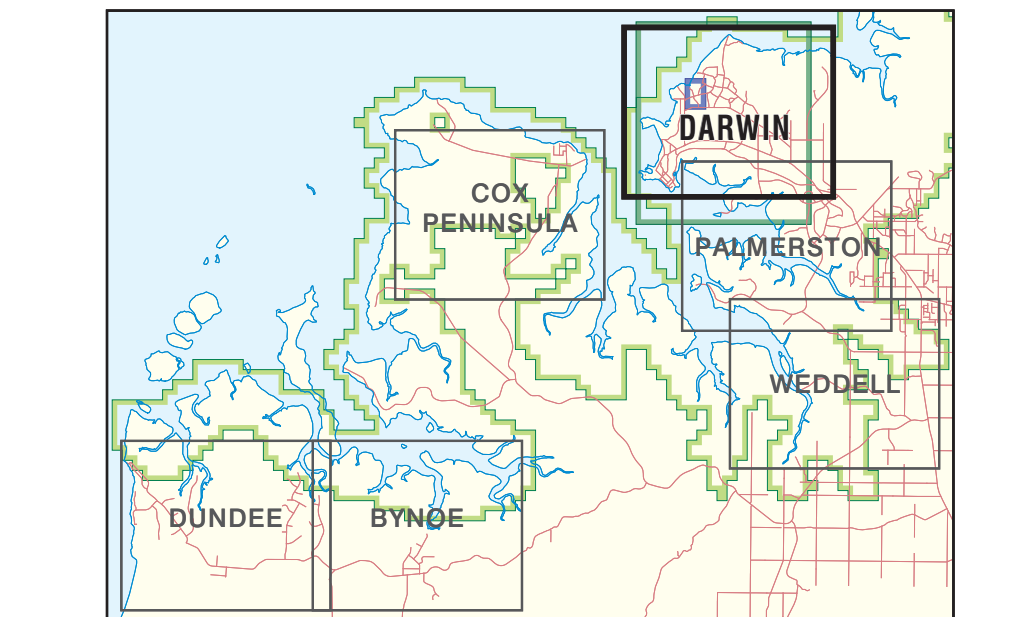
Data Source:
 Cadastre, road centrelines and administrative information
 Northern Territory Department of Infrastructure, Planning and Logistics.

Map prepared by:
 Department of Environment, Parks and Water Security,
 Geospatial Services Branch
 Drawing No. DENR2020066



Black numbered lines are 2500 metre intervals of the Map Grid of Australia (MGA) Zone 52 Transverse Mercator Projection Horizontal Datum: GDA 94
 This map was produced on the Geocentric Datum of Australia 1994 (GDA 94)

INDEX TO DARWIN REGION STORM SURGE MAPS



Extent of topographic information
 2009 2011 2015

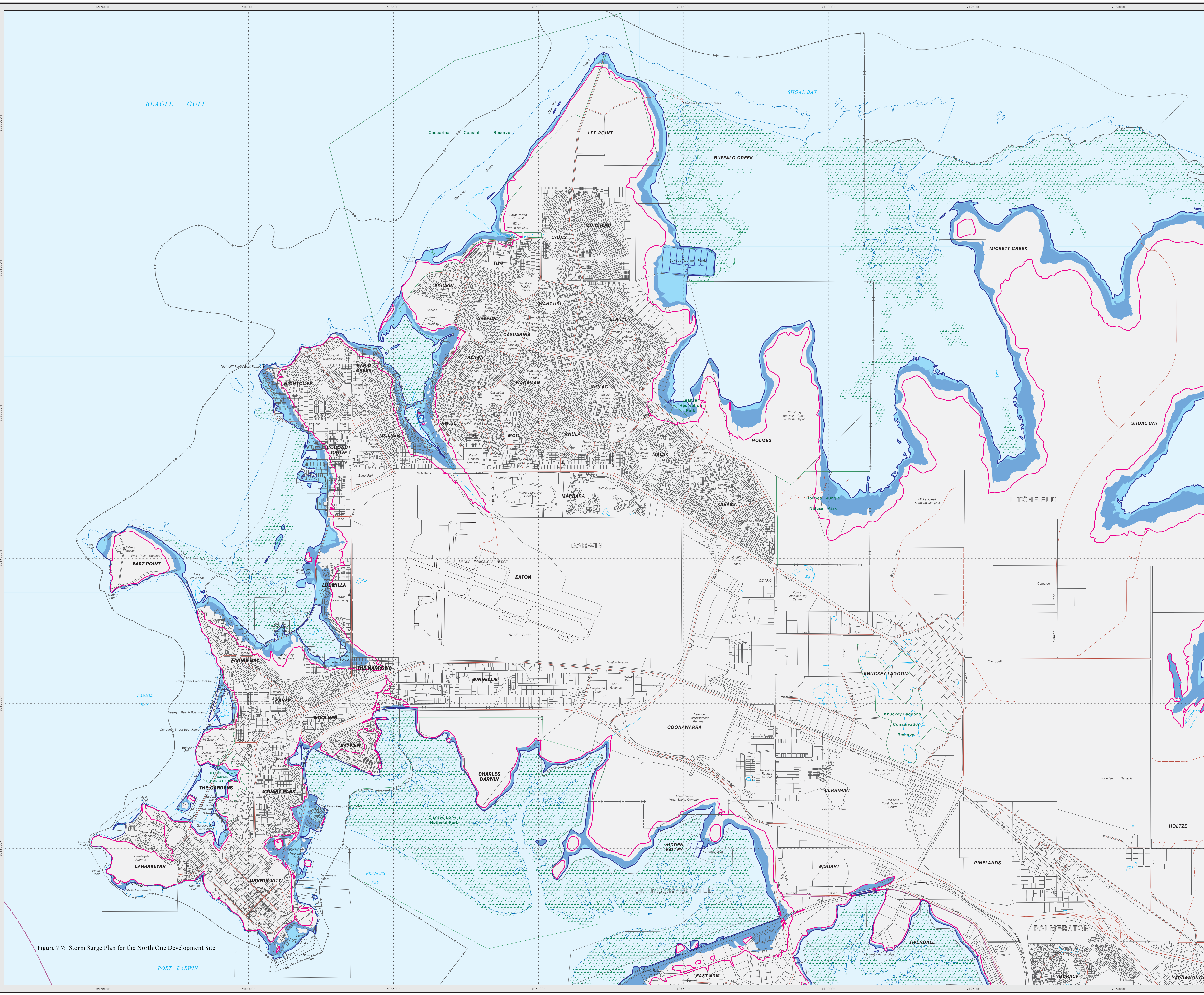
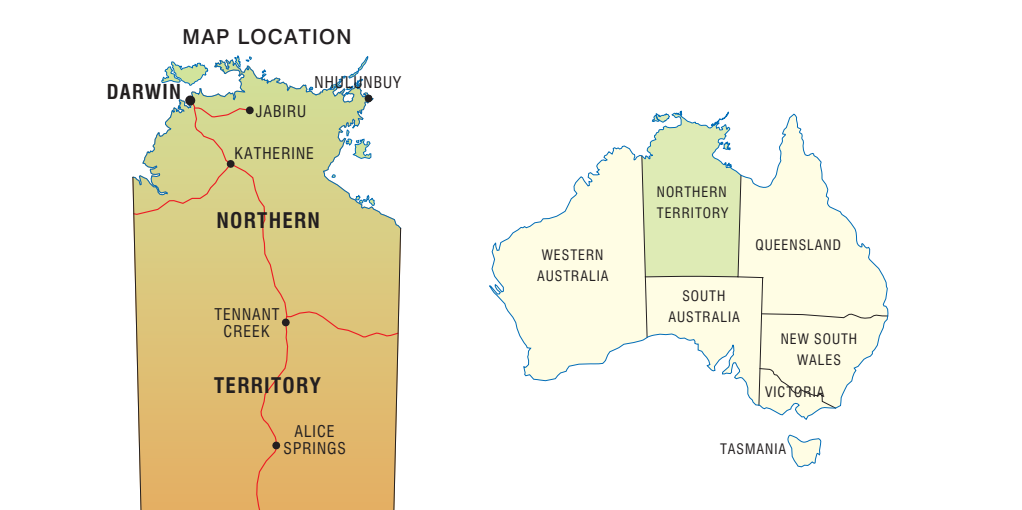


Figure 7.7: Storm Surge Plan for the North One Development Site

7.2.4.4 Groundwater

A search of the DENR Natural Resource Maps online database (DENR, 2020) confirmed that no registered groundwater bores exist within Lot 7651. The search further indicated that four registered groundwater bores exist within a 500 m radius of the site. **Table 7-10** provides a summary of the location and details of the identified registered bores.

Table 7-10: Summary of Registered Bore Search

Registered Number	Static Water Level (mbgs)	Total Depth (mbgs)	Yield (L/s)	Distance from site boundary
RN000953	NR	33.5	0.13	360m north-west
RN002756	24	18.3	Monitoring Well	300m south
RN000954	NR	65.2	0.25	360m north-west
RN000955	NR	66.8	0.25	310m west

* NR = Not Recorded

Groundwater is not expected to be encountered during construction of the Development. Infrastructure will be built on a raised pad, negating the requirement for deep excavation works; the semi-basement carparking facilities will also be constructed predominantly within the fill zone. No groundwater dewatering is proposed for this Project.

7.2.5 Potential Impacts and Risks

The Development has the potential to impact the surface water hydrology of the site. No impact to groundwater is predicted, being that it is so close to tidal influences, no draw on groundwater is anticipated and there are no beneficial users in proximity of the site. The source-pathway-receptor model was used to identify potential impacts (**Table 7-11**), with individual pathways discussed in the sections below.

Table 7-11: Potential Impact Pathway for Hydrological Processes

Source	Pathway	Receptor
Construction and operational activities.	Alteration of surface hydrology – flow paths, volume and velocity – through altered stormwater management.	Onsite and offsite surface water hydrology characteristics; particularly impacts associated with Little Mindil Creek and Little Mindil Beach.
	Project infrastructure influencing flood regimes.	

7.2.5.1 Alteration of Surface Hydrology

The surface hydrology of the Development site will necessarily be altered by the removal of the lawn area and car park during preparation for the construction phase, and the addition of new infrastructure. It is expected that there will be minor increases in runoff volume due to the establishment of impervious surfaces when the site is developed. The infiltration characteristics of the Development site are indicated in **Table 7-12**.

Table 7-12: Proposed Development Areas Infiltration Characteristics

Land Type	Area (m ²)	Total Site Area (%)
Roof Area (Impervious)	18,600	36%
Ground Area (Impervious)	4,520	9%
Ground Area (Pervious)	26,140	51%
Lagoon Area (Impervious)	2,040	4%
Total	51,300	100%

An implication of the increase in impervious area from 30% to 49% of the site is that the total volume and flow rate of stormwater runoff will increase. The unmitigated post-development peak flow rate predictions are presented in **Table 7-13**.

Table 7-13: Post-Development Peak Flow Rates (Unmitigated)

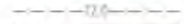

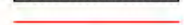









Catchment	Area (ha)	Time of Concentration (min)	Coefficient of Discharge			Peak Flow Rate (m ³ /s)		
			C ₁	C ₁₀	C ₁₀₀	Q ₁	Q ₁₀	Q ₁₀₀
C1	5.19	10	0.64	0.8	0.96	1.05	2.21	3.88

Although there will be a slight increase in peak runoff as a result of the proposed development, the environmental impacts of the interception are of a low risk given appropriate design of infrastructure, installation of effective stormwater controls and implementation of suitable management measures. ADG Engineers determined that due to the immediate proximity of the site to an open water body, Fannie Bay, it is not recommended that detention measures will be required. Stormwater drainage infrastructure will, however, be installed throughout the site to convey stormwater to the proposed Point of Discharge, as detailed in the ESCP (**Appendix 12**).

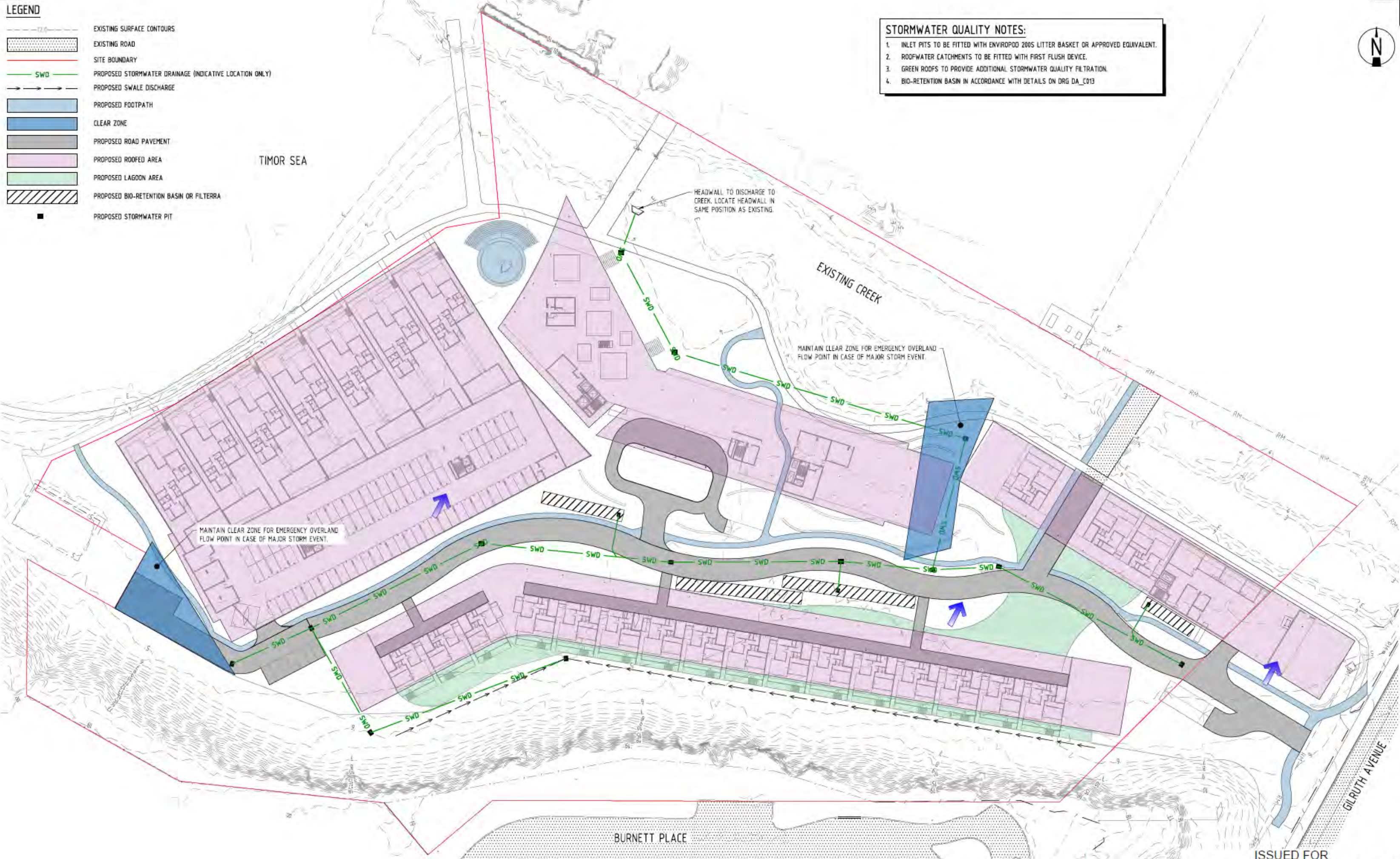
The Point of Discharge for the site will continue to be within Little Mindil Creek, as illustrated on **Figure 7-8**. Discharge flows will be directed to the creek via a headwall outlet in the same location as the existing outlet. A pit and pipe system will convey minor stormwater flows to the discharge point. Major rainfall events will be conveyed as overland flow to a centralised driveway, ensuring a depth velocity multiplier of less than 0.4, to the Point of Discharge. Significant impacts from altered stormwater discharge, including increased water volumes or scour from runoff velocity are not anticipated within Little Mindil Creek.

The recently approved PSA application to excise the Little Mindil Creek from the North One Hotel and Apartments site will also ensure protection of the creek from development activities. No direct alteration of the creek will occur; therefore, no impact to the hydrological processes of the creek system is expected.

LEGEND

-  EXISTING SURFACE CONTOURS
-  EXISTING ROAD
-  SITE BOUNDARY
-  PROPOSED STORMWATER DRAINAGE (INDICATIVE LOCATION ONLY)
-  PROPOSED SWALE DISCHARGE
-  PROPOSED FOOTPATH
-  CLEAR ZONE
-  PROPOSED ROAD PAVEMENT
-  PROPOSED ROOFED AREA
-  PROPOSED LAGOON AREA
-  PROPOSED BIO-RETENTION BASIN OR FILTERRA
-  PROPOSED STORMWATER PIT

- STORMWATER QUALITY NOTES:**
1. INLET PITS TO BE FITTED WITH ENVIROPOD 2005 LITTER BASKET OR APPROVED EQUIVALENT.
 2. ROOFWATER CATCHMENTS TO BE FITTED WITH FIRST FLUSH DEVICE.
 3. GREEN ROOFS TO PROVIDE ADDITIONAL STORMWATER QUALITY FILTRATION.
 4. BIO-RETENTION BASIN IN ACCORDANCE WITH DETAILS ON DRG DA_C013



ISSUED FOR INFORMATION ONLY

Rev	Date	Description	By	CHK
B	01.02.21	ISSUED FOR DISCUSSION	JMB	HD
A	01.06.20	ISSUED FOR INFORMATION	JMB	HD



Figure 7-8: Preliminary Stormwater Management Plan

ADG
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 Tenancy 3, Level 1, 5 Edmunds Street,
 Darwin, Northern Territory 0803, Australia
 GPO Box 2422, Darwin, Northern Territory 0801
 T 1300 657 402 F +617 3871 2266
 E info@adgce.com W www.adgce.com
 BRISBANE / DARWIN / GOLD COAST / MELBOURNE / PERTH /
 SUNSHINE COAST / SYDNEY / TOOROOMBA

Client: Arthur Winston Investments Pty Ltd
 Project Name: LITTLE MINDIL BEACH THE GARDENS, NORTHERN TERRITORY

Discipline	Info
CIVIL	INFORMATION
Designed By: HD	Checked By: HD
Project No: 23085	Drawn By: JMB
Approved By: BL	Scale at A1: 1:1000

File	Revision
PRELIMINARY STORMWATER MANAGEMENT PLAN	B
Drawing No: DA_C012	

7.2.5.2 Storm Surge and Flooding Influence Post-Development

Development of the North One Hotel and Apartment Complex will involve filling of the building footprint above the PSS level to ensure infrastructure is not subject to storm surge effects. Filling of the development site will deliver negligible impact to the water level of the adjacent creek and in turn will result in a negligible impact to the storm surge inundation level (ADG, 2021b).

Flooding behaviours were assessed for the post-development scenario using a 1D/2D TUFLOW model. Modelling results indicate:

- The flooding behaviour of the catchment is not affected by the filling required over the site to provide storm surge immunity;
- The filling works are located outside of the creek flowpath;
- Peak flood levels, depths and velocities are unchanged within the creek and across the catchment.

The post-development 1% AEP flood scenario is presented in **Figure 7-9**. Changes to the hydrological processes within the site associated with flooding and storm surge are not anticipated to impact the environmental values or hydrological processes of areas adjacent to the Development site.



Figure 7-9: Post-Development Flood Extent

7.2.6 Mitigation and Management

Mitigation measures to address alteration of hydrological characteristics will be implemented through the construction and operational phase of the Development. Mitigation strategies to reduce the risk of impacts are outlined in **Table 7-14**, with further detail on the construction phase presented in the CEMP (**Appendix 7**).

Table 7-14: Mitigation Measures for Hydrological Processes

Pathway	Mitigation Measures
Alteration of surface hydrology	<ul style="list-style-type: none"> ● Avoid impact to Little Mindil Creek ● Implement the ESCP during both the construction and operational phase of the Development ● Install measures, as appropriate, to mitigate velocity impacts at the Point of Discharge from the site ● Incorporate impervious areas into the Complex design to reduce stormwater flow ● Design landscaping to facilitate on-site infiltration of stormwater runoff ● Design private open space for dwellings within the Complex to have at least half of the area permeable, allowing stormwater infiltration and minimising stormwater runoff from the site ● Incorporation of biophilic architecture into the design to reduce stormwater runoff from roof-spaces ● Incorporate operational stormwater management into an Environmental Management Plan (EMP), to be developed prior to commencement of operations.
Site flooding or inundation from storm surge	<ul style="list-style-type: none"> ● Fill the site to RL 5.80 m AHD to ensure key infrastructure is situated outside of the storm surge inundation level.

7.2.7 Monitoring and Inspection

There are no specific monitoring regimes for Hydrological Processes (monitoring requirements are associated with Inland Water Environmental Quality – **Section 7.3**); however, inspection activities are outlined in **Table 7-15**.

Table 7-15: Inspection Activities to Meet Hydrological Processes Objective

Issue	Inspection	Reporting
Erosion and Sediment Control	<ul style="list-style-type: none"> ● Conduct inspections of erosion and sediment control measures in accordance with DENR/ IECA guidelines. Specifically: <ul style="list-style-type: none"> ○ Daily inspection when construction works are occurring on site or weekly when works are not occurring ○ Within 24hr of expected rain ○ Within 18 hours a high intensity rainfall event 	Monthly environmental performance report.

7.2.8 Statement of Residual Impact

In line with the outcomes of the proposed management measures, KTT Investment considers that the EPA objective for Hydrological Processes can be achieved. The following outcomes are predicted:

- The surface water hydrological regime can be maintained given appropriate consideration of modelling and studies being integrated into the design of the proposed infrastructure.
- The groundwater hydrological regime will not be impacted, due to the Project not interacting with groundwater and the lack of groundwater users in close proximity to the site.
- The cumulative impacts from the Development are expected to be minimal, as the Development has no downstream beneficial users or sensitive receptors and the contribution of additional stormwater runoff is not significant.

The residual impact to Hydrological Processes from the North One Hotel and Apartment Development is considered negligible.

7.3 ENVIRONMENTAL FACTOR: INLAND WATER ENVIRONMENTAL QUALITY

7.3.1 NT EPA Objective

Inland Water Environmental Quality refers to the quality of surface water and ground water features for both present and future declared beneficial users. The NT EPA's objective for the Environmental Factor Inland Water Environmental Quality is to:

Protect the quality of groundwater and surface water so that environmental values including health, land uses, and the welfare and the amenity of the people are maintained.

7.3.2 Technical Studies

Technical studies undertaken to inform assessment of potential impacts of the proposal on Inland Water Quality are listed in **Table 7-16**.

Table 7-16: Technical studies informing Inland Water Environmental Quality

Date	Study Title	Consultant	Description	Report
Sept 2019	Preliminary Site Investigation. Reference number 680.30010-R01. Version No: v3.0	SLR	Preliminary site investigation at 25 Gilruth Avenue, The Gardens, Northern Territory (Little Mindil), based on publicly available historical data, master plan documentation, and observations during an initial site inspection.	Appendix 5
June 2021	Little Mindil Beach. 25 Gilruth Avenue, The Gardens, Northern Territory. Engineering Services Report No 23085 C R002 REV00	ADG	Provides advice to the development proposal at Little Mindil, covering works required to service the proposed development with regards to earthworks, roadworks, stormwater drainage, sewerage and water supply, electricity, communication, and gas.	Appendix 9
June 2021	Little Mindil Beach. 25 Gilruth Avenue, The Gardens, Northern Territory. Stormwater Management Plan No. 23085 C R001 REV00	ADG	Comprises a stormwater quantity assessment for Little Mindil based on the development proposal and recommends best management practice measures for stormwater quality.	Appendix 10
June 2021	Little Mindil Beach. 25 Gilruth Avenue, The Gardens, Northern Territory. Hydraulic Assessment No. 23085 C R003 REV01	ADG	Summarises the hydraulic characteristics of the site, defines the flooding extent associated with local catchment flows and assesses the peak levels associated with storm surge inundation.	Appendix 11
June 2021	Erosion and Sediment Control Plan No 23085 Rev A	ADG	Comprises plans and notes to describe the proposed erosion and sediment control measures to be implemented for the construction and operational phases of the Proposal.	Appendix 12

7.3.3 Key Policies and Guidelines

Relevant Policies and Guidelines include:

- *Best Practice Erosion and Sediment Control Guidelines* (IECA)
- *Australian and New Zealand Environment Conservation Council (ANZECC) Guidelines for Fresh and Marine Water Quality* (2000)
- *Water Quality Objectives for Darwin Harbour Region*
- *NT EPA Stormwater Strategy for the Darwin Harbour Region* (2010)
- *National Acid Sulfate Soils Sampling and Identification Methods Manual* (Sullivan et al., 2018)
- *Australian Standard AS1940:2017 – Storage and Handling of Flammable and Combustible Liquids*
- *Waste Management and Pollution Control Act 1998*
- *National Environment Protection (Assessment of Site Contamination) Measure 2013*
- *NT EPA Northern Territory Contaminated Land Guideline 2017*
- *Northern Territory Code of Practice for Handling Pesticides.*

7.3.4 Existing Environment

7.3.4.1 Water Quality

The nearest inland surface water body to the Development is Mindil Creek, on the north-western boundary of the project area. No surface water quality sampling has been conducted at the site; therefore, no baseline assessment data is available to inform the existing Inland Water Environmental Quality. The initial site inspection conducted by SLR, however, observed fly-tipping evident within the creek (refer to **Appendix 5**).

No groundwater bores exist on, or in close proximity, to the site, as detailed in **Table 7-10** in **Section 7.2.4.4**. As such, information on groundwater quality is currently not available.

7.3.4.2 Stormwater Quality Management

There are currently no formal stormwater quality management measures in place at the site.

7.3.5 Potential Impacts and Risks

During the construction phase, transport of sediment presents a risk to the adjacent environment due to large areas of land disturbance. The operational phase, without suitable management, could also have the potential to impact water quality in the adjacent Mindil Creek. The source-pathway-receptor model has been used to identify potential impacts and risks to this Factor, as presented in **Table 7-17**.

Table 7-17: Potential Pathways for Impact on Inland Water Environmental Quality

Source	Pathway	Receptor
Construction Activities	Contamination resulting from disturbance of ASS.	Degradation of environmental water quality within Mindil Creek.
	Use of hazardous materials resulting in spills and leaks entering the adjacent waterway.	
	Sedimentation of surface water as a result of land disturbance activities during construction.	
Operational Activities	Use of hazardous materials resulting in spills and leaks entering the adjacent waterway; predominantly pesticides and cleaning products.	

	Litter within Mindil Creek as a result of operation of the Resort Complex.	
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7.3.5.1 Disturbance of ASS

As described in **Section 7.1**, there is a high potential for ASS to be encountered across the site during the proposed constructions works, although it is acknowledged that excavation requirements will be limited as the majority of the Development envelope will be filled. As a result of ASS disturbance, if not appropriately managed, acidification may occur and lead to contamination of Little Mindil Creek and Little Mindil Beach or degradation of shallow groundwater quality, promoting an increase in solubility of some metals in groundwater as the pH decreases.

Exposure of ASS could liberate sulphuric acid, which can in turn enter Little Mindil Creek through site runoff. This risk is increased in the wet season where large amounts of rainfall can fall on exposed ASS and consequently create acidic runoff.

There is a medium to high risk of contamination to surface or ground water during the construction phase if no active management of exposed actual ASS is undertaken. This risk will, however, be significantly reduced with the implementation of mitigation strategies and will not apply during the operational phase of the Development.

7.3.5.2 Spills and Leaks

The operation of the North One Hotel and Apartment Complex does not involve the use or storage of significant volumes of industrial chemicals. As such, the risk of spills and leaks impacting inland environmental water quality during the operational phase is considered negligible. Cleaning chemicals and pesticides will be managed to ensure appropriate storage and handling measures are implemented.

During construction, numerous hazardous materials may be required including, but not limited to:

- Chemical solvents
- Fuels and diesel
- Cement
- Asphalt
- Paints

There is potential that the quality of surface and groundwater could be impacted by leaks and spills of building products/chemicals, hydrocarbons, or cement residue during construction activities. There is a medium to high level of inherent risk (pre-mitigation) associated with alteration of the chemical characteristics of surface water considering the proximity of Mindil Creek and the waters of Little Mindil Beach, should a spill or leak of significant proportion occur at the site.

7.3.5.3 Erosion and Sedimentation

Erosion and sedimentation risks are expected to be highest during the construction phase of the Development. Clearing of topsoils, excavation, site levelling and temporary stockpiling activities have the potential to facilitate migration of sediments into the inland water environment as site runoff. This is predominately anticipated during the wet season.

Construction activities have been categorised into two phases in consideration for the variation to catchment boundaries as construction progresses. An erosion risk assessment has been undertaken using the Revised Universal Soil Loss Equation (**RUSLE**), which accounts for factors such as soil texture, the predicted soil loss rate and other site specific factors such as the size of the catchment.

RUSLE Equation: $A = R * K * LS * C * P$

Where:

A = annual estimated average soil loss due to erosion (t/ha/y)

R = rainfall erosivity factor

K = soil erodibility factor

LS = combined slope length and gradient factor

C = cover factor

Results from the assessment and identification of control requirement types are presented in **Table 7-18** (construction phase 1) and **Table 7-19** (construction phase 2). **Figure 7-10** illustrates the catchment boundaries for phase 1 construction; **Figure 7-11** indicates phase 2 catchment boundaries. **Appendix 12** (ESCP) provides further detail.

Table 7-18: Erosion Risk Assessment – Construction Phase 1

Catchment ID	Area (m ²)	R	K	LS	P	C	A (t/ha/y)	Control Requirement
C	8,737	15,724	0.027	0.19	1.30	1.00	104.86	Type 2
D	22,308	15,724	0.027	0.19	1.30	1.00	104.86	Type 1
E	1,245	15,724	0.027	0.19	1.30	1.00	104.86	Type 2
F	198	15,724	0.027	0.19	1.30	1.00	104.86	Type 2

Table 7-19: Erosion Risk Assessment – Construction Phase 2

Catchment ID	Area (m ²)	R	K	LS	P	C	A (t/ha/y)	Control Requirement
C	1,251	15,724	0.027	0.19	1.30	1.00	104.86	Type 2
D	748	15,724	0.027	0.19	1.30	1.00	104.86	Type 2
E	1,245	15,724	0.027	0.19	1.30	1.00	104.86	Type 2
F	198	15,724	0.027	0.19	1.30	1.00	104.86	Type 2

Given the relatively short time frame for construction, the seasonality of the risk, the generally flat topography of the site and the availability of proven management strategies, it is not considered that sedimentation and erosion will present a long-term significant impact for the proposal. It is acknowledged, however, that without mitigating strategies erosion and sediment could pose a high risk to Little Mindil Creek water quality and environmental values throughout the construction phase. Management measures are further detailed in **Section 7.3.6**.

7.3.5.4 Litter Impacts

Impacts from wastes, such as litter, are present in all urban and industrial areas. Wastes, particularly plastics, can reduce visual amenity and water quality, thus affecting the environmental values of inland waterways.

Implementation of effective controls, such as application of the waste hierarchy to reduce waste generation, good housekeeping and formal waste handling processes, are anticipated to result in low risk to inland water quality from the Development.

LEGEND

- 12.0--- EXISTING SURFACE CONTOURS
- - -12.0- - - PROPOSED FINISHED SURFACE CONTOURS
- [Pattern] EXISTING ROAD
- [Line] SITE BOUNDARY
- [Green Line] SWD PROPOSED STORMWATER DRAINAGE (INDICATIVE LOCATION ONLY)
- [Blue Arrow] PROPOSED SWALE DISCHARGE
- [Blue Box] PROPOSED FOOTPATH
- [Grey Box] PROPOSED ROAD PAVEMENT
- [Cross-hatch] PROPOSED 'NO GO ZONE'
- [Light Green Box] PROPOSED LAGOON AREA
- [Red Box] PROPOSED TEMPORARY SEDIMENT BASIN
- [Diagonal Hatch] PROPOSED TEMPORARY STOCKPILE
- [Black Square] PROPOSED STORMWATER PIT
- [Cross-hatch Box] FIELD INLET SEDIMENT BARRIER (FOR CLEAN WATER DIVERSION)
- [Grid Box] TEMPORARY IMPERMEABLE COVER FOR STORMWATER INLET PIT
- [Blue Line] SF SEDIMENT FENCE (INDICATIVE LOCATION)
- [Orange Line] EARTH BUND
- [RFD Symbol] RFD ROCK FILTER DAM
- [LS Symbol] LS LEVEL SPREADER
- [Catch Drain Symbol] CATCH DRAIN
- TIMOR SEA

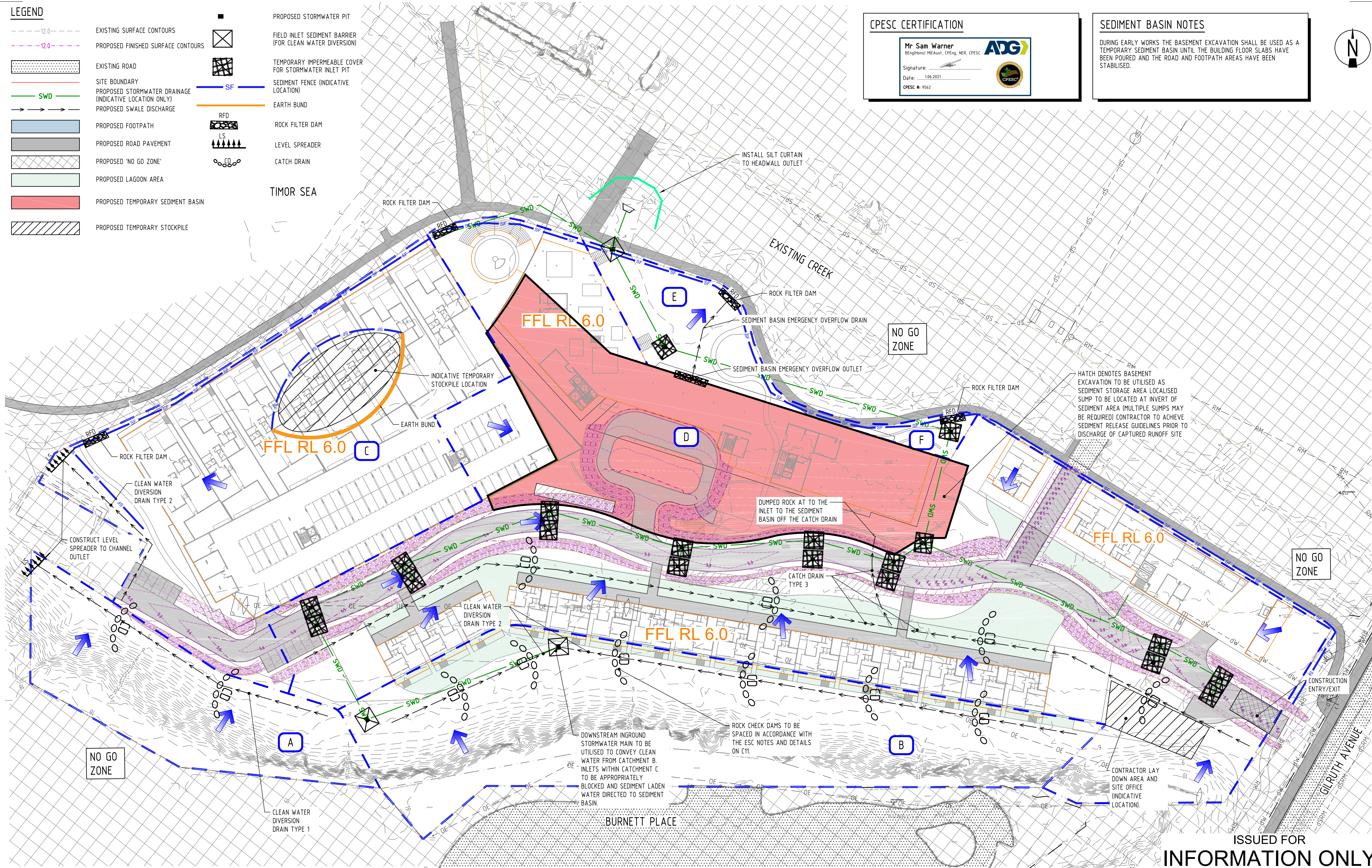
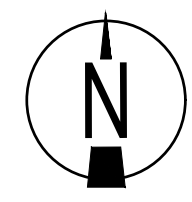
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 Benlions1 MIEAust, CPEng, NER, CPESC

Signature: _____
 Date: 1.06.2021
 CPESC #: 9562

SEDIMENT BASIN NOTES

DURING EARLY WORKS THE BASEMENT EXCAVATION SHALL BE USED AS A TEMPORARY SEDIMENT BASIN UNTIL THE BUILDING FLOOR SLABS HAVE BEEN POURED AND THE ROAD AND FOOTPATH AREAS HAVE BEEN STABILISED.



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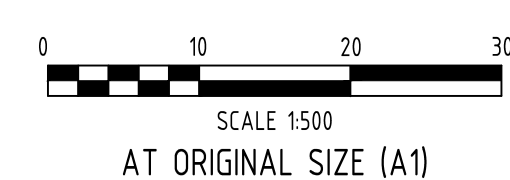


Figure 7-10: Catchment Boundaries and Erosion Controls - Construction Phase 1

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Client: Arthur Winston Investments Pty Ltd
 Project Name: LITTLE MINDIL BEACH THE GARDENS, NORTHERN TERRITORY

Discipline: CIVIL		Status: INFORMATION	
Designed By: HD	Checked By: HD	Approved By: BL	Scale at A1: AS SHOWN
Project No: 23085	Drawn By: DG		

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Title: EROSION AND SEDIMENT CONTROL LAYOUT PLAN CONSTRUCTION STAGE - PHASE 1	
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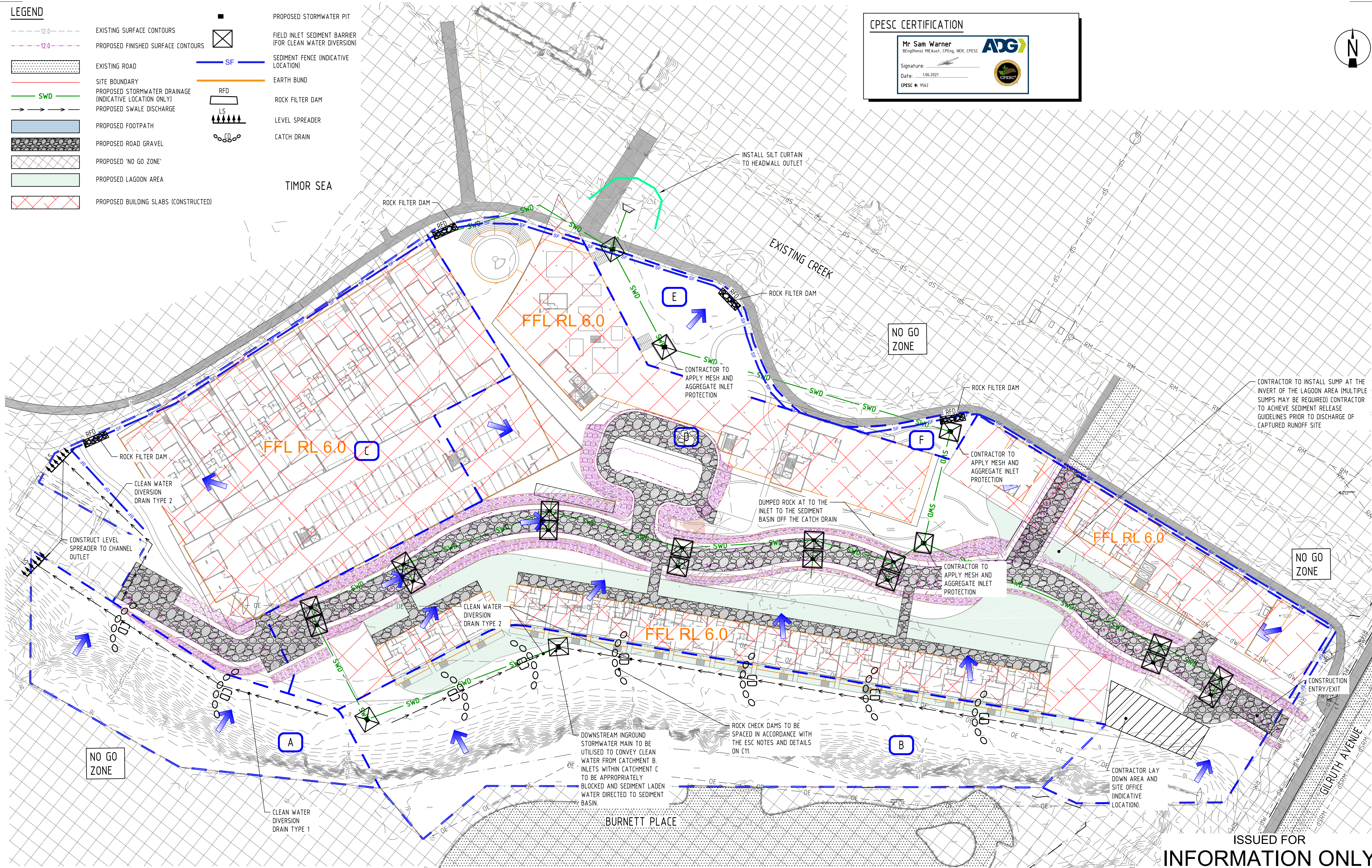
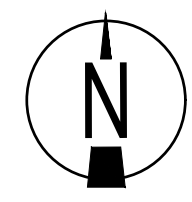
LEGEND

- EXISTING SURFACE CONTOURS
- PROPOSED FINISHED SURFACE CONTOURS
- EXISTING ROAD
- SITE BOUNDARY
- PROPOSED STORMWATER DRAINAGE (INDICATIVE LOCATION ONLY)
- PROPOSED SWALE DISCHARGE
- PROPOSED FOOTPATH
- PROPOSED ROAD GRAVEL
- PROPOSED 'NO GO ZONE'
- PROPOSED LAGOON AREA
- PROPOSED BUILDING SLABS (CONSTRUCTED)
- PROPOSED STORMWATER PIT
- FIELD INLET SEDIMENT BARRIER (FOR CLEAN WATER DIVERSION)
- SEDIMENT FENCE (INDICATIVE LOCATION)
- EARTH BUND
- ROCK FILTER DAM
- LEVEL SPREADER
- CATCH DRAIN

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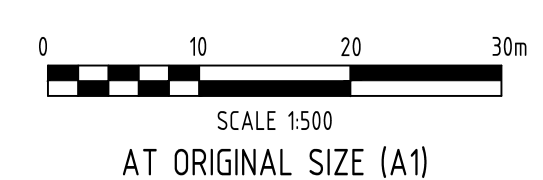


Figure 7 11: Catchment Boundaries and Erosion Controls - Construction Phase 2

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EROSION AND SEDIMENT CONTROL LAYOUT PLAN		DA_C111	
CONSTRUCTION STAGE - PHASE 2		Revision: A	

7.3.6 Mitigation and Management

The mitigation measures outlined in **Table 7-20** will be implemented to reduce the risk of impacts on inland water quality. More detail is provided in the management plans and procedures developed through the Stormwater Management Plan (**Appendix 10**), ECSP (**Appendix 12**) and the CEMP (**Appendix 7**). A summary of the erosion and sediment controls proposed during constructions and operations is also provided in **Section 7.3.6.1**.

Table 7-20: Mitigation Measures for Inland Water Environmental Quality.

Pathway	Mitigation Measures
Disturbance of ASS during earth works and clearing.	<ul style="list-style-type: none"> ASS management is explored in depth in Section 7.1 and is to be managed in accordance with the CEMP.
Contamination of surface and groundwater systems through leaks and spills during construction.	<p>Implement mitigation measures identified in the CEMP; including:</p> <ul style="list-style-type: none"> Record and report all chemical and hazardous substance spills. Ensure personnel have access to spill kits that contain an absorbent material, clearly marked oily waste disposal drum and shovel. All contaminated soil and absorbent in the oil/chemical waste disposal drum should be disposed of at a designated oil waste disposal site approved by Darwin authorities. In the event of a chemical or hazardous substance spill ensure all requirements of the MSDS's are complied with. MSDSs are to be located within storage areas as well as centrally located and readily available to staff for use in case of emergency. MSDSs are to remain current. Any spillage of wastes, contaminants or other materials shall be cleaned up as quickly as practicable using procedures that prevent contaminants or material being transferred to the stormwater drainage system. The stormwater system for the site shall be inspected regularly to identify any failures and, if necessary, repairs shall be undertaken. Chemical storage and handling areas shall be bunded and have drainage lines separate from the stormwater drainage, to reduce the likelihood of chemical contamination of stormwater.
Contamination of surface and groundwater systems through leaks and spills during operations.	<ul style="list-style-type: none"> Development of an EMP prior to operations commencing, which includes storage, handling and spill management for chemicals and hazardous substances used for the Hotel Complex. Ensure pesticides are handled by a licensed operator, in accordance with the <i>Northern Territory Code of Practice for Handling Pesticides</i>.
Erosion and sedimentation impacting on water quality during construction.	<ul style="list-style-type: none"> Implementation of the ESCP and CEMP. Ensure stockpiles of bulk material are located well clear of any waterway or drainage system. The stormwater system for the site shall be inspected regularly to identify any failures and, if necessary, repairs shall be undertaken.
Erosion and sedimentation impacting on water quality during operations	<ul style="list-style-type: none"> Install erosion and sediment controls in accordance with the ESCP. Incorporate erosion and sediment control into the EMP, prior to commencement of operations. An inspection schedule should be included in the EMP for stormwater control infrastructure.
Litter impacts within Mindil Creek impacting water quality and environmental values	<ul style="list-style-type: none"> Implement the Waste Management Plan (Appendix 13), including consideration of the waste management hierarchy to minimise waste generation from the Development. Undertake regular inspections of Little Mindil Creek for excessive litter and remove rubbish from the creek, as required.

7.3.6.1 Erosion and Sediment Control

Erosion and sediment control measures accorded to the IECA guidelines and specifications have been incorporated into the design of the Development. During the construction phase control measures utilised will include a combination of:

- Level spreaders;
- Catch drains;
- Rock filter dams;
- Field inlet sediment barriers;
- Sediment basins;
- Sediment fences;
- Silt curtains;
- Stormwater pits; and
- Swale discharge areas.

Figure 7-10 and **Figure 7-11** provide an indicative plan of control structures during Phase 1 and 2 of construction respectively. **Figure 7-12** indicates measures during the site stabilisation phase. The ESCP incorporates further detail.

During operation of the North One Hotel and Apartments Complex, the following control structures are proposed:

- Stormwater drains;
- Swale discharge areas;
- Stormwater pits;
- Rock filter dams;
- Bioretention basins and
- Level spreaders.

Figure 7-10 illustrates the indicative stormwater management plan for the operational phase. **Figures 7-13 to 7-17** illustrate typical rock filter dams, diversion drains, sediment basins and bioretention basin specifications proposed for the Development.

Stormwater quality improvement devices (**SQIDs**) such as *EnviroPod* litter baskets inside standard stormwater inlet pits will also be applied, as appropriate, to treat runoff prior to discharge from site. Details are included within the Stormwater Management Plan (**Appendix 10**).

LEGEND

- EXISTING SURFACE CONTOURS
- PROPOSED FINISHED SURFACE CONTOURS
- EXISTING ROAD
- SITE BOUNDARY
- PROPOSED STORMWATER DRAINAGE (INDICATIVE LOCATION ONLY)
- PROPOSED SWALE DISCHARGE
- PROPOSED FOOTPATH
- PROPOSED ROAD PAVEMENT
- PROPOSED VEGETATION AREA
- PROPOSED BUILDING AREA
- PROPOSED LAGOON AREA
- PROPOSED STORMWATER PIT
- FIELD INLET SEDIMENT BARRIER
- SEDIMENT FENCE (INDICATIVE LOCATION)
- ROCK FILTER DAM
- LEVEL SPREADER

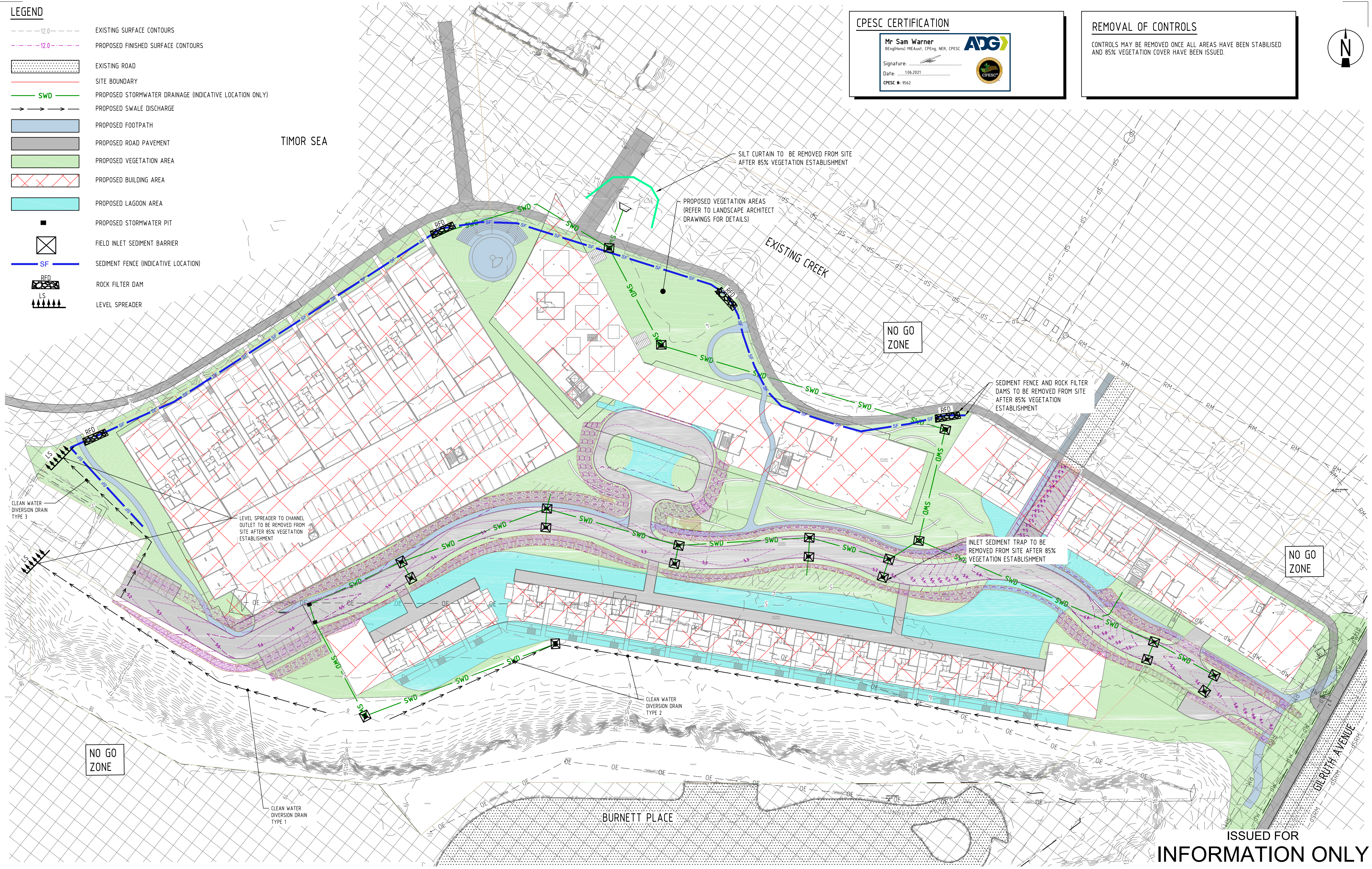
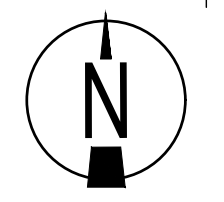
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Signature: _____
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REMOVAL OF CONTROLS

CONTROLS MAY BE REMOVED ONCE ALL AREAS HAVE BEEN STABILISED AND 85% VEGETATION COVER HAVE BEEN ISSUED.



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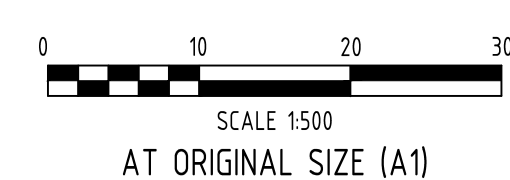


Figure 7 12: Erosion and Sediment Control – Stabilisation Phase

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Title: EROSION AND SEDIMENT CONTROL PLAN STABILISATION STAGE	Drawing No: DA_C112	Revision: A
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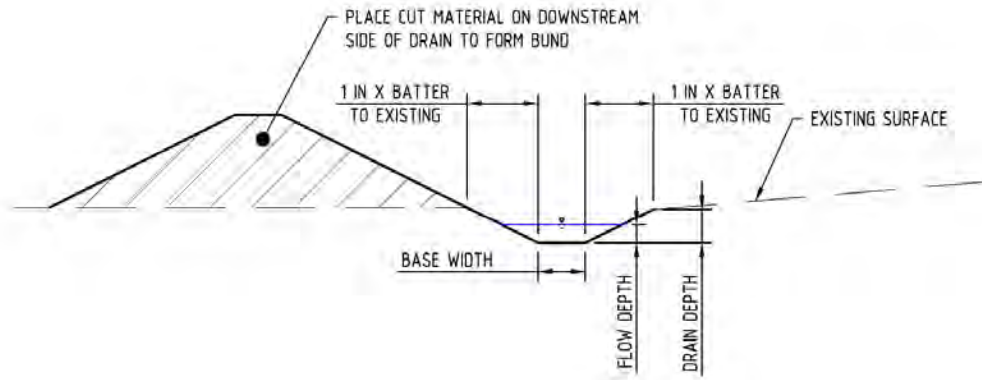


Figure 7-13: Typical Diversion/Catch Drain (scale 1:50)

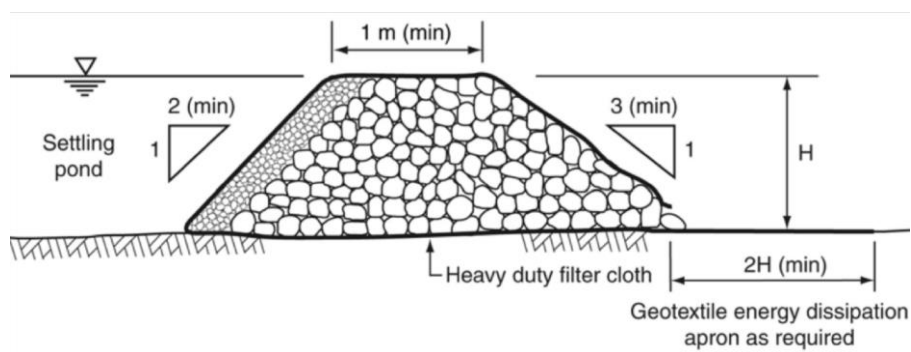


Figure 7-14: Typical Rock Filter Dam Details

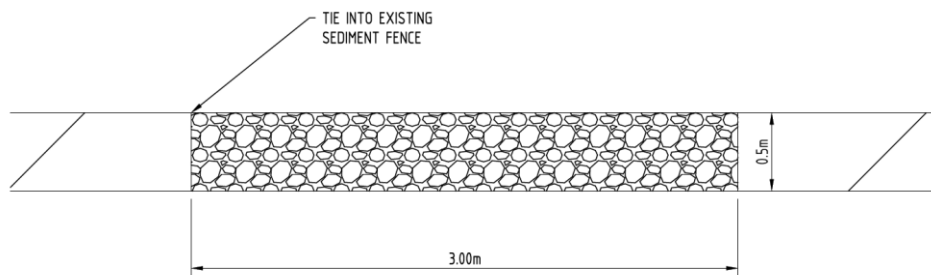


Figure 7-15: Rock Filter Dam Section

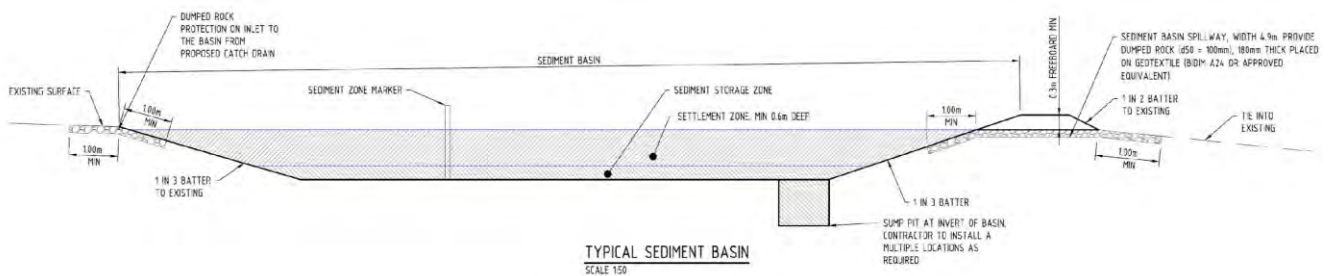


Figure 7-16: Typical Sediment Basin (scale 1:50)

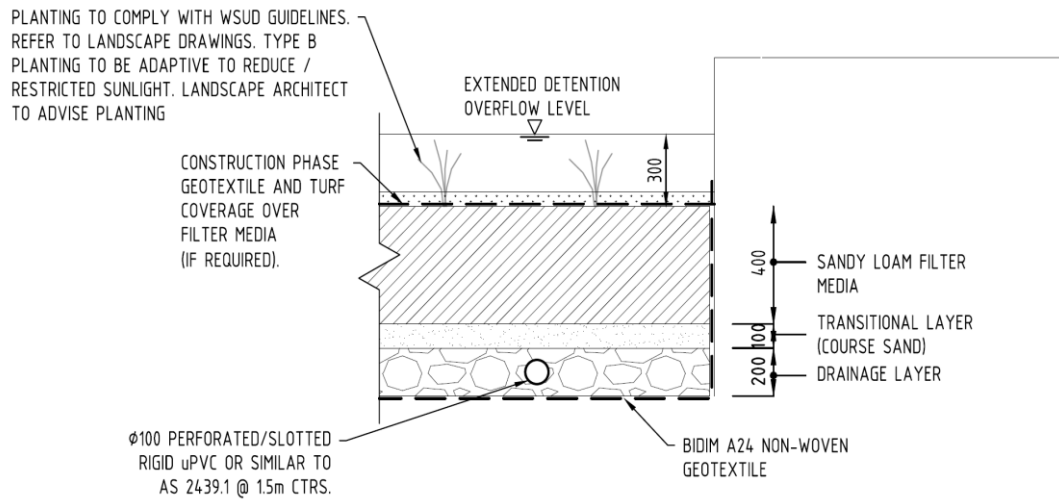


Figure 7-17: Bioretention Basin Specifications

7.3.7 Monitoring and Inspection

Monitoring and inspection activities associated with Inland Water Environmental Quality appear in **Table 7-21** and **Table 7-22** below.

Table 7-21: Monitoring for Inland Water Environmental Quality

Issue	Monitoring	Timing
ASS Management	<ul style="list-style-type: none"> Monitoring of lime-treated soil for successful neutralisation before being moved and covered. 	Monthly
	<ul style="list-style-type: none"> Monitor pH of any pools of water collected within bunds and treatment of water to keep the pH within the range of baseline data levels (generally between 6.5 to 8.5). 	Weekly during ASS treatment
Erosion and Sediment Control	<ul style="list-style-type: none"> Monitoring of sediment levels within basin to ensure design capacity is available. 	Prior to commencement of, and periodically throughout, the wet season.
	<ul style="list-style-type: none"> Periodic water quality monitoring of discharges entering Little Mindil Creek, including total dissolved solids (TDS), total suspended solids (TSS) and hydrocarbons. 	Periodic, during the wet season.
	<ul style="list-style-type: none"> A maximum release turbidity concentration of 20 NTU (measured using a Turbidity meter) is proposed, unless a better environmental outcome will be achieved by releasing higher TSS water to provide sufficient capacity to capture and treat runoff from an imminent rainfall event. 	

Table 7-22: Inspections for Inland Water Environmental Quality

Issue	Inspection	Reporting
ASS Management	<ul style="list-style-type: none"> ● Daily inspection of ASS treatment pad during the wet season to ensure all contaminated water is contained within bunding. ● Rectify bunded, as appropriate to maintain containment. 	Daily Inspection Report
Erosion and Sediment Control	<ul style="list-style-type: none"> ● Conduct inspections of erosion and sediment control measures in accordance with DENR/ IECA guidelines. Specifically: <ul style="list-style-type: none"> ○ Daily inspection when construction works are occurring on site or weekly when works are not occurring ○ Within 24hr of expected rain ○ Within 18 hours of a high intensity rainfall event 	Monthly Environmental Performance Report
Litter	<ul style="list-style-type: none"> ● Weekly inspection of Resort grounds and Little Mindil Creek for presence of litter. 	Monthly Environmental Performance Report

7.3.8 Statement of Residual Impact

Maintaining the environmental quality of inland waters is a key focus for KTT Investments, particularly given the presence of Little Mindil Creek adds to the ambience of the Hotel Development and is an asset for the local community.

With consideration for the type and scale of the Development, the lack of potential groundwater impacts and the proposed management measures, particularly during the construction phase, it is expected the EPA's objective for Inland Water Environmental Quality can be achieved. The following outcomes are predicted:

- Inland surface water quality can be maintained given appropriate design of facilities and management of surface water infrastructure, which is integrated into the construction and operation of the proposed development.
- Groundwater quality can be maintained so the environmental values associated with groundwater are not likely to be impacted.

By implementing the management measures detailed above, the residual impact to Inland Water Environmental Quality is not considered significant and cumulative impacts are expected to be negligible.

7.4 ENVIRONMENTAL FACTOR: COMMUNITY AND ECONOMY

7.4.1 NT EPA Objective

The Community and Economy Factor refers to a liveable environment with healthy lifestyles and financial security, by participating in jobs, businesses and education of existing industries whilst uplifting vulnerable sectors of the community and maintaining connections to culture and community. The NT EPA's objective for the environmental factor Community and Economy is to:

Enhance communities and the economy for the welfare, amenity, and benefit of current and future generation of Territorians.

7.4.2 Technical Studies

Technical studies undertaken to inform assessment of potential impacts of the proposal on Community and Economy are listed in **Table 7-23**:

Table 7-23: Technical Studies Informing Community and Economy

Date	Study Title	Consultant	Description	Report
June 2020	Proposed Little Mindil Beach Hotel Traffic Impact Assessment , Ref 20T366A, Rev A.	SJ Traffic Consulting	Provides an assessment of the expected traffic and parking impacts arising from the Development, including assessment of appropriate access opportunities for the site and the potential impacts of the proposal upon the surrounding road network.	Appendix 14
January 2021	Little Mindil – 25 Gilruth Ave, The Gardens; Visual Impact Study , D20-0018-R01, Issue B.	Clouston Associates	Incorporates a visual impact study for the Development, comprising analysis of eight viewpoints across the Development from within the Myilly Point Heritage Precinct.	Appendix 15
January 2021	Economic Benefits Snapshot.	Urbanscope	Provides a summary of the economic benefits of the proposed Development, including anticipated revenue and employment benefits.	Appendix 16
February 2021	Little Mindil Development Noise Impact Assessment ; Version No. v1.0	SLR Consulting	Provides the results of a noise impact assessment for the Development, including calculation of the potential noise emissions and assessment of the noise effects from the Development on surrounding noise sensitive sites.	Appendix 17
February 2021	Little Mindil Darwin Landscape Concept Presentation , D20-0018, Issue D.	Clouston Associates	Comprises a landscape design concept for the Development that complements the architectural concept presentation.	Appendix 2
July 2021	North One Hotel and Apartments Desktop Environmental Wind Study , v1.0.	SLR Consulting	Assesses the wind impact on the Development and the immediate surrounds.	Appendix 18
August 2021	Stakeholder Engagement Plan , North One Development.	Urbanscope	Provides an overview of the principles of stakeholder engagement applicable to the Development and a summary of the consultation undertaken to date.	Appendix 3

7.4.3 Key Policies and Guidelines

Relevant Policies and Guidelines include:

- *Environment Protection Act 2019*
- *IAP2 Quality Assurance Standard for Community and Stakeholder Engagement*
- *NT EPA Guidance for Proponents – Stakeholder Engagement 2019*
- *Austrroads Guide to Traffic Management, Part 12: Traffic Impacts of Developments (2009)*
- *Northern Territory Planning Scheme 2020*
- *Australian Standard AS 1055:2018 Description and Measurement of Environmental Noise*
- *Northern Territory Noise Management Framework Guideline (2018)*
- *NSW EPA Noise Policy from Industry (2017)*

7.4.4 Existing Environment

7.4.4.1 Locality

The Town of Darwin is located approximately 2.5 km north-west of the North One Development site. The Greater Darwin area includes three local government areas (**LGAs**); namely, Darwin, Litchfield, Palmerston LGAs. The Greater Darwin Area accounts for more than half (59.8%) of the Northern Territory's population; around 136,830 residents. The median age is 33 (compared to 32 for the median age for the rest of the Territory) and nearly three-quarters (73.2%) of households are family households, where couples with children represent 46.5% of family compositions. The Greater Darwin Area has a lower proportion of Aboriginal and Torres Strait Islander residents than the rest of the Territory; 8.7% compared to 25.5%.

The Darwin LGA accommodates 34.4% of the Territory's population; 78,804 residents. With the same median age as the rest of the Northern Territory, 32, the area is moderately young. Compared to the Greater Darwin Area, there are slightly fewer family households (70% compared to 73.2%); representation of couples with children and couples without children are similar (44.4% compared to 40.0%). The Darwin LGA had the lowest representation of Aboriginal and Torres Strait Islander residents out of all the areas identified in the Greater Darwin Area (7.4%).

The Darwin LGA has key infrastructure which supports the Darwin CBD, the major economic centre in the Northern Territory, including:

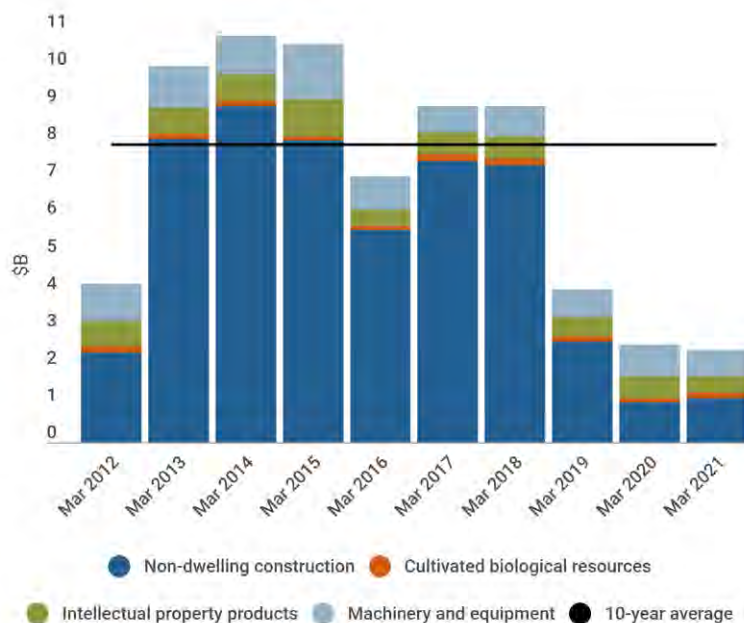
- The Darwin Airport;
- Major ports for export; and
- Tourism and hospitality hub.

The North One Development resides within the Darwin LGA.

7.4.4.2 Economy

Macroeconomic data published by the NT Department of Treasury and Finance indicates that the NT recorded a 5.3% increase in annual economic growth over the 2019-2020 period, compared to a 1.3% decline in growth in the 2018-2019 period. The NT Gross State Production (**GSP**) per capita also increased by 5.7% during 2019-2020. During this period, partly as a response to the Coronavirus Pandemic, household consumption declined by 3.6%, whereas public consumption increased by 3.7%.

During the 2019-2020 period, private investment declined by 20.2%, mainly driven by a 23.7% decline in business investment and a 6.3% decline in dwelling investment. The main detractors were total non-dwelling construction (down 41.1%), cultivated biological resources (down 6.1%) and machinery and equipment (down 2.5%), as represented in **Figure 7-18**.



*Source – NT Department of Treasury and Finance, <https://nteconomy.nt.gov.au/economic-growth>

Figure 7-18: Northern Territory Annual Business Investment

7.4.4.3 Employment

Unemployment rates within the NT and Greater Darwin area have increased since 2017, as presented in the **Table 7-24**. This may be, in part, reflective of the Coronavirus pandemic, the completion of the construction phase of the INPEX Ichthys LNG Project at Middle Arm in Darwin and the decrease in business investment in the region.

Table 7-24: Unemployment Rates Across NT and Greater Darwin 2017 - Present

Year	March Quarter		June Quarter		September Quarter		December Quarter	
	NT	Greater Darwin	NT	Greater Darwin	NT	Greater Darwin	NT	Greater Darwin
2017	3.6%	3.3%	3.4%	3.3%	3.6%	3.3%	3.9%	3.5%
2018	3.9%	3.4%	4.2%	3.6%	4.25%	3.7%	4.3%	3.9%
2019	4.4%	4.1%	4.5%	4.2%	4.9%	4.4%	5.0%	4.4%
2020	5.2%	4.7%	5.6%	5.4%	5.5%	5.8%	5.6%	6.1%
2021	5.7%	6.0%	-	-	-	-	-	-

*Source – Regional Development Australia, <https://economy.id.com.au/rda-northern-territory/unemployment>

The industries of employment for the NT, based on the 2016 Australian Bureau of Statistics Census data, is presented in **Figure 7-19**. The three biggest employers for residents of the NT are public administration and safety (18%), health care and social assistance (11%) and construction (10%), followed by education and training (9%), accommodation and food services (7%) and retail (7%).

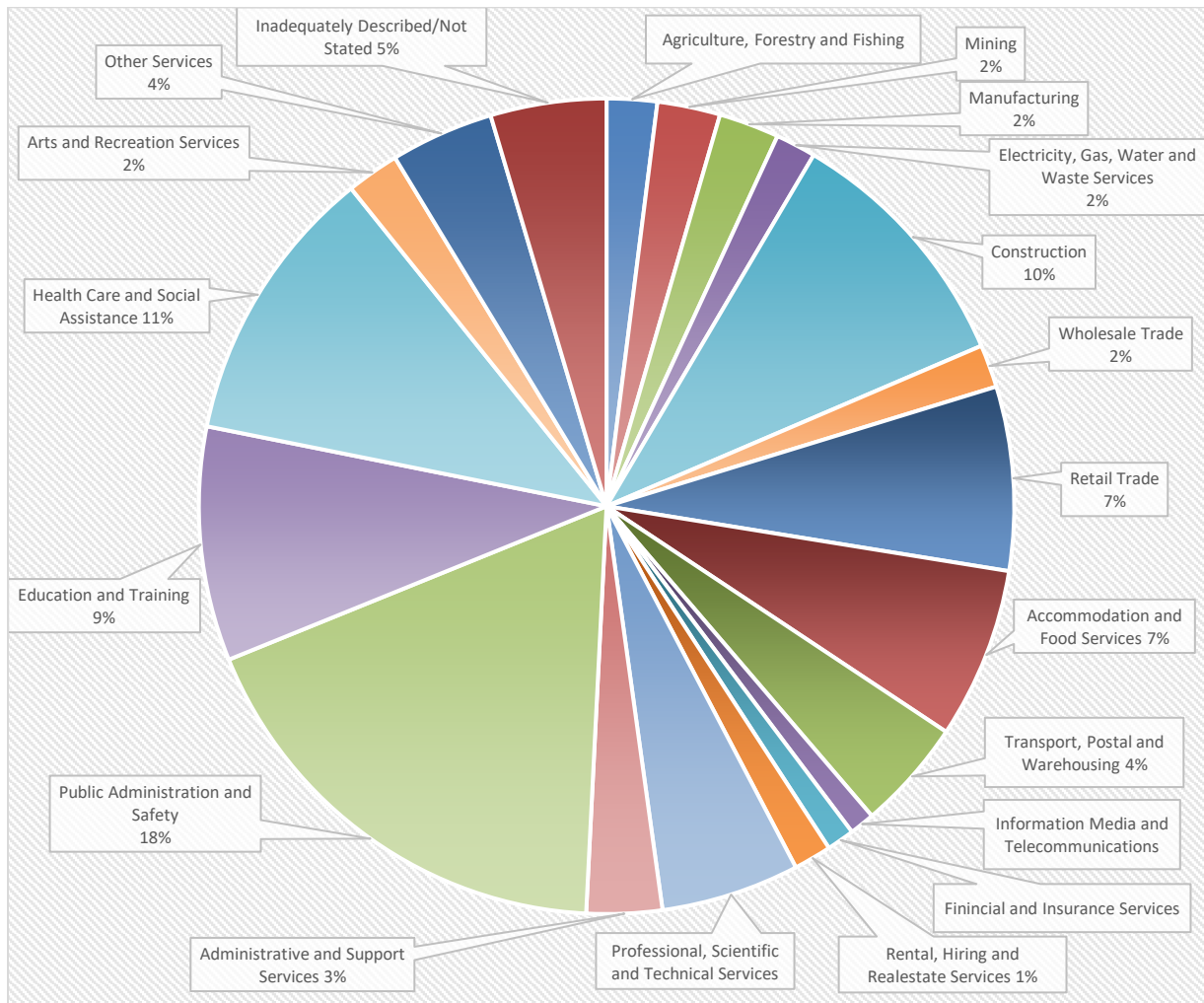


Figure 7-19: Industries of Employment - NT

7.4.4.4 Local Infrastructure

The North One Development Site is well serviced; reticulated water, sewerage, stormwater drainage, NBN and electrical infrastructure are available for connection with existing services. The existing sewer main in Gilruth Avenue will require upgraded to facilitate the proposed development, with the developer intending to pay a contribution to PWC to permit the connection. The 66 kV electrical transmission line within the site will also require relocating underground as part of the proposal.

An established road network is in place. Traffic will be directed to the site via Gilruth Avenue, which is a sub-arterial road under the control of the City of Darwin. Gilruth Avenue is an undivided road comprising of one traffic lane in each direction. It aligns north-south and connects to Goyder Road to the north and Smith Street to the south. Existing traffic volumes are presented in **Figure 7-20**, with further detail provided in **Appendix 14**.

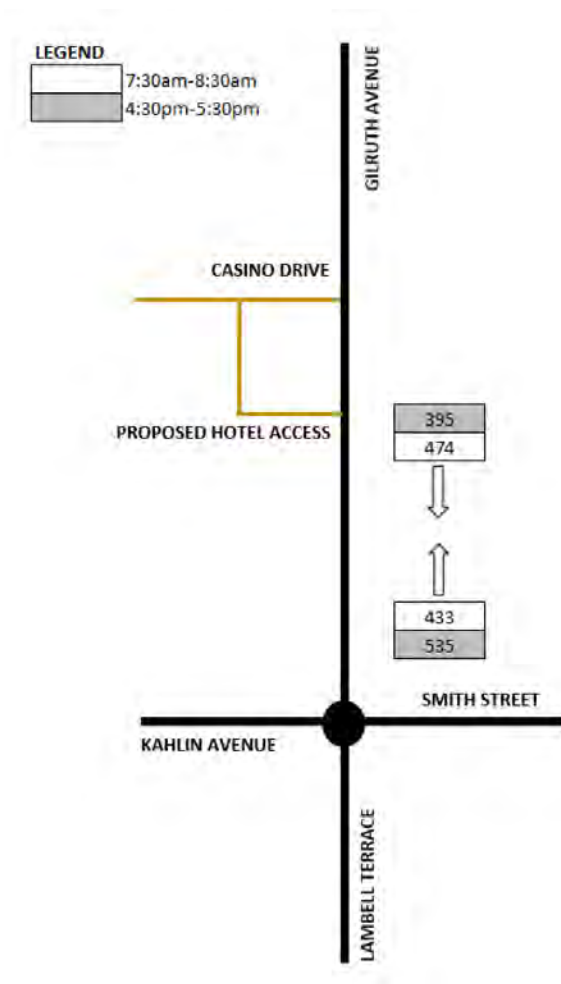


Figure 7-20: Existing Traffic Volumes Along Gilruth Avenue, The Gardens, NT

Public transport is also established in the area, with three existing bus routes operating along Gilruth Avenue. Two of these services have bus stops just north of the Development, both of which operate from the Darwin CBD.

7.4.4.5 Sensitive Receptors

The environment in the vicinity of the Development can be characterised as tourist, residential, public open space, and commercial. The nearest sensitive receptors to the Development, as identified in the Noise Impact Assessment (**Appendix 17**) are:

- Mindil Beach Casino Resort, located to the north-east of the site adjacent to Gilruth Avenue;
- Multiple storey residential dwelling, located to the south-west adjacent to Burnett Place; and
- Myilly Serviced Apartments, located to the south-west adjacent to Myilly Terrace.

Continuous unattended SVAN 957 noise loggers were installed at two representative locations, shown in **Figure 7-21**, between 8th February and 15th February 2021 to quantify the existing noise levels in the areas surrounding the development site. The noise loggers were configured to record a range of A-weighted fast-response statistical noise levels, including the rated background noise levels (**RBL**), over consecutive 15 minute periods. A summary of the background noise levels is provided in **Table 7-25**.



Figure 7-21: Noise Monitoring Locations

Table 7-25: Summary of Measures Rated Background Noise Levels (RBL)

Parameter	Period	Location 1	Location 2
		Average of 15-minute Measured Noise Levels (dBA)	
Rated Background Noise Level (RBL)	Daytime (7am – 6pm)	49	48
	Evening (6pm – 10pm)	47	48
	Night (10pm – 7am)	47	47

Octave band noise data was extracted from the noise monitoring results, with representative minimum baseline LA90 noise spectrum results detailed in **Table 7-26**.

Table 7-26: Background Noise Spectrum, dB

Parameter	Octave-band Levels dB re 20 µPa at Octave Band Centre Frequency (Hz)							Overall (dBA)
	63	125	250	500	1000	2000	4000	
Location 1 – 4:00am to 4:15am Tuesday 9/02/2021	37	38	38	38	39	36	40	46
Location 2 – 12:30am to 12:45am Sunday 14/02/2021	39	31	30	30	31	30	36	41

7.4.4.6 Community Uses

The site is highly integrated into the surrounding pedestrian network, with footpaths providing access to the site from Gilruth Avenue to Little Mindil/Mindil Beach foreshore and a connection to Myilly Terrace via the Nurses Walk.

The Little Mindil Creek corridor incorporates a public pedestrian footbridge traversing the creek, with the pathway leading to the foreshore. KTT Investment recently submitted a PSA to amend the zoning of the creek reserve from Zone TC to Zone PS to ensure its continued protection as a community asset. The PSA was approved on the 27th May 2021. Little Mindil Creek has therefore been excised from the site.

The southern area of the site includes a heavily vegetated escarpment rising to Burnett Place. This area of the site is proximal to the historic Nurses Walk, which is the main access way from Myilly Point Peninsula to Mindil Beach. Preservation of the escarpment vegetation is incorporated into Covenant Dealing Number 731712 and access to the Nurses Walk will not be hindered by the proposed Development.

The lack of development on the site and its proximity to key recreational areas has resulted in the site being informally utilised by the community as public open space. This includes for recreation purposes and occasional Gala events.

7.4.5 Potential Impacts and Risks

Social impacts are subjective, with activities having a different impact on individuals depending on their specific circumstances, their personal level of concern for an aspect, and proximity to activities.

Stakeholder engagement has been recognised as fundamental to planning of the Development and, as such, a comprehensive engagement plan has been implemented to determine the potential areas of concern for individual stakeholders. The Stakeholder Engagement Plan, included as **Appendix 3**, incorporates a register of consultation and summarises the outcomes of pre-development engagement.

Positive feedback on the Development included support for a new tourism product in Darwin, the retention of public access, the biophilic design and the indication of growing investment confidence for Darwin.

The key areas of concern arising from consultation have been identified in **Table 7-27** and the potential impacts described in the proceeding sections.

Table 7-27: Potential Pathways for Impact on Community and Economy.

Source	Pathway	Receptor
Construction and operational activities.	Restrictions on public access to the Mindil Beach foreshore	Beach users.
	Loss of the site as community public open space	Recreational users.
	Reduced amenity due to noise generation.	Nearby residents.
	Visual amenity impacts.	Nearby residents, beach, and Myilly Point Heritage Precinct users.
	Traffic delays, congestion, and increased road safety risk.	Vehicle operators in the vicinity of the proposed development.
	Sea breeze impacts on heritage buildings within the Myilly Point Heritage Precinct.	Myilly Point Heritage Precinct.

7.4.5.1 Public Access Restrictions

Within the general community there is concern that public access will be restricted as a result of the development. As previously detailed, and as illustrated in **Figures 7-22** and **7-23**, public access will be maintained and enhanced to and along the foreshore. Access to the Nurses Walk will also be preserved.

No impacts to public access are expected as a result of the Development.



Figure 7-22: Pathway and Road Access

- 1 7 secluded executive beach front Villas
- 2 7 private beach yards
- 3 Access to beach
- 4 Private garage and storage
- 5 Apartment car parking & lobbies
- 6 16 private hotel Villas on lagoon
- 7 16 private courtyard for each Villas
- 8 Hotel & function lobbies
- 9 Public activity with communal market
- 10 Feature F&B beach front venue
- 11 New connecting public pathway
- 12 Main vehicle entrance
- 13 Hotel & function porte cochère
- 14 Delivery drop off & storage
- 15 Large lagoon surrounding Villas
- 16 Vehicle access from casino
- 17 Public open space for events
- 18 Landscape buffer for residence
- 19 Landscape buffer for residence
- 20 Screening of substation
- 21 New landscaping to Crown land



Figure 7 23: Site Layout Illustrating Public Access to Little Mindil Beach

7.4.5.2 Loss of Public Open Space

Whilst the site is considered public open space by some community members, Lot 7651 is a privately owned land parcel zoned for Tourist Commercial development. Construction of the Development will necessitate removal of the large grassed area, which will impact the existing use of the site; however, KTT is cognisant of the importance of the Little Mindil/Mindil Beach precinct for recreation and entertainment by the general public.

As a response to concerns the Proponent has provided open space and public facilities beyond those required by the NTPS, including a public activity and market area on the ground floor of the hotel; convenient public access to the feature food and beverage venue; retention of the existing public footpath through the site; retention of public access to the foreshore and comprehensive site landscaping incorporated into the design of the Hotel Complex.

The zoning of the site and freehold nature of the land holding indicates that development on the site and loss of public open space is expected. The inclusion of the North One Hotel and Apartment Development in this location is deemed reasonable, with every effort being made to reduce the impact on amenity for the general public.

7.4.5.3 Noise Impacts

Noise emissions for identified sensitive receptors were modelled for the following non-steady noise sources:

- Mechanical plant (roof top air-conditioning/ventilation units);
- Vehicles servicing the Development, such as delivery trucks;
- Unloading and loading of delivery trucks;
- Amplified music; and
- Noise from patrons.

The Industry Noise (ISO 9613-2) 1996 algorithm was utilised in SoundPLAN to calculate and predict future noise emission levels at nearby noise sensitive receptors influenced by the proposed development. The modelled noise sources are indicated in **Figure 7-24**.

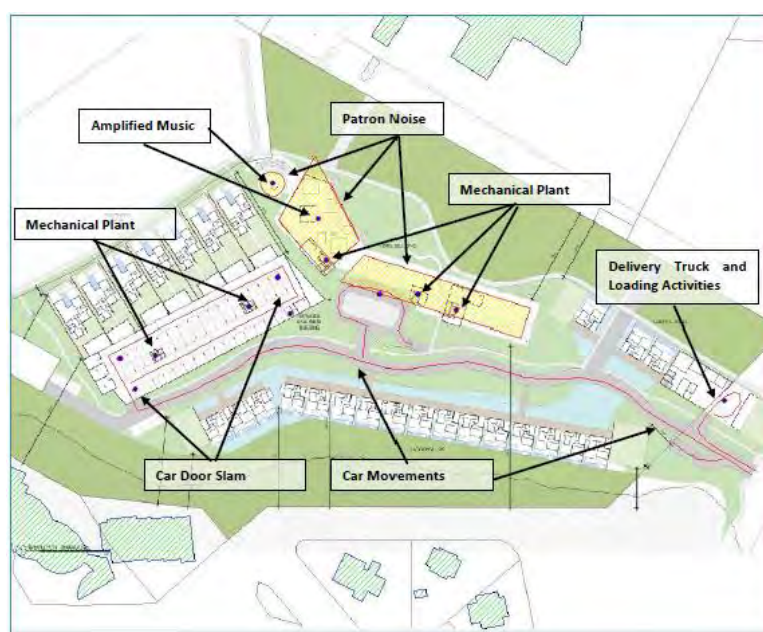


Figure 7-24: Indicative Noise Source Locations

Based on the source items and operational assumptions described in the Noise Impact Assessment, the predicted noise emission levels at the worst affected sensitive receptors on each street are presented in **Table 7-28** and **Table 7-29** and further detailed in **Appendix 17**.

Table 7-28: Noise Emission Predictions

Noise Source	Noise Sensitive Receptor	Noise Levels (dBA LAeq)		
		Day (7 am - 6 pm)	Evening (6 pm – 10 pm)	Night (10 pm – 7 am)
Mechanical Plant	Mindil Beach Casino Resort	37	37	37
	Myilly Serviced Apartments	42	42	42
	1 Burnett Pace, Larrakeyah	43	43	43
Criteria		53	50	45
Car Park Noise	Mindil Beach Casino Resort	27	27	27
	Myilly Serviced Apartments	39	39	39
	1 Burnett Pace, Larrakeyah	40	40	40
Criteria		53	50	45
Delivery Trucks	Mindil Beach Casino Resort	28	27	23
	Myilly Serviced Apartments	29	28	24
	1 Burnett Pace, Larrakeyah	31	30	26
Criteria		53	50	45
Loading and Unloading Activities	Mindil Beach Casino Resort	39	39	36
	Myilly Serviced Apartments	38	38	35
	1 Burnett Pace, Larrakeyah	37	37	34
Criteria		53	50	45
Amplified Music (Indoor Entertainment Venues)	Mindil Beach Casino Resort	40	40	Refer to Table 7-29
	Myilly Serviced Apartments	20	20	
	1 Burnett Pace, Larrakeyah	17	17	
Criteria		52	52	-
Amplified Music (Outdoor Entertainment Venues)	Mindil Beach Casino Resort	20	20	20
	Myilly Serviced Apartments	14	14	14
	1 Burnett Pace, Larrakeyah	15	15	15
Criteria		55	55	37
Patron Noise (Indoor Entertainment Venue) (Ground Level Bar)	Mindil Beach Casino Resort	41	41	Refer to Table 7-29
	Myilly Serviced Apartments	18	18	
	1 Burnett Pace, Larrakeyah	14	14	
Criteria		52	52	-
Patron Noise (Indoor Entertainment Venue) (Level 1 All Day Dining)	Mindil Beach Casino Resort	23	23	Refer to Table 7-29
	Myilly Serviced Apartments	19	19	
	1 Burnett Pace, Larrakeyah	19	19	
Criteria		52	52	-
Patron Noise (Outdoor Entertainment Venue) (Market Area)	Mindil Beach Casino Resort	27	27	N/A
	Myilly Serviced Apartments	19	19	N/A
	1 Burnett Pace, Larrakeyah	19	19	N/A
Criteria		55	55	37

Noise Source	Noise Sensitive Receptor	Noise Levels (dBA LAeq)		
		Day (7 am - 6 pm)	Evening (6 pm – 10 pm)	Night (10 pm – 7 am)
Patron Noise (Outdoor Entertainment Venue) (Level 1 Poolside Bar)	Mindil Beach Casino Resort	50	50	50
	Myilly Serviced Apartments	31	31	31
	1 Burnett Pace, Larrakeyah	37	37	37
Criteria		55	55	37

Table 7-29: Amplified Music and Patron Predicted Noise Emissions from Indoor Venues – Night-time Period

Noise Source	Noise Sensitive Receptor	Night Noise Levels (dBA LAeq) (10 pm – 7 am)						
		63Hz	125Hz	250Hz	500Hz	1kHz	2kHz	4kHz
Amplified Music	Mindil Beach Casino Resort	16	29	29	34	34	33	28
	Myilly Serviced Apartments	4	15	11	13	10	10	5
	1 Burnett Pace, Larrakeyah	1	12	6	9	10	10	6
Criteria		47	39	38	38	39	38	44
Patron Noise (Ground Level Bar)	Mindil Beach Casino Resort	-3	13	28	38	36	31	23
	Myilly Serviced Apartments	-16	-2	9	15	12	3	-2
	1 Burnett Pace, Larrakeyah	-20	-7	3	10	10	5	-2
Criteria		47	39	38	38	39	38	44
Patron Noise (Level 1 All Day Dining)	Mindil Beach Casino Resort	-17	-3	10	20	18	13	6
	Myilly Serviced Apartments	-21	-6	6	15	15	9	1
	1 Burnett Pace, Larrakeyah	-20	-7	6	15	14	9	2
Criteria		47	39	38	38	39	38	44

All predicted noise levels are within criteria at each sensitive receptor with the exception of Patron Noise at the Level 1 Poolside Bar (outdoor venue), which is expected to exceed the night-time limit at Mindil Beach Casino Resort. Mitigation measures such as reducing the maximum allowable patrons and acoustic upgrades to venue facades can be applied to the Poolside Bar area to reduce noise levels at this receptor.

The Noise Impact Assessment concluded that with the implementation of appropriate noise management and mitigation measures, no detrimental impact to the amenity of surrounding residential receptors or the general amenity of the surrounding area would be expected as a result of the Development.

7.4.5.4 Visual Amenity Impacts

An intrinsic aspect of the Development, which enhances the visual amenity, is the biophilic rooftop design and complementary landscape plan, as detailed in **Section 2.3.2** and **Appendix 2**. The high-quality built form of the Hotel will create visual interest and result in a landmark development for the NT.

The design phase of the proposal has considered visual amenity, with amendments made to reduce impacts. The original design arrangement included the majority of buildings near the escarpment, with a maximum building height of up to 10 levels. The current design has the bulk of the development sited near the foreshore and has restricted the height of the Complex to 6 levels. This has reduced both visual and noise impacts on the receptors within the Myilly Point Peninsula.

Clouston Associates was commissioned to undertake a Visual Impact Study (VIS) of the current design to evaluate how changes in the landscape may impact individuals or groups of people. Eight viewpoints related to the heritage buildings at 2 Burnett Place and 4 Burnett Place were assessed, with a description of the overall ratings presented in **Table 7-30** and results of the VIS summarised in **Table 7-31**.

Table 7-30: Ratings Description

0 - 1	Negligible	Only an insignificant part of the Project is discernible.
1 - 1.3	Low	The Project constitutes only a minor component, which might be missed by the casual observer or receptor. Awareness of the proposal would not have a marked effect on visual amenity.
1.4 - 1.7	Moderate/low	Whilst discernible, the Project does not dominate the visual scene and has only slight impacts on visual character.
1.8 - 2.3	Moderate	The Project may form a visible and recognisable new element within the overall scene that affects and changes its overall character.
2.4 - 2.6	Moderate/High	The Project is a discernible feature of the scene leading to moderately high impacts on visual character.
2.7 - 3.0	High	The Project becomes the dominant feature of the scene to which other elements become subordinate, and significantly affects and changes the visual character.

Table 7-31: Impact Rating for Viewpoints Assessed in the Visual Impact Study

Viewpoint	Location	Rating
1	View west – 2 Burnett Place at ground level	Low
2	View west – 2 Burnett Place at first floor level	Moderate
3	View north – 2 Burnett Place at ground level	Moderate
4	View north – 2 Burnett Place at first floor level	Moderate
5	View west – 4 Burnett Place at ground level	Low
6	View west – 4 Burnett Place at first floor level	Moderate
7	View north – 4 Burnett Place at ground level	Moderate/Low
8	View north – 4 Burnett Place at first floor level	Moderate

The key findings of the VIS are as follows:

- The Development site will be heavily modified;
- Development land use is compatible with the surrounding commercial area;
- Existing vegetation along the escarpment and within the grounds of the two heritage properties provides varying levels of screening of views, which has a significant impact on the visual assessment;
- The primary visual impact relates to long views to East Point Reserve and the horizon, views of Fannie Bay and glimpses of Mindil Beach. Where these views occur, they would be lost in all instances.

Clouston Associates concluded the following:

On balance it is the professional opinion of the authors of this assessment that the scale, character and visual catchment of the proposal will result in a moderate impact overall. On the basis that the proposal complies with the relevant planning heights and set-backs associated with the parcel of land, it is our opinion that the visual impacts on the heritage properties of the proposal does not constitute reasons to hinder planning approval.

The VIS primarily considers the potential impact on views from the Myilly Point Heritage Precinct to the south of the site. Given the similar location relative to the Heritage Precinct, the above findings are likely to be similar (i.e. moderate) to the existing two-storey dwellings on Lot 2422, and less (minor-moderate) to the existing apartments on Lot 7260, given the height of the Myilly Terrace building and location further west. Visual impacts on other residential areas within Larrakeyah, predominantly south-east of the site, are likely to be minor given the height difference between the subject land and existing apartments (apartment buildings along Smith Street, Warrego Court, Beagle Street and Houston Street are elevated above the golf course) and distance to the site.

The full VIS is presented in **Appendix 15**.

7.4.5.5 Sea Breeze Influence

Stakeholder engagement identified the impact of the Development on the sea breeze at Myilly Point Heritage Precinct as an area of concern. As a result, SRL Engineers were commissioned to undertake a Wind Impact Assessment, which is presented as **Appendix 18**.

Wind impact from the proposed Development is described by examining the impact of key prevailing wind conditions on areas of interest within and external to the development. The key directions analysed were:

- North and northwest winds between September to March; and
- East and southeast winds between April to August.

The predicted wind environment at the site is examined in terms of both existing winds and future winds following addition of the North One Development. Results for the surrounding areas are provided in **Table 7-32**. Further detail, including wind impacts within the site, are included in the attached SLR report.

Table 7-32: Wind Impacts on Surrounding Areas

Location	Existing Compliance	Future Compliance	Key Factors
Burnett House Heritage Residential Precinct	Likely Comply	Likely Comply	Due to the low-rise design and large setback from the surrounding area of the North One Hotel and Apartments and the high cliff on the southern side of the Development it is expected the Development should not impact the local wind breeze or create further adverse wind conditions for the Burnett House Heritage areas.
Further Residential	Likely Comply	Likely Comply	Due to the low-rise design and large setback from the surrounding area of the North One Hotel and Apartments and the high cliff on the southern side of the Development it is expected the Development should not impact the local wind breeze or create further adverse wind conditions for surrounding residential areas.

Location	Existing Compliance	Future Compliance	Key Factors
Beach Footpath	Likely Comply	Likely Comply	The proposed development's beachfront facades are set back from the footpath. The mix of proposed and existing trees will be retained and are expected to shield the footpath from winds impacting the path.
Mindil Beach Casino Resort	Likely Comply	Likely Comply	Sheltering from the proposed and existing trees along the north and northwest boundary line is expected to limit any impacts North One Hotel and Apartments will have on the existing Mindil Beach Casino Resort.

Buildings within the proposed Development are set back from the two perimeter street frontages, with extensive existing and planned landscaping along both Burnett Place and Gilruth Avenue. Due to this recessed design, the large setback from the surrounding areas and the landscaping plan it is expected that the Development will have negligible impact on the north to westerly sector winds or sea breezes that will impact the southerly buildings on top of the cliff.

7.4.5.6 Traffic Impacts

Vehicular access to the Development is proposed via Gilruth Avenue; the existing vehicle access from the Mindil Beach Casino Resort car park will also be maintained.

The Traffic Impact Assessment presented in the **Appendix 14** utilised traffic generation rates from the Road Transport Association (RTA) to predict expected traffic volumes post-development of the North One Resort. It was concluded that the access point for the Development will have sufficient sightlines, with a left in/ left out access configuration preferred. The additional traffic movements from the proposed Development are presented in **Figure 7-25**.

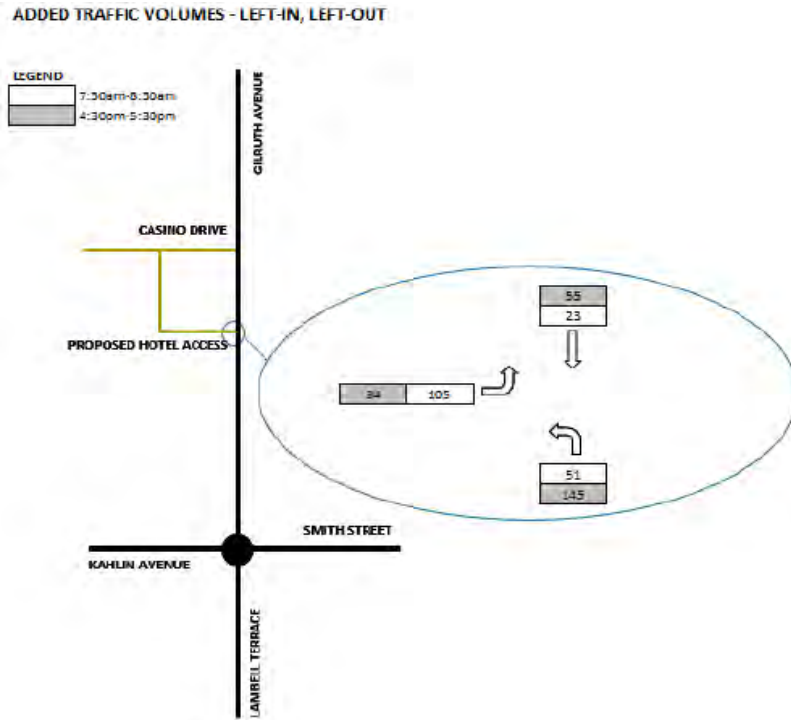


Figure 7-25: Additional Traffic Volumes Post-Development – Left In/Left Out Scenario

Future (2030) traffic volumes, based on estimated volumes from the Development and background traffic volumes, with a 1.5% increase in background traffic volumes incorporated into the assessment to account for traffic growth over the period to 2030, are displayed pictorially in **Figure 7-26**. The Traffic Impact Assessment concluded that additional traffic generated by the Development is not likely to result in adverse impacts in the surrounding road network.

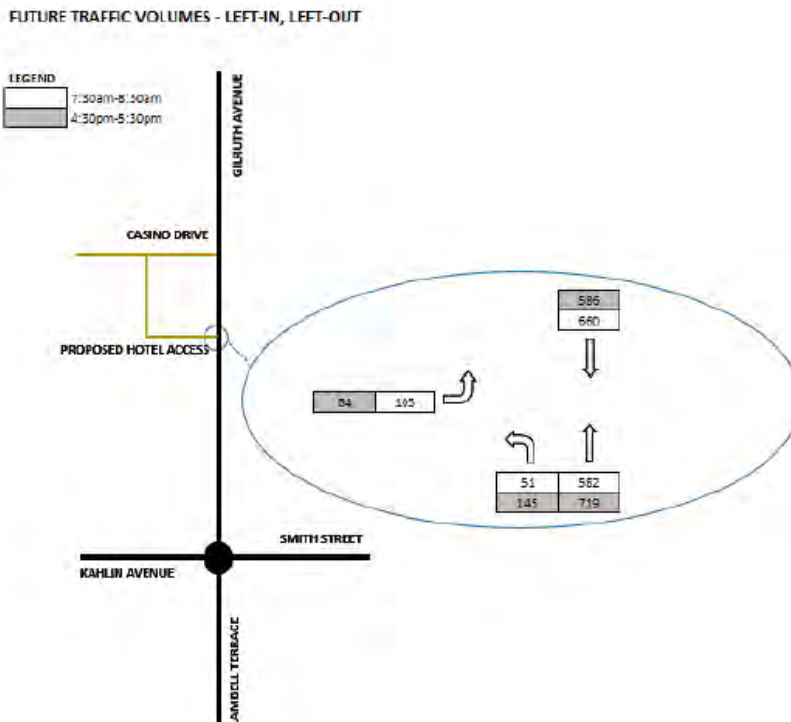


Figure 7-26: Predicted Future Traffic Volumes – Left In/Left Out Scenario

7.4.5.7 Economic Implications of the Development

During a period where investment in the Northern Territory has significantly decreased, the North One Hotel and Apartment Development will provide an economic benefit to the local region and the broader NT. An Economic Benefits Snapshot for the Development is provided in **Appendix 16** and summarised below:

Table 7-33: Economic Benefits of the North One Hotel and Apartment Development

Phase	Benefit	Outcome
Construction Phase	Construction Cost Estimate	\$200,000,000
	Annual Gross Value-Add (GVA) to the NT economy	\$102 M / annum - \$29M average direct GVA - \$73M average indirect GVA
	Full-time Equivalent (FTE) jobs created	350 jobs - 100 average direct on-site FTE jobs - 250 average indirect FTE jobs
	Construction Period	3 years
Operational Phase	Annual GVA to the NT economy	\$41.5M / annum - \$24.4M average direct GVA - \$17.1M average indirect GVA
	FTE jobs created (at capacity)	120 jobs - 90 direct Hotel jobs on-site - 30 indirect Hotel jobs on-site
	Total spending in local region by Hotel guests whilst visiting*	\$8.5M

* Based on 76% capacity (expected in Year 3 of operations). Includes spending on goods and services outside of hotel by guests. Excludes spending on accommodation.

Beyond the quantification of economic contributions identified above, the Development also presents broader benefits to the community and economy including, but not limited to:

- Providing capacity to accommodate additional visitors that would generate expenditure to local businesses in the area;
- Assisting in further activation of the local tourism region, which would increase the economic and social benefits for both individuals and businesses within the region;
- Provision of high standard facilities for use by local residents; and
- Increased taxation revenue to both Local and NT Governments.

7.4.6 Mitigation and Management

To ensure impacts of the local community and economy remain equitable, mitigation measures described in **Table 7-34** will be implemented as part of the construction and operation of the North One Development.

Table 7-34: Mitigation Measures for Community and Economy.

Pathway	Mitigation Measures
Economic Benefits	<ul style="list-style-type: none"> • Preferential employment of local personnel • Develop a Local Procurement Plan for goods and services required to support the Development • Initiate early engagement with potential local businesses to ensure project requirements are understood and businesses have an opportunity to review capabilities to be able to service Development needs. • Promotion of local businesses, particularly within the tourism industry, to Hotel guests.
Community Use	<ul style="list-style-type: none"> • Ensure the Development does not encroach on publicly- accessible open space. • Maintain pedestrian pathways to ensure access to the Little Mindil Beach foreshore. • Explore partnership options to upgrade and enhance the adjacent Nurses Walk. • Incorporation of public areas, including the Market area, within the design of the Development.
Noise	<ul style="list-style-type: none"> • No direct line of site between major plant items and the nearest sensitive receptors • Implement acoustic treatments if the overall sound power level of mechanical plant exceeds 80 dBA for each building • Ensure acoustic testing is undertaken to confirm compliance for mechanical plant prior to completion of construction. • Establish speed limits within the site to reduce traffic noise impacts. • Construct trafficable surface with a low-squeal compound. • Investigate acoustic upgrades for Ground Level Food and Beverage Bar to reduce break-out noise from amplified music. • Investigate options for acoustic upgrades to the facades of the Hotel Building and patron limits to reduce Level 1 Poolside Bar noise emissions. • Adhere to Responsible Serving of Alcohol principles to reduce likelihood of patrons causing noise and participating in anti-social behaviour. • Establish protocols for live music events, including notification procedures, noise monitoring (if appropriate) and complaint processes. • Incorporate noise impacts into the EMP, to be completed prior to the commencement of operations.
Visual Impact	<ul style="list-style-type: none"> • Maintain the maximum limit on building height to 6 levels. • Siting of the taller buildings away from the sensitive receptors to the south of the Development site. • Preserve and enhance the vegetation within Little Mindil Creek and the southern escarpment. • Inclusion of biophilic rooftop design into the Development to enhance the visual amenity of the Development. • Ensure building and landscape designs incorporate sympathetic vegetation and design choices to integrate with the surrounding environmental values and provide adequate screening of non-aesthetic infrastructure.
Stakeholder Engagement	<ul style="list-style-type: none"> • Continue open and collaborative relationships with key stakeholders. • Implement the Stakeholder Engagement Plan (Appendix 3) throughout the construction and operational phase to ensure the Development remains current with social issues and expectations.

No mitigation measures have been identified for traffic movements, as the impacts were deemed negligible to the public road network.

No specific measures are described for wind impact as the Development was deemed to have a negligible impact on external surrounding areas. Mitigation measures for wind impacts within the Complex are described in the Wind Impact Assessment (**Appendix 18**).

7.4.7 Monitoring and Inspection

Monitoring and reporting for aspects of the Community and Economy Factor will vary over time as the socio-economic environment alters.

Monitoring will be undertaken as required, generally in response to complaints received (for example, noise complaints may trigger a requirement to undertake additional noise monitoring). A formal complaints process will be established, which will include investigation and corrective action protocols.

Feedback mechanisms will also be promoted to capture issues and provide an opportunity for rectification, as appropriate.

7.4.8 Statement of Residual Impact

The North One Hotel and Apartment Development represents an economic benefit to the local and NT economies. The preservation of public access to key recreational areas, such as Little Mindil Beach, and the incorporation of public features such as the Market area and entertainment facilities into the Development will also result in the provision of a high-quality tourism asset for the Darwin community.

KTT Investment considers that with the implementation of the described design criteria and mitigation strategies the Development will achieve the NT EPA's objective for Community and Economy. It is recognised, however, that the following residual impacts will occur:

- Moderate visual impact from some vantage points within the Myilly Point Heritage Precinct;
- Loss of large grassed area, currently informally used as public open space.

The Development is consistent with the intent and provisions of Zone TC planning schemes and has considered social impacts throughout the design phase. Overall, it is expected that the Development will have a net positive impact on the local, regional and national community and economy.

7.5 ENVIRONMENTAL FACTOR: CULTURE AND HERITAGE

Culture and Heritage refers to sacred sites, historic heritage and places, and world heritage. The NT EPA's objective for the environmental factor of Culture and Heritage is to:

Protect sacred sites, culture, and heritage.

This includes consideration of both Indigenous and European heritage values.

7.5.1 Technical Studies

Technical studies undertaken to inform assessment of potential impacts of the Development on Culture and Heritage are listed in **Table 7-35**.

Table 7-35: Technical studies informing Culture and Heritage

Date	Study Title	Consultant	Description	Report
September 2019, May 2020	Preliminary Site Investigation. Reference number 680.30010-R01. Version No: v3.0	SLR	Preliminary site investigation at 25 Gilruth Avenue, The Gardens, Northern Territory (Little Mindil), based on publicly available historical data, master plan documentation, and observations during an initial site inspection.	Appendix 5
November 2020	Little Mindil Beach – Proposed Hotel Site – Small Scale Archaeological Assessment Report	Ellengowan Enterprises	Archaeological survey for a proposed hotel development on Little Mindil Beach, Darwin.	Appendix 19
August 2021	Heritage Impact Assessment: Myilly Point	Ellengowan Enterprises	Investigation and review of heritage documents relating to the Myilly Point Heritage Precinct, to determine the proposed development's impact.	Appendix 20

7.5.2 Key Policies and Guidelines

Relevant Policies and Guidelines include:

- *Environment Protection Act 2019*
- *Heritage Act 2011*
- *Aboriginal Sacred Sites Act 1989*

7.5.3 Existing Environment

7.5.3.1 Aboriginal Heritage

The traditional owners of the land on which the site sits, and the wider Darwin area are the Larrakia people. There are approximately 2000 Larrakia people and eight major Larrakia family groups in the Northern Territory today.

The archaeological assessment conducted by Ellengowan Enterprises in 2020 (**Appendix 18**) states that Little Mindil Beach and the Development site are of high cultural importance to the Larrakia people, whom are the traditional owners. Mindil Beach Foreshore was used historically, well into the 1930's, as a burial ground by the

Larrakia people and other indigenous people from nearby areas. One of these burial sites is present on the north-eastern boundary of the Lot 7561 and is a Registered Sacred Site (5073-89) (**Figure 2-4**).

Whilst the Development site is highly disturbed, additional reports including from Larrakia Elder Kathy Mills, suggest that other burial sites still exist in and around the Sacred Site at Little Mindil Beach. In addition to the cultural importance of the burial sites of Larrakia ancestors, Little Mindil Beach is an integral and sacred part of Darwin's indigenous culture and the Larrakia people continue to use Little Mindil Beach as a food resource.

7.5.3.2 European Heritage Values

The North One Development is adjacent to the Myilly Point Heritage Precinct, which comprises four heritage listed tropical style houses constructed in the 1930s, the associated gardens and the escarpment on Lot 3481. The houses were originally built for senior public servants and represented passive cooling design concepts that are an anathema to today's reliance on air conditioning. **Plate 7-3** displays Burnett House, one of the houses within the Precinct, which is currently occupied by the National Trust NT.



Plate 7-3: Burnett House

In recognition as a rare example of the type of housing, the Precinct was entered onto the Register of the National Estate (RNE) in 1985. With the enactment of the *Environment Protection and Biodiversity Conservation Act 1999*, the RNE was superseded; the Myilly Point Heritage Precinct is not listed on Australia's Commonwealth Heritage List or the National Heritage List, however, the Precinct does appear on the Northern Territory Heritage Register.

Further detail on the Myilly Point Heritage Precinct is contained within the *Heritage Impact Assessment (Built Heritage): Myilly Point Precinct and 25 Gilruth Avenue, The Gardens, Little Mindil Beach*, which is included as **Appendix 20**. **Figure 7-29** indicates the study area for this assessment.



Figure 7-27: Myilly Point Heritage Precinct Location and Heritage Assessment Study Area

7.5.4 Potential Impacts and Risks

The key potential impacts and risks to cultural and heritage values are presented in **Table 7-36**.

Table 7-36: Potential Pathways for Impacts to Culture and Heritage

Source	Pathway	Receptor
Construction and operational activities	Disturbance or destruction of culturally significant sites.	Larrakia people and other indigenous people from nearby areas.
	Restricted access to Sacred Site and Little Mindil Beach for cultural purposes.	
	Degradation of scenic values of Myilly Point Heritage Precinct.	Myilly Point Heritage Precinct.

7.5.4.1 Disturbance to Sacred Sites

Given the known and potential presence of culturally significant sites, disturbance of aboriginal sites (including burial sites) may occur during excavation activities for the Development. Mitigation measures will be required to ensure that implications of unintended disturbance of sites not previously identified does not impact the cultural and spiritual connections for the Larrakia people.

An APPA certificate will also be required prior to ground disturbance.

During operation of the North One Development, impacts to sacred sites will be mitigated by the recent approval to rezone the Little Mindil Creek area and the Registered burial site to Zone PS. Integration of cultural aspects into the design of the Development will also enhance the cultural connection with the site.

7.5.4.2 European Heritage Impacts

The North One Hotel and Apartment Development will not have a direct impact on the Myilly Point Heritage Precinct. All activities will be constrained to within Lot 7651 and away from the escarpment or Myilly Point.

The indirect impacts associated with visual amenity and wind impacts have previously been addressed in **Section 7.4**.

No significant heritage or cultural impacts are anticipated from the Development.

7.5.5 Mitigation and Management

Mitigation measures to be implemented to avoid and/or minimise the likelihood of construction and operational activities impacting on Culture and Heritage are outlined in **Table 7-37**.

Table 7-37: Mitigation Measures for Culture and Heritage

Pathway	Mitigation Measures
Disturbance or destruction of culturally significant sites	<ul style="list-style-type: none"> • Obtain an AAPA Certificate prior to ground disturbance. • Develop procedures for discovery of an unknown potential archaeological site during excavation activities. • Instigate an archaeological monitoring program for any ground disturbance work in recognition of the possibility that historic burials may still exist at the site. • A Larrakia representative to be present on site to monitor excavation work.
Restricted access to Sacred Site and Little Mindil Beach for cultural purposes.	<ul style="list-style-type: none"> • Establish a process of stakeholder engagement and participatory planning with the Larrakia people. • Engage with the relevant indigenous stakeholders to ensure traditional activities in nearby areas are understood and not impacted. • Ensure the Development does not encroach on publicly- accessible open space. • Maintain pedestrian pathways to ensure access to the Little Mindil Beach foreshore.
Incorporation of cultural considerations in the North One design	<ul style="list-style-type: none"> • Continue liaison with Larrakia traditional owners and elders. • Acknowledge indigenous people with the Development; eg. interpretive signage and include cultural performances at the site, such as fire dances in the grassed area. • Acknowledge and respond to the process of Welcome to Country; eg. design the reception area to signify respect for the Larrakia ancestors and acknowledge the nearby burial island. • Third-party funding commitments for Larrakia Cultural Centre or community sponsorship. • Incorporate Larrakia design into the development. • Guarantee indigenous job opportunities. • Involve Larrakia Development Corporation at the construction stage.
Degradation of scenic values of Myilly Point Heritage Precinct.	<ul style="list-style-type: none"> • Refer to mitigation strategies detailed in Section 7.4.6.

7.5.6 Monitoring and Reporting

Monitoring and inspection activities associated with Culture and Heritage appear in **Table 7-38** below.

Table 7-38: Monitoring and Reporting for Culture and Heritage

Impact	Monitoring/Inspections	Reporting
Cultural Heritage	<ul style="list-style-type: none"> • Archaeological monitoring program to be implemented prior to and during any ground disturbance work. • Maintain an Incident Register for any incidents associated with cultural heritage impacts. • Maintain training records for employees to ensure Cultural Awareness Training has been conducted for all employees. • Maintain minutes, or other appropriate records, of meetings with Larrakia people. 	<p>Annual Report and Performance Review</p> <p>Regulatory Incident Report, as required.</p>
Visual Amenity Impacts to Myilly Point Heritage Precinct	<ul style="list-style-type: none"> • Maintain a Complaints Register. • Undertake regular inspections of the vegetation health within Little Mindil Creek and the southern escarpment. Review with photographs to use as visual reference. 	Annual Report and Performance

7.5.7 Statement of Residual Impact

The construction phase of the proposed Development has the potential to have significant cultural impacts if an unknown site of cultural significance is disturbed. Implementation of the mitigation measures provided in **Table 7-37** significantly reduces the likelihood of disturbance to a culturally significant site.

Maintaining access to the Registered Sacred Site and Little Mindil/Mindil Beach foreshore for use for cultural purposes will minimise impacts from the Development.

The proposed development will not have a direct impact on the historic values of the Myilly Point Heritage Precinct.

7.6 ENVIRONMENTAL FACTOR: HUMAN HEALTH

7.6.1 NT EPA Objective

The NT EPA's objective for the environmental factor Human health is to:

Ensure that risks to human health are identified, understood and adequately avoided and/or mitigated.

The human health objective recognises the importance of ensuring that human health is not significantly affected as a result of the Development.

7.6.2 Technical Studies

Technical studies undertaken to inform assessment of potential impacts of the Development on Human Health are listed in **Table 7-39**.

Table 7-39: Technical studies informing Human Health.

Date	Study Title	Consultant	Description	Report
June 2021	Biting Insects Management Plan, North One Hotel and Apartment Development, V1.2.	BPL	Management Plan developed to identify potential biting insects for the Development site and proposed mitigation measures to protect health and reduce nuisance impacts.	Appendix 21

7.6.3 Key Policy and Guidelines

Relevant Policies and Guidelines include:

- *Construction Practices Near Tidal Areas in the Northern Territory – Guidelines to Prevent Mosquito Breeding (2009)*
- *Guidelines for Preventing Biting Insect Problems for Urban Residential Developments or Subdivisions in the Top End of the Northern Territory (2009)*

7.6.4 Existing Environment

The climatic conditions within the Top End provide potential risks to human health with regard to heat, sun exposure and potential exposure to severe weather events, such as cyclones.

Given the locality of the Development within the coastal foreshore of the Darwin region and adjacent to a tidal creek, biting midges and mosquitoes are anticipated to be present on the site. Seasonal factors, food, habitat availability and breeding cycles influence the distribution and abundance of biting insects.

The Development site also supports habitat for populations of vertebrate fauna, such as snakes and crocodiles, that could pose risk to human health.

7.6.5 Potential Impacts and Risks

The risks to human health attributed to the North One Development are not specific to the site and are applicable to the Greater Darwin region and beyond. Nevertheless, with the increase in human activity associated with the Development it is essential that human health impacts are considered and appropriately managed.

Potential pathways for key human health impacts applicable to the Development are indicated in **Table 7-40**.

Table 7-40: Potential Pathways for Impact on Human Health

Source	Pathway	Receptor
Construction and Operational Activities	Exposure to environmental elements by employees, contractors or Hotel guests.	Hotel guests and employees.
	Animal interactions.	
	Exposure to biting insects.	

7.6.5.1 Exposure to Environmental Elements

The nature of the Development as a tourist destination results in an increased number of people without local knowledge of the environmental elements. The NT environment can be extreme, and consideration needs to be given to the risk of exposure, particularly of Hotel guests, resulting from:

- Heat and sun exposure;
- Cyclonic events;
- Flooding.

Sunburn and heat stress are foreseeable risks in a climate such as Darwin. The risks of exposure will, however, be reduced with adequate climate control and ventilation incorporated into the design of buildings, the inclusion of pool and swimming facilities and the comprehensive landscape plan, which will provide shade refuge and reduce heat stress risks. Information and warnings provided to guests on heat and sun exposure will also reduce instances of illness. It is not anticipated that the Project will result in undue risks to human health from this element.

Cyclones are active in Northern Australia during November to April each year. Prediction of cyclones has significantly improved with technological advances and the implementation of emergency procedures preceding arrival of cyclones is well understood within the community. KTT Investment will construct the Hotel Complex in accordance with relevant Building Codes to account for cyclonic activity. A Cyclone Response Plan will also be developed that will incorporate evacuation procedures during cyclone warnings. It is not expected that human health impacts resulting from cyclones will increase as a result of the North One Development.

Consequent to the location of the Project being adjacent to Little Mindil Creek and Little Mindil Beach, portions of the site are subject to storm surge and inundation. The North One site will be filled to ensure infrastructure is situated above the storm surge level and will install adequate structures as appropriate to mitigate flood risk to Hotel areas. Given these measures, it is not anticipated that flood impacts at the site will significantly detriment human health.

7.6.5.2 Animal Interactions

Animals anticipated within the surrounding areas have capability for human interactions and inflicting bites, particularly snakes and crocodiles. The risks to human health are not expected to be any greater as a result of the Development, although it is acknowledged that awareness and management protocols, including response procedures in the instance of injury, will be required as the Development will attract a high proportion of non-Territorians.

7.6.5.3 Biting Insects

The presence of tidal areas and natural and man-made water holding receptacles allows for the expectation that seasonally raised numbers of biting insects may occur. Biting insects may pose a risk during both the construction and operational phases of the North One Development.

Potential sources of biting insects associated with construction of the Project include:

- Little Mindil Creek;
- Erosion and sediment control structures, as described in **Section 7.3.6.1**;
- Pooling within vehicle tracks, ground depressions and lower topographic areas following heavy rainfall; and
- Pooling within artificial receptacles utilised at the site during construction following heavy rainfall.

During operation of the North One Development, the following potential sources of mosquito and midge breeding may occur:

- Little Mindil Creek;
- Constructed Lagoon;
- Water features;
- Landscaped vegetated areas (both roof-top and ground level);
- Stormwater control structures;
- Surface ponding following heavy rainfall; and
- Artificial receptacles collecting water following heavy rainfall.

Light emissions associated with the operation of the Hotel may also act as an attractant to biting insects.

The potential human health issues associated with biting insects on site include:

- unbearable nuisance caused by biting insects in very high numbers;
- painful bites, intense itching, infection and scarring (following scratching); and
- transmission of viruses.

Establishment of management protocols is essential in reducing the health risk and nuisance factors associated with biting insects for the Development.

7.6.6 Mitigation and Management

Mitigation measures outlined in **Table 7-41** will be implemented to reduce the risk of undesirable impacts on human health.

Table 7-41: Mitigation Measures for Human Health.

Pathway	Mitigation Measures
Exposure to environmental elements	<ul style="list-style-type: none"> Hotel personnel will be trained in the risks associated with climate exposure, the signs and symptoms of over-exposure to heat and its effects (e.g. dehydration) and what to do in case of an emergency. Hotel guests will be informed of the risks and mitigation strategies to avoid or minimise effects to human health. First-aid facilities will be equipped to provide at least an initial response to incidents of this type. Develop and implement a Cyclone Response Plan. Ensure buildings are designed and constructed in accordance with relevant building codes, with particular emphasis on cyclone ratings.
Animal Interactions	<ul style="list-style-type: none"> Awareness for Hotel guests on risks of animal interaction and avoidance measures to be implemented. First-aid facilities will be equipped to provide at least an initial response to incidents of this type, with Hotel personnel trained in first response procedures.
Biting Insects	<ul style="list-style-type: none"> Implement the Biting Insects Management Plan (BIMP) (Appendix 21)

7.6.7 Monitoring and Inspection

An effective monitoring and inspection regime can address biting insect control in the early stages, reducing the number of insects reaching the adult phase. Monitoring and inspection activities associated with biting insects are summarised in **Tables 7-42** and **7-43** and detailed in the BIMP.

Risks associated with environmental exposure and animal interactions will not increase as a result of the Development and, as such, no monitoring requirements are noted. Any instances of incident will, however, be recorded in the North One Incident Management System.

Table 7-42: Monitoring for Biting Insects

Issue	Monitoring	Timing
Biting Insects	<ul style="list-style-type: none"> Sampling of mosquito larvae to determine species present. Record in Biting Insects Register and report to the NT Medical Entomology Branch, where appropriate. 	Where infestations are detected.
	<ul style="list-style-type: none"> Maintain a Complaints Register/Incident Management System, which includes recording nuisance complaints from biting insects. 	As required.

Table 7-43: Inspections for Biting Insects

Issue	Inspections	Reporting
Biting Insects	<ul style="list-style-type: none"> Visual inspection of the site for pooled water and larvae, including erosion and sediment control structures, water features, the Lagoon, Little Mindil Creek, any other water holding structures, landscaped areas and newly created depressions or ponding (particularly in construction). 	Record in Biting Insects Register.

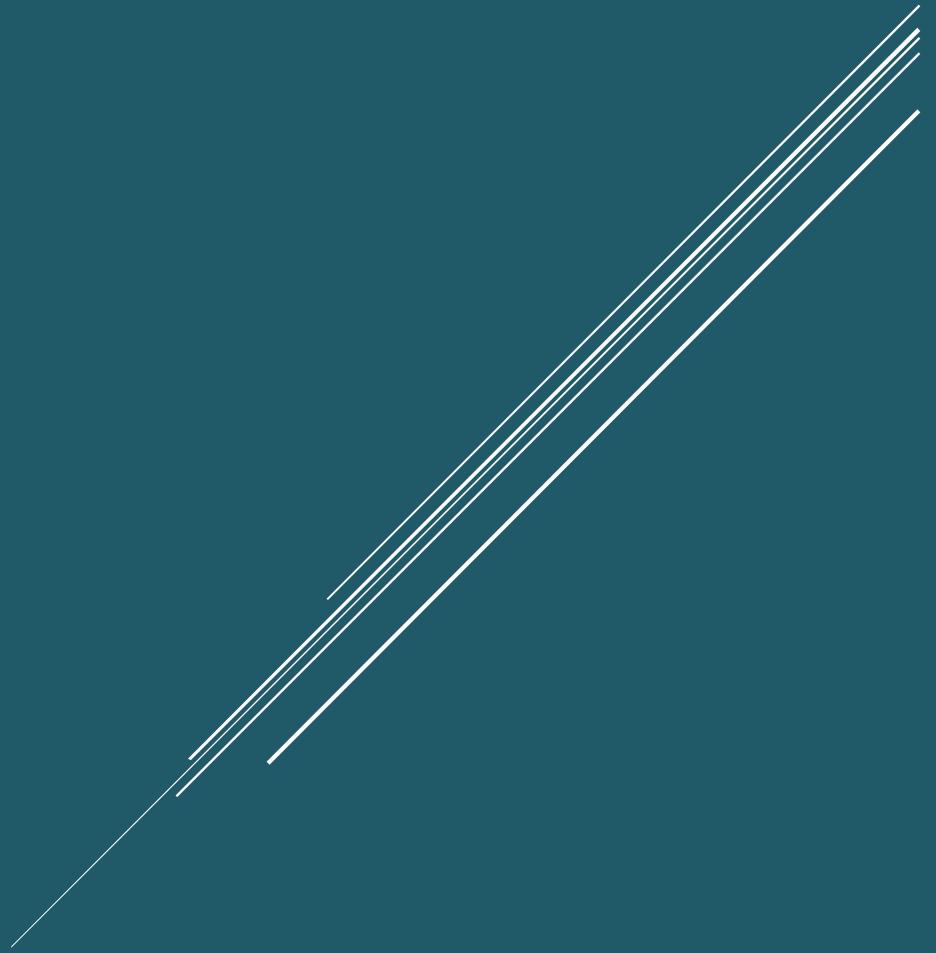
Issue	Inspections	Reporting
	<ul style="list-style-type: none"> Record instances of significant infestation and/or sickness due to biting insects. 	<p>Record in Biting Insects Register.</p> <p>Report to the NT Medical Entomology Branch, as required.</p>

7.6.8 Statement of Residual Impact

The risks to human health from exposure to environmental elements and animal interaction will not alter as a result of the proposed Development. As such, no residual impact is expected.

Biting insects are synonymous with the Australian landscape and well established management measures exist to control infestations and reduce human health impacts. Implementation of control measures established in the BIMP, as well as consideration of biting insect occurrences in the landscape design of the Development, will result in the risk being low.

KTT Investment consider that the NT EPA objective for Human Health will be achieved for the proposed Development and do not anticipate increased cumulative impacts as a result of the proposal.



NON-SIGNIFICANT ENVIRONMENTAL FACTORS

NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

8 NON-SIGNIFICANT ENVIRONMENTAL FACTORS

8.1 ENVIRONMENTAL FACTOR: TERRESTRIAL ECOSYSTEMS

8.1.1 NT EPA Objective

Terrestrial Ecosystems refers to significant or sensitive vegetation that provides important ecological functions, for local endemic, threatened, and migratory species. This may include, but is not limited to, existing conservation and management activities, the integrity of terrestrial ecosystems and the ecological services they provide, biological and functional diversity, provision of refuge, and food supply.

The NT EPA's objective for the factor of Terrestrial Ecosystems is to:

Protect terrestrial habitats to maintain environmental values including biodiversity, ecological integrity, and ecological functioning.

8.1.2 Technical Studies

Technical studies undertaken to inform assessment of potential impacts of the Development on Terrestrial Ecosystems are listed in **Table 8-1**.

Table 8-1: Technical studies informing Terrestrial Ecosystems

Date	Study Title	Consultant	Description	Report
February 2021	Little Mindil Desktop Biological Study.	APM	A desktop assessment of terrestrial fauna, vegetation and flora, for Parcel 7651.	Appendix 6

8.1.3 Key Policy and Guidelines

Relevant Policy and Guidelines include:

- *Environment Protection Act 2019*
- *Northern Territory Land Clearing Guidelines (2019)*
- *EPBC Significant Impact Guidelines (2000)*
- *NT EPA Guidelines for Assessment of Impacts on Terrestrial Biodiversity (2013)*
- *Weed Management Act 2001*

8.1.4 Existing Environment

8.1.4.1 General Site Description

Lot 7651 is a 5.13 ha disturbed site. It contains a grassed area maintained in a mowed condition, a bitumen carpark with some established garden plantings and concrete paths, totalling 3.31 ha (**Plate 8-1**). One sensitive area occurs within the Lot that correlates to a natural feature in the landscape, the escarpment to the south (0.88ha) (**Figure 8-1**). Little Mindil Creek on the north-eastern boundary is also a sensitive area however a PSA was approved on the 27th May 2021 to excise the Little Mindil Creek reserve from the site and rezone it from Zone TC to Zone PS.



Plate 8-1: General Site Photo

8.1.4.2 Sensitive Areas

Little Mindil Creek

Little Mindil Creek runs along the north-eastern boundary of the site. The Creek contains mangrove vegetation (**Plate 8-2**) and is tidally influenced. Riparian areas are identified as Sensitive and Significant vegetation under the NT Land Clearing Guidelines.

Escarpment

An escarpment runs along the southern boundary of the site, which is identified in the NT Register of Significant Trees as 'D Area 11: Gilruth Avenue Cliffs' (**Plate 8-3**). The description provided on the Register states:

This is a diverse group of trees. Some are native and of the original peninsula vegetation. Others have been planted by the Darwin City Council. While some have had their seeds brought into the area by visiting birds and animals. The trees help in cliff retention, provide shelter and forage for birds, small mammals and reptiles and is aesthetically pleasing to the users of this main road.

This vegetation has elements that are reflective of the Monsoon Vine Thicket vegetation, which is considered Significant and Sensitive under the NT Land Clearing Guidelines.

The guidelines recommend these vegetation types are allocated a buffer where disturbance is excluded; however, the land adjacent to these vegetation types is defined as Completely Degraded (based on Western Australia EPA, 2016 criteria), hosting non-native grass and contains walking tracks, carparks, bridges, and infrastructure corridors.

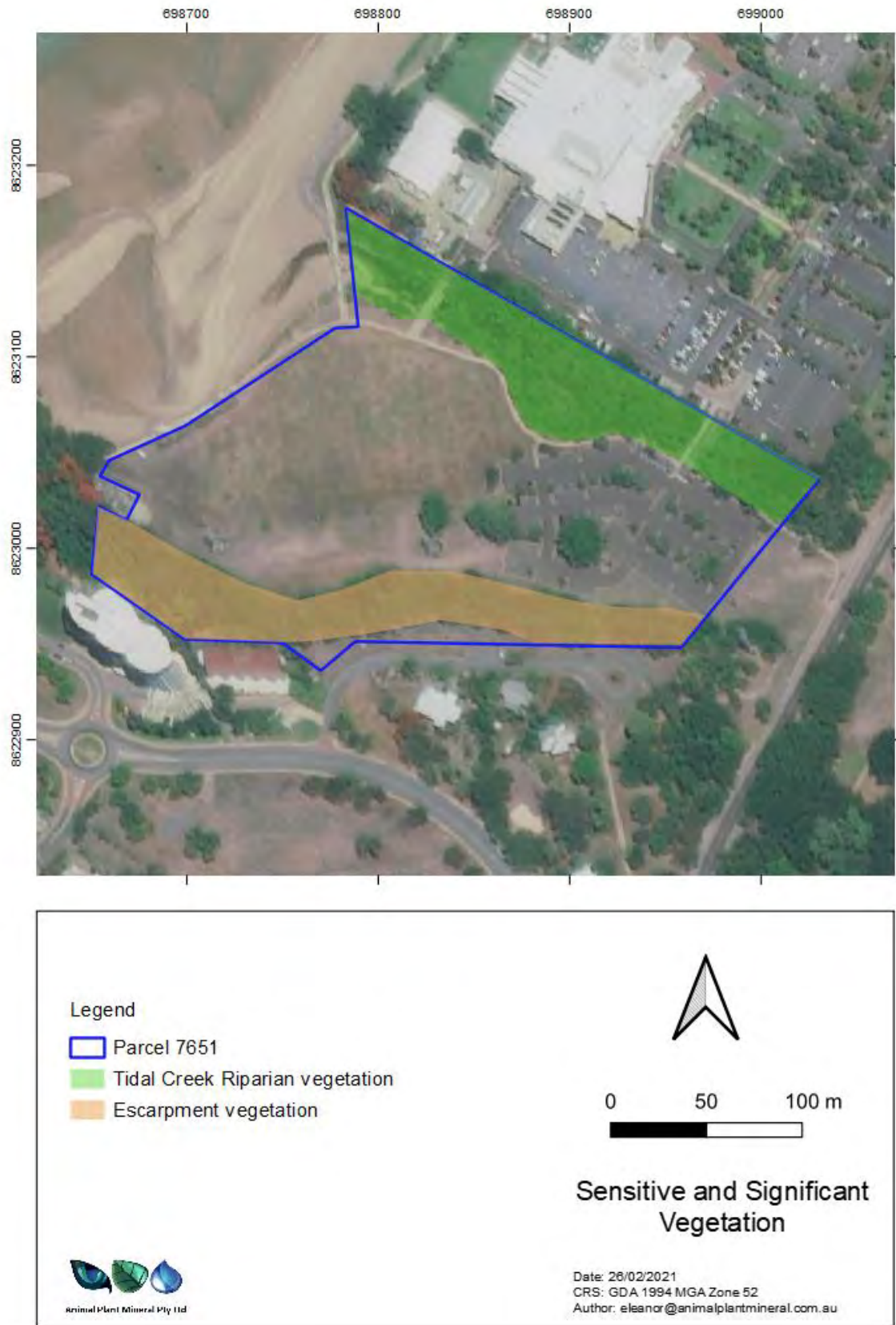





Figure 8-1: Sensitive and Significant Vegetation



Legend

-  Parcel 7651
-  Tidal Creek Riparian vegetation
-  Escarpment vegetation

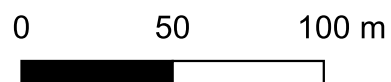


Figure 8 1: Sensitive and Significant Vegetation

Sensitive and Significant Vegetation



Date: 26/02/2021
 CRS: GDA 1994 MGA Zone 52
 Author: eleanor@animalplantmineral.com.au



Plate 8-2: Riparian Vegetation of Mindil Creek



Plate 8-3: Vegetation Along the Escarpment

8.1.4.3 Critical Habitats and Threatened Ecological Communities

There are no Critical Habitats listed under the *Territory Parks and Wildlife Conservation Act 1976 (TPWC Act)* or Threatened Ecological Communities listed under the *Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act)* known to occur in Lot 7651. The expected vegetation does not conform to a vegetation type or group of vegetation types that resemble these listed habitats and communities.

8.1.4.4 Wetlands and Sites of Significance

Lot 7651 does not drain to any Wetlands of National or International Significance.

Darwin Harbour is a Site of Conservation Significance (SOCS) and is rated as being of International Significance. Lot 7651 is within the boundaries of the SOCS (**Figure 8-2**).

There are no sites of botanical significance recorded within Lot 7651.

8.1.4.5 Threatened Flora

No threatened flora listed under the EPBC Act are known to occur on or within 10 km of Lot 7651.

No threatened flora listed under the TPWC Act occur on Lot 7651, however, three listed threatened flora have been recorded within 10 km of Lot 7651. These are detailed in **Table 8-2** and the location of records shown in **Figure 8-3**.

Table 8-2: Threatened flora occurring within 10 km of Lot 7651

Species	Common name	Conservation Code	Year of record	Record locations
<i>Cycas armstrongii</i>	Darwin Cycad	Vulnerable	1963-2007	33 records in Charles Darwin National Park. One record in The Gardens Cemetery.
<i>Hibiscus brenanii</i>	Hibiscus	Vulnerable	2014-2019	Two records in the Botanic Gardens.
<i>Utricularia singeriana</i>	Bladderwort	Vulnerable	1889	One record in The Gardens Cemetery.

The likelihood of the Threatened flora listed above occurring within the Development site is assessed in **Table 8-3**.

Table 8-3: Threatened Flora for Lot 7651

Species	Habitat	Likelihood of occurrence
<i>Cycas armstrongii</i>	Occurs mainly in Eucalyptus woodland on yellow and red earths but avoids areas of poor drainage.	Low. No suitable habitat.
<i>Hibiscus brenanii</i>	Found in shrubland with Acacia and Grevillea, on sandy soil associated with sandstone slopes, and among outcrops. Restricted to a few square kilometres on the Mt Brockman outlier in Kakadu National Park.	Low. Nearby records likely planted.
<i>Utricularia singeriana</i>	Occurs along the margins of freshwater drainage flats among sparse mixed grasses and sedges.	Low. No suitable habitat.

There are no records of Near Threatened or Data Deficient flora existing within Lot 7651.



Legend



-  Parcel 7651 boundary
-  Darwin Harbour Site of Conservation Significance

Figure 8 2: Darwin Harbour Site of Conservation Significance



0 2.5 5 km



Darwin Harbour
Site of
Conservation
Significance



Animal Plant Mineral Pty Ltd

Date: 26/02/2021
 CRS: GDA 1994 MGA Zone 52
 Author: eleanor@animalplantmineral.com.au



Figure 8 3: Threatened Flora within 10km of Lot 7651

Legend

TPWC Act Threatened flora

- *Cycas armstrongii*
- *Hibiscus brennanii*
- ★ *Utricularia singeriana*

Parcel 7651 boundary



0 750 1500 m



Threatened Flora
within 10 km of
Parcel 7651



Animal Plant Mineral Pty Ltd

Date: 28/02/2021

CRS: GDA 1994 MGA Zone 52

Author: eleanor@animalplantmineral.com.au

8.1.4.6 Introduced Flora

No weeds declared under the *Weeds Management Act*, Weeds of National Significance or listed as a Key Threatening Process are known to occur in or immediately adjacent Lot 7651.

Two subspecies of the weed species *Leucaena leucocephala* (subsp. *leucocephala* and *glabrata*) have been recorded in Lot 7651 in 2010 and 2003, respectively. There are no Statutory Weed Management Plans for these subspecies, and they have no legislated control category in the NT.

No additional weeds were identified in the area from the Protected Matters Search Tool (**PMST**), an interactive map device which displays the known spatial distribution of threatened species and communities listed under the Act, available on the Department of Agriculture, Water, and the Environment (**DAWE**) website.

8.1.4.7 Threatened Fauna

APM was commissioned to undertake a desktop fauna assessment of Lot 7651. Fifteen records for Threatened Fauna were identified on the NT Fauna Atlas. Record notes were examined and those incorrectly spatially assigned were removed. Remaining records are listed in **Table 8-4**.

Table 8-4: Threatened Fauna Records within Lot 7651

Species	Common Name	Conservation Code		Record notes
		TPWC Act	EPBC Act	
<i>Calidris canutus</i>	Red Knot	VU	EN	1 Historic Bird Atlas records. No dates or notes.
<i>Charadrius leschenaultii</i>	Greater Sand Plover	VU	VU	2 Historic Bird Atlas records. No dates or notes.
<i>Charadrius mongolus</i>	Lesser Sand Plover	VU	EN	1 Historic Bird Atlas records. No dates or notes.
<i>Erythrura gouldiae</i>	Gouldian Finch	VU	EN	A museums Victoria record – record location states Port Darwin.
<i>Limosa lapponica</i>	Bar-tailed Godwit	VU	CR - subspecies <i>L.l.menzbieri</i> VU - <i>L.l.baueri</i>	1 Historic Bird Atlas record. No dates or notes.
<i>Mesembriomys gouldii gouldii</i>	Black-footed Tree-rat	VU	EN	Location note Darwin. Museum and Art Gallery of the Northern Territory Mammal Collection
<i>Numenius madagascariensis</i>	Far Eastern Curlew	VU	CR	An eBird Australia record with location stated as The Gardens, record date 2015-12-06 plus 3 Historic Bird Atlas records. No dates or notes.
<i>Tyto novaehollandiae kimberli</i>	Masked Owl	VU	VU	Museums Victoria Ornithology collection. Record location Port Darwin

* VU = Vulnerable; EN = Endangered; CR = Critically Endangered

The lack of detail in the records suggests they are historic and unlikely to have been recorded with spatial accuracy high enough to be certain the record occurred within the Lot. The exception is the eBird Australia record for Far Eastern Curlew, which is likely to have been recorded with a higher level of accuracy.

In the adjacent properties there are three records from the Casino site, all prior to 1967, and 46 records from the Golf Course, all prior to 2005 and predominantly prior to the Golf Course being built in 1974. Modern records

include Curlew Sandpiper, Lesser Sand Plover, Far Eastern Curlew and Bar-tailed Godwit from a survey in December 2004 and one record for Yellow Spotted Monitor in 2005.

As records are generally historic and of dubious spatial accuracy, the value of Lot 7651 as threatened fauna habitat is more suitably assessed through a likelihood of occurrence assessment. The Threatened fauna species returned from the NT Fauna Atlas and the PMST were assessed for likelihood of occurrence in Lot 7651 based upon the habitats likely to be present. **Table 8-5** lists the species with a high likelihood of occurrence and discusses the likely nature of the occurrence.

Table 8-5: Conservation significant fauna with a High likelihood of occurrence in or near Lot 7651

Common Name	Cons. Code		Nature of Occurrence
	EPBC Act	TPWC Act	
Suitable Habitat within Lot 7651			
Lesser Sand Plover	EN	VU	A known visitor to the coastal waters surrounding Darwin and likely to use the sandflats adjacent Little Mindil Beach for foraging at low tides and possibly the beach for roosting. Possibly uses the tidal creek and mangrove vegetation in Lot 7651 during high tides, and likely to use the adjacent beach, sandspit and intertidal zone periodically in low numbers. No breeding habitat as breeding occurs in the northern hemisphere.
Bar-tailed Godwit*	VU/ CR	VU	A known visitor to the coastal waters surrounding Darwin and likely to use the sandflats adjacent Little Mindil Beach for foraging at low tides and possibly the beach for roosting. Possibly uses the tidal creek and mangrove vegetation in Lot 7651 during high tides, and likely to use the adjacent beach, sandspit and intertidal zone periodically in low numbers. No breeding habitat as breeding occurs in the northern hemisphere.
Far Eastern Curlew	CR	VU	A known visitor to the coastal waters surrounding Darwin and likely to use the sandflats adjacent Little Mindil Beach for foraging at low tides. Possibly uses the tidal creek and mangrove vegetation in Lot 7651 during high tides, and likely to use the adjacent beach, sandspit and intertidal zone periodically in low numbers. No breeding habitat as breeding occurs in the northern hemisphere.
Yellow-spotted Monitor	-	VU	The species has broad habitat suitability and is likely an infrequent visitor to Lot 7651 and the surrounding beaches, escarpment, Golf Course and Botanic Gardens.
Suitable Habitat near Lot 7651			
Red Knot	EN	VU	A known visitor to the coastal waters surrounding Darwin and likely to use the sandflats adjacent Little Mindil Beach for foraging at low tides and possibly the beach for roosting. Unlikely to use the land in Lot 7651 as habitat is not suitable, but likely to use the adjacent beach and intertidal zone periodically in low numbers. No breeding habitat.
Curlew Sandpiper	CR	VU	A known visitor to the coastal waters surrounding Darwin and likely to use the sandflats adjacent Little Mindil Beach for foraging at low tides and possibly the beach for roosting. Unlikely to use the land in Lot 7651 as habitat is not suitable, but likely to use the adjacent beach and intertidal zone periodically in low numbers. No breeding habitat.
Great Knot	CR	VU	A known visitor to the coastal waters surrounding Darwin and likely to use the sandflats adjacent Little Mindil Beach for foraging at low tides and possibly the beach for roosting. Unlikely to use the land in Lot 7651 as habitat is not suitable, but likely to use the adjacent beach and intertidal zone periodically in low numbers. No breeding habitat.
Greater Sand Plover	VU	VU	A known visitor to the coastal waters surrounding Darwin and likely to use the sandflats adjacent Little Mindil Beach for foraging at low tides and possibly the beach for roosting. Unlikely to use the land in Lot 7651 as habitat is not suitable, but likely to use adjacent beach, sandspit and intertidal zone periodically in low numbers. No breeding habitat.

* EPBC Act recognises 2 subspecies.

8.1.4.8 Important Fauna Sites - Migratory Shorebird Habitat

No congregations, large populations or important sites for migratory fauna listed under the EPBC Act are found in or adjacent to Lot 7651.

The important sites for migratory shorebirds of the greater Darwin area, are shown in **Figure 8-4**. The proposed Development site is not identified as one of these sites.



Figure 8-4: Locations of significant sites for migratory shorebirds in the Greater Darwin area

8.1.4.9 Seagrass beds

Seagrass beds are known to occur in coastal waters off Casuarina beach between Lee Point and Rapid Creek, up to around 2.5 km offshore (INPEX 2009 chapter 7 reported as N. Smit, Marine Biodiversity Group, NRETAS, pers.comm. July 2009). These areas are 15 km from the Development site.

8.1.4.10 Introduced Fauna

Asian house gecko (*Hemidactylus frenatus*), black rat (*Rattus rattus*), cane toad (*Rhinella marina*), cat (*Felis catus*), House Sparrow (*Passer domesticus*) Eurasian Tree Sparrow (*Passer montanus*), Flower Pot Blind Snake (*Indotyphlops braminus*), House Mouse (*Mus musticus*) and Rock Dove (*Columba livia*) are commonly recorded introduced fauna in Darwin. The pig (*Sus scrofa*) is common in the outlying rural areas but infrequently recorded in the urban areas.

In addition to these introduced fauna, the PMST lists the Water Buffalo (*Bubalus bubalis*) and Horse (*Equus caballus*) as possibly occurring in the area, however due to the urban setting this is unlikely. The domestic dog (*Canis familiaris*) is also listed and is likely to occur as both domestic and wild individuals.

8.1.5 Potential Impacts and Risks

The Development site is largely void of vegetation; however, the building envelope occurs adjacent to Sensitive and Significant Vegetation where there is a likelihood of Threatened Fauna utilising habitats within this vegetation. As such, a number of potential impacts may arise from construction and operation of the Development, as described in **Table 8-6**.

Table 8-6: Potential Impact Pathway for Terrestrial Ecosystems

Source	Pathway	Receptor
Construction and operational activities.	Unauthorised clearing of Sensitive and Significant vegetation.	Sensitive and Significant Vegetation along Little Mindil Creek or the escarpment
	Human Disturbance	
	Vehicle Strike	
	Introduced Species	Threatened Fauna, such migratory shorebirds or Yellow Spotted Monitor
	Noise and Light	
	Marine Debris	
	Erosion and Sediment Impacts	

8.1.5.1 Unauthorised clearing of Sensitive and Significant Vegetation

No vegetation clearing is proposed to occur in the sensitive and significant vegetation or in habitats suitable for the threatened and migratory shorebirds or Yellow Spotted Monitor. Given the proximity of the Development envelope to these vegetation corridors, management strategies will be required to ensure unauthorised clearing does not occur.

The risk of clearing of significant vegetation or habitats is considered low.

8.1.5.2 Human Disturbance

Human disturbance can cause shorebirds to interrupt their feeding or roosting and may influence the area of otherwise suitable feeding habitat that is actually used. The existing level of human disturbance at Little Mindil is high. The current land use is as an overflow carpark for the Casino and for passive recreational activity by local residents and visitors to the area. The site is permitted as a dog exercise area and is a major access to the Mindil Beach for pedestrian and cyclist traffic.

Human disturbance will increase from high baseline levels through both the construction and operations phases of the Project. Increased human activity in the construction phase will be concentrated within Lot 7651 or in nearby areas where infrastructure (such as supply of services) is required to support the Project.

During operations, an increase in human disturbance will occur within Lot 7651 as capacity rates of the supplied accommodation are filled and in adjoining areas as guests to the accommodation use the Little Mindil and Mindil Beach environments.

The impact is expected to be localised in scale, low intensity and medium term. It is unlikely to cause significant additional impact in addition to the high level of pre-existing human disturbance.

8.1.5.3 Vehicle Strike

The Development will increase the vehicle traffic in the locality during both the construction and operations phases. This increases the possibility of vehicle strike for fauna that may occur in the traffic areas. This is limited to the Yellow Spotted Monitor, as shorebirds generally remain in the non-traffic areas and fly between destinations.

The impact is expected to be localised in scale and medium term. Vehicle strike in this urban setting is expected to be rare.

8.1.5.4 Introduced Species

There is a risk that the construction and operations phases of the Development will increase the presence, diversity and abundance of introduced fauna. Due to the urban setting, there is a high likelihood that introduced fauna are already present within the Development site.

The generation of putrescible waste is a common attractant to introduced fauna, both domestic and feral, that scavenge the waste or prey upon those that scavenge. Migratory shorebirds are susceptible to impacts from predation and can incur a high energy burden in the avoidance of predators (Lilleyman *et al* 2020a).

The provision of shallow seasonal water can provide breeding habitat to Cane Toads, a known threatening process for Yellow Spotted Monitor.

The impact is expected to be limited in scale and very low in intensity. It is unlikely to cause significant impact in addition to the high level of introduced species already present.

8.1.5.5 Noise and Light

There is little research available on the impacts of noise and light to fauna locally, nationally or internationally. Baseline noise and light in the locality is relatively high due to the highly urbanised setting. Project noise impacts are likely to be highest during construction but limited in scale and short in duration. Noise and light impacts during operations are likely to be limited to Lot 7651 and very low in intensity. It is unlikely to cause significant

additional impact in addition to the high level of noise and light already present in this highly urbanised environment.

8.1.5.6 Marine Debris

Marine debris pose a threat to threatened and migratory shorebirds through entanglement and ingestion (CoA 2016). The construction phase has the potential to increase marine debris through the production of industrial waste and domestic waste generated by construction workers. Through the operational phase the Development poses a risk of increasing marine debris through the generation of domestic waste both within the site and from guests visiting the beach environments at Little Mindil and Mindil Beach and inappropriately disposing waste.

The generation of marine debris would be exacerbated under a storm surge scenario. A Stormwater Management Plan has been prepared for the Development in which all relevant standards and guidelines are addressed and includes provision of control structures to capture litter in stormwater infrastructure, preventing it from entering the marine environment.

The impact is possible to occur, at which time it would be expected to be localised, of low intensity and medium term.

8.1.5.7 Erosion and Sediment Control

Potential impacts from increases in surface runoff are scour from runoff velocity, terrestrial erosion, smothering of aquatic flora and fauna and loss of aquatic habitat. Without mitigation, the risk of stormwater leading to sedimentation of surface water that enters the tidal creek is increased.

The generation of suspended sediments would be exacerbated under a storm surge scenario occurring during the construction phase.

Erosion and sediment control is addressed in **Section 7.3** (Inland Water Environmental Quality).

8.1.6 Mitigation and Management

Mitigation measures outlined in **Table 8-7** will be implemented to reduce the risk of undesirable impacts on Terrestrial Ecosystems.

Table 8-7: Mitigation Measures for Terrestrial Ecosystems

Pathway	Mitigation Measures
Unauthorised Vegetation Clearing	<ul style="list-style-type: none"> Physically define disturbance footprint prior to commencement of construction activities, to ensure unauthorised clearing does not occur. Incorporate detail on the importance of Sensitive and Significant Vegetation within site induction and awareness training.
Human Disturbance	<ul style="list-style-type: none"> Awareness for Hotel guests on the environmental values of the surrounding area, including the importance of reducing human disturbance wherever possible on significant vegetation or fauna species.
Vehicle Strike	<ul style="list-style-type: none"> Implement vehicle speed limits within the Hotel Complex to reduce risks of fauna strike. Record fauna impacts from vehicle strike in the Incident Management System.
Introduced Species	<ul style="list-style-type: none"> Ensure any vehicles or equipment are free of weeds prior to commencement of work on the site. During both construction and operations, implement a weed control program to manage infestations.

Pathway	Mitigation Measures
	<ul style="list-style-type: none"> Regular maintenance of landscaped areas to ensure planted species do not become invasive and impact the ecology of the adjacent Sensitive and Significant Vegetation.
Noise and Light	<ul style="list-style-type: none"> Implement noise strategies described in Section 7-4. Consider lighting options in the final design stage, to discourage attraction of fauna species where possible.
Marine Debris	<ul style="list-style-type: none"> Implement the Waste Management Plan (Appendix 13) to reduce waste generation and inappropriate disposal Awareness for Hotel guests on the environmental values of the surrounding area and the importance of appropriate waste disposal, to ensure marine debris impacting on terrestrial ecosystems and the adjacent aquatic environment.
Erosion and Sediment Control	<ul style="list-style-type: none"> Refer to Section 7.3

8.1.7 Monitoring and Inspection

No formalised monitoring programs are required for Terrestrial Ecosystems, although photographic monitoring points will be established to monitor escarpment and creek vegetation health.

Inspection regimes for management of Terrestrial Ecosystems are listed in **Table 8-8**.

Table 8-8: Inspections for Terrestrial Ecosystems

Issue	Monitoring / Inspections	Reporting
Weed Infestations	<ul style="list-style-type: none"> Inspection of Hotel grounds, Little Mindil Creek and the escarpment vegetation for infestations of weed species. Implement control measures as required, in accordance with the <i>NT Code of Practice for Handling Pesticides</i>. 	Monthly Environmental Performance Report
Marine Debris	<ul style="list-style-type: none"> Weekly inspection of Hotel grounds and Little Mindil Creek for presence of litter. 	Monthly Environmental Performance Report
Erosion and Sediment Control	<ul style="list-style-type: none"> Refer to Section 7.3. 	-

8.1.8 Statement of Residual Impact

The North One Hotel and Apartment Development site is largely cleared and situated within a highly disturbed setting. As such, the impacts to Terrestrial Ecosystems on a regional and cumulative scale are negligible.

At a local scale, KTT Investment gained approval on the 27th May 2021 from DIPL for a PSA to excise Little Mindil Creek from the Lot, in order to preserve the environmental and social values of the creek, and have made commitments to preserve and maintain the escarpment vegetation. This, along with implementation of management strategies to reduce impacts from human disturbance, vehicle strikes, erosion and sedimentation, weed infestation, noise and light and waste generation, results in the Development's impact on Terrestrial Ecosystems being considered negligible.

The NT EPA objective for the Terrestrial Ecosystems Factor will be achieved for the North One Development.

8.2 ENVIRONMENTAL FACTOR: ATMOSPHERIC PROCESSES

The NT EPA's objective for the environmental factor Atmospheric Processes is to:

Minimise greenhouse gas emissions so as to contribute to the NT government's goal of achieving net zero greenhouse gas emissions by 2050.

8.2.1 Technical Studies

Technical studies undertaken to inform assessment of potential impacts of the development on Atmospheric Processes are listed in **Table 8-9**.

Table 8-9: Technical studies informing Atmospheric Processes

Date	Study Title	Consultant	Description	Report
June 2021	North One Hotel and Apartments GHG Emissions Assessment	WSP	A high-level greenhouse gas (GHG) emissions estimate for the operation of the proposed North One Hotel and Apartments development.	Appendix 22

8.2.2 Key Policies and Guidelines

Relevant Policies and Guidelines include:

- *Environment Protection Act 2019*
- *National Greenhouse and Energy Reporting (NGER) Scheme*
- *Northern Territory Climate Change Response: Towards 2050 (2020)*

8.2.3 Existing Environment

In July 2020, the NT Government released the *Northern Territory Climate Change Response: Towards 2050* framework document, with a target of net zero emissions by 2050. This long-term objective sets expectations about future emissions constraints and aligns the NT with all other States and Territories across Australia. The NT Government has stated an objective to transition the Territory's economy to a low carbon economy. This objective is reflected in the *Climate Change Response: Towards 2050* document, which indicates to industry that the Territory expects all reasonable and practical steps to be taken when designing and implementing projects, to ensure GHG emissions are kept as low as reasonably possible.

8.2.4 Potential Impacts and Risks

The North One Development has the potential to contribute to the emission of GHGs through the operation of the Hotel and associated facilities; however, the proposal is deemed not to have a significant impact on Atmospheric Processes. Potential pathways for key impacts to Atmospheric Processes applicable to the Development are indicated in **Table 8-10**.

Table 8-10: Potential Pathways for Impact on Atmospheric Processes

Source	Pathway	Receptor
Construction and Operational Activities	Greenhouse gases such as carbon dioxide, methane and nitrous oxide released to the atmosphere as a result of an activity on site e.g. LPG for cooking, refrigerants, petrol/diesel combustion and use of grid electricity.	Atmospheric Processes

8.2.5 Greenhouse Gas Emissions

Table 8-11 identifies the potential sources of GHG emissions and provides preliminary GHG emission estimates for the proposed North One development during the operational phase. The results are presented in tonnes of carbon dioxide equivalent (**tCO₂e**) per year which encompasses emissions of carbon dioxide, methane and nitrous oxide. Greenhouse gas emissions have not been quantified for the construction phase of the Project due to the short term nature of this phase; however, management strategies that reduce and minimise emissions during construction will be implemented.

Table 8-11. Estimated Annual GHG Emissions and Percentage Breakdown for the Development.

Emissions Source	Energy Source	tCO ₂ e/year	%
Heating Ventilation and Air Conditioning (HVAC)	Electrical	815	37
Electrical equipment (e.g. computers, servers etc.)	Electrical	326	15
Lighting	Electrical	255	12
Lifts	Electrical	204	9
Cooking	LPG	175	8
Domestic hot water (DHW)	Electrical	110	5
Maintenance activities (e.g. gardening, cleaning etc.)	Electrical/diesel/petrol	110	5
Miscellaneous recreational activities	Electrical/diesel/petrol	110	5
Pumps (e.g. irrigation and lagoon pumps)	Electrical	44	2
Refrigerants	N/A	22	1
Waste management equipment (e.g. compactors)	Electrical	22	1
TOTAL		2,193	100
Proportion of NT's annual emissions		0.01%	
Proportion of Australia's annual emissions		0.0004%	

Based on the current design and operating assumptions of the Development, direct GHG emissions will equate to approximately 2,193 **tCO₂e** per year. The calculated increase in emissions due to the operation of the North One Development represents an increase of approximately 0.01% to the NT's annual emissions, and a 0.0004% increase in the overall Australian emissions. Therefore, the proposal is deemed not to have a significant impact on the NT's Atmospheric Processes.

8.2.6 Mitigation and Management

Mitigation measures to be considered to reduce emissions from construction and operational activities and minimise the impact on Atmospheric Processes are outlined in **Table 8-12**. As shown in **Table 8-11**, the emissions sources that contribute to the highest proportion of total annual emissions during operations are HVAC, equipment, lighting, cooking and lifts. These emissions sources should, therefore, be the focus of any emissions reduction measures.

Table 8-12: Mitigation Measures for Atmospheric Processes

Pathway	Mitigation Hierarchy	Mitigation Measures
Greenhouse gas emissions from construction and operational activities	Minimise	<p><u>Project Wide</u></p> <ul style="list-style-type: none"> Implementation of a comprehensive commissioning and tuning program following construction to ensure building systems are operating efficiently and as designed. Investigate options for solar PV on the Level 6 roof (or elsewhere depending on design development). The system capacity will depend on the extent of the green roof across the development and available space for solar. All-electric services and equipment – designing and operating the Development with all electric services and equipment (i.e. no fossil fuels combusted onsite) allows for purchase of renewable energy to supply electricity. Adopt a commitment to certify or benchmark the project against a third-party ratings scheme such as Green Star or NABERS for Hotels. <p><u>HVAC</u></p> <ul style="list-style-type: none"> Installation ceiling fans in hotel rooms and other spaces throughout the resort to reduce reliance on air conditioning systems. Ceiling fans also improve occupant comfort by promoting air flow. Smart controls on air conditioning systems to allow for remote control of systems, temperature limiting and automatic shutdown depending on occupancy. Optimisation of passive measures at the detailed design stage such as natural ventilation strategies, natural cooling, thermal mass, improved insulation, window orientation and shading strategy Implementing equipment with natural refrigerants with low global warming potential and/or the use of refrigerant leak detection systems <p><u>Equipment</u></p> <ul style="list-style-type: none"> Specification and procurement of efficient equipment. For example, procure TVs / computers within one energy rating star of best available as per the Australian government's energy rating system. <p><u>Lighting</u></p> <ul style="list-style-type: none"> Installation of efficient LED lighting throughout the development Smart lighting systems such as PE sensors, timers and remote-control capability <p><u>Lifts</u></p> <ul style="list-style-type: none"> Place stairs in prominent locations throughout the resort to promote use and reduce reliance on lifts. Automatic controls for lighting and air-conditioning within lift car. <p><u>Cooking</u></p> <ul style="list-style-type: none"> Consider switching to all electric cooking appliances to eliminate combustion of fossil fuels onsite and allow for purchase of renewable energy. <p><u>Construction</u></p> <ul style="list-style-type: none"> Plant and equipment, including vehicles and air conditioners, to be maintained to manufacturer's specifications to ensure efficiency in operation and reduce GHG contribution.

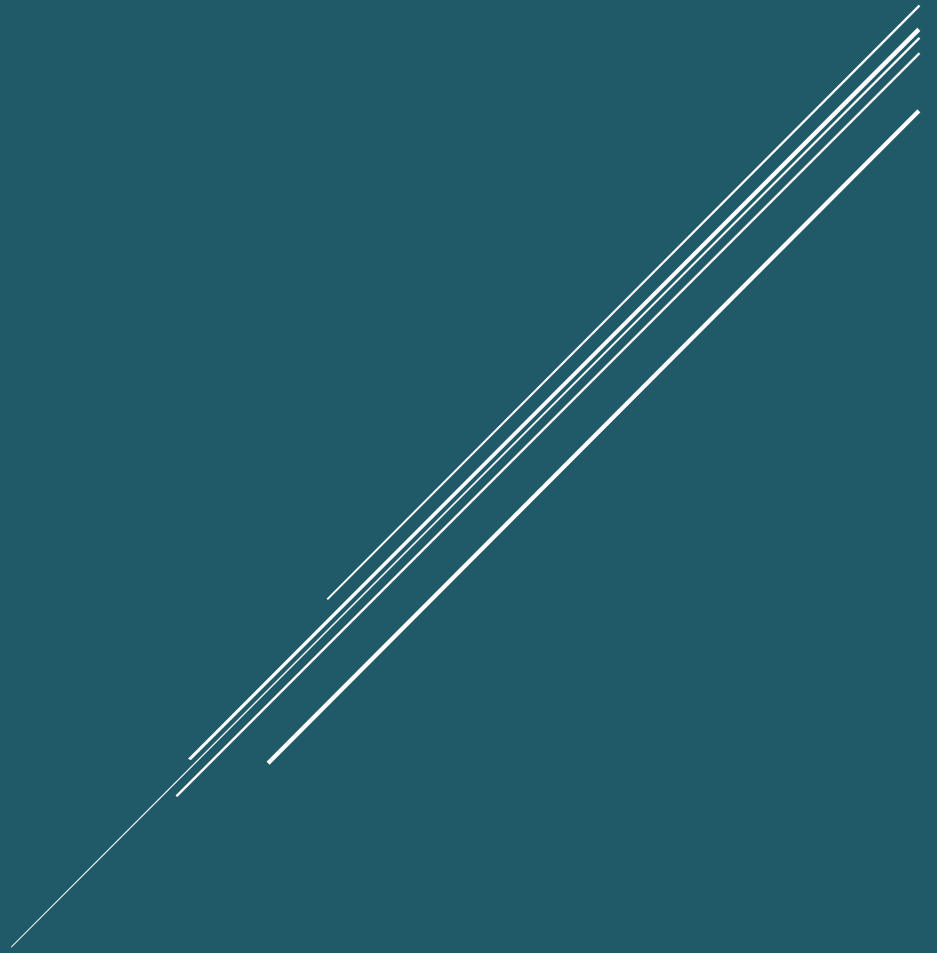
8.2.7 Monitoring and Reporting

Risks to Atmospheric Processes are not considered significant and, as such no specific monitoring or reporting plan is required. Despite this, an Energy Management System will be implemented once the Development is operational. The Energy Management System will allow for monitoring and control of building energy supply to identify areas to reduce unnecessary consumption. As part of the Energy Management System, annual energy consumption will be monitored and reported on to identify areas of energy wastes; recommendations will be made to increase energy efficiency.

Where threshold levels are triggered, reporting to the *National Pollutant Inventory* or through the *National Greenhouse and Energy Reporting Act 2007* will be undertaken.

8.2.8 Statement of Residual Impact

Development of the North One Hotel and Apartment Complex will result in a minor additional GHG contribution; however, the impact of the Development is deemed not to be a significant impact on the environmental factor Atmospheric Processes. Greenhouse gas emission reduction opportunities will be implemented, and alternative energy sources considered where feasible as the Project progresses, to reduce emissions and to contribute towards achieving the NT Government's goal of achieving net zero GHG emissions by 2050.



PRINCIPALS OF ENVIRONMENT PROTECTION AND MANAGEMENT

NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

9 PRINCIPLES OF ENVIRONMENTAL PROTECTION AND MANAGEMENT

The EP Act defines Ecologically Sustainable Development (**ESD**) as being:

Development that improves the quality of human life, both now and in the future, in a way that:

- a. Maintains the ecological processes on which all life depends; and*
- b. Recognises the need for development to be equitable between current and future generations*

The principles of ESD and a discussion how the proposed Development meets these principles is provided in **Table 9-1**.

Table 9-1: Principles of Ecologically Sustainable Development

Principle	Discussion
Decision Making Principle	
<p>Decision-making processes should effectively integrate both long-term and short-term environmental and equitable considerations.</p> <p>Decision-making processes should provide for community involvement in relation to decisions and actions that affect the community.</p>	<p>The risk assessment detailed in Appendix 4 has considered both the long term and short term nature of impacts. The risk assessment methodology incorporates the duration of impact into the assessment of the severity of consequence. Thus gives consideration to the long term and short term nature of impacts. This is effectively integrated into the decision making process as the risk level is tied to a mitigation response, identifying the appropriate level of corporate governance over which the impact must be managed.</p> <p>Stakeholder engagement has been recognised as fundamental to planning of the Development and, as such, a comprehensive engagement plan has been implemented to determine the potential areas of concern for individual stakeholders and ensure the Development remains current with social issues and expectations. KTT has engaged the services of Darwin-based stakeholder and community engagement consultant Redsplash to inform and consult with stakeholders. In total 42 people were consulted and feedback was recorded and taken on board.</p>
Precautionary Principle	
<p>If there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.</p> <p>Decision-making should be guided by:(a) a careful evaluation to avoid serious or irreversible damage to the environment wherever practicable; and (b) an assessment of the risk weighted consequences of various options.</p>	<p>The Environmental Risk Assessment has determined that the development of the Hotel will not have any significant impacts on the environmental factors described by the NT EPA (2020). The Risk Assessment was informed by technical studies undertaken by suitably qualified, experienced specialists and stakeholder engagement. The Risk Assessment details the application of mitigation measures, many of which have been successfully applied in similar projects.</p> <p>An alternatives section has been included in Section 2.6 of this referral. The section identifies where options have been decided against for the project as the consequences and/or risk was determined to be unfavourable.</p>
Principle of evidence-based decision-making	
<p>Decisions should be based on the best available evidence in the circumstances that is relevant and reliable.</p>	<p>The environmental impact assessment detailed in Sections 7 and 8 has been informed by detailed technical studies that have drawn on the best available information to identify the environmental values present in the Development site and to assess the potential for the Development to impact these values. The technical studies that were commissioned</p>

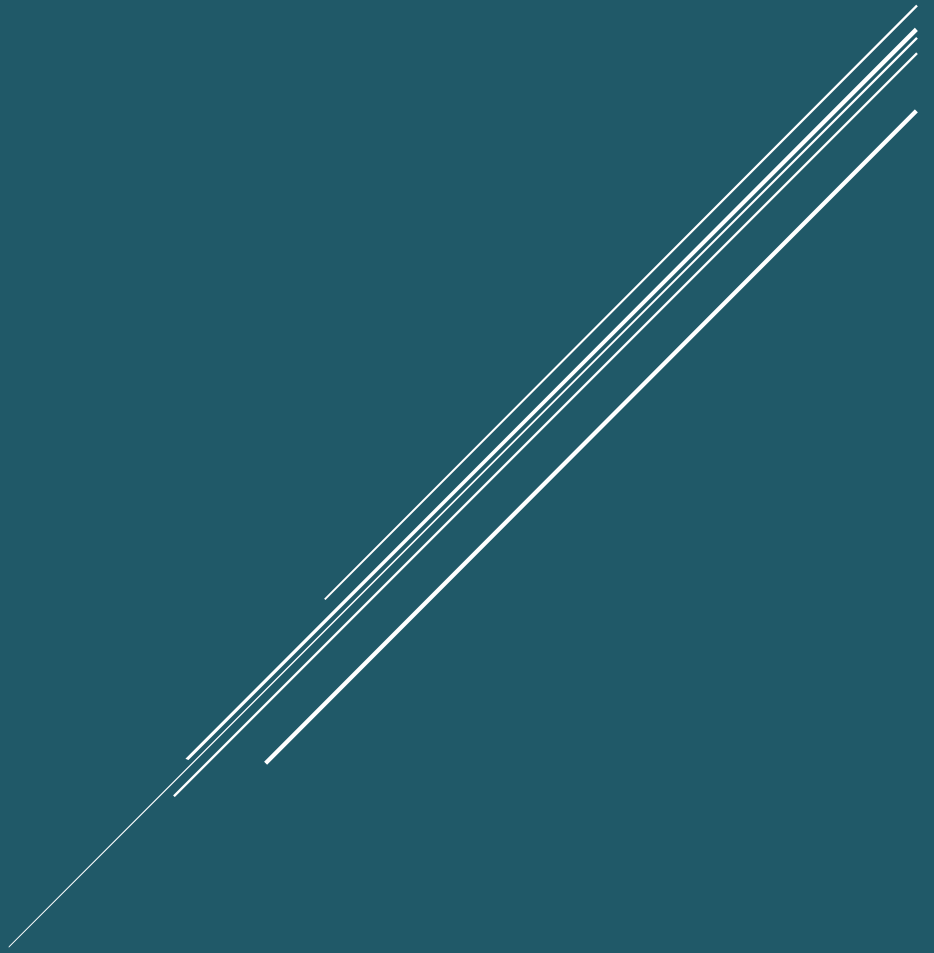
	by KTT Investment are listed under each environmental factor section in this Referral.
Principle of intergenerational and intragenerational equity	
The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of present and future generations.	<p>The Development of the Hotel meets the Principal of Intergenerational Equity by ensuring the health of environmental values, maintaining ecological functions for future generations, whilst minimising any impacts on the environment.</p> <p>Whilst the Development site is largely void of vegetation due to previous disturbances, two areas of Sensitive and Significant Vegetation are adjacent to the building envelope. These areas will not be disturbed as part of the Development and management and monitoring practices will be implemented to ensure they are preserved for future generations. Further management and mitigation measures for protection of other environmental factors for future generations are provided in the Risk Assessment.</p> <p>Development of the North One Complex will create a number of job opportunities for the people of Darwin. The construction phase of the Development is expected to generate approximately 350 direct or indirect jobs within the Darwin region and once operational, the Hotel will require 120 direct or indirect employees on an ongoing basis. It is also anticipated that a number of local businesses will benefit, and potentially expand, as a result of attraction of tourists to the region from the North One Development.</p>
Principle of sustainable use	
Natural resources should be used in a manner that is sustainable, prudent, rational, wise and appropriate.	Natural resources that will be used by the Development includes fresh water. The Development will also utilise fossil fuels to generate electricity to power the Complex. KTT will implement on-site wastewater recycling to reduce freshwater requirements, and in the longer term, solar and other sustainable power generation technology will be investigated to reduce the Development's reliance on fossil fuels.
Principle of conservation of biological diversity and ecological integrity	
Biological diversity and ecological integrity should be conserved and maintained.	<p>The Development site is largely void of vegetation; however, the building envelope occurs adjacent to Sensitive and Significant Vegetation, where there is a likelihood of Threatened Fauna utilising habitats within this vegetation. No vegetation clearing is proposed to occur in the Sensitive and Significant Vegetation or in habitats suitable for the threatened and migratory shorebirds or Yellow Spotted Monitor. Given the proximity of the Development envelope to these vegetation corridors, mitigation strategies will be implemented to ensure unauthorised clearing does not occur.</p> <p>In addition, KTT Investment were granted approval of a PSA on the 27th May 2021 to excise Little Mindil Creek from the Lot, in order to preserve the environmental and social values of the creek. Furthermore, KTT Investments have made commitments to preserve and maintain the escarpment vegetation. This, along with implementation of management strategies to reduce impacts from human disturbance, vehicle strikes, erosion and sedimentation, weed infestation, noise and light and waste generation, results in the Development's impact on biological and ecological diversity being considered negligible.</p>
Principle of improved valuation, pricing and incentive mechanisms	
Environmental factors should be included in the valuation of assets and services.	Environmental factors relevant to the Development have been considered as part of this Referral and the cost associated with the management of the environmental factors has been considered throughout the planning and design phase of the proposal.

<p>Persons who generates pollution and waste should bear the cost of containment, avoidance and abatement.</p> <p>Users of goods and services should pay prices based on the full life cycle costs of providing the goods and services, including costs relating to the use of natural resources and the ultimate disposal of wastes.</p> <p>Established environmental goals should be pursued in the most cost-effective way by establishing incentive structures, including market mechanisms, which enable persons best placed to maximise benefits or minimise costs to develop solutions and responses to environmental problems</p>	<p>KTT Investment Pty Ltd will be responsible for funding the cost of implementing mitigation and management measures to avoid, contain and decrease pollution and waste at the Hotel during both construction and operations. Waste streams associated with the Development are detailed in the Waste Management Plan (Appendix 13). This Plan also details management measure that will be implemented with a strong focus on the waste management hierarchy to minimise waste generation from the North One Development.</p> <p>The costs of services provided by the Development will incorporate the costs relating to the disposal and abatement of wastes.</p>
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10 CONCLUSION

The North One Hotel and Apartment Development will provide a prestigious waterfront accommodation and entertainment experience for tourists and the local Darwin community and will provide economic benefits to the Darwin and NT economies.

Assessment of the environmental impacts and risks potentially associated with the Development, and the identification of mitigating strategies to reduce impacts, has resulted in the North One Development being compatible with the NT EPA Objectives for all applicable environmental factors.



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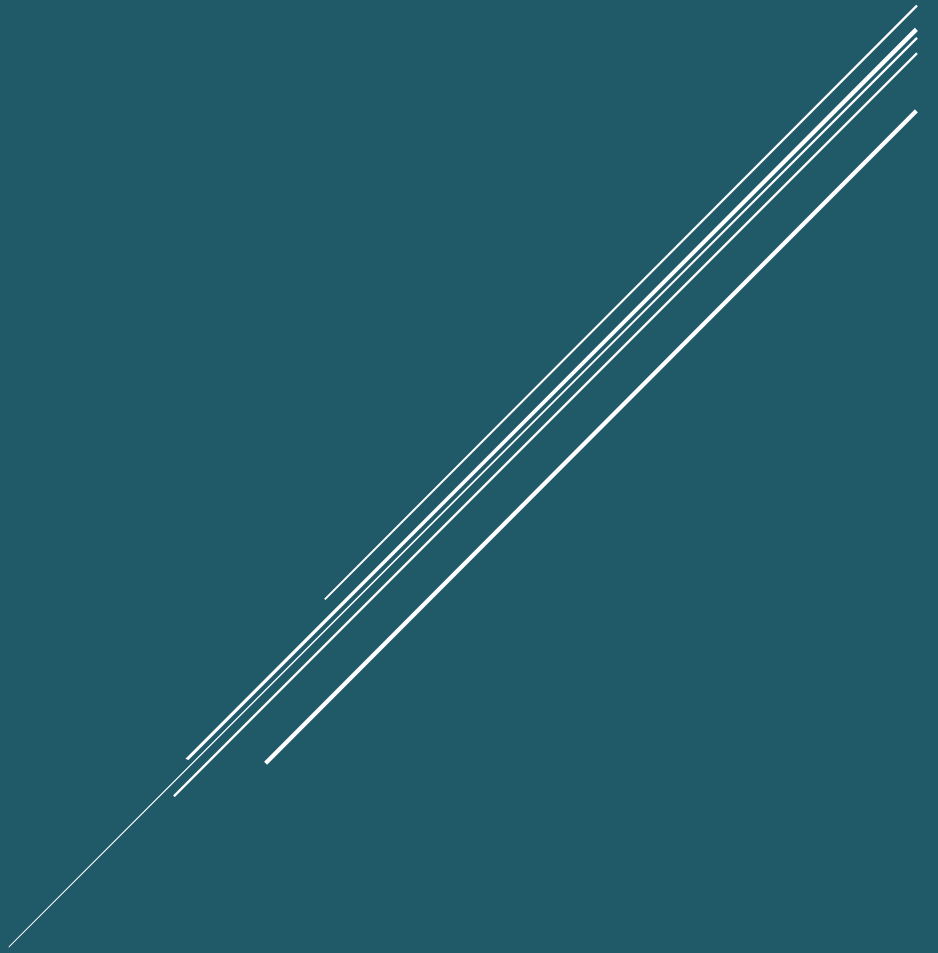
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APPENDICES

NORTH ONE HOTEL AND APARTMENT DEVELOPMENT

12 APPENDICES

(Provided as separate documents)